

ISSN 1812-9129

VOLUME 29 • NUMBER 2 • 2017

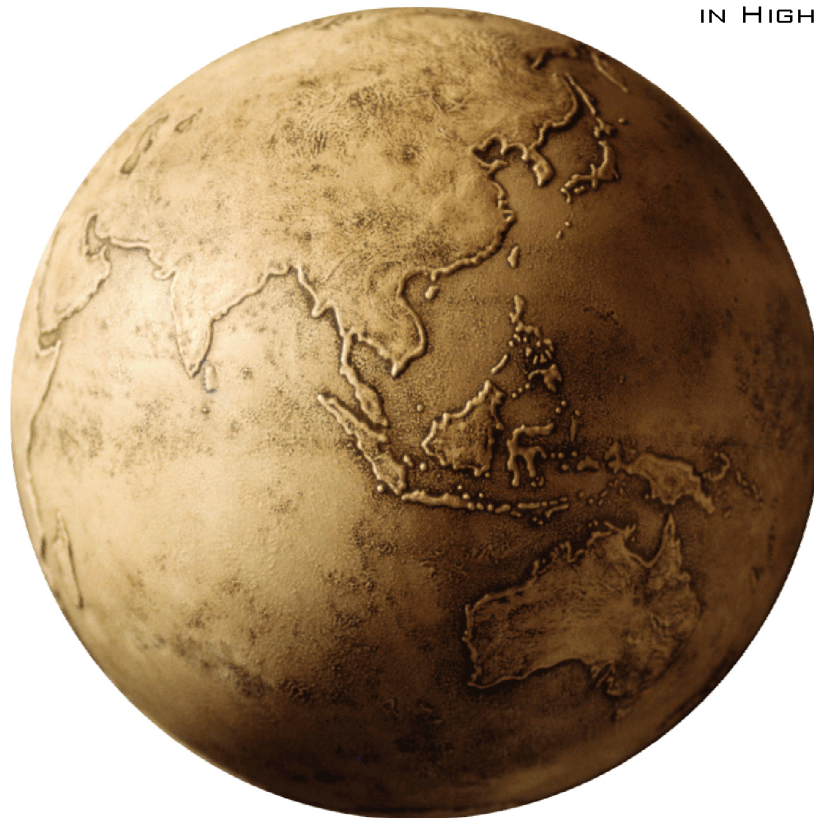
INTERNATIONAL JOURNAL OF

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# TEACHING & LEARNING

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IN HIGHER EDUCATION



The University of Georgia

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The International Journal of Teaching and Learning in Higher Education (ISSN 1812-9129) provides a forum for the dissemination of knowledge focused on the improvement of higher education across all content areas and delivery domains. The audience of the IJTLHE includes higher education faculty, staff, administrators, researchers, and students who are interested in improving post-secondary instruction. The IJTLHE is distributed electronically to maximize its availability to diverse academic populations, both nationally and internationally.

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### **Submissions**

The focus of the International Journal of Teaching and Learning in Higher Education is broad and includes all aspects of higher education pedagogy, but it focuses specifically on improving higher education pedagogy across all content areas, educational institutions, and levels of instructional expertise. Manuscripts submitted should be based on a

sound theoretical foundation and appeal to a wide higher education audience. Manuscripts of a theoretical, practical, or empirical nature are welcome and manuscripts that address innovative pedagogy are especially encouraged.

All submissions to IJTLHE must be made online through the Online Submission Form. In addition, all manuscripts should be submitted in English and in Microsoft Word format. The following Submission Guidelines pertain to all manuscript types, that is, Research Articles, Instructional Articles, and Review Articles. Ultimately, authors should follow the guidelines set forth in the most recent edition of the Publication Manual of the American Psychological Association (APA).

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### **Review Process**

Following a brief editorial review, each manuscript will be blind reviewed by two members of the Review Board. The review process will take approximately 90 days. At the end of the 90-day review process authors will be notified as to the status of their manuscripts - accept, revise and resubmit, or reject - and will receive substantive feedback from the reviewers. Manuscript authors are responsible for obtaining copyright permissions for any copyrighted materials included within manuscripts.

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## Capturing Student Perspectives Through a ‘Reggio’ Lens

Diane Boyd and Caroline Bath  
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This research considers the views and perspectives of a group of students on an Education Studies and Early Years course in an English university that took part in an arts project inspired by the philosophy and pedagogy of the Reggio Emilia preschools in Italy. This ethnographic study included semi-structured interviews and a questionnaire which provided further themes for discussion. The intention of the research was to explore why the students perceived this style of learning as so difficult in order to support future pedagogical development on the course. Findings suggest that there is more preparatory work needed before students can comfortably engage with this approach to study.

Education Studies programs in England, which are academic rather than combined with teacher education programs, are distinguished by their critical focus on pedagogical and structural issues as related to all phases of education and training. The Education Studies and Early Years degree program in this study, which is located in a Higher Education Institution (HEI) in the North West of England, specifically encompasses critical thinking in relation to early years practice and provision. As part of this critical approach, attention is paid to significant international and radical examples of preschool education, in particular that of the Reggio Emilia preschools in northern Italy. The study reported here emerged from the lecturers’ attempts to bring pedagogical approaches embedded in the Reggio Emilia preschools into the higher education arena in order to consolidate students’ experiential understanding of this model of education.

The “module” or short course of study, which formed the basis for the study accounts for 20 credits of the overall program and involves third-year students, who are in their final degree year, in a visit to a local museum in order to consider what sparks or provokes their imagination and curiosity. The specific museum has been chosen because it embraces the ideas of Reggio Emilia by providing an open plan space with areas for discussion and interaction, which itself was created with support from local children. During the students’ visit to the museum they are encouraged to work in a collaborative and open-ended way and understand how children think creatively and imaginatively. To lay the foundations of the project, the students are previously given an introduction to the history, philosophy, and pedagogy of Reggio Emilia, and they also go out into the community on short practice visits. Nevertheless, it was noted that every year since the module had been introduced in 2010, tensions linked to its freedom had emerged during the project work both between tutor and students and students themselves. Therefore, in 2014 this small scale exploratory research study was conducted in order to understand better the source of these tensions and to

find out what students were finding difficult about the module and why.

The type of tensions that were generated by the approach to the module suggested that the students resisted the idea of its pedagogic freedom. Indeed, they often stated that they would rather have “ten essays than this!” Thus, relevant to the findings that emerged from this reported exploration, the paper also considers areas such as students’ previous experiences in learning and the emotions associated with transition from school, with its more prescribed focus on targets, to the expected independent learning in higher education in England.

This study can be considered original in that it crosses the boundaries of early and higher education. To enable students to understand a pedagogic approach popular in early years education, it seems logical that their understanding will be heightened if they see it modeled by lecturers and experience it first-hand, albeit from the vantage point of young adulthood. There are few similar reported studies with higher education students despite the fact that Crosling, Nair, and Vaithilingam (2015) point out the importance for sustainable economic development of facilitating creativity and innovation through higher education.

Relevant research has been conducted into students and tutor experiences of group work in higher education, for example, Elliott and Reynolds’ (2014) study with international students which alludes to the notion of “learning shock” (Griffiths, Winstanley, & Gabriel, 2005) when students meet unfamiliar pedagogical approaches. However, our key point is that in this and other similar studies the creative philosophy of the Reggio preschools has not been directly drawn from, with the exception of Heyward (2010), who cites Reggio Emilia approaches as enabling students to face and deal with strong emotions in the midst of learning. Maynard and Chicken (2010) used approaches derived from Reggio Emilia preschools in their research with early years practitioners (rather than higher education students) and found that the practitioners were limited by their own preconceptions of prescribed outcomes. Nevertheless, whole-hearted immersion in Reggio

Emilia approaches, in order to achieve creative and collaborative ends in the realm of higher education makes this study of particular interest.

### **The Pedagogy of Reggio Emilia**

#### **Practicing “Child-Centered” Learning**

It is important to place the study reported here firmly in the philosophical context of the Reggio Emilia preschool project with its strong social cultural and theoretical aspects. The community of Reggio Emilia grew out of the devastation of the Second World War when the town was rebuilt through the Women’s Liberation Movement, embedding a strong foundation of social, community and moral responsibility. Cooperative movements provided the services, one of which one was the municipal preschools. These preschools embraced the idea that education is a shared experience between a democratic society and its citizens who want to take full responsibility for *all* children. One fundamental reason why “Reggio” is still seen as an enduring model of excellence is its “willingness to border cross” (Rinaldi, 2006, p. 4), as it continually draws on developing theories and concepts. This involves everyone within the community in having a commitment to the welfare of all children and working together with a shared responsibility and understanding. This participation encompasses shared meanings and recognition of the equal contribution that everyone brings with them, regardless of their history or culture, as a community of learners. Robin Alexander (2013) notes that the epistemology of a curriculum is central along with cultural and pedagogical understanding and “direct, hands-on local knowledge of the children being taught and the families and communities to which they belong” (p. 11). Another crucial aspect of the Reggio pedagogical experiment is the recognition of the importance of reflecting and experimenting with ideas, thus developing meanings and interpretations of practice: the “border crossing,” as noted by Rinaldi (2006) above.

#### **Providing a Social Constructivist Environment**

Hoyuelos (2013) suggests that Jean Piaget’s work was the initial inspiration of the Reggio Emilia founding Director Loris Malaguzzi. This meant that the child was seen as an investigator and explorer within the environment with the adult’s role being to facilitate and ensure the right conditions for learning. Malaguzzi was one of the first to “import” (Hoyuelos, 2013, p. 98) Piagetian influences into Italian settings, admiring his view of the constructivist child. However, Malaguzzi deconstructed aspects of Piaget’s theory and stressed the additional importance of the social, cultural, and

historical perspectives of the child. The adult’s role was not as a director or transmitter of knowledge, but as a co-researcher learning alongside the child. The adult and child therefore learned in a social-constructivist “process of meaning making in continuous encounters with others and the world ...as co-constructors of knowledge and culture” (Rinaldi, 2006, p. 6). These “continuous encounters” Malaguzzi calls “the concept of circuitry” (cited in Hoyuelos, 2013, p. 125), and he reminds adults of the importance of the “active relationship between one who learns and the one who teaches” (p. 125). Importantly, there are no children with “special needs” in Reggio, only recognition of difference as pedagogy of listening. By valuing difference, Reggio promotes rich values of participation, democracy, open ended learning, and emotional cognitive educational processes. This lies at the heart of Reggio: an awareness of reciprocal relationships. Children are encouraged to listen and negotiate with their peers in long-term projects. This develops a strong sense of self, as noted by Thornton and Brunton (2009) who observe that Reggio Emilia preschools value “different opinions, respecting the knowledge children already have, welcoming doubt and uncertainty, and developing children’s skills in asking questions of themselves and others” (p. 59). The child is viewed as a collaborator, a learner and researcher alongside the adult, and this enables a strong learning context to emerge. This also provides a powerful image of the Reggio child as a strong, confident, capable, and competent learner.

#### **Encouraging the Development of Learners**

Bennett (2004) suggests that there are two defined approaches in early childhood across Europe: the social pedagogic approach, as favored by Reggio Emilia, and the pre-primary or “ready for school” approach as demonstrated by the Early Years Foundation Stage (EYFS) (DfE, 2014) in England. Reggio children are considered to be strong and confident, and this approach empowers them to become “active citizens” (Williams, Sheridan, & Sandberg, 2014, p. 227) in their own right. *The Effective Provision of Preschool Education* (EPPE) report (Sylva, Melhuish, Sammons, Siraj-Blatchford & Taggart, 2004) stresses the importance of a quality early years environment in promoting the development of self-regulating learners. EPPE also places great emphasis on adult-child interactions, identifying sustained shared thinking as a valuable opportunity during which adults can extend, develop, and enable children to talk “authentically” (Whitebread, 2012, p. 7) about their ideas. Siraj-Blatchford (2010) and Siraj-Blatchford, Sylva, Muttock, Gilden and Bell (2003) extend this further by stating that quality is dependent upon both cognitive

and social pedagogic interactions between the child and practitioner. Siegler, DeLoache and Eisenberg (2010) also note the emphasis on a learner's "perceived self-efficacy" (p. 356), which Bandura (1994) stresses. Thus, there is plenty of evidence to support the claim that Reggio children develop strong feelings of mastery, that is, high self-esteem, high aspirations of themselves, and a strong sense of belief.

### Enabling the "Hundred Languages" of Creativity

Creativity is an essential element of the Reggio approach, as demonstrated in this extract from Malaguzzi's iconic poem *The Hundred Languages of Children* (translated by Lella Gandini in Edwards, Gandini & Foreman, 1998, p. 3):

The child has  
a hundred languages  
(and a hundred hundred hundred more)  
but they steal ninety-nine.  
The school and the culture  
separate the head from the body.

This expresses the multiple ways in which children communicate to great effect as well as the ways in which these are denied. Thus, the wealth of resources in Reggio pre-schools is vast, openly displayed to enhance ideas and opportunities in the atelier. The resources offer open-ended and creative possibilities. Boyd Cadwell (1997) noted these materials "have the power to engage children's minds, bodies and emotions... and in this way, the children continue to build and rebuild, through the materials, an ever-expanding awareness and understanding of the world and their place in it." (p. 27). As Malaguzzi (1998) outlined, creativity allows children to engage with their world, discovering new meanings. Reggio is not about "art," but about the different and creative ways children interpret their world, using the "hundred languages." Katz (1998) expands this further by recognizing that creativity provides "additional languages available to young children not yet competent in conventional writing and reading" (p. 35). This is in contrast to the English EYFS (DfE, 2014) which recognizes literacy as a specific subject which practitioners need to promote in order to insure that children are "ready for school" (p. 4). This is the culture of readiness which Malaguzzi refers to in the above poem where he talks of separating the head from the body, noting lack of creativity and open ended play opportunities and strong focus on more formal cognitive skill based applications. Thus, there is no curriculum in Reggio Emilia, unlike in England, and the pedagogista and practitioners have total control and autonomy over the learning, drawing on the ideas and provocations of the children as inspirations. Unlike the

English EYFS (DfE, 2014) which promotes teaching and learning to ensure children's "school readiness" (p. 5), Reggio advocates a method of planning and flexible objectives, formulating "hypotheses of what could happen on the basis of their knowledge of children and of previous experiences" (Rinaldi, 1998, p. 113).

### Learning in Collaboration

As a result of the above features, an important element of the Reggio approach is the collaborative working, which can range from collaboration with and between individuals, pairs, or small groups. There is total autonomy in how the groups are formed. In a Reggio classroom there will be multiple levels of learning occurring, with children and adults in collaboration together. The children can support and move between groups as a "competent audience" (Seidel, 2001, p. 319), and the adult facilitating the processes can as well. The children understand that there is a significance to group working and they accept the need to be dependent upon their peers. There is trust in their relationship and in the democratic participation, and as ideas evolve, the documentation makes them visible to the children and helps form the next stage of the process. It is an emotional experience as well as a cognitive one because ultimately through the collaboration and discussion it creates a "collective body of knowledge" (Krechevsky & Mardell, 2001, p. 286). This process of "design, discourse and documentation" (Forman & Fyfe, 1998, p. 240) provides opportunities for children to think in creative and divergent ways, while learning about empathy, respect for others and tolerance. This is a community of learners, as Malaguzzi and the Women's Movement envisaged. As Mooney (2000) noted, John Dewey also advocated that learning should be open ended and an educative experience, not just about having fun, and the success of learning is in the potential of new lines of discovery and thinking, so that children are "confident in their ability to dive in and satisfy their curiosity" (p. 19).

### Research Methods

The study both researched and emulated Reggio Emilia pedagogical approaches in a higher education context. The research design reflected the creativity and flexibility of Reggio approaches by utilizing an interpretive ethnographic methodology of inquiry (Geertz, 1973). As Marcus (2000) points out, messy texts "insist on an open-endedness" (p. 567) and the ethnographer acts within the landscape of the study. Thus, as reported earlier, the focus grew organically from the tensions and discussions around the freedom of an open-ended project during which students were encouraged to be creative and divergent while working

collaboratively. To capture and reflect on this, a mixture of semi-structured interviews and a short questionnaire were designed for use with the participants at the end of the module.

A small selection of eight from the overall group of 44 final year Education and Early Years students voluntarily agreed to become part of this research. It is important to stress that the data was all collected *after* the module had been concluded and marks allocated. This negated any potential impact of students' disclosure to the module tutor who conducted the research. The positive aspect of this was that the interviewer had also observed and organized the module. Ethical clearance for the study was given by the relevant HEI, and the students were all aware of the purpose behind the research and understood their rights to withdraw at any time. The researchers recognized the principle of informed consent, and they insured all participants signed letters of agreement for their participation and also understood the implications of this (Oliver, 2010).

The interviews contained five standard questions which addressed the following: how easy they had felt it was to engage in the Reggio process; how they had worked as an individual and as a member of a group; and how they felt about having to work together in this way. The semi-structured nature of the interview provided the interviewer with access to individually constructed interpretations, providing "thick descriptions" (Geertz, 1973) and emotive responses. The interview informality also provided opportunities for flexibility, allowing the interviewee to move freely from one topic to another and produce a wealth of thematic data. This enabled conversation with a purpose (Dexter, 1970). The interviews lasted around half an hour to an hour, and they were conducted in an informal place that was convenient to the student.

The questionnaire comprised the English version of the Generalised Self-Efficacy Scale (Schwarzer & Jerusalem, 1995). There were seven different types of questions on the questionnaire (Youngman, 1982), of which 'ranking' was one. The students all ranked how they had perceived their self-efficacy and were asked to place how they perceived their ability to deal with different situations in a rank order from 4 (high) to 1 (low). The comments ranged from how they managed solving difficult problems to how they handled whatever came their way.

### Thematic Analysis

Using an interpretivist approach provided the interviewer with an opportunity for a thematic data analysis that was inductive, developing naturally out of the research. The analysis was conducted using the pedagogical themes of Reggio Emilia, as reported above, to attribute meaning to

the thoughts and behaviors of the students, as revealed in the interviews and questionnaire. In this respect, the study sought, through the open nature of its categorization, to construct, as well as to illuminate, the ideas that emerged from the data collected. There were several themes that emerged and re-occurred during the interviews with the students. These ranged from working within a group in a collaborative manner, not feeling as if ideas or thoughts were listened to, not enjoying the freedom of creativity, and finding the place of documentation as a formative rather than as a summative tool.

The data collection was concentrated in a very short time scale (a week) immediately after the completion of the module, which ensured that collection and analysis did not become a long drawn out process and was as simple as possible. There was no analysis of any of the data until after all interviews had been completed. It was important to draw credible conclusions while remaining aware of how interpretations of the data might be compromised (Sapsford & Jupp, 1996). Thus, the main findings are supported by actual and detailed quotations from the interviews in order to provide a solid foundation for the discussion with which they are intertwined. These quotations are presented in italic script.

### Findings

#### **The Struggle to Become a Reggio Emilia Learner: "It's a dark place."**

There were tensions even at the initial stage of visiting the museum, with some of the students questioning the relevance of the visit, asking couldn't they just get "on with it." After the initial visit they were encouraged to work collaboratively in small self-chosen friendship groups. They had to share and discuss their ideas and find a negotiated pathway to work together. From this point on the sessions became workshops, and the tutor became a combined pedagogista and atelierista. These sessions were open-ended with students choosing if to attend and in what capacity they required support. However, giving the students such freedom also provided some with the opportunity not to engage. Their reasoning was that the "process" was not going to be marked and therefore was not worth the effort, as it did not contribute to their final grade. However, their lack of engagement often provoked tensions with other members of their groups.

The module the students were studying expects that them to be independently engaged and motivated to learn and question ideas. Learning outcomes require the students to critically reflect and critically review research evidence about different international preschool environments. However, some students lacked confidence in their ability to take charge of their

own learning to achieve this level of critical review. Siegler and colleagues (2010) term this as “low perceived academic self-efficacy” (p. 357). Whitebread (2012) also notes the learner’s belief about the importance of the task, its relevance, its level of interest and difficulty will impact upon their “goal-orientation” and their “metacognitive performance” (p. 145).

As a possible explanation for this phenomenon, Alexander (2013) comments that from 1988 to 2010 policy makers and government in England focused on school curricula which “effectively equates with what is prescribed, tested and inspected” (p. 10). Lumsden, McBryde-Wilding & Rose (2014) also highlight this, stating that the school curriculum has had “a focus on core subjects, foundation subjects and testing” (p. 12) and that “performativity and target meeting have been the norm” (p. 14). In their research into transition issues from secondary schooling into the university, they note the difficulties students (post formal curriculum) have in adapting to a different type of learning. They refer to problems with learning to learn (Wingate, 2007), when students struggle with creative methods of learning or in non-traditional styles. Interestingly, despite the fact that students were in their final year of a university program, they had not felt pressure to change long established approaches to learning. As an illustration of what all of them felt, one student in our study stated:

There was a lot of pressure, and we were being asked to do like a radical thing, people felt uncomfortable because there was no comfort blanket, which is being told what to do, like it was different to what I originally been used to doing in a degree.

### The Hundred Languages of Creativity

Students’ perceived fear of creative freedom was noticeable in several ways. Some students struggled with being given the autonomy and freedom to be creative and develop their ideas in an open-ended way. For example, one student said the following:

I thought at first the idea was to choose something you can go with and develop the idea yourself. It seemed attractive, you know when you are sitting on the other side of the fence and you’ve never had that before, the idea you think on, I’d like to do that that. But when I was actually in the process of actually having that freedom, it shook; it shook the ground for me. It didn’t feel comfortable; it didn’t sit well because I think the pressure because it was the final year.

This almost visceral sense of fear resonates with House’s comment (2008) that “practitioners are forced

to think about children in an anxiety-fuelled, relentlessly ‘developmental’ way which constricts the space for children to just be” (p. 10). Gray (2014) in his lecture on the decline of play suggests that there is a growing focus on a “schoolish view” similar to that of “school readiness” (DfE, 2014, p. 5). Gray says that this suggests that “adults know best” and ensures a “continuous erosion in children’s freedom and opportunity to play.” The implication of this adult-directed, goal-oriented approach is a focus on a product rather than a process. However, the documentation involved in this project embraced the *process* rather than the finished product, which was viewed negatively and initially misunderstood by the students as they struggled to understand how to utilize the open-endedness of this tool. Rather than using a Reggio lens on formative assessment, the students focused on a summative one, for example:

We used it more as evidence – summative...I had to get Reggio to fit me. I tried to adapt it to meet the outcomes.

Robinson (2009) suggests that within our curriculum, literacy and numeracy are seen as hierarchical subjects leading to a “need to evolve a new appreciation of the importance of nurturing human talent along with an understanding of how talent expresses itself differently in every individual” (p. xiii). Alexander (2013) draws a similar parallel, stating a limited and narrow curriculum that focuses on core subjects is effectively “at a stroke severing the learner from history, culture and some of humankind’s principal ways of making sense and acting on the world” (p. 7). The creativity of the project was that it was not being marked per se but was providing material for an assessed presentation. However, rather than embracing this opportunity to widen their talents culturally or creatively, the lack of direct assessment caused anxiety within groups, and some perceived the project as an unnecessary inconvenience. For example, one student made the following comment:

They just wanted to do the minimum possible because they didn’t think it was being marked, essentially.

### The Partnership of Collaborative Learning

The Reggio Emilia approach is “child-originated” (Edwards et al., 1998, p. 240), and the centrality of these principles was firmly located within our students’ projects. Reggio children discuss and negotiate meanings and move together into a level of shared awareness and understanding through trusting partnerships. However, most of the university students saw group working and collaboration

during the process as a difficulty, making comments such as: "I like being in control of my own work". This seemed to develop out of the feeling that it was a "waste of their precious time," especially knowing that the process had little emphasis on the final grade. The following is an example:

"It was difficult - people were concerned about the outcomes of their individual experience and it did really impact upon the learning as a group of students and so many times I actually said 'we are in a faculty of education, leisure and community' and it didn't sit together well."

Another apparently negative aspect of collaboration and working in a group was not being valued or being listened to. Again, within the pedagogy of Reggio Emilia, there is a deep, strong desire and recognition of not just listening to, but also understanding each other's words or ideas. There is recognition that this openness can lead to a conflict of ideas but this is acknowledged as part of a process "where speakers constructively confront each other, experience conflict, and seek footing in a constant shift of perspectives" (Edwards et al., 1998, p. 241). However, in contrast this conflict of ideas caused a lot of tensions within the groups of students, as one student noted:

I made a conscious decision to not come with a completed design, as I felt it sort of contradicted the idea of collaborative working.....I kept saying plans are being made in individual ways but I kept on saying we need to actually have this conversation ... So the project work was decided. I was trying to sort of encourage people to have that conversation because the product was decided .....but I didn't understand why we weren't having that conversation.  
But they wouldn't actually listen to me, to my reasoning behind why I had done what I'd done.... which was so frustrating and that was the biggest tension in the process.

There also appeared to be a certain expectation, because of tuition fees, that the lecturers and the university should have provided all of the necessary resources, such as "a sheet with a tick list of things I have to do," to support students to achieve their assessment. This was magnified further after the details of the assessment for this module were initially explained, and there was a sudden rush of frustration because of differences from how students had been assessed in the past. They made comments such as, "Why are we being asked to do it ourselves?," and, "We're paying the lecturers to teach us, not for us to teach the lecturers, if that makes sense."

Students also struggled to embrace the Reggio open-ended learning approach, with comments such as,

"I'm not learning anything," and, "What is the point of it?" They seemed to view the project through a target and performativity lens rather than a Reggio-inspired lens. However, during the interviews all of the students seemed to rank themselves as having a high self-efficacy (scores of either 3 or 4), even though they had struggled to undertake a project that required them to be creative and work in partnership and negotiate from the beginning. In hindsight, the questionnaires should have been completed by the students at the start of the process while they were in the process of struggle. It seemed at that point that their educational histories impacted upon their belief that this style of learning was too difficult and beyond their understanding. This was evident with the real depth of despair voiced during the interviews, during which one student commented, "It was dark. I didn't know which way to go with it."

Although positive aspects of the process were not initially noted, upon later reflection there was an overwhelming sense from students of recognition of how it had either developed them as reflective practitioners or given them a better understanding of viewing and listening to children. There was also a sense of recognizing how others in the group had supported them or that they had not actually listened to them. Finally, there was an awareness of how, within a social pedagogy, the interaction and trust between groups, individuals, and the environment is a fundamental aspect of this style of democratic learning, in contrast to the predefined goal-orientated style they were used to. With regard to collaborative learning one student voiced: "We all put our own different strengths into making it," and, "The more we went through the project, the more we ended up scaffolding each other."

As for recognizing the rights of the child in the process of learning, one student noted that children should "go where their learning is and when they want; they don't have to be doing anything at a certain time," and, "They should be in charge of their own learning." It was universal that reflection of students' own experience had made them "see" differently that children's learning can be centered "around their ideology and pedagogy rather than just drilling them..... The 100 languages, it's important to use all of them."

### **Into the Light as a Reflective Practitioner: "Everything is Reggio Really"**

Initially this research was to understand why our early years students fought against a style of learning that was so embedded into the social pedagogy of European early years provision. Through these interviews it was apparent that both the students and the tutor (interviewer) reflected on the journey, thus providing both knowledge and understanding which empowered all learners and



developed a community of learners. Within Reggio Emilia preschools, the child and teacher are co-constructors and co-researchers, meaning that all views are valued, discussed, and shared. As there is no hierarchy within Reggio, there is a strong democratic thread which ensures opportunities for unguarded conversations (Baskerville & Goldblatt, 2009) and a shared responsibility of practice. Children work with their knowledgeable other (Vygotsky, 1978) to think divergently and challenge preconceived ideas, while these are scaffolded (Bruner, 1960). Comments from the students demonstrated an awareness of the importance, not just of a strong social constructivist approach but also a place within the learning for reflecting-in-action and on-action (Schon, 1987), for example:

It taught me to think about why you do stuff and to be more open minded and not just focus on a percentage, on that piece of paper. Doesn't just focus on the end, but how you're getting there, how you're going to do it, rather than having to plan an end . . . just see here it takes you?

This appears close to the authentic Reggio approach that supports a community of learners and develops critically creative thinkers who find challenge in conflict of ideas. One student stated: "It has been the most thought provoking, it has been the best module I've done in my degree, the most challenging. It was a very emotional experience." At the end of this process the students individually presented their "journey" from their perspective and reflected on the process. Mostly they recognized that they had learned not only a lot about a pedagogy of listening, but also a lot about themselves as learners.

### Conclusion

This research suggests that policy makers and educationalists could embrace some elements of the Reggio Emilia outlook on learning in order to promote creative and divergent thinking. Rather than the English EYFS view of getting the child ready for school (DfE, 2014), or indeed a view of the student as getting ready to graduate, we could provide contexts for learning that build "confidently on the enormous perceptual and cognitive powers and motivations of children ...to probe deeply into areas that interest them" (Gardner, 2001, p. 27). By providing multiple opportunities to think, investigate, experiment, and challenge, and by allowing time for reflection and dialogue along the journey, children and university students can develop a strong self-belief in their ability to climb any mountain in front of them. Whitebread (2012) reminds practitioners that the emotional and social environment

is also a crucial and powerful factor in cognitive ability. Real active learning is a social activity that engages communication, questions, and involves collaborative learning and negotiation. The Reggio Emilia approach "compels the children to seek cooperative strategies" because of the "deep roots of cooperative culture and organization" (Vecchi, 2001, pp. 178/9).

In an English higher education system that students note as having priorities such as "the grades being pinned on that" or learning that has a lot of "individualism and competition," even the idea of being creative and having freedom to try different "languages" of learning was not seen in a positive light. It was viewed as "radical" and brought feelings of low self-efficacy evidenced by comments such as, "I can't do art, not really, I can write but I can't paint, art, music anything like that." This provokes the question as to whether the focus in education right through from early years to higher education has become a system of "authoritative consensus" (MacNaughton, 2005, p. 30).

In Wales (in contrast to England) there have been signs of a move towards a more play-based pedagogy in the early years. As mentioned earlier, Maynard and Chicken (2010) who were worried over the "perceived over formalization of young children's learning experiences" (p. 29), piloted a small scale study to encourage Welsh early years practitioners to explore the Reggio philosophy in practice. However, similar to our findings with students, their research exposed the teachers' entrenched approach to be "dominated by prescribed subject-related outcomes" (p. 29), even when they had been given total support and freedom to explore and utilize the hundred languages. Thus, the teachers, like our students, struggled to let go of their teacher training theories and previous educational histories: as one of our students noted, "Well, I suppose that's the way the university always works; you just kind of get lectured at." This suggests that government, policy makers, schools, and universities as a whole must embed more co-constructing cognitive pedagogical interactions; as another of our students noted, "There are not many opportunities to sort of engage in projects.... This is more wholesome." The evidence of this study demonstrates that if students are given more opportunities to develop "wholesome projects," they become more confident, cooperative and, importantly, self-reflective and critical co-learners and ultimately can become Reggio-inspired co-constructors. As one student commented: "I have learned how to reflect in teaching.... Otherwise you have teachers who think very narrow-mindedly. Before this module I would have been exactly the same - here's this, here's that .....now it is about understanding what you are doing- the journey rather than the end result."

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## A Multifaceted Partner Presentation Assignment for Improving Educational Outcomes Among College Students

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This article reports a multifaceted course assignment involving the development of information literacy skills, speed partnering, a brief team VoiceThread presentation, and peer evaluations of the presentations. The assignment was rooted in Chickering and Gamson's (1989) highly regarded principles of good educational practice, as well as the pedagogical literature on speed partnering, collaborative learning, use of VoiceThread, and peer evaluations. It was piloted in a high enrollment introductory family course and in an advanced close relationships seminar. The instructors employed both quantitative and qualitative methods as a basis for both formative and summative evaluation of the assignment. Student responses were generally favorable. For example, 75% of students said speed partnering was an average or good way of forming partnerships. Other results showed that the assignment generated student enthusiasm and engagement in the course material, enhanced learning, and fostered peer relations. Student reactions to conducting peer evaluations were mixed. Despite some initial shortcomings, overall the students and instructors perceived this assignment as successful.

"Education is the kindling of a flame, not the filling of a vessel" -Socrates

Much like the previous quote by Socrates emphasizes, education is about sparking students' interest in learning rather than just promoting rote memorization. One of the challenges for instructors in higher education is how to engage students in the classroom and facilitate them as active participants in their own learning.

The current paper reports the development and implementation of a multifaceted course assignment whose aims were sixfold: (a) to demonstrate the utility of speed partnering events in an educational context, (b) to assist students in building and developing interpersonal relationships with their classmates and foster collaborative work contexts, (c) to stimulate student learning and engagement, (d) to promote technology and library-based skill acquisition, (e) to facilitate peer-to-peer feedback and assessments of project presentations, and (f) to demonstrate the overall quality of the partner presentation assignment. The goals of this project were based, in part, on Chickering and Gamson's (1989) *Principles of Good Practice* (e.g., developing reciprocity and cooperation among students, using active learning techniques, providing prompt feedback, communicating high expectations, and respecting diverse talents and ways of learning). Although the current project has unique implications for a course on close relationships (e.g., speed partnering protocols) with an adjustment in substantive focus, the individual components and overall project can be used in a wide variety of fields and courses.

### Speed Partnering in Higher Education

The first goal of the described project was to demonstrate the utility of speed partnering, a variant of

speed dating, as a method of forming partnerships for group work. In speed dating sessions, men and women spend a short period of time (e.g., 3 to 8 minutes) meeting a series of potential dates and then indicate with whom they would like to have a date. This way of forming partnerships was especially pertinent given the courses the students were taking focused on intimate relationships. Speed partnering protocols have been implemented in higher education settings as a means to improve classroom dynamics for students. Studies have demonstrated the applicability of speed partnering for several purposes, including forming undergraduate student groups or partnerships, aiding students to get to know one another, helping students share information to form opinions, and making presentations. Speed partnering has also been used as a mechanism to facilitate peer assessments (e.g., Cook, Bahn, & Menaker, 2010; Maidment & Crisp, 2007).

Collins and Goyder (2008) noted several strengths of speed dating protocols for forming groups, including promoting the development of "soft" skills, such as developing networking and interviewing skills, encouraging group commitment via autonomy in partner selection, and improving the classroom environment as it enables students to meet and get to know their peers. Furthermore, research has demonstrated that a positive group environment has been linked with increased student learning, and students reported more positive group outcomes when they had some freedom in selecting their partners or group members (Bacon, Stewart, & Silver, 1999). Some research suggests that by allowing students to choose their own groups within a selected number of potential partners, speed partnering can help overcome problems with randomized group assignments such as unbalanced groups and diminished productivity and satisfaction (Chapman, Meuter, & Wright, 2006; Collins & Goyder, 2008).

### **Interpersonal Relationships and Learning Engagement (via Collaborative Work)**

The second and third goals of the described project were (a) to assist students in building and developing interpersonal relationships with their classmates and foster collaborative work contexts and (b) to stimulate student learning and engagement. These goals align with the good teaching element of developing reciprocity and cooperation advocated by Chickering and Gamson (1989). Chickering and Gamson argued that collaborative work deepens understanding as well as increases learning engagement among students. A constructivist perspective on learning (e.g., Biggs, 1996) emphasizes active participation in knowledge construction via social, or cooperative, and individual activity. Furthermore, in order to align the teaching methodology with our theoretical perspective on teaching (e.g., Cohen, 1987), we included several aspects of the course that should encourage constructive learning. Through the emphasis on dyadic partnerships and group work, in which student dyads were allowed to be somewhat self-directed to learn about and present on a topic on close relationships or families, our goal was to promote co-constructive learning.

Collaborative learning in dyads, as well as in groups, has been shown to provide a variety of benefits to students including academic, relational, and adjustment. In their review, Johnson, Johnson, and Smith (1998) noted that cooperative learning promoted students' academic achievement, "meta-cognitive thought, willingness to take on difficult tasks, persistence (despite difficulties) in working toward goal accomplishment, intrinsic motivation, transfer of learning from one situation to another, and greater time on task" (p. 31). In terms of fostering interpersonal relationships among students, cooperative learning strategies, compared with competitive learning and working alone, have been shown to promote better quality relationships among students across a variety of groups (e.g., cultural/ethnic, gender, social class, and gender groups) (Johnson et al., 1998). Furthermore, cooperative learning has been shown to have positive influences on students' self-esteem and attitudes towards the university, learning, and the particular subject area (Johnson et al., 1998).

Several studies have identified positive outcomes from allowing students to work in groups or in dyads. In their qualitative, in-depth look at upper-level students' perceptions of task-oriented and problem-solving group work, Colbeck, Campbell, and Bjorklund (2012) found that students perceived group work as beneficial in that it encouraged the development of a variety of skills. Students in this study reported that learning communication and conflict resolution skills—skills they developed and honed through group work—

were highly relevant and would be beneficial for their future careers. In other studies, group work among college students has been shown to "promote students' academic achievement, persistence in college, and positive attitudes about learning" (as cited in Colbeck et al., 2012, p. 61; Springer, Stanne, & Donovan, 1999).

### **Promote Technology and Library Skills Acquisitions (via VoiceThread)**

The fourth goal of the assigned project was to promote technology and library-based skill acquisition. In the current project, students used VoiceThread to create narrated, online presentations. Although frequently used for lectures, VoiceThread has also been used for presentation purposes as well (Aponte, 2010). Chan and Pallapu (2012) interviewed eight students who had made short presentations about their opinions regarding whether VoiceThread fulfilled Chickering and Gamson's (1989) Principles of Good Practice. A majority of students reported VoiceThread does fulfill each Principle of Good Practice.

VoiceThread<sup>1</sup> is a free Web 2.0 tool that allows users to communicate asynchronously with one another through multiple modalities, namely text, audio file, video, telephone, or microphone. It is akin to narrated PowerPoints. However, VoiceThread offers many advantages over PowerPoint. VoiceThread is offered in a universal format that is easily accessible via an internet connection, does not require software downloads, and functions on both Mac and PC operating systems. Furthermore, VoiceThread avoids the large file-size problems that can be encountered with narrated PowerPoint presentations. Rather than being saved locally, VoiceThread files are stored on VoiceThread's server and accessed by using a url address.

Brunvand and Byrd (2011) claimed that student motivation and engagement as well as the quality of learning can be enhanced through the use of innovative technologies in the classroom. Through the introduction of a new and innovative medium of presentation (i.e., narrated VoiceThread presentations) in the classroom, we attempted to augment students' technological skills. The use of VoiceThread, specifically, in educational settings has also been widely credited with improving student learning and educational outcomes (e.g., Brunvand & Byrd, 2011; Chan & Pallapu, 2012; Orlando & Orlando, 2010). For

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<sup>1</sup> VoiceThread LLC  
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Boca Raton, Florida 33497  
United States

example, Orlando and Orlando (2010) noted that the use of VoiceThread presentations promoted students' understanding of nuance and visual concepts, and it improved their sense of community and feelings of social presence in the classroom. Brunvand and Byrd (2011) noted that an advantage of VoiceThread is that it allows students to work at their own pace, taking the time needed to formulate their thoughts on a given topic or lecture. In another application of VoiceThread in an upper-level business course, Chan and Pallapu (2012) found that the majority of students would recommend using VoiceThread for creating presentations in future classes, with several students commenting about the ease of use in the open-ended responses.

### **Peer-to-Peer Feedback and Assessments of Project Presentations**

Our fifth goal of the overall project was to facilitate peer feedback and assessment. As noted earlier, one of the Principles of Good Practice noted by Chickering and Gamson (1989) includes providing prompt feedback. To capitalize on this principle of good practice, students were asked to provide feedback and respond to feedback within the week following the posting of their presentations. This method not only alleviates some of the burden from the instructor to assess all of the student presentations immediately, but also allows students the chance to act as evaluators and critiquers.

Several scholars have suggested that formative peer feedback can provide several beneficial learning opportunities for students, including promoting higher quality thought processes and effective learning across settings, increasing productivity and time on task, and reducing overall errors (Bangert-Drowns, Kulik, Kulik, & Morgan, 1991; Crooks, 1988; Kulik & Kulik, 1988; Natriello, 1987; Topping, 1998). Peer feedback and assessment also has demonstrated benefits for students, including increasing motivation and personal responsibility for projects, encouraging active learning, and developing the ability to negotiate constructive criticism (for a review see Topping, 1998).

Turning from formative feedback to evaluative assessment, Topping (1998) defines peer assessment as "an arrangement in which individuals consider the amount, level, value, worth, quality, or success of the products or outcomes of learning of peers of similar status" (p. 250). As data reviewed by Topping (2009) testifies, a majority of studies (70%) find that students' peer evaluations have adequate reliability and validity. Peer feedback and evaluations encourage learning through their role as an assessor. Similar to learning via teaching, students are required to place themselves in the role of the instructor and evaluate the quality of their peers' work. Allowing students to provide

feedback, critique, and evaluate peer work fulfills another of Chickering and Gamson's Principles of Good Practice as it encourages active learning via the use and development of critical thinking.

## **Method**

### **Brief Project Procedure Overview**

The overall project for this course was multifaceted and involved several steps<sup>2</sup> (i.e., library information and skills training; group formation via speed partnering; narrated, online VoiceThread presentation; and peer reviews and evaluations) throughout the semester. The project was designed to fulfill the six specific aims identified at the beginning of this article. The basic procedure for the speed partnering event involved randomly creating groups of 8-10 students. Four (or six)-minute sessions were held to enable each student to meet each member of their group, with 30-seconds in between sessions. Students then formed partnerships with one other student they met through the speed partnering event. Student pairs were then required to create narrated VoiceThread presentations and upload them to Blackboard, the course learning management system. In Blackboard, student pairs were organized into small discussion and review groups. Each student in the small group reviewed, critiqued, and evaluated the other presentations in their small group.

### **Participants**

Data were collected at a large public university in the Southeast enrolling approximately 17,700 students, 14,350 of whom are undergraduates. Carnegie ratings indicate this is a high research activity institution. The university at which this study was conducted is a comprehensive university with a diverse student body (White 57%, Black or African-American 25.2%, Hispanic/Latino 6.2%, Asian 4.3%, Nonresidents including international students 1.7%, and other 5.6%). Approximately 80% of first-year students reside in the on-campus dormitories, and this is the first university or college experience for many of the students and families of students attending this institution.

During the Fall 2013 and Spring 2014 semesters the multifaceted Partner Presentation task was assigned in three undergraduate courses in the Human Development and Family Studies (HDFS) department: two sections of an introductory-level course entitled Families and Close Relationships during the fall semester and an upper-level course entitled Advanced Family and Developmental Studies Seminar during the

<sup>2</sup> Complete project procedure is available upon request from the corresponding author.

Table 1  
*Descriptive Statistics and Bivariate Correlations among the Study Variables for Each Course*

	1	2	3	4	5	6
1. Instruction Clarity	-	.38*	.55**	.35†	.57***	.61***
2. Interpersonal Relationships	.17†	-	.48*	.27	.39*	.51**
3. Learning & Engagement	.34***	.29**	-	.58***	.72***	.47**
4. Library-Based and Technological Skills	.66***	.13	.42***	-	.40*	.47**
5. Peer Feedback & Evaluation	.37***	.04	.54***	.44***	-	.26
6. Assignment/Speed Partnering Quality	.49***	.25**	.45***	.46***	.28**	-
Implementation 1: Mean	2.39	2.98	2.53	2.37	2.30	2.63
Implementation 1: Std dv	.75	1.71	.65	.77	.48	.80
Implementation 2: Mean	1.91	2.29	2.38	2.44	2.30	2.29
Implementation 2: Std dv	.73	1.33	.71	.86	.45	.75

Note: Correlations below the diagonal are for the larger introductory course (implementation 1), whereas correlations above the diagonal are for the smaller, upper-level course (implementation 2); lower mean values signify more positive evaluations for each variable.

†  $p < .10$  level (2-tailed). \*  $p < .05$  level (2-tailed). \*\*  $p < .01$  level (2-tailed). \*\*\*  $p < .001$  level (2-tailed).

spring semester. Students completed anonymous questionnaires as part of the normative teaching efforts to improve course delivery. As surveys were completed anonymously in an effort to promote accurate student feedback, comparative descriptions of the students who completed the survey versus those who did not are unavailable. Survey questions were designed to gather data regarding this study's specific aims.

During the first implementation of the partner presentation protocols, the introductory-level close relationships course had a total of 218 students between these two sections. The larger section had 137 students, whereas the smaller of the two sections had 81 students. This introductory course is often taken by students of various majors as opposed to just Human Development and Family Studies (HDFS) students. Furthermore, there is a much higher proportion of first-year students in introductory courses compared with upper-level courses. Questionnaires regarding the project were supplied at the end of the semester. Of the 218 students who participated in the course project, 108 completed the survey. The upper-level course in which we implemented this project is typically for students in the HDFS department who are in their senior year and have completed several prerequisite courses. Of the 32 students who took the course, 31 completed the survey provided after the project.

### Quantitative Measures

The web-based questionnaires used in this study, which were approximately 50 questions long, included both qualitative and quantitative components. In accordance with our study goals, the questions were targeted at understanding students' perspectives of several key aspects of the overall project. Means and standard deviations for each quantitative scale and class are presented in Table 1.

**Instructional clarity (6 Items).** Although not a specific aim of the study, as part of improving the instruction and implementation of this project, students were asked to rate the overall instructional clarity of each of the various aspects of this assignment (e.g., the overall partnering and presentation assignment, the Speed Partnering event, and grading requirements for evaluating classmate presentations). Responses were averaged across this measure (1 = *very clear* and 5 = *very unclear*). This scale was reliable for both the introductory and upper-level courses ( $\alpha = .81$ ,  $\alpha = .88$ , respectively).

**Foster interpersonal relationships (3 Items).** One of the specific aims of this project was to assist students in building and developing interpersonal relationships with their classmates. Three scale items were developed to assess how well students were able to build relationships with their peers and to what extent these relationships were enjoyable (e.g., how much did you

like your partner?). Response options ranged from 1 (*not at all*) to 9 (*very much*) for two items and 1 (*very well*) to 4 (*not well at all*) for the third. Responses for two items were reverse coded so that lower values indicated more positive relationship experiences. This scale was reliable for both the introductory and upper-level courses ( $\alpha = .76$ ,  $\alpha = .72$ , respectively).

#### **Technology and library-based skills (2 items).**

An additional goal of this project was to further develop students' technological and library-based skills. Two items were designed to assess the helpfulness of instructional material at attaining this goal. The two items asked were (a) How useful were doing the information literacy PowerPoint and the quiz in helping you find academic material to use in making your presentation?, and (b) How helpful was the Blackboard Presentation Technology material? Response options, for these two items ranged from 1 (*very useful/helpful*) to 4 (*not at all useful/helpful*). This scale was reliable for both the introductory and upper-level courses ( $\alpha = .73$ ,  $\alpha = .86$ , respectively).

**Student learning and engagement (4 items).** This project was also aimed at promoting student learning and engagement through enabling students to conduct independent research on a topic of their choosing. A four-item scale was designed to gauge students' interest and learning from this presentation. Items included (a) To what extent did this assignment increase your interest in this subject matter?, which was 5-point scale ranging from 1 (*significantly*) to 5 (*none at all*) (b) How much did you learn from having a partner that you probably wouldn't have learned by yourself? (c) To what extent did having a partner make you look at your topic differently than you initially looked at it by yourself? and (d) How much did you learn from the presentations you watched?. For items b, c, and d, response options were on a 4-item scale ranging from 1 (*significantly*) to 4 (*none at all*). This scale was reliable for both the introductory and upper-level ( $\alpha = .66$ ,  $\alpha = .78$ , respectively). Students were also asked to estimate their final grades in the course. This item was dropped as it was uncorrelated with all other variables.

#### **Peer-evaluations and feedback (6 items).**

Facilitating peer-to-peer feedback and assessments of project presentations was another specific aim with this project. As reported earlier, students were asked to provide feedback and evaluate peer projects. A 6-item measure was developed to assess students' perceptions of this process. The six items from this scale were (a) How much insight into good and poor ways of making a presentation did you feel giving feedback to peers gave you?, (b) To what extent did you feel getting feedback from your peers helped you think about ways you could improve your presentation?, (c) The feedback I gave my peers on their presentations in this class was useful, (d) In deciding on ratings of my peers' presentations, I felt

very comfortable (to very uncomfortable) in being an evaluator, (e) "Class members evaluated my work in a meaningful and conscientious manner" (1 = *strongly agree* and 5 = *strongly disagree*), and (f) The grading procedures for the assignment were 1 = *very fair* to 5 = *very unfair*. Items were averaged to determine a scale mean for further analyses. This scale was reliable for both the introductory and upper-level courses ( $\alpha = .74$ ,  $\alpha = .69$ , respectively).

**Assignment quality/utility of speed partnering (2 items).** Students were also asked two questions designed to assess their perceptions of the overall quality of this assignment including the utility of using the speed partnering exercise as a way of forming partnerships. The 2-item scale consisted of the questions: (a) How would you rate the speed dating exercise as a way of forming partnerships for group work?, which was 5-item scale ranging from 1 (*very good*) to 5 (*very poor- should not be used in the future*) and (b) Overall how would you describe this assignment?, which was also a 5-item scale with responses ranging from 1 (*far above average*) to 5 (*far below average*). Means scores were computed for this scale. This scale was reliable for both the introductory and upper-level courses ( $\alpha = .69$ ,  $\alpha = .73$ , respectively).

### **Qualitative Items**

Qualitative items were designed to allow students to provide more in-depth feedback regarding their experiences with this project. Students were asked three questions designed to assess their experiences with the overall project: (1) What were the things you liked best about doing a partner presentation?, (2) What were the things you liked least about doing a partner presentation?, and (3) What suggestions do you have for making this a better assignment?

After the first implementation of this survey, decisions were made to ask students in subsequent courses about their specific opinions regarding the speed partnering portion of this assignment. Therefore for the upper-level, advanced family seminar, students were also asked: Specifically, what did you like or dislike about speed partnering as a way of forming partnerships? How can this method be improved in the future?

### **Results and Discussion**

Overall the results supported the success of this project at engaging students in the course as well as fostering the other goals of the project. We will first present quantitative, descriptive statistics testifying to the general success of the multi-faceted presentation assignment. For ease of discussion, we will present these results separately for each implementation as well as aggregated across both implementations. Then we



Table 2  
*Descriptive Statistics and Bivariate Correlations Among the Study Variables Across Implementations*

	1	2	3	4	5	6
1. Instruction Clarity	-					
2. Interpersonal Relationships	.24**	-				
3. Learning & Engagement	.40***	.33***	-			
4. Library-Based and Technological Skills	.56***	.15†	.46***	-		
5. Peer Feedback & Evaluation	.40***	.10	.58***	.43***	-	
6. Assignment Quality	.53***	.32***	.46***	.44***	.28**	-
Mean	2.29	2.82	2.50	2.38	2.30	2.55
Std dv	.77	1.66	.66	.79	.47	.80
Minimum	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	4.67	7.33	4.25	4.00	3.50	4.50
Possible Maximum	5.00	7.33	4.25	4.00	4.50	5.00

Note: Lower mean values signify more positive evaluations for each variable.

†  $p < .10$  level (2-tailed). \*\*  $p < .01$  level (2-tailed). \*\*\*  $p < .001$  level (2-tailed).

Table 3  
*Univariate One-Way Analyses of Variance of Project Dimensions between First and Second Implementations*

	<i>F</i>	<i>p</i>
Instruction Clarity	10.28	.00***
Interpersonal Relationships	4.19	.04*
Student Learning & Engagement	1.30	.26
Library and Technological Skills	.19	.67
Peer Evaluations and Feedback	.00	.95
Assignment Quality	4.41	.04*

Note: There was 1 degree of freedom for each of the ANOVAs as the comparison was across two implementations of the assignment.

will present results pertaining to specific aims of the assignment, reporting sequentially on each aim. Reporting on the specific aims will involve presenting a mix of quantitative and qualitative data.

The data from the first implementation of the assignment informed several modifications made to the second implementation. Discussion of these changes will be interwoven with the presentation of the results for specific aims. Given these modifications, we deemed it important to determine, quantitatively, if those modifications were associated with changes in students' ratings of the components and overall assignment quality. Arguably the biggest changes were in the way we conducted the speed partnering event, but other changes were also made (e.g., with regard to training on library

skills, the instructions, the length of the presentations, providing a rubric for students in doing peer evaluations). There were also differences in the class sizes and student populations across the two implementations that may have played a role in the differences in students' reactions between the first and second implementations.

A MANOVA was run to determine if there were overall differences between the implementations. The MANOVA was significant ( $F(6,132) = 3.63$ ,  $p = .002$ , Wilks'  $\lambda = .86$ , partial  $\eta^2 = .14$ ). Univariate tests (i.e., one-way ANOVAs) were examined to determine where the differences existed between the two implementations (see Table 3). There were several significant findings. The noteworthy results from the ANOVAs will be presented in conjunction with their

corresponding specific aim. Finally, an ANCOVA was performed to determine what might be a key factor in the greater success of the second implementation, and a regression was performed to determine the strongest predictors of the overall quality of the assignment.

### Descriptive Statistics

Table 1 provides correlations and descriptive statistics for each implementation separately. The pattern of correlations was similar for both courses, albeit the power to detect significant relationships was limited in the upper-level course due to a smaller sample size ( $N = 31$ ). Table 2 provides the bivariate correlations, means, and standard deviations for all study variables (except estimated grades) across the two implementations of this project.

Focusing on the combined analysis (Table 2), the means of the scales in the current study were all below the scale mid-points, indicating a more favorable reaction from students. The scale measuring interpersonal relationships was rated most favorably as indicated by mean scores proportionally furthest below the mid-point. Of 15 intercorrelations, 13 were statistically significant. These variables (in both implementations) were generally associated with one another. Two of the strongest correlations involved instruction clarity, which was correlated positively with the utility of the library-based and technological skills component ( $r = .56, p < .001$ ) and overall assignment quality ( $r = .53, p < .001$ ). Interpersonal relationships failed to correlate significantly with either library-based and technological skills or peer evaluations.

### Evaluation of Specific Aims and Its Use in Changing Procedures

**The utility of speed partnering (Aim 1).** The first aim of the project was to demonstrate the utility of speed partnering events as a method for forming partnerships in an educational context. Overall, students responded positively to the speed partnering exercise. For example, one student noted, "I thought the speed dating exercise was a very effective way of choosing our partners. Working with a partner made the presentation easier and more interesting to work on." Especially in the larger, introductory sections, however, there were some mixed responses (22 percent of students in those sections rated speed partnering as poor). This anti speed-partnering sentiment revolved around confusion on the day of the event, not enough time to choose suitable partners, and not knowing what to talk about with the potential partners being met, for example, "I did not like how we selected our partners through speed dating activity. Even though I thought it was a good idea, I felt like I didn't get to know enough about my partners work ethics in that short amount of time."

There were a few noteworthy challenges with our initial implementation of the speed partnering protocols in the large introductory section. First, tardiness and absenteeism is an issue in large introductory courses, although not in the subsequent administration in a smaller senior level course. Due to the nature of having predetermined groups, these factors created issues for the ease and smoothness of some aspects of the speed partnering protocols, especially getting the exercise started on the day of the event. In the introductory course, late students were added to groups with odd numbers of members whose members were absent. To avoid the problem of missing members, assignment to groups can be done in class after students have arrived. Second, although 4 minutes was typical of previous speed partnering paradigms, students felt that it may have hindered their ability to choose good partners. For this reason, we created smaller groups during the second implementation (8 students versus 10) and gave them more time to interact (6 minutes versus 4 minutes).

A third problem was that some students were perplexed as to what to ask about and discuss in their speed partnering encounters. In the feedback from the first implementation students noted difficulties in meeting up with their selected partners. Logistical issues, such as meeting up with partners outside of class time, require a consideration of issues such as geography and availability when selecting a partner (e.g., Collins & Goyder, 2008; Oakley, Felder, Brent, & Elhaji, 2004). Some scholars have noted that expectations and requirements regarding project work outside of class should be explicitly stated before group formation, as schedule conflicts may be a pertinent reason for partners not to work together (Collins & Goyder, 2008; Gradwohl & Young, 2003). Given students' concerns about getting together as well as our reading of the related literature, we provided sample questions specifically addressing geography and schedule conflicts in the second implementation, as well as additional questions that students might have wanted to ask potential partners to determine their suitability.

With the various other changes in the project procedures section, the responses were much more positive about the speed dating style event in the second implementation of this project. For example, one student stated, "I like how the speed partnering was the way we formed partners. Not only was I able to choose who I wanted to be with but it was a chance to meet other classmates." Another student additionally commented, "I thought the process for speed partnering was so fair. We got to meet everyone in our group and ask questions to see not only if they were the right fit for us but if we were the right fit for them!" This was also evidenced in the advanced students' quantitative responses as well. When asked how they would rate speed partnering as a way of forming partnerships, 54.8% of students thought

it was a good or very good way, 38.7% thought it was average, and only 2 students (6.5%) thought it was a poor way of forming partnerships.

### **Developing interpersonal relationships (Aim 2).**

The second aim of this project was to assist students in building and developing interpersonal relationships with their classmates. We expected this theme to be more relevant for the introductory course as these students are often new to the university and may have had little time to develop new friendships. However, this was one of the consistently noted favorite aspects of the project across both implementations.

In the introductory class, a consistent theme reported by students was that meeting their classmates and partners was one aspect of this project that they liked best. For example, one student stated: "I liked being able to get to know others in such a large class." Other students reported the following:

- I enjoyed getting to know my partner because I probably wouldn't have met her without this project (Comment 1).
- I liked the fact that I was able to meet new people. I am new to the area and it was nice to meet positive people with the same goals and ambitions as I have...My partner and I have grown a much fonder relationship and have been able to call on each other in the time of need, which is nice (Comment 2).
- My partner and I actually ended up becoming good friends. I think we will continue to be friends after this semester ends. When we did our voice thread, we laughed a lot. I haven't previously done many group projects. I feel like I choose a good fit for myself and the way I work on assignments. We worked well together and learned a lot of interesting and useful information during this assignment (Comment 3).
- [I] got to know someone else at the University [as a result of this project]. This is my first semester, and I know no one (Comment 4).

However, not every partnership worked perfectly and promoted liking. There can be pitfalls to team assignments (Hansen, 2006). In the open ended responses, several students noted issues with their partners, such as conflicting schedules and an inability to find time to work on the project outside of class, or feeling that the responsibility for the project was unequally distributed. In one of the more extreme cases, a student complained:

"My partner did literally nothing to help with project. I did the PowerPoint with no help from partner (he was always busy) had to do narration on my own (partners narration was totally

unacceptable) I found the articles (my partner contributed 0 info.) and put them together."

Several students in the upper-level course mentioned as a theme that their favorite aspect was getting to know other students on a personal level and making new friends. Results from the one-way ANOVA revealed that students in the upper-level course rated the development of interpersonal relationships significantly higher than students in the introductory course ( $F(1, 137) = 4.19, p < .05$ ). Furthermore, students in this class linked our second and the third objectives (fostering relationships and promoting engaged learning). They noted that their favorite aspect of this project was working with a partner as it also enabled them to think about topics in a new way.

**Promoting student learning and engagement (Aim 3).** The third aim of this project was to promote student learning and engagement in the material. Complementing the favorable quantitative ratings, students' comments related to this objective were generally positive. No adjustments were made across the two implementations of this project that were targeted at altering outcomes on student's learning and engagement. Results from the one-way ANOVA provided further evidence of this and indicated that learning and engagement did not vary across implementations (See Table 3).

In the larger, introductory course, several students noted that the part they liked best about the assignment was the freedom in choosing a presentation topic, which was one of the ways we had tried to foster engagement. Further illustrating both the aim of interpersonal relationships and student learning, students wrote the following:

- What I personally liked best about doing the partner presentation is being able to meet someone new... I also liked that we had that extra voice within our decision on what I had planned to say within the presentation so we could see it from a different perspective (Comment 1).
- I enjoyed being able to bounce off ideas between the two of us. As well as, we both had similar ideas of what we wanted which helped make our process go along faster. It was also interesting how much you learn from another persons knowledge of the subject (Comment 2).

This theme was reflected in the smaller, upper-level class as well. One student wrote that this assignment "allowed both people to participate and be creative in presenting the material (I would like this better than writing a paper for sure). We also were able to bounce ideas off of each other." Another student wrote, "I liked working with my partner and learning more about a

subject with a companion, I liked working together and seeing how someone else works or thinks.”

**Promoting technology and library-based skills (Aim 4).** The fourth aim of this project was to promote technology and library-based skill acquisition. In the first implementation of this project involving introductory level students, this included multiple presentations by the department’s Instructional Technology Consultant (ITC) on how to use the university library website and the VoiceThread website and software. In the qualitative responses, several students noted that they learned a lot about using VoiceThread from the presentations by the ITC. For example, one student mentioned, “I learned a lot about the library, about voicethread, about powerpoint.” Another student noted that their favorite part of the assignment was the ITC’s presentation on finding and resizing images. However, several students also noted frustrations over learning to use VoiceThread, e.g., “The VoiceThread was a little complicated, maybe doing something else.”

We made adjustments when adapting this for an upper-level course. As students at the upper-level were expected to have a basic understanding of locating scholarly sources and using the library website, outside presentations from the university’s Instructional Technology Consultant were not utilized. Students in the upper-level section reported positive technological experiences. For example, “My partner and I was able to learn from each other on different techniques for voice thread,” and “I liked that we could do a voiceover rather than presenting in front of the whole class.”

**Facilitating peer-to-peer feedback and assessments (Aim 5).** The fifth specific aim of this project was to facilitate peer-to-peer feedback and assessments of project presentations. Students in the larger introductory sections noted mixed feelings about the feedback and evaluation aspect of this assignment. One student mentioned that getting feedback from other students was his or her favorite part, whereas another student noted some concerns, e.g., “I felt like the people in my group was a little biased with their feedback; Some didn’t want to make others mad by what they said really about their presentations.” In terms of doing an evaluation of other students’ presentations, student feedback was not very positive. One student articulated that he or she thought the instructor should be responsible for final grades. Another concern students raised was the lack of a grading rubric for peer evaluations. As one student reported:

“The assignment wasn’t a bad assignment, however, I do believe some things about it should be changed. For instance, I don’t believe the assignment should be peer reviewed without there being a rubric. A rubric not only helps the maker of

the presentation more comfortable about what it is they are submitting, it also helps [provide] the peer reviewer [with] specifics about what they should be looking for to help them better critique the work.”

We agreed with this student’s critique. Topping (1998) also noted the importance of clarifying assessment criteria for peer evaluators. It seems that having a rubric provides a more tangible goal when creating the presentation as well as when grading one. We therefore implemented a rubric for the presentation in the second administration.

There seemed to be less open-ended responses specifically about grading and evaluations procedures in the second application of this project with the smaller, upper-level class. A few students in the upper-level class expressed the sentiment that the amount of feedback required may have been excessive. For example, one student noted that to make the assignment better she or he would “cut down on the feedback we have to give each other... It would be different if we actually had the chance to go back and make changes based on the feedback.” We feel that this is an accurate criticism and ideally should be reflected in future implementations of this project. Students should be able to see the value of providing feedback by being able to adapt their presentations in response to their peers’ comments. Students in both classes also noted the need to be able to evaluate the contributions of their partner and have that (e.g., relative contributions) reflected in the overall grades. We believe this may be an important addition for future replications to help promote a more equal distribution of work between partners.

**Demonstrating the overall quality of the assignment (Aim 6).** The sixth specific aim of this project was to demonstrate the overall assignment quality of the partner presentation assignment. Although students generally gave positive ratings to the overall quality of this assignment, students in the first implementation of this project noted there were several aspects in which they felt unclear of what they were expected to do or how exactly to do it. Some of the student frustrations over using VoiceThread and uploading their presentations to Blackboard prompted us to evaluate the instruction clarity and simplicity of instructions presented for using VoiceThread as well as for the steps necessary for uploading presentations. Several students in the first implementation of this project had technical issues with their projects, difficulty posting their presentations, or challenges in figuring out how to provide feedback to their peers. For these reasons, we attempted to improve our instructions by providing more explicit and detailed step-by-step guidelines for each stage of the project in the second implementation. However, there were still a few students in the smaller, upper-level class who

mentioned issues with instruction clarity and confusion about specific aspects of the assignment. They specifically noted issues regarding the speed partnering event and using VoiceThread.

Results from the one-way ANOVA indicated that our adjustments improved the instruction clarity and overall assignment for the second implementation. Instruction clarity and overall assignment quality were rated higher by students in the smaller, upper-level class ( $F(1, 137) = 10.28, p < .01$ ;  $F(1, 137) = 4.41, p < .05$ , respectively) compared with the larger, introductory class. We aimed to improve the instruction clarity as a way to improve the overall assignment quality which was demonstrated by the significant improvements in instruction clarity and assignment quality from the first to the second implementations. Furthermore, results from an ANCOVA examining the differences in assignment quality after controlling for instruction clarity supported this. Instruction clarity remained significantly different across implementations ( $F = 48.025, p < .001$ ), but with clarity as a covariate the overall assignment quality no longer was significantly different across the implementations ( $F = .268, p = .605$ ). Thus, the improvements in instruction clarity may be an influential factor accounting for the improvement in overall assignment quality found between the first and second implementations of this assignment.

The amount of qualitative feedback on the overall assignment was modest in both courses. Some students, however, were quite expressive of their positive feelings about the assignment. For example one student in the upper-level course wrote: "I thought it was a good assignment... I WOULD TAKE THIS OVER ANY PAPER ANY DAY!!!!" Another student in the introductory course wrote, "Thanks for being risky to try something new and let everyone experience 'relationship' in a new light!!!" Future replications might ask students how they felt about the overall assignment in order to better qualitatively assess their opinions.

A regression analysis was run to determine which component or components of the project were predictive of the overall assignment quality. We analyzed the regressions separately for each class to determine if there were differences in what predicted assignment quality between the two implementations of the project. The overall regression analysis was significant for both the larger, introductory class and the smaller, upper-level course ( $F(5, 102) = 10.97, p < .001$ ;  $F(5, 25) = 6.99, p < .001$ , respectively). The regression analyses indicated that in the larger, introductory class, only instruction clarity and learning engagement were significant predictors of assignment quality ( $\beta = .29, t(102) = 2.65, p < .01, \beta = .28, t(102) = 2.76, p < .01$ , respectively). In the smaller, upper-level class, overall assignment quality was predicted by instruction clarity ( $\beta = .54, t(25) = 3.28, p < .01$ ), the

development of interpersonal relationships ( $\beta = .32, t(25) = 2.11, p < .05$ ), and marginally by peer evaluations and feedback ( $\beta = -.39, t(102) = -1.99, p = .06$ ). We then ran the regression again aggregating across the classes. The overall regression was significant in predicting assignment quality ( $F(5, 133) = 16.97, p < .001$ ). Results from the regression analysis indicated that the overall assignment quality was significantly predicted by instruction clarity ( $\beta = .35, p < .001$ ) and learning and engagement ( $\beta = .27, p < .01$ ). The development of interpersonal relationships ( $\beta = .13, p = .08$ ) and library-based and technological skills acquisition ( $\beta = .15, p = .09$ ) marginally predicted the overall assignment quality. However, peer feedback and evaluations did not significantly predict the overall assignment quality.

### Concordance between Instructor and Peer Evaluations

We conducted informal checks to compare our own (faculty) evaluations with students' evaluations of the presentations. We sensed three differences: (a) students gave more favorable judgments overall, (b) students tended to award more points to stylish and well-delivered presentations, and (c) we gave weight to more complete content (e.g., more use of traditional academic sources, etc.).

### Conclusions

We feel, and the evidence indicates, that the speed partnering and presentation assignment was successful and generally well-received by students. From the qualitative student comments and quantitative responses from students, it is apparent that having clear instructions at each stage is imperative for the functioning of the project. Student's ratings of the instruction clarity, development of interpersonal relationships, and overall assignment quality improved in the second implementation.

There were several strengths of this partner presentation assignment using a speed partnering event to form the pairs who worked together. First, students were allowed some degree of choice in selecting their partners, hopefully allowing students to select partners who have similar work expectations and quality. Collins and Goyder (2008) noted that productivity and harmony from group work could be diminished if there were divergent expectations about the final product. In terms of the speed partnering style event for selecting partnerships, it is not always possible for students to ensure a cooperative and successful partner within a limited time frame for interacting. However, ensuring a successful partnership is not a given when students select their own partners or when they are randomly assigned by instructors either. An asset of speed

partnering for forming dyads is that it allows students to interact with several potential partners and then select an individual who they feel may be an effective partner.

Along with the several demonstrable strengths from this progressive assignment, there were some limitations of our evaluation of the multi-faceted assignment and components of the assignment itself. In terms of our evaluation, one limitation is that there was unequal participation in completing the evaluation survey across the two implementations, which may have introduced bias in the responses gathered. In the first implementation of this assignment approximately 50% of students completed the review survey, compared with the second administration in which 97% of students completed the review survey. Future implementations would do well to find ways to promote higher levels of engagement in evaluation for students in larger, introductory classes, perhaps by awarding extra credit.

There were two salient concerns that students expressed in doing the assignment. First, as previously mentioned, students reported that providing and receiving feedback from their peers would have been more effective and useful had they been allowed to correct or make adjustments to their presentations based on their peers' feedback. Topping (1998) noted that peer feedback is useful only to the extent that students act on it. Although it may be possible that students incorporate their peers' feedback into later projects, it would likely have been more useful and effective to allow for the incorporation of feedback for their current presentation. Future implementations of this assignment, or any assignment utilizing peer feedback, may benefit from allowing students to incorporate their peers' feedback into their final presentations before they are evaluated.

Second, in some cases, students noted that the inability to assess their partners' contributions to the final presentation may have been associated with, and possibly contributed to, an unequal distribution of work between partners. In support of assertions made by Slavin (1989), Colbeck and colleagues (2012) argued that group evaluations or rewards may create conditions under which one or two group members do most or all of the work, and conversely where one or two members evade their group responsibilities. However, there was variability in terms of the relative contributions made within the partnerships such that unequal work distributions were not uniformly present. Colbeck and colleagues (2012) suggested the problem of slackers is less likely in dyads than in larger groups. Future implementations of this assignment, or assignments that incorporate group work, should utilize evaluation methods that allow partners to assess each group member's contributions to the final project.

There are some disadvantages to peer feedback and assessment more generally. Regarding peer feedback,

some students may reject peer feedback or assessment as inaccurate whereas others may not assess peers in a meaningful and appropriate manner (Topping, 1998). For example, students who assess peers with whom they have close affectional bonds may be more likely to overestimate their performance. A limitation of using peer evaluations noted by Topping (1998) is the inability to account for variation in students' level of proficiency at being an evaluator. A potential limitation of the project was that students weren't trained as assessors and we were therefore unable to minimize this variability. Although for the second administration of this project students were provided with a grading rubric to assess their peers, more instruction regarding providing constructive feedback and evaluating peer presentations may have better equipped them to assess and critique their peers.

In addition to addressing the project limitations in future implementations of this assignment, there are also some alternative ways to structure aspects of the project that may lead to interesting outcomes. In the larger class, some students mentioned that it was difficult to find a partner with a limited number of class members from whom to choose. A potential alternative might include putting students into groups for the speed partnering event based on a number of predefined characteristics. This paradigm could essentially be treated as experimental in the future. Have students in each of the clusters matched on personality, schedules/geography, interests, or haphazardly (as was done in the current administrations), and see if differences in the composition of the speed partnering clusters were associated with how well the partners from those clusters got along and/or did in making high caliber presentations.

In looking back over our experience developing this assignment, three additional points stand out. First, students often get nervous or shy in making face-to-face presentations in classes. The use of VoiceThread seems to considerably reduce any anxieties they might have. Second, having peer evaluations reduces the burden on faculty of grading assignments and adds a second perspective in the evaluation of students. In large classes where peer-rated assignments are just one component of course grades, the reliability and validity of peer evaluation, especially when pooled over multiple raters (Magin, 1993), is high enough (see Falchikov & Goldfinch, 2000), in our opinion, to be used as the sole basis of grading assignments. Finally, we found several of the peer presentations creative and stimulating to review.

In sum, having students work together to make presentations is grounded in sound pedagogical principles. We believe this approach helps build social ties among students and fosters engagement in the learning process. In our approach, we have added

elements (a) to enhance students' information technology skills, (b) to engage students in critical evaluation of their peers, and (c) to introduce students to a free technology that they can use for other purposes. Although experiencing speed partnering has special relevance to courses on close relationships, with adjustment in substantive focus, the approach of this assignment can be used in a wide variety of courses—be they large or small—and fields. This assignment can be easily adapted to a variety of learning management systems such as Canvas or Desire2Learn (D2L). The multiple parts of this multifaceted assignment can be separated and just some components used. We recommend that you consider adapting speed partnering and VoiceThread type partner presentation assignments to your own situation. We believe you will find this approach a gratifying teaching experience and importantly are optimistic that students will benefit academically, professionally, and interpersonally.

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Appendix  
Scales

Instructional Clarity		Very Clear					Very Unclear				
How clear were the instructions for:											
1.	The overall partnering and presentation assignment	1	2	3	4	5					
2.	The Speed Partnering event	1	2	3	4	5					
3.	Narrating the presentation	1	2	3	4	5					
4.	Uploading the presentations to Blackboard	1	2	3	4	5					
5.	Knowing what to do once materials were on Blackboard	1	2	3	4	5					
6.	Grading requirements for evaluating classmate presentations	1	2	3	4	5					
Foster Interpersonal Relationships		Very Well					Not Well at All				
1.	How well did you get to know classmates with whom you would like to work as a result of the speed dating exercise?	1	2	3	4						
(Reverse Coded)		Not at all					Very Much				
2.	How much did like your partner?	1	2	3	4	5	6	7	8	9	
3.	How much did you like working together on this project with your partner?	1	2	3	4	5	6	7	8	9	
Technology and Library-Based Skills		Very useful/helpful					Not at all useful/helpful				
1.	How useful were doing the information literacy PowerPoint and the quiz in helping you find academic material to use in making you presentation?,	1	2	3	4						
2.	How helpful was the Blackboard Presentation Technology material?	1	2	3	4						
Student Learning and Engagement		Significantly					None at all				
1.	To what extent did this assignment increase your interest in this subject matter?	1	2	3	4	5					
		Significantly					None at all				
2.	How much did you learn from having a partner that you probably wouldn't have learned by yourself?	1	2	3	4						

3. To what extent did having a partner make you look at your topic differently than you initially looked at it by yourself?	1	2	3	4
4. How much did you learn from the presentations you watched?	1	2	3	4

<b>Peer-Evaluations and Feedback</b>	<b>Significantly</b>				<b>None at all</b>
1. How much insight into good and poor ways of making a presentation did you feel giving feedback to peers gave you?	1	2	3	4	
2. To what extent did you feel getting feedback from your peers helped you think about ways you could improve your presentation?	1	2	3	4	
	<b>Very comfortable being an evaluator</b>		<b>Very uncomfortable being an evaluator</b>		
3. In deciding on ratings of my peers' presentations, I felt:	1	2	3	4	
	<b>Strongly Agree</b>		<b>Strongly Disagree</b>		
4. The feedback I gave my peers on their presentations in this class was useful.	1	2	3	4	5
5. Would agree or disagree with the statement: "Class members evaluated my work in a meaningful and conscientious manner."	1	2	3	4	5
	<b>Very Fair</b>				<b>Very Unfair</b>
6. The grading procedures for the assignment were:	1	2	3	4	5

<b>Assignment Quality/Utility of Speed Partnering</b>	<b>Very Good</b>				<b>Very Poor</b>
1. How would you rate the speed dating exercise as a way of forming partnerships for group work?	1	2	3	4	5
	<b>Far Above Average</b>		<b>Far Below Average</b>		
2. Overall how would describe this assignment?	1	2	3	4	5

# Enabling Systemic Change: Creating an ePortfolio Implementation Framework Through Design and Development Research for use by Higher Education Professionals

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Drawing from a design and development research approach, specifically model research, this study investigated the perspectives of higher education faculty and administrators regarding their experiences with a university-wide electronic portfolio implementation initiative. Participants in the study were fifty-two faculty and administrators at a large research university in the United States who were either continued users or recent abandoners of electronic portfolios. Survey and interview data were used to understand participant perspectives on the electronic portfolio implementation process, including perceived enablers and barriers to adoption of this instructional technology. Study findings and Diffusion of Innovation (DOI) theory informed the development of a six-component electronic portfolio implementation framework. Three external experts in systemic change were then asked to review the framework. Feedback from these external experts was incorporated into a revised version of the framework that is presented here. The framework can be used by an educational institution to support the successful adoption and integration of electronic portfolios regardless of where the organization is within the implementation process.

In recent years, higher education has witnessed an increase in the availability and use of electronic portfolios (ePortfolios) to support learning, assessment, and professional development. ePortfolios offer a unique way to capture a variety of learning evidence from students over time in multiple formats and across varied contexts, while also gaining students' personal reflections on individual learning and growth (Chen & Light, 2010). ePortfolios enable instructor insight into student mastery of knowledge as well as fluency with technology (Chen & Light, 2010). As an instructional technology, ePortfolios offer customized approaches to learning and assessment through the integration of varied technologies that provide more choices for students and educators; thus, broadening opportunities for pedagogical change in higher education contexts.

While essential to successful ePortfolio adoption and implementation, higher education faculty are engaged rarely as active participants in an open innovation process (C. E. Watson, personal communication, January 19, 2012). Further, whereas student perspectives of ePortfolio adoption are well represented in the literature, faculty perspectives are not (Ruiz, Quadri, & Karides, 2009; Wang & Turner, 2007). Yet it is well documented that the involvement of all key stakeholders throughout an entire change process is important to its success (Patton, 2014; Russ-Eft & Preskill, 2009). The purpose of this study was to investigate faculty and administrators perspectives regarding the university-wide implementation of an ePortfolio initiative in order to develop an implementation framework that integrates their voices in light of systemic change theory. Two research questions supported this work:

- How do faculty and administrators perceive the ePortfolio adoption process? What about the process is successful? What about the process is lacking and requires improvement? What about the process reflects Diffusion of Innovation (DOI) theory?
- In light of participant experiences, what features of DOI theory should be included in an ePortfolio implementation framework?

The resulting ePortfolio implementation framework, as a support for instructional technology innovation management across an organization, informs higher education policy, administration, and process. In addition, the framework transforms ePortfolio implementation into a more accessible and feasible endeavor for faculty interested in ePortfolio adoption and use but at a loss for how to enact, as well as sustain, this innovation.

## Conceptual Framework

This study was informed by two major conceptual areas: the evolution and use of portfolios, and specifically ePortfolios, to support learning, assessment, and professional development and the adoption and implementation of an innovation such as ePortfolios through the lens of DOI theory.

## The Evolution and Use of Portfolios

The use of portfolios to demonstrate mastery of knowledge and skills is not new to education. Writers, artists, builders, and more have used portfolios to

collect, document, and share growing bodies of work as they developed in knowledge and skill. To be sure, portfolio use spans content areas and dates back centuries (Adams, 2010). Formal portfolio work can be dated back to Leonardo Di Vinci, who diligently kept a portfolio to document his inventions, thoughts, and reflections (H. Barrett, personal communication, August 14, 2014). As portfolios have shifted to electronic formats, a renewed interest in their adoption and implementation has led to new opportunities for learning, assessment, and professional development.

Assessment of student learning will continue to gain importance in ongoing educational reform efforts (Baker, 2001). Assessment approaches must continue to advance if they are to inform individual student learning in more dynamic and sophisticated ways. While traditional assessments such as exams are often considered efficient to administer and grade, these types of assessments typically focus on the acquisition of foundational knowledge and are unable to assess higher-level knowledge and skills (Linn, 1993). However, performance assessments, such as those included in a portfolio of work, require observable disciplinary activity and artifacts (Davies & Le Mahieu, 2003; Linn, 1993) and empower a learner to exhibit the development of new knowledge and skills over time, offering greater depth and complexity (Airasian, 1996).

Watson, Zaldivar, and Summers (2010) claim that ePortfolios assist with assessment of students on three distinct levels. First, the creation process for building ePortfolios provides a method for capturing student learning that is often unable to be captured using traditional assessment, allowing instructors to see the growth of students through a course or program. Second, if the instructor of a course or program builds their own ePortfolio alongside students, that instructor will be able to better reflect on the progress and experiences of their students. Lastly, programs and institutions also benefit from the use of ePortfolios, providing rich learning and program assessment data that can be used for curricular improvements.

Over the last decade, the versatility, portability, and efficiency of ePortfolios have brought prominence to this instructional technology in higher education across disciplines. While this trend may originate in the need to assess students and student work in diverse ways, ePortfolios have also proven useful for examining and supporting individual learning and professional development over time (Mitchelson & Mandell, 2004; Watson & Doolittle, 2011). In recent years, the use of ePortfolios has continued to increase at the undergraduate level in higher education (Dahlstrom & Bichsel, 2014).

### **ePortfolio Adoption and Diffusion of Innovation Theory**

As higher education institutions increase their use of instructional technologies, ePortfolios meet a growing institutional need for relevancy to the teaching and learning enterprise (Bass & Eynon, 2009; Schneider, 2009). However, similar to any other innovation, ePortfolios are subject to the conditions and stages of the innovation diffusion process and barriers to their adoption, integration, and sustainment arise (Annan, 2008; Surry, 2002). In addition, the meaningful and purposeful implementation of ePortfolios on a large scale can be challenging (Cambridge, 2012). Applying what is known about technology adoption and diffusion to the introduction of ePortfolios into an institutional system can support integration while still honoring the unique perspectives and contexts of local faculty users.

Diffusion of innovation theory (DOI), which seeks to understand the social process that community members engage in to adopt or reject an innovation (Rogers, 2003; Surry & Farquhar, 1997), was relied on as the broad conceptual framework for guiding all aspects of the study's design including instrument development, data collection and analysis, framework development, and framework review and revision. Specifically, this study drew from two DOI theoretical perspectives: Rogers' five Stages of Adoption and Ely's Eight Conditions for Change.

Rogers (2003) identified five Stages of Adoption of an innovation: knowledge, persuasion, decision, implementation, and confirmation. Similarly, Ely (1990) described Eight Conditions for Change: dissatisfaction with the status quo, sufficient knowledge and skills, availability of resources, availability of time, rewards or incentives, participation, commitment, and leadership. Drawing from Rogers and Ely, Surry and Farquhar (1997) argued that the study of an instructional technology in light of DOI theory can help instructional designers have a better understanding of the adoption or rejection of an innovation, work more effectively with clients, and even "lead to the development of a systematic model of adoption and diffusion" (p. 2). Grounded in DOI theory and his own professional experiences with innovation adoption, Surry developed the RIPPLES survey as a means for studying the adoption of an instructional technology across seven dimensions of DOI: resources, infrastructure, people, policies, learning, evaluation, and support. This study employed a modified RIPPLES survey (Blevins & Brill, 2013), along with selected follow-up interviews, to explore the perspectives of faculty and administrators experienced with the adoption of ePortfolios at a large university to inform the development of an implementation framework.

## Methodology

### Study Design

This study drew from a design and development research methodology, defined by Richey and Klein (2007) as the “systematic study of design, development and evaluation processes with the aim of establishing an empirical basis for the creation of instructional and non-instructional products and tools and new or enhanced models that govern their development” (p. 1). More specifically, this effort used what was previously known as Type 2 developmental research, recently renamed to model research, in which the research “pertains to the [study] of the development, validation, and use of design and development models.” (Richey & Klein, 2007, p. 10).

Consistent with model development research, three phases informed framework development: analysis, development and evaluation, and revision. In the analysis phase, faculty and administrator perspectives about the ePortfolio implementation process were investigated through survey and interviews shaped by DOI theory. In the development and evaluation phase, study findings and DOI theory guided the development of a six-component framework that was then evaluated by three experts in systemic change. In the revision phase, recommendations from the experts directed the revision and finalization of the framework. An overview on how these phases were applied in this study is provided in Table 1.

### Setting and Participants

A large United States research university with approximately 30,000 students began a university-wide initiative to implement ePortfolios in 2002. During this time, several credible strategies were considered to support the initiative’s success including: strategic alignment of the initiative to department, college, and institutional goals; partnerships with key stakeholders; pilot-testing; faculty development opportunities; and the use of the Concerns-Based Adoption Model (CBAM) for change (Hord, Rutherford, Huling-Austin, & Hall, 2006) and Ely’s Eight Conditions of Change (Ely, 1990) for implementation (Watson et al., 2010).

Anecdotal data suggested challenges with long-term ePortfolio implementation. However, empirical data to investigate the success of these strategies and potentially guide improvements did not exist. Thus, approximately 10 years after the initial implementation of ePortfolios on the university’s campus, the perspectives of 144 members of the university community were sought through survey and follow-up interviews. These members of the university community were identified through the university’s ePortfolio office as faculty and administrators who had used or were currently using ePortfolios.

## Data Sources and Analysis

The survey instrument was a modified RIPPLES survey, which is based in part, in DOI theory and specifically designed to explore instructional technology integration in higher education. The 55 question survey was divided into four sections: participant demographics; background (individual historical use of ePortfolios); ePortfolio implementation at their university; and, opinion of ePortfolio adoption and implementation. The ePortfolios at the university section, which was modified to more directly reflect Ely’s Eight Conditions for Change, contained seven subsections reflective of the RIPPLES model acronym: resources (time and money); infrastructure; people (communication and shared decision-making); policies; learning (specific instructional outcomes for user training); evaluation; and (user) support. Each of the seven subsections contained close-ended questions as well as at least one open-ended question. The close-ended question in these sections had a possible value between one and six (1 = don’t know/unsure; 2 = strongly disagree; 3 = disagree; 4 = neutral; 5 = agree; 6 = strongly agree).

Fifty-two out of 144 individuals (36%) responded to the survey. Typical response rates for online surveys are 52%, plus or minus 20% (Baruch & Holtom, 2008). Thus, while the response rate was lower than desired, it can still be considered acceptable. A descriptive analysis of the data was conducted first in order to determine the means, percentages, and standard deviations for each survey item. Second, participants’ answers to the open-ended questions were examined for emerging themes (Creswell, 2009). The survey findings influenced the development of the final interview protocol in order to provide opportunities for more directed data collection based upon the study’s purpose.

The ten-question interview protocol probed each participant to speak in greater depth about their experiences implementing ePortfolios at the university. A small interview sample of 12 survey participants was selected to represent a diverse cross-section of the university. Selection criteria included: discipline, gender, years at the university, years teaching, role (faculty or administrator), time using ePortfolios, and current usage status (continued user or abandoner). Interview transcripts were coded for themes. Interview findings were then triangulated with participant survey findings in order to strengthen the analytic process (Creswell, 2009).

Using the findings from the survey, interviews, and DOI literature review, a framework for supporting the adoption of ePortfolios by university faculty, staff, and administrators was developed. Conceptually, the framework was meant to operationalize those aspects of DOI theory that appeared to be most supportive of successful ePortfolio adoption. Five experts in DOI theory were asked to provide feedback, via a rubric, regarding the extent to which the framework effectively

Table 1  
*Overview of Study Phases*

Phases	Framework Development and Validation
Analysis	Analyze DOI Literature and create survey and interview protocol to collect participant data. Analyze survey data, interview data, and DOI literature.
Development and Evaluation	Develop framework based on analysis. Develop rubric for DOI expert reviewers. Administer expert reviews.
Revision	Analyze expert reviews. Incorporate feedback from expert reviewers to create a revised framework.

and appropriately integrated important DOI elements. Three reviewers completed the review process. This feedback was analyzed and incorporated into a revised ePortfolio implementation framework.

## Findings

### Participant Demographics

Fifty-two out of 144 individuals responded to the survey (36%), and all of them indicated that they were currently or had previously used Sakai, the university's ePortfolio system. Sixty-two percent (32) of the participants who submitted the survey were female, and 38% (20) were male. In response to age, 4% (2) indicated they were age 20-29; 10% (5) selected age 30-39; 27% (14) indicated age 40-49; 38% (20) identified as 50-59; 17% (9) selected age 60-69; and 4% (2); age 70 or above. Thus, based on age alone, 14% of respondents could be considered early career, while 69% could be characterized as mid to late career.

Regarding professional position, 67% (34) of survey respondents were faculty with at least some teaching responsibilities and 29% (15) were in administrative roles. When asked the number of years teaching at the college or university level, 35% (18) answered zero to 10 years; 40% (21) answered 11 to 25 years; and 25% (13) answered 25 years or more.

### ePortfolio Use

When asked how long participants had been using or previously used ePortfolios, 48 of 52 participants (92%) responded. Of those responses, 23% (11) answered less than one year; 35% (17) answered one to three years; and 42% (20) answered four or more years. Surprisingly, 42% of respondents reported abandoning the use of ePortfolios. When asked why they stopped using them, 22 of 52 participants (42%) responded. Responses were grouped into the following six

categories, ordered here from high to low: change in employment position (8); usability and reliability of technology (8); faculty or student resistance (3); too much time or effort required (3); change in course structure (3); and, still in development (1). Of note here are the two categories of technology usability and time investment in that these themes also arose in other sections of the data.

Regarding the purpose(s) for using ePortfolios, 50 of 52 participants (96%) responded. Of those responses, 58% (29) answered to track learning; 60% (30) answered to assess learning; 40% (20) answered to support professional development; and 36% (18) answered Other. From the Other category, the following response themes emerged: scholarship and employment (4); course or program requirement (3); showcase student work (3); and accreditation (1). Thus, most respondents rely on assessment and the tracking of learning as the main reasons for using ePortfolios.

When prompted to identify what they liked most about using ePortfolios, 50 of 52 participants (98%) responded. Ordered high to low, these categories included: housing and showcasing of artifacts (27); self-reflection and learning process engagement (15); meets accreditation and assessment requirements (7); reveals whole picture of student (6); flexibility (4); and availability and security (1). Thus, most survey respondents value ePortfolios as a means to store and access student work. A comment by Professor Adams (Instructor) reflected how ePortfolios have been of value:

Prior to [ePortfolios], we were doing [artifact creation and collection] in different areas. We had a piece here, a piece here, and we were trying to teach the [students] a methodology of developing themselves, but in addition to that, 'How can I prepare myself for finding a job?'

When asked to pinpoint what they liked least about using ePortfolios, 51 of 52 participants (98%)

responded. Responses were grouped in categories, high to low, as: lack of user-friendly electronic platform (33); time spent planning and grading (11); student and faculty difficulty and resistance (9); defining and understanding ePortfolios (2); and inaccessibility after graduation (2). Given these responses, survey respondents appear most troubled by the limitations of the current ePortfolio system, Sakai.

Regarding what participants perceived as the most important factor(s) influencing faculty adoption and use of ePortfolios, 49 of 52 participants (94%) responded. Responses were categorized as follows: usability and flexibility of system (20); faculty buy in to a clear purpose (19); support and training (7); reward for use and time commitment (6); and, the learning curve (5). Consistent with prior responses, quality of the ePortfolio system and user buy-in to a clearly communicated purpose arose as the top two factors in ePortfolio adoption.

### **ePortfolios at the University**

To investigate more closely how participants viewed the seven DOI factors previously identified in the RIPPLES model, they were asked to rate the importance of each of these factors in regards to ePortfolio implementation at their university as well as ePortfolio, as a representative instructional technology, for adoption and implementation in general. Regarding the importance of each individual RIPPLES item to implementation, participants rated Infrastructure of greatest importance (94% agree or strongly agree); Resources (time and money) of second greatest importance (92%); Learning (specific instructional outcomes of user training) in third place (87%); and User Support as fourth (85%). The rest of the items fell in line as follows: Policies (60%), Evaluation (66%), and People (communication and shared decision-making) (52%).

Given that Infrastructure was rated of greatest importance, it is not surprising that participants chose to comment on infrastructure issues the most on both the survey and during the interviews. Survey data revealed that, while the overall university infrastructure is viewed positively, the ePortfolio technologies are not. In fact, the ePortfolio technology system's design was identified by survey participants as the top barrier to ePortfolio use. As Professor Johnson (administrator) put it during his interview, "You cannot have a successful portfolio program if you have a product that is full of holes and bugs." Interestingly, when asked on the survey what they felt was the greatest potential enabler to ePortfolio use, participants identified the technology's capabilities as second only to support.

While 92% of survey respondents ranked the Resources of time and money as second most important to ePortfolio implementation, they distinguished time as

more important than money to successful use. In fact, they identified a lack of time to learn about and implement ePortfolios as the second most significant barrier to use. In his interview, Professor Lewis (Associate Professor) commented, "You have to have time to be able to think through the process. There has to be time dedicated to the instruction of the technology itself and the support of that technology." Professor Young shared, "If you put a lot of technology into your class, you get a pat on the head...Nobody's saying to me, 'Oh here, let me give you fewer classes or something to make up for the time you are spending.'"

In regards to RIPPLES, user Learning (87%) and user Support (85%) were rated as third and fourth most important respectively to ePortfolio implementation. At the university, one central office was dedicated to providing both training and support to ePortfolio adopters across the campus. This type of centralized support was viewed as both essential and exemplary by survey respondents. Comments included the following:

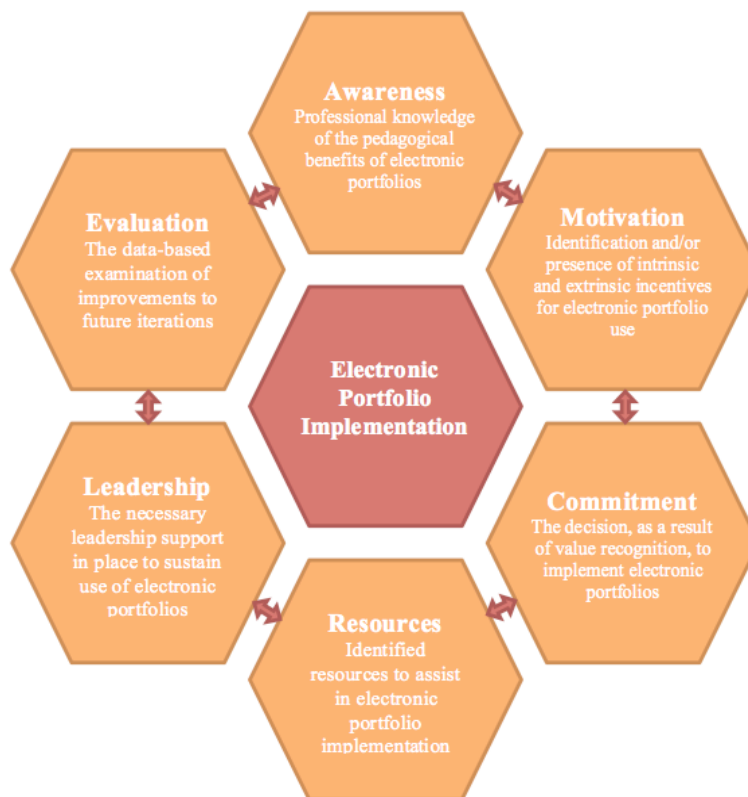
- "The university office responsible for administering ePortfolio support is excellent. They are always very helpful" (Lecturer).
- "The eP office group is great. They have been extraordinarily helpful" (Instructional Faculty).
- "The eP office is a lifesaver. Without those folks and their support, I would not have included ePortfolios" (Instructional Faculty).

In contrast, elements of support at the program, department, and university levels, particularly in regards to leadership, were also viewed as essential but inconsistent and disjointed. In his interview, Professor Adams (Instructor) addressed this need for a more unified culture of support: "We all need to be aligned in the goals of the ePortfolio...there's a lot of moving parts, and a lot of people need to be on board for it to work." Recall that survey respondents identified faculty buy-in to a clear purpose as the second most important adoption factor.

### **The ePortfolio Implementation Framework**

Based on the findings from survey and interview data, as well as a review of the DOI literature, a framework for implementing ePortfolios was created. This original framework was reviewed by three external DOI experts. These experts were selected based on their expertise in technology integration and systemic change. In addition, all three had experience working within higher education as either faculty or administrators. Their feedback was then analyzed and incorporated into a revised framework. Generally, the reviewers agreed that the framework had strong

Figure 1  
*ePortfolio Implementation Framework components*



alignment with DOI theory. They also agreed that the framework would prove useful for its intended audience. Reflective comments include: “For institutions new to ePortfolio, this framework will provide much needed guidance and systematic recommendations for moving an adoption campaign forward” (Reviewer 1); “The framework provides a guidance process for implementing and sustaining ePortfolio in higher education” (Reviewer 2); “Great potential and practical use in the field” (Reviewer 3). Reviewers also agreed that the purpose of the framework and use of the rating scale could be clarified with concerns addressed through the addition and revision of some of the framework’s column headings and descriptive text. This section describes the revised framework in detail.

The framework developed is meant to support those implementing, or attempting to implement, ePortfolios in a higher education context by guiding them through key attributes of systemic innovation in a practical and applied manner. First, six essential components were identified and defined through both

the DOI literature, specifically Rogers (2003) and Ely (1990), and study findings. The framework was then assembled to include these six components in a modular format: awareness, motivation, commitment, resources, leadership, and evaluation (see Figure 1).

Awareness is defined as the professional knowledge of the pedagogical benefits of ePortfolios. The Awareness component reflects Rogers’ (2003) knowledge stage in his Stages of Adoption model and Ely’s (1990) dissatisfaction with the status quo and sufficient knowledge and skills conditions in his Conditions for Change model. Study findings demonstrate that participants had developed an awareness of the usefulness of ePortfolios, especially to capture and show student work and as a means for assessment. Further, through the centralized ePortfolio office, adopters had opportunities to knowledge and skill-build and viewed these support experiences as positive. Participants also saw the importance of a clear purpose for ePortfolio use, an awareness goal that can be supported through professional development.



The Motivation component of the framework is defined as the identification and/or presence of intrinsic and extrinsic incentives for using ePortfolios. The Motivation component reflects Rogers' (2003) persuasion stage in his Stages of Adoption and Ely's (1990) dissatisfaction with the status quo and need for rewards/incentives conditions in his Conditions for Change model. A remark by Professor Johnson (Administrator) pinpoints a recognized intrinsic value to ePortfolios, the move from unwieldy paper-based to more manageable electronic means for storage and access:

Because again, you've got a portfolio [this] thick for every student in the department and, you know we were graduating at that point 20 to 25 students a year. Twenty or 25 students a year was three quarters of a drawer and after 10 years we had ... a lot of records and so ... we were very eager to see the ePortfolio and we participated from the very beginning.

Although participants recognized the intrinsic value of ePortfolios, they also recognized the significant time investment necessary to implement and that such an investment should be acknowledged and even mitigated or compensated through extrinsic rewards such as a course release or graduate assistant support.

Commitment, the third component in the framework, is defined as the decision, as a result of value recognition, to implement ePortfolios. The commitment component reflects Rogers' (2003) decision stage in his Stages of Adoption and Ely's (1990) participation and commitment conditions in his Conditions for Change. The need for consistent commitment across program, department, and university levels was evident in study findings. As Associate Professor Lewis, remarked, "We all need to be aligned in the goals of the ePortfolio... there's a lot of moving parts, and a lot of people need to be on board for it to work."

The next component, Resources, is defined as identified resources to assist in ePortfolio implementation. This component reflects Rogers' (2003) implementation stage in his Stages of Adoption and three conditions in Ely's (1990) Change model: sufficient knowledge and skills, availability of time, and availability of resources. Study findings supported the importance of adequate resources and resource allocation, including adequate time and support, for successful ePortfolio implementation. As Professor Clark (Administrator) commented:

"We ran into a whole lot of resource issues, no one had the time to work on it even though we had leadership buy-in. Resources were not provided to back it up even though I think

[faculty] were interested in it. They felt overwhelmed all the time."

Leadership is defined as the necessary leadership support in place to sustain use of ePortfolios. This component reflects Ely's (1990) leadership condition in his Conditions for Change. Study findings supported the idea that ongoing involvement and support from leadership at all levels is important to sustaining ePortfolio implementation. As Professor Johnson (Administrator) remarked:

"You need to make sure that the faculty are aware of the opportunity and how easy it to use. I do not see much information coming across my desk anymore that says, 'Hey we have this cool tool, why don't you try it?'"

The final component, Evaluation, is defined as the data-based examination of ePortfolio use for improvements to future iterations. This framework component reflects Roger's (2003) stages of implementation and confirmation. Further, it is also reflective of the need for systemic evaluation of the ePortfolio initiative, as documented in study findings. One survey respondent, an administrator, noted the following:

"I think evaluation is very important. Evaluation results need to be communicated and acted upon in order for them to be enablers. I think if evaluations are done in a solitary way and not acted upon, I am not sure how helpful they are."

Lumsden (2007) reports evaluation as one of five success factors to the university-wide implementation of ePortfolios at Florida State University, providing further support for including an Evaluation component in the framework.

After the six essential components were identified and arranged, more work was done to expand the framework into a usable resource (see Appendix) that anyone considering implementing ePortfolios, or already in the process of implementation, could use to assess the workgroup's current status in the implementation process as well as critical next steps. In addition to providing a definition of each component, guidance in the following areas was provided for each component: Selected Strategies to Support Component, Key Stakeholder Involvement, Assessment of Current Implementation Status, and Next Steps for Implementation Efforts. The "Selected Strategies to Support Component" column offers selected strategies to act on each component. The "Key Stakeholder Involvement" column identifies stakeholders that can impact progress on that component. A rating scale is

provided in the “Assessment of Current Implementation Status” column for users to assess where a workgroup stands with each component and identify next steps for implementation. A rating of one (1 = low) would identify a component as a priority in planning efforts, whereas a three (3 = high) would indicate the component is well-attended to and therefore of low priority. Through such a quick check, action planning provided in the “Next Steps for Implementation Efforts” column could then be based on top priorities, perhaps minimizing time required toward adoption and implementation efforts.

### Summary

Study findings resulted in an understanding of faculty and administrator perspectives as participants in an ongoing university-wide ePortfolio implementation that, through the lens of DOI theory, were used to construct a framework that can be used by higher education community members to enable such a systemic initiative. The ePortfolio framework consists of six essential elements: awareness, motivation, commitment, resources, leadership, and evaluation. Importantly, the framework is modular, not linear, with individual elements taking on varied degrees of emphasis at different stages in the innovation life cycle. An action planning tool accompanies the framework to support faculty implementation efforts over time. To ensure the framework was appropriately aligned with DOI theory in addition to practitioner experiences, it underwent expert review by three systemic change scholars. Reviewer feedback was then incorporated into the final version of the framework in Appendix.

### Discussion

A university-wide ePortfolio implementation is a complex undertaking that requires the long-term and attentive coordination of infrastructure, resources, and people. This study contributes to the instructional design and technology field in two ways. First, it offers a framework for ePortfolio adoption and implementation in higher education contexts that acknowledges and includes the perspectives of faculty and administrators while addressing key elements of DOI theory. Second, the study contributes to a small but growing collection of design and development research studies, providing an example of what this newer methodological approach can look like in practice.

### A Robust ePortfolio Implementation Framework

This study contributes insight into faculty and administrator perspectives regarding a university-wide ePortfolio adoption process, as well as a framework for supporting it. As noted, faculty perspectives on

instructional technology adoption, including ePortfolio adoption, have not been well documented in the literature (Ruiz et al., 2009; Wang & Turner, 2007), and yet they are key stakeholders in the process. Findings from this project shed light on what faculty and administrators value in an ePortfolio implementation process including a user-friendly infrastructure, a clear and communicated purpose, support and training, and rewards for use and time commitment. By creating a framework for implementation that acknowledges faculty priorities and engages them early and systemically in the process can heighten instructional technology adoption and sustainment success. In a study of Florida State University's (FSU) ePortfolio adoption initiative, Lumsden (2007) identifies “feedback and buy-in from key stakeholders (students, staff, faculty, and employers)” (44) as a critical success factor. Further, components of the framework are consistent with several other named success factors of the FSU program, including university-wide leadership and vision and ePortfolio evaluation. At FSU, stakeholders established the goals and created the prototype for the ePortfolio system through an iterative, design-evaluation-revision process prior to a team of information technology professionals beginning work on the infrastructure, thus resulting in a more usable system (Reardon, Lumsden, and Meyer, 2005), a prominent concern of participants in this study.

A study on instructional technology adoption by Lei and Morrow (2010) provides further support for an implementation framework that puts faculty at the center of a process early on as collaborative decision makers and enactors who are well-supported by strong leadership, sufficient and timely resources, a means for critical feedback, and incentives. The framework makes the innovation process transparent to all stakeholders and guides open communication and decision-making across the organization. Educators remain connected to the initiative and are better prepared to call on the most important innovation adoption support elements at critical and appropriate times. Using a framework that supports an open implementation process, educators are less distracted by unexpected innovation stumbling blocks and better able to focus on ePortfolios as a means for student learning, assessment, and professional development.

In the past two decades, educational researchers continue to demonstrate that instructional technologies have not been well integrated into teaching and learning practices (Cuban, 2001; Tyack & Cuban 1995; Zhao, Pugh, Sheldon, & Byers, 2002). Significant costs associated with wide-scale integration efforts, such as organization-wide ePortfolio initiatives, certainly warrant concern if investments are not yielding positive and sustainable results. Recall that 42% of respondents in this study chose to abandon ePortfolio use. Rogers

(2003) and other diffusion of innovation experts (Watson, Watson, & Reigeluth, 2008) have well documented the complex nature of innovation adoption and the supports necessary to undergird this type of change. The framework presented here accounts for the necessary knowledge and skill development of those adopting an instructional technology but also provides for other vital supports to an innovation implementation process, as well as a way to assess current performance on these supports in order to move forward in an informed manner. Use of such a framework may improve our track record with instructional technology integration. However, while validated by DOI experts, the framework now needs to be tested in the field in a variety of contexts.

### Design and Development Research in Practice

As the popularity of design and development research continues to grow, this research project can serve as a model for those who are considering or currently using this methodology. While there is significant guidance regarding design and development research (see, for example, Ellis & Levy, 2010; Richey & Klein, 2005; Richey & Klein, 2007), the body of research using this methodology remains relatively small (Richey & Klein, 2014). This study adds to the empirical body of knowledge on design and development research, providing another example of what this methodology can look like in practice. Two important lessons were learned by the researchers in using this approach: lessons that may help other researchers. First, it took more time than anticipated to secure expert reviewers and collect their feedback on the framework, a critical component of this methodology. In addition to gaining the commitment of expert reviewers earlier, using a scheduled interview, rather than an online survey, to obtain feedback for the framework revision phase might be more efficient. Second, developing a framework and the supporting instructions for use that was mature enough to be understood and evaluated by experts was a more challenging task than anticipated. Getting feedback on early prototypes of the framework from intended users, akin to a rapid prototyping approach (Tripp & Bichelmeyer, 1990), may expedite the development process and lend greater validity to the framework prior to releasing it for expert review. The second author has inserted this rapid prototyping approach into the development phase of a design and development study to be carried out over the coming year.

Two study limitations should be noted. First, the setting of the study, a large higher education institution with certain ePortfolio resources in place, could be viewed as a study limitation. While the researchers aimed for a framework that could be adaptable to any

higher education setting, survey and interview findings may have been different if this study had been conducted in a different setting. For example, a smaller institution with different ePortfolio technologies at hand may have yielded different priorities, potentially impacting the framework. A second limitation relates to when the study was conducted in relation to the institution's adoption lifecycle. The diffusion literature points to an s-curve rate of innovation adoption in which early on adoption rates are low but increase dramatically in later stages and then taper off as time passes often due to fewer adopters and even abandoners (Rogers, 2003). This study was conducted fairly late into the adoption lifecycle, over ten years into the university's ePortfolio initiative, a factor that could have impacted participant perceptions. It is hoped that the grounding of the study, including instrument development, in the diffusion of innovation literature provided a useful counterweight to these concerns. However, the study of the framework in other higher education contexts and at earlier stages of the adoption process is needed to shed light on these issues. As a first step, the first author is now using the framework created in this study to collaborate with faculty on the implementation of ePortfolio as an innovation at a mid-sized university in the United States.

The field of instructional design and technology demands that researchers and practitioners not only create new knowledge, but also research and improve upon current practices. The use of design and development research can assist professionals in the study, improvement, and validation of instructional design tools and practices (Klein, 2013), serving as a useful approach to forming important connections between instructional design theory and instructional design practice.

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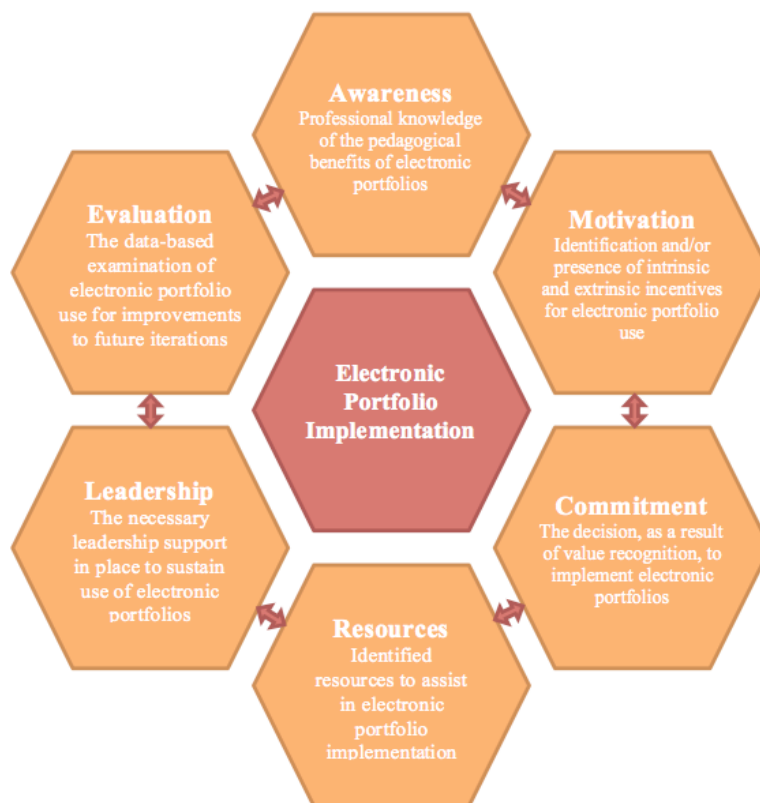
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## Appendix

### A Framework to Support Electronic Portfolio Implementation in Higher Education Contexts

#### Introduction to the Framework

Based on survey and interview data from faculty and administrators who have implemented electronic portfolios (ePortfolios) at a large research university in the United States and improved upon by suggestions from three diffusion of innovation (DOI) expert reviewers, the following framework for implementing ePortfolios was created. The framework is meant to support those implementing, or attempting to implement, ePortfolios in a higher education context by guiding them through key attributes of systemic innovation in a practical and applied manner.





*Figure 2. ePortfolio Implementation Framework components*


As illustrated in Figure 2, the framework is divided into six components that are vital to the successful implementation of ePortfolios by faculty over time. These components (Awareness, Motivation, Commitment, Resources, Leadership, and Evaluation) reflect important DOI elements put forth by Everett M. Rogers (2003) and Donald P. Ely (1990), prominent scholars in systemic change. Awareness is defined as professional knowledge of the pedagogical benefits of ePortfolios and corresponds with Roger's element of knowledge as well as Ely's condition of dissatisfaction with the status quo. Motivation is defined as the identification and/or presence of intrinsic and/or extrinsic incentives for using ePortfolios and corresponds with Roger's element of persuasion as well as Ely's conditions of dissatisfaction with the status quo and rewards or incentives. Commitment is defined as the decision, as a result of value recognition, to implement ePortfolios and corresponds with Roger's element of decision as well as Ely's conditions of participation and commitment. Resources is defined as identified resources to assist in ePortfolio implementation and corresponds with Roger's element of implementation as well as Ely's conditions of sufficient knowledge and skills, availability of time, and availability of resources. Leadership is defined as the necessary leadership supports in place to sustain use of ePortfolios and corresponds with Roger's element of implementation as well as Ely's conditions of leadership. Evaluation is defined as the data-based examination of ePortfolio use to inform improvements to future iterations and corresponds with Roger's element of confirmation.

The framework was built to assist those in a higher education context who are considering implementing


portfolios or already in the process of implementation to assess a workgroup's current status in the implementation process, as well as important next steps. The framework is modular in that components can be considered in any order as needed. In addition to defining each component, selected strategies to act on each component, as well as key stakeholders who can influence progress on that component are provided (See Figure 3). In column four of each framework component, you may notice a scale for rating the current implementation status of the component. This scale is provided for users to assess performance on each component and identify next steps important to implementation. The intent of the 3-point rating scale is for the workgroup (e.g. organization, department, or program level) to take the pulse of the group's current implementation status. A rating of one would identify a component as a priority in planning efforts, whereas a three would indicate the component is of low priority. Through such a quick check, action planning can then be based in top priorities.


Component	Selected Strategies to Support Component	Key Stakeholder Involvement	Rating of Current Implementation Status	Next Steps for Implementation Efforts
 <p>Professional knowledge of the pedagogical benefits of electronic portfolios</p>	<ul style="list-style-type: none"> <li>• Websites</li> <li>• Newsletters</li> <li>• Articles</li> <li>• Presentations</li> <li>• Professional development</li> </ul>	<ul style="list-style-type: none"> <li>• Identified high-level opinion leaders including but not limited to:               <ul style="list-style-type: none"> <li>○ Academic leaders on campus (e.g. provost, teaching and learning directors)</li> <li>○ Leading electronic portfolio scholars and practitioners</li> <li>○ Local faculty innovators</li> </ul> </li> </ul>	<ol style="list-style-type: none"> <li>1. Faculty are unaware of the pedagogical value of electronic portfolios.</li> <li>2. Faculty are somewhat aware of the pedagogical value of electronic portfolios.</li> <li>3. Faculty are very aware of the pedagogical value of electronic portfolios.</li> </ol>	<p>Rating of 1 or 2</p> <ul style="list-style-type: none"> <li>• Identify multiple avenues for electronic portfolio awareness building.</li> <li>• Plan a 3-6 month awareness building campaign.</li> <li>• Reassess awareness status after one to two academic years.</li> </ul> <p>Rating of 3</p> <ul style="list-style-type: none"> <li>• Reassess awareness status at next formal, systemic evaluation of electronic portfolio implementation. (A systemic evaluation is recommended every three to five years.)</li> </ul>

Component	Selected Strategies to Support Component	Key Stakeholder Involvement	Rating of Current Implementation Status	Next Steps for Implementation Efforts
 <p>Identification and/or presence of intrinsic and extrinsic incentives for electronic portfolio use</p>	<ul style="list-style-type: none"> <li>• Learner incentives               <ul style="list-style-type: none"> <li>◦ Hands-on, applied projects</li> <li>◦ Alternative assessment opportunities</li> <li>◦ Showcases and/or competitions</li> <li>◦ Job seeking resource</li> </ul> </li> <li>• Faculty incentives               <ul style="list-style-type: none"> <li>◦ Departmental awards</li> <li>◦ Accreditation fulfillment</li> <li>◦ Teaching release time for development</li> <li>◦ Grants and monetary incentives</li> </ul> </li> <li>• Communication channels (awareness campaign, professional development sessions)</li> </ul>	<ul style="list-style-type: none"> <li>• Provost and/or academic unit decision makers</li> <li>• Electronic portfolio advocates</li> <li>• Faculty innovators</li> <li>• Student innovators</li> </ul>	<ol style="list-style-type: none"> <li>1. Faculty are unaware of the intrinsic and extrinsic incentives for using electronic portfolios.</li> <li>2. Faculty are somewhat aware of the intrinsic and extrinsic incentives for using electronic portfolios.</li> <li>3. Faculty are very aware of the intrinsic and extrinsic incentives for using electronic portfolios.</li> </ol>	<p>Rating of 1 or 2</p> <ul style="list-style-type: none"> <li>• Identify appropriate and realistic complement of learner and faculty incentives.</li> <li>• Use communication channels to convey incentives.</li> <li>• Showcase examples of student electronic portfolios that are relatable and convey incentives.</li> <li>• Reassess motivation status after one to two academic years.</li> </ul> <p>Rating of 3</p> <ul style="list-style-type: none"> <li>• Reassess motivation status at next formal, systemic evaluation of electronic portfolio implementation. (A systemic evaluation is recommended every three to five years.)</li> </ul>

Component	Selected Strategies to Support Component	Key Stakeholder Involvement	Rating of Current Implementation Status	Next Steps for Implementation Efforts
 <p>The decision, as a result of value recognition, to implement electronic portfolios</p>	<ul style="list-style-type: none"> <li>• Faculty acknowledgements and rewards for initial investments of time and effort</li> <li>• Exemplar electronic portfolios as models</li> <li>• Dedicated ePortfolio staff/office</li> <li>• Inclusion in strategic plan</li> </ul>	<ul style="list-style-type: none"> <li>• Provost and/or academic unit decision makers</li> <li>• Electronic portfolio professional staff</li> <li>• Faculty leadership team</li> </ul>	<ol style="list-style-type: none"> <li>1. Faculty are not committed to the use of electronic portfolios.</li> <li>2. Faculty are somewhat committed to the use of electronic portfolios.</li> <li>3. Faculty are very committed to the use of electronic portfolios.</li> </ol>	<p>Rating of 1 or 2</p> <ul style="list-style-type: none"> <li>• Identify a faculty leader by department or program, to establish and direct a regular schedule of work meetings regarding electronic portfolio implementation.</li> <li>• Reward faculty for initial time and effort.</li> <li>• After defining the direction of the initiative, involve technology service providers and ePortfolio staff in conversation with the faculty team to ensure potential:               <ul style="list-style-type: none"> <li>◦ technology solutions are feasible.</li> <li>◦ ePortfolio platforms are feasible and will support the features of desired models.</li> </ul> </li> <li>• Reassess commitment status after one to two academic years.</li> </ul> <p>Rating of 3</p> <ul style="list-style-type: none"> <li>• Reassess commitment status at next formal, systemic evaluation of electronic portfolio implementation. (A systemic evaluation is recommended every three to five years.)</li> </ul>



Component	Selected Strategies to Support Component	Key Stakeholder Involvement	Rating of Current Implementation Status	Next Steps for Implementation Efforts
 <p>Identified resources to assist in electronic portfolio implementation</p>	<ul style="list-style-type: none"> <li>Targeted in-house professional development activities</li> <li>Dedicated Technology support</li> <li>Dedicated Pedagogy support</li> <li>Professional ePortfolio organizations (AAEEBL, ePIC, EPAC) and associated resources</li> </ul>	<ul style="list-style-type: none"> <li>In-house professional development service providers (ePortfolio, technologies, pedagogy)</li> <li>Faculty innovators</li> <li>Graduate assistants</li> <li>External electronic portfolio professional organizations, conferences, and/or journals</li> </ul>	<ol style="list-style-type: none"> <li>Faculty are unaware of the resources available to assist in their implementation of electronic portfolios.</li> <li>Faculty are somewhat aware of the resources available to assist in their implementation of electronic portfolios.</li> <li>Faculty are very aware of the resources available to assist in their implementation of electronic portfolios.</li> </ol>	<p>Rating of 1 or 2</p> <ul style="list-style-type: none"> <li>Use communication channels (awareness campaign, professional development sessions) to convey available resources.</li> <li>Ensure that available resources (including incentives) are accessible to faculty in light of work habits and environments.</li> <li>Check for other reasons for non-use of resources.</li> <li>Reassess resources status after one to two academic years.</li> </ul> <p>Rating of 3</p> <ul style="list-style-type: none"> <li>Reassess resources status at next formal, systemic evaluation of electronic portfolio implementation. (A systemic evaluation is recommended every three to five years.)</li> </ul>

Component	Selected Strategies to Support Component	Key Stakeholder Involvement	Rating of Current Implementation Status	Next Steps for Implementation Efforts
 <p>The necessary leadership support in place to sustain use of electronic portfolios</p>	<ul style="list-style-type: none"> <li>Ongoing recognition by important leaders through preferred communication channels (websites, newsletters, showcases, and presentations)</li> <li>Inclusion in strategic plan and other policy documents</li> </ul>	<ul style="list-style-type: none"> <li>Electronic portfolio professional staff</li> <li>Contact staff for technology and pedagogy supports</li> <li>Provost and/or academic unit decision makers</li> <li>Faculty champions</li> </ul>	<ol style="list-style-type: none"> <li>Faculty do not have the leadership support needed to sustain their use of electronic portfolios.</li> <li>Faculty somewhat have the leadership support needed to sustain their use of electronic portfolios.</li> <li>Faculty have the leadership support needed to sustain their use of electronic portfolios.</li> </ol>	<p>Rating of 1 or 2</p> <ul style="list-style-type: none"> <li>Align electronic portfolio initiative with strategic plan goals.</li> <li>Recognize faculty and student electronic portfolio work.</li> <li>Develop new initiatives for enhancing and highlighting ongoing ePortfolio work.</li> <li>Reassess leadership status after one to two academic years.</li> </ul> <p>Rating of 3</p> <ul style="list-style-type: none"> <li>Reassess leadership status at next formal, systemic evaluation of electronic portfolio implementation. (A systemic evaluation is recommended every three to five years.)</li> </ul>





Component	Selected Strategies to Support Component	Key Stakeholder Involvement	Rating of Current Implementation Status	Next Steps for Implementation Efforts
 <p>The data-based examination of electronic portfolio use for improvements to future iterations</p>	<ul style="list-style-type: none"> <li>Gather student, faculty, and/or potential employer feedback through survey, interview, or other data collection options.</li> </ul>	<ul style="list-style-type: none"> <li>Electronic portfolio professional staff</li> <li>In-house evaluation resources service provider</li> <li>Faculty</li> </ul>	<ol style="list-style-type: none"> <li>Faculty are unaware of the evaluation activities and outcomes related to the implementation of electronic portfolios.</li> <li>Faculty are somewhat aware of the evaluation activities and outcomes related to the implementation of electronic portfolios.</li> <li>Faculty are very aware of the evaluation activities and outcomes related to the implementation of electronic portfolios.</li> </ol>	<p>Rating of 1 or 2</p> <ul style="list-style-type: none"> <li>Electronic portfolio staff and evaluation staff plan for and implement an electronic portfolio evaluation</li> <li>Use evaluation findings to improve the next phase of ePortfolio implementation</li> <li>Reassess evaluation status after one to two academic years.</li> </ul> <p>Rating of 3</p> <ul style="list-style-type: none"> <li>Reassess evaluation status at next formal, systemic evaluation of electronic portfolio implementation. (A systemic evaluation is recommended every three to five years.)</li> </ul>

Figure 3. Component details of ePortfolio Implementation Framework

The action planning worksheet in Figure 4 can be used to identify next steps in the implementation process. Project management of these steps can then begin through the identification of key stakeholders and target completion dates.

Component	Current Implementation Rating	Next Steps	Key Players to Involve	Target Completion Date(s)	Additional Notes
 <p>Awareness</p>	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3				
 <p>Motivation</p>	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3				
 <p>Commitment</p>	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3				

Component	Current Implementation Rating	Next Steps	Key Players to Involve	Target Completion Date(s)	Additional Notes
Resources	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3				
Leadership	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3				
Evaluation	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3				

Figure 4. Action Planning Worksheet for ePortfolio Implementation

## Demonstrating Empathy: A Phenomenological Study of Instructional Designers Making Instructional Strategy Decisions for Adult Learners

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Instructional designers are tasked with making instructional strategy decisions to facilitate achievement of learning outcomes as part of their professional responsibilities. While the instructional design process includes learner analysis, that analysis alone does not embody opportunities to assist instructional designers with demonstrations of empathy for learners. The purpose of this phenomenological study was to investigate the influence of empathy on instructional strategy decisions made by instructional designers for adult learners. Twelve expert instructional designers, having at least five years of experience, participated in the study (six females, six males). Telephone interviews provided the method for data collection to arrive at the essence of participants' lived experiences with the phenomenon. A brief questionnaire, which also collected demographics, established criteria for study participation. Findings indicated that empathy for adult learners was an important concept used by participants to identify and mitigate educational challenges faced by adult learners. Six themes emerged from data analysis: criticality/importance of empathy in instructional design, instructional strategies that should reflect empathy, knowledge of the audience/learners, hindrances to demonstrations of empathy vary, the understanding that online learning requires different considerations, and relevancy. Findings may extend discussions about empathy for adult learners in the instructional design process.

The word *empathy* invokes different viewpoints. Coplan (2011) viewed empathy as a process by which the psychological state of another is simulated by an observer while the observer maintains his or her own well-defined, separate perception of self. Consideration of self, while considering others, is a component of the process of taking another's perspective (Chadwick & Ralston, 2010). It is through this firsthand consideration of another that empathy, a multifaceted process of imagination, becomes possible (Coplan, 2011). It was proposed by Coeckelbergh (2007) that empathy, as a perspective-shifting process, can be mutual and beneficial in helping and caring contexts. Empathy, as viewed by Astleitner and Leutner (2000), is the balance of emotional states and is strongly associated with sympathy because an increase in empathy is part of the process of establishing sympathy. Trout (2009) offered a concise distinction between empathy and sympathy, stating that while the foundation of empathy is accuracy in understanding another, the foundation of sympathy is emotion for another. Trout also offered a viewpoint of empathy as an emotion that without a vehicle of expression by which sustainable change is effected, is limited in its scope and effectiveness.

Parrish (2006) proposed that empathy, as a perspective-shifting process, is the most fundamental instructional design skill. A study by Savage (1975) is a rare example of what Parrish (2006) termed the little discussed topic of empathy in instructional design literature. While the Savage study investigated the development of empathic relationships between instructional designers and clients, there has seemingly been a gap over the years explicitly relating to instructional designers and empathy for learners.

More specifically, for the purposes of this research study, the gap encompassed the study's research question:

How do instructional designers describe their experiences of demonstrating empathy when making instructional strategy decisions for adult learners in higher educational settings?

Regarding the demonstration of empathy for learners in the instructional design process, Parrish asked, "Can they do it intentionally, or is it simply a trait they possess that shows itself in the quality of their work?" (p. 72). Parrish posited that explicit cultivation, by instructional designers, of empathy will not only extend the concept of the design, but will also extend the concept of the design's anticipated achievements.

The first consideration in making instructional strategy decisions is to distinguish an instructional strategy—planning what will be taught and how it will be taught—from an instructional tactic, the implementation of an instructional strategy (Jonassen, Grabinger, & Harris, 1991; Rothwell & Kazanas, 2008). Once planned and written, instructional strategies become real products for (a) a prescription for new instructional material development, (b) standards for the evaluation of existing materials, (c) standards and prescriptions for the revision of current instructional materials, and (d) structure for the organization of instructional activities (Dick & Carey, 1990). As proposed by Dick, Carey, and Carey (2015), development of an instructional strategy includes features such as the characteristics that pertain to the media to be used for learner engagement, learner characteristics, and the instructional content.

Table 1  
*Participant Demographics*

Participant	Gender	Year-of-Birth Range	Years employed as Instructional Designer	Employment Status
Expert IDer A	Male	1956-1971	5-7	Full-time
Expert IDer B	Female	1972-1986	5-7	Full-time
Expert IDer C	Male	1956-1971	10 or more	Full-time
Expert IDer D	Female	1956-1971	5-7	Full-time
Expert IDer E	Female	1956-1971	5-7	Full-time
Expert IDer F	Female	1940-1955	5-7	Full-time
Expert IDer G	Female	1956-1971	5-7	Part-time
Expert IDer H	Female	1956-1971	5-7	Full-time

Instructional strategy features are used to select or develop materials; plan instructional interaction, mediation, online learning technology; and use other methods of instructional packaging and delivery (Dick et al., 2015). As interceders for learners, instructional designers continually probe subject matter experts (SMEs) to insure the accuracy of instructional content to develop content that is clear to learners (Smith & Ragan, 1993). After selecting an instructional strategy, an essential instructional design decision (Christensen & Osguthorpe, 2004), instructional designers have the foundation to develop content to help learners acquire knowledge and skills (Merrill, 2009).

Instructional design practitioners essentially plan and develop instructional resources and activities based on principles of learning and instruction (Smith & Ragan, 1993), along with the systematic analysis of performance problems and the identification of instructional solutions (Rothwell & Kazanas, 2008). Instructional design practitioners, much like engineers, reflect on past successes to determine appropriate action in the development of a new design, a product (Rothwell & Kazanas, 2008). To design a product that meets consumer needs, some effort must be put forth to discern those needs and to learn some details about the consumers (Leonard & Rayport, 1997); the process by which this is done in instructional design is called learner analysis. It is through learner analysis that information on learner characteristics, deemed pertinent as a result of client-designer communications, is gathered (Parrish, 2006). Learner analysis may be limited in that it provides a specific, different purpose, one that does not present empathic opportunities that include how learners will experience instruction (Parrish, 2006; 2008).

### Methodology

This study implemented a qualitative methodology using a phenomenological approach to understand instructional designers' descriptions about their experiences with empathy for adult learners.

Phenomenology provided a means by which the essence of the phenomenon could be explained (Baker, Wuest, & Stern, 1992; Creswell, 1998, 2009, 2013; Flood, 2010; Moustakas, 1994). It is through phenomenological research that the researcher, through empathic understanding, attempts to view the participants' world from their perspectives (Lodico, Spaulding, & Voegtler, 2010).

### Sampling Strategy

The sampling strategy for this study was purposeful and utilized criterion sampling. A purposeful sampling strategy that utilizes criterion sampling limits the sampling scope to recruit study participants who have experience with the phenomenon under investigation (Creswell, 2013). The participants, instructional designers, were recruited from four Internet-based instructional design groups. Those who satisfied participation criteria shared similar demographics (Table 1), i.e., they designed instruction for adult learners in higher educational settings; had expert status (at least five years of experience); and worked either as full- or part-time, permanent staff or independent contractors.

### Data Collection

Data were collected through recorded interviews guided by an interview protocol comprised of open-ended questions. While there are various qualitative data collection methods, data must be collected in a manner that exemplifies the sensitive nature of the research study's anticipated conclusions (Creswell, 2013). Intensive interviews (Charmaz, 2006) were utilized to investigate participants' insights and opinions about empathy for adult learners. As explained by Charmaz (2006), an intensive interview extends beyond basic conversation to facilitate a thorough exploration of a subject or experience. Topic

saturation was reached during each interview. Interview protocols were emailed to each participant.

### Data Analysis

Data analysis for this research study was based on a simplified version of the modified Stevick-Colaizzi-Keen method of phenomenological data organization and analysis (Creswell, 2013). Guided by the simplified version of the Stevick-Colaizzi-Keen method of phenomenological organization and analysis, the researcher did the following:

- Completely described personal experiences in relation to the phenomenon;
- Developed a significant statements list;
- Grouped important statements into “meaning units” (p. 193), which are larger information units;
- Described what participants experienced in relation to the phenomenon; this is the “textural description” (p. 193);
- Described how participants’ experiences with the phenomenon happened; this is the “structural description” (p. 193); and
- Created a composite description comprised of the structural and textural descriptions.

The researcher transcribed all interviews and read each transcript before beginning data analysis. Meaning units were developed as part of the horizontalization process of phenomenological data analysis (Creswell, 2013; Moustakas, 1994). Six themes emerged (Table 2).

### Findings

The study’s findings offer a description of the lived experiences of instructional designers making instructional strategy decisions for adult learners in online higher educational settings. Participants’ responses offered insight into their empathic instructional strategy decisions and their advocacy for adult learners. The concept of empathy, or the state of being empathetic, is the ability to shift perspectives to assess, understand, and consider the feelings of an individual in a way that is free of judgment, uninvited advice, or disparaging remarks (Coeckelbergh, 2007; Coplan, 2011; Johnson, 2002; Parrish, 2006; & Savage, 1975). Concern about how learners experience instruction is the essence of the ability to demonstrate empathy for learners, the process in which the instructional designer seeks to comprehend the experience from the learner’s viewpoint (Parrish, 2006). Therefore, taking the perspective of another—in this regard, adult learners—is reliant upon the concept of empathy.

Data analysis resulted in the emergence of six themes: the criticality/importance of empathy in instructional design, the need for reflection of empathy in instructional

strategies, knowledge of the audience/learners, hindrances to demonstrations of empathy exist and vary, awareness that online learning requires different considerations, and relevancy. Each theme reflected viewpoints on the role of empathy in decisions about instructional strategies for adult learners.

### Criticality/Importance of Empathy in Instructional Design

This theme established the level of importance participants placed on empathy in their roles as instructional designers. Findings showed that all (100%) participants considered empathy for learners to be an essential concept in the instructional design process. Participants seemed to regard empathy for learners in the instructional design process as not only important, but as an integral component of successful instructional design projects. One of the instructional designers stated the following:

“I like how you word it in some of these questions you have here, and empathy is a great word, it’s absolutely critical. There are so many facets to each and every student with their story and their experiences, and it’s important to really think about what those learners are experiencing because you want to engage them”.

Another instructional designer said, “I think it’s [empathy] one or two of the most important skills, if you can call it that, that an instructional designer actually demonstrates.” Participants discussed the importance of meeting adult learners’ needs, the underrepresentation of empathy for learners in the literature, and the essentiality of empathy in high-quality course design. An instructional designer suggested that courses can be designed without empathy, “but they’re not going to be as useful for a lot of people. They might reach a few, but I think they’ll be more effective if designed with the user in mind.”

The instructional designers also offered insights into their personally- and professionally-held beliefs about the vital role of empathy in instructional strategy decisions for adult learners. Some exemplary insights are included below:

- “I think in order to be successful at it you have to have empathy. You have to have empathy in a lot of different situations, it has to be in your mind all the time when you’re making decisions.”
- “We’re looking at the course content and we’re saying how this would best be organized to give the best student outcome and the best

Table 2  
*Themes and Meaning Units*

Themes	Meaning Units
Criticality/importance of empathy in instructional design	<ul style="list-style-type: none"> <li>essential to high quality course design</li> <li>essential to meet the needs of adult learners</li> <li>seemingly underrepresented topic</li> </ul>
Instructional strategies should reflect empathy	<ul style="list-style-type: none"> <li>consider adult learners' time constraints in respect to workload and extraneous content</li> <li>be agile with instructional strategies</li> <li>reflection on personal learning experiences strengthen empathic viewpoint on instructional strategy decisions</li> </ul>
Know the audience/learners	<ul style="list-style-type: none"> <li>consider disabilities</li> <li>ADA (Americans with Disabilities Act) compliance</li> <li>consider generational differences</li> <li>provide resources/scaffolding as needed</li> </ul>
Hindrances to demonstrations of empathy exist and vary	<ul style="list-style-type: none"> <li>instructors lack or do not understand empathy in online learning</li> <li>subject matter experts (SMEs)</li> <li>policies</li> <li>time constraints</li> <li>learners</li> </ul>
Online learning requires different considerations	<ul style="list-style-type: none"> <li>provide explicit instructions</li> <li>make it interesting</li> <li>reduce boredom</li> <li>consider technology skill levels</li> </ul>
Relevancy	<ul style="list-style-type: none"> <li>relevancy</li> <li>choices</li> <li>consider life experiences</li> </ul>

student experience, and if that's not empathy based, I don't know what is."

- "I think empathy plays a very important role. If you're not empathetic toward the student, then I don't think you're allowing the student to be successful."
- "I'm looking at what my subject matter expert has put together for an assignment, putting myself in that learner's spot and saying how would I take it? How would I perceive this if I were the learner?"

### **Instructional Strategies Should Reflect Empathy**

This theme established that empathy should be evident in the instructional strategy decisions made for adult learners. Findings showed that all (100%) participants believed that empathy should guide the decisions that inform the instructional strategy for any

given instructional design. Being empathetic included considerations about "things like the workload, what is the workload a student's going to do week in and week out? If you're not considerate and empathetic of the adult learner, you're going to pile on." A major goal of participants was to make instructional strategy decisions that presented adult learners with pertinent content to facilitate learning success. As stated by a participant: "I know you can't individualize instruction, but I like to have a couple of different things that I do as activities so people can join in a way that makes it feel most useful to them."

Participants often reflected on their own adult learning experiences to consider learners' viewpoints. As expressed by a participant, "I think my overall strategy is just to try to see things from the students' point of view and make decisions based on that." Another participant stated, "I try to implement or suggest things and use strategies that are empathetic

toward the learners, especially the adult learner.” Participants also expressed concern about the responsibilities of adult life and the reality that some adult learners need help with learning. As an instructional designer expressed: “It’s about bringing up that positive part, the uplifting pieces, but when you’re looking at designing for them, what are things that you can do to scaffold that student to the learning strategy?” Clarity of instructions and authentic learning opportunities were also areas of empathic consideration for participants: “I look at the materials and I think to myself, if I were taking this class, would this make sense to me? Would I understand what the instructor is going for here?” Regarding authentic learning opportunities, an instructional designer stated:

“In some ways, we could have made it more of a standard course where students were doing projects based on something that we gave them. Instead we worked with them and had them be able to use something in their life that they could really relate to and then build on in their personal way, and actually use.”

### **Know the Audience/Learners**

This theme established another way in which instructional designers demonstrated empathy when making instructional strategy decisions for adult learners. Findings showed that all (100%) participants considered it essential to know the audience when making instructional strategy decisions. One of the instructional designers stated, “You’ve got to have empathy. Not all instructional strategies are going to work for all types of people, but I also think you have more leeway in the strategy part of it regarding empathy.” When designing instruction for adult learners, it helps to know the communities from which they come, as explained by one participant: “I think almost one-third of our students are military. These are people that have a full-time job but they can also be stationed overseas. We really have to understand what they’re going through.”

While it is impossible to know each learner, diversity can be addressed, as noted by an instructional designer: “How can you insure quality when you don’t know the end user unless you build in multiple pathways for people, different types of people, different types of backgrounds, different types of purposes?” Additionally, knowing adult learners should include some awareness of their strengths and limitations related to social technologies. An instructional designer asked: “Do you want to force them into things that they maybe are not comfortable with at this point?” Just because a technology appears to be widely used does not mean that adult learners use or have awareness of the technology.

Much emphasis was placed on the acknowledgement of the individuality of adult learners, as expressed by an instructional designer: “I think it’s a little bit myopic sometimes to judge learners in a group. In other words, one of the things about adult learners I know is that the individual differences are vast.” As much as possible, it is important to make instructional strategy decisions based on the awareness that adults learn in different ways. An instructional designer stated, “While certainly, you can group them maybe by a series of preferences or learning styles, one of the things I think is a little shortsighted to do is to think that all of them will respond to every strategy.” Yet another consideration about empathic instructional strategies is how learners may perceive certain activities. If an instructional designer, after interacting with an activity, views it as tedious or unnecessary, it may be reasonable to assume that learners will have the same response. An instructional designer explained: “We have Check Your Understanding, and there’s this one thing where they’re supposed to reflect, and it’s supposed to be metacognitive, but when I get to that one, I’m like man, as a student I’d skip it.”

Course feedback provides another way for instructional designers and instructors to understand what works or does not work within an instructional design. An instructional designer stated, “Usually, if it’s a flop we’ll find out later through the student evaluations or feedback that we get.” Knowing the audience through course feedback can also change instructors’ viewpoints, as explained by an instructional designer: “There are just some faculty who really have very firm opinions and positions about how they want the material to be delivered and there’s nothing we can do about that.” However, specific feedback like, “This exercise was really hard,” or “This assignment didn’t make sense to me,” can be useful to instructional designers and instructors when it highlights problematic areas. Attention to learner engagement with course content can provide insight into unsuccessful as well as successful instruction: “Sometimes what I think isn’t going to go very well is just fine.”

### **Hindrances to Demonstrations of Empathy Exist and Vary**

This theme revealed acknowledgement and awareness of hindrances to demonstrations of empathy as experienced from instructors, SMEs, policies, and learners. Findings showed that seven (87.5%) participants encountered hindrances to their demonstrations of empathy for adult learners when making instructional strategy decisions. Hindrances to demonstrations of empathy did not appear to deter participants’ advocacy for adult learners. Insights from one of the instructional designers seemed to sum up



participants' experiences with hindrances to demonstrations of empathy for adult learners:

"I don't think a lot of teachers are empathetic. In a face-to-face class you get to see who your students are, right? In an online course, they don't see the learners, I don't think they even realize that there might be different learners, different ages of learners and races, or whatever in their course. They don't take that into consideration so they just build the course I guess from their perspective on what they want done, they don't look toward the students or the learners at all, and that's really hard."

An instructional designer expressed concern about the scarcity of empathy from some SMEs: "Yes, there have been [hindrances], and some of that has come from the SMEs, the subject matter experts, who just don't understand beyond the bubble of traditional-student mentality." Some SMEs "just don't get it, and we have to educate and work with them on that." Also, "The other side of that is some of the people that are working on courses with us don't grasp fully the andragogical mindset that we're trying to do."

Occasionally, time itself is a hindrance to demonstrations of empathy as explained by an instructional designer: "If any hindrance, it probably took longer to get the training together, putting it online as opposed to if we had done a face-to-face workshop." If adult learners themselves have an aversion to unfamiliar instructional activities, another hindrance to empathy surfaces, as an instructional designer explained: "I think there are some people, some learners that appear to be more comfortable with that very lecture and test kind of mentality; when you do something really different, sometimes it throws them off their game."

Limited influence over final instructional strategy decisions sometimes hinders empathy, as an instructional designer indicated: "I think the major hindrance is that I don't get the final say in what goes into the courses. I can make recommendations and suggestions, but I can't make that final decision." Further hindrances to empathy may stem from instructors' unwillingness to implement recommendations, as expressed by an instructional designer: "Sometimes those faculty members don't want to do other than very lecture based, problem-practice kinds of approaches." Another instructional designer stated, "I feel like the underdog when I start talking about, 'Well, what about the students?' Very few instructors that I help are receptive to my suggestions."

### **Online Learning Requires Different Considerations**

This theme revealed acknowledgement of the differences between online and face-to-face learning environments and instructional designers' concerns for

adult learners. Findings indicated that six (75%) participants acknowledged the different ways in which their online as opposed to face-to-face instructional designs affect their instructional strategy decisions. An instructional designer indicated that some instructors need empathetic nudges, "and that's where the ID, if they're working with a faculty member, has to gently push . . . that may work in a classroom, but it may not work in an online environment." In essence, to encourage empathy for adult learners, instructional designers themselves have to be empathetic toward instructors and subject matter experts. An instructional designer offered insight about assisting teachers with demonstrations of empathy for adult learners: "You are kind of a teacher to the teacher that's putting the course together to try to help them understand the environment and to be empathetic to adult students. You can't leave them out."

A perceived lack of empathy for online adult learners presents instructional designers with opportunities to offer insight to all involved faculty. As stated by an instructional designer, "I just finished designing and then facilitated an online training for faculty who will be teaching online . . . I was thinking that they needed to experience being online students to fully get it." Participants discussed adult learners' need for clear instructions to avoid ambiguity, and the need for realistic technology requirements to reduce learner frustration. In a traditional learning setting, as expressed by one of the instructional designers, "I could go into a classroom, get to know people within a session, and we're good, and I kind of know that I can do these things and they'll follow me." Conversely, "in an online class I may have designed some things that this particular group is not ready for."

Online learning environments require different considerations because, as explained by an instructional designer, "in the online environment you're not standing up in front of those people: you're not going to be there to see the puzzled looks on their faces." Through an empathetic mindset certain predictions can be made about the areas where learners may need help: "You have to anticipate those places and build in those extra resources or stories or whatever in order to get them over the hump, and that's always kind of a revelation to them [instructors/SMEs]." To further alleviate learner frustration and to facilitate success, it is imperative that instructions be clear as expressed by one of the instructional designers: "I feel like this is all online courses, you need explicit instructions to tell the student exactly what it is that they need to do; you might need some videos or something." Empathetic consideration in online learning, as explained by one of the instructional designers, is "basically everything, because not only is it important that you put yourself in the perspective of the online student, but then there's another complication on top of that," which is primarily, "How is this going to be

understood by an online student? How is this going to be understood by a student that might have a cognitive disability that can't process things the same way as our typical student does?"

### Relevancy

It was through this theme that the importance of making instructional strategy decisions to include content that adult learners could find applicable to their needs became apparent. Findings indicated that four (50%) participants considered the necessity to design relevant instruction as a fundamental component of instructional strategy decisions. Pertinent, relevant instruction helps adult learners to understand what is in it for them regarding knowledge acquisition and transfer to authentic, real world environments. Basically, as expressed by one of the instructional designers, "Adult learners tend to need to see the immediate usage, or the way that they can use this material. What am I going to do with this now? They need it to be relevant." Relevant, meaningful instruction can also provide the motivation that adult learners need to work toward successful achievement of instructional goals. One of the instructional designers stated, "I think it's even more important for adult learners to receive empathy because adult learners need to know that they learn more readily when the information is relevant and meaningful." Giving instruction a life beyond the courseroom is essential, as conveyed by an instructional designer: "When we're looking at those instructional strategies, how can we make that appeal to lifelong learning in a sense that they're not just learning it for this one time and this one exercise?" Relevancy and meaning are essential considerations for instructional strategy decisions as suggested by one of the instructional designers:

"If the institution is open to it, competency-based instruction, looking at some different instructional design strategies and really making it engaging, meaningful, and relevant. I think those pieces really impact how we reach adult learners and I think that we have to really take it from their perspective and what they're going to be able to do with the instruction."

### Discussion and Implications

This study's findings appear to support an expectation based on Mezirow's (1994) position about transformative learning. Mezirow's position is that adult learners are caught in their own history and continually add to, and experience iterations of, that history in ways that create continuous learning. It seems that participants' empathic instructional strategy

decisions could assist adult learners with the acquisition of continuous learning and, therefore, transformative learning. Findings appear to support learning environments for adults that reflect andragogical and constructivist ideas as foundations for instructional strategy decisions. Study findings imply that study participants design instruction in ways that consider adults differently from children while providing supportive opportunities to construct new knowledge.

#### The Dick and Carey model of instructional design.

Findings seem to confirm that participants, as proposed by Dick and colleagues (2015), effectively design instructional materials comprising many techniques or strategies naturally utilized by effective teachers. Findings also seem to confirm that participants' attention to adult learners' needs align with Dick et al.'s statement that instructional design necessitates the development of instructional strategies that reasonably utilize what is known about learning facilitation. Study participants did not specifically express adherence to any particular model of instructional design. However, it seemed that participants follow the structure and guidelines for instructional design as mandated by their learning institutions. Participants appeared to treat the development of instructional strategies, step six of the Dick and Carey instructional design model, with high regard.

**Adult learning theory and andragogy.** As a uniquely-adult learning theory, andragogy helped to alleviate the guilt some educators may have experienced in relation to their departure from some andragogical principles when teaching adults (Knowles, 1973). It was also suggested by Knowles (1973; 1989) that the theory of andragogy provided a separation of educator assumptions about childhood and adulthood learning. Forrest and Peterson (2006) indicated that andragogy and pedagogy are not techniques of education, but rather, they are philosophies to which educators may look for guidance, and that both offer an examination of the foundational goals of education.

Relative to instructional design, andragogy, as explained by Holton, Swanson, and Naquin (2001), offers essential learning philosophies and assumptions about adult learners that may assist in the design of effective instruction for adult learners. Knowles (1973) stated that the art of pedagogy, by which many adults, in school and professional settings had been taught, is a contradiction in terms. The contradiction exists according to Knowles because the Greek translation of the root words "'paid,' meaning child (plus 'agogus,' meaning leader of)" render the literal translation as "the art and science of teaching children" (p. 42).

Earlier educators, as explained by Knowles had to disobey some pedagogical conventions and conceptions in an effort to assist and retain adult learners, in many cases departing from acceptable academic principles. While andragogy is an adult learning theory, Knowles

(1973) suggested that as children mature, their instruction would increasingly become andragogical. Knowles (1989) posited that adult learning orientation is centered around their personal lives and that learning motivation is intrinsic. Andragogy, as well as self-directed learning, are vital components in the array of concepts, examples, principles, and rationalizations that comprise the adult learning information base (Merriam, 2001a). It is inaccurate, as explained by Merriam (2001b), to categorize andragogical, self-directed, and transformative learning as *passé*, because while they could be considered foundational, their development was intended to establish adulthood learning as distinguishable from childhood learning.

It was apparent that andragogical principles fueled participants' empathic decisions. It was also apparent that participants view learning in adulthood, as explained by Merriam (2001b), as distinct from learning in childhood. It was not apparent in participants' responses that there was a reliance on a particular adult theory of learning in making instructional strategy decisions for adult learners. However, the common thread of awareness that adults have different educational needs than younger learners was evident, as andragogical concerns seemed to be the underlying motivation for empathic decisions.

**Constructivism.** As proposed by Shabani, Khatib, and Ebadi (2010), the purpose of constructivism is to help learners discover significance and empowerment through learning processes. Findings supported Shabani et al.'s proposition because participants' empathy focused on helping adult learners achieve instructional goals through relevant and meaningful instructional strategies. In light of the regard participants demonstrated for adult learners' prior knowledge/life experiences, it appears that the purpose of constructivism was supported.

**Transformative learning theory.** As explained by Mezirow (1994), transformative learning theory acknowledges four ways in which adults learn: (a) "refining or elaborating our meaning schemes," (b) "learning new meaning schemes," (c) "transforming meaning schemes," and (d) "transforming meaning perspectives" (p. 224). Mezirow suggested that there is another type of learning, that adult learners are caught in their own history and continually add to and experience iterations of that history in ways that create continuous learning. Adult learners' new experiences are influenced by past experiences and transform into a "meaning perspective" (Mezirow, 1978, p. 101), which brings about a critical awareness of the psychological and social assumptions that shape perceptions, relationships, and life choices. For a meaning perspective to occur, according to transformative theory, critical reflection on the premise of a problem must occur (Mezirow, 1994).

Content and process reflections do not lead to perspective transformation; rather, they aid in the achievement of a change of mind, i.e., a transformation of meaning schemes; it is perspective transformation that can lead to substantial learning (Mezirow, 1994). Perspective transformation, as explained by Imel (1998), offers explanations about how a person's concepts, based on culture and experience, can influence their behavior and interpretations. As an example, Imel proposed that a person's meaning structures can be influential in the way he or she decides to react to or vote for women's issues. New experiences are assimilated into past experiences, which in turn create a personal model for learning.

Mezirow (1997) posited that the two kinds of learning exhibited by adults are (a) communicative, or expressed through feelings, and (b) instrumental, or cause and effect. It is through communicative learning that adult learners can make valid, or justify, their beliefs in relation to, or in response to, what someone else purports, which is different from instrumental learning, which attempts to discover a truth. Therefore, a main component of transformative theory is to help the adult learner to think autonomously through critical reflection on personally held assumptions in order to strengthen a worldview or to establish a new one (Mezirow, 1997). If the ultimate goal of transformative learning is to help adults to think autonomously (Mezirow, 1997), then it seems that empathy for adult learners could play a major role in this goal. Helping adult learners to interpret their experiences based on their own viewpoints, rather than adopt interpretations based on the viewpoints of others, which as pointed out by Mezirow (1997), is one of the central goals of adult education. Transformative learning can be interpreted as independent thinking (Christie, Carey, Robertson, & Grainger, 2015).

Within adult education transformative learning is persistently considered to be a purposeful and practical area of research (Taylor, 2007). It appears that continued interest has helped transformative learning to surpass andragogy as the icon of educational philosophy. Conversely, Newman (2012) argued that the abundance of literature on transformative learning has led to repetition and a generalized theory. Franz (2010) suggested that in training situations, the implementation of transformative learning could be difficult because instrumental learning tends to be the focal point of training. Instrumental learning involves the acquisition of new skills or information, and transformative learning requires dedicated trainers and learners, as well as clients' sustained commitment to resources (Franz, 2010).

Another critique of transformative learning comes from Newman (2012), who suggested that the verification of transformative learning is dependent upon learner confirmation, which is not a reliable measure of change.

Newman further suggested that while a learner can claim profound change, that change cannot be automatically assumed. Cranton and Kasl (2012) proposed that assuming whether or not someone has experienced transformative learning, is a problem because such assumptions are based on behavior observance, which probably suggests different types of change.

As described by Kitchenham (2008), transformative learning theory, despite having undergone adjustments and the incorporation of new concepts, continues to impact the practice of adult learning across numerous disciplines. Pilling-Cormick (1997) stated that it is when learners' assumptions change that the learning process becomes transformative. Through all learning, some type of change occurs, but it is through transformative learning that personal change occurs: the type of change that is major and substantial (Sandlin, Wright, & Clark, 2011). The focus of transformative theory is how individuals learn to act on and transfer reasons, morals, thoughts, and implications without dependence on others and to arrive at decisions based on social responsibility and unambiguous thinking (Mezirow & Associates, 2000).

**Transformative learning theory and the adult learner.** Mezirow (2003) proposed that adult learners need help to gain skills, feelings, and empathies necessary to reflect critically on their assumptions in order to nurture their reasoning abilities. Mezirow further suggested that nurturing adult learners' reasoning abilities would also help them to more completely participate in "critical-dialectical discourse" (p. 62). Participants' responses did not directly support Mezirow's position on critical-dialectical discourse as a component of transformative learning. However, responses did reflect nurturing attitudes for adult learners in support of instructional strategies to facilitate learning, at times through group discussions, which could encourage critical-dialectical discourse. As stated by Merriam, Caffarella, and Baumgartner (2007), it is through conversations with others that an individual accomplishes understanding. Participation in discourse with similarly affected persons affords adult learners, in the process of challenging personally held interpretations, opportunities to develop thoughtful conclusions (Mezirow, 2003). It was also proposed by Mezirow (1997) that the mission of adult education is to (a) help learners gain critical awareness of their own assumptions and those of others, (b) provide opportunities to help learners with the recognition of frames of reference, (c) help learners to become imaginative in order to view problems from a different perspective, and (d) help learners in effective participation in rational discourse.

Implications of the findings for practice, based on participant experiences, indicated that:

- Expert instructional designers place a high value on empathy in instructional design. The implication is that expert instructional designers consider the design from the perspective of the

learners: how those learners, the intended audience, will interact with and understand instructional content. This implication adds support to Parrish's (2006) suggestion that a vital skill of instructional designers is the capability to leave their own point of view to adopt the point of view of the learner.

- Expert instructional designers place a high value on empathy for adult learners in relation to instructional design. The implication is that a genuine empathetic mindset amongst expert instructional designers exists for adult learners during the instructional design process. This empathic mindset supports the importance of the explicit cultivation of empathy when designing in order to extend a design's concept and its planned achievements (Parrish, 2006).
- Expert instructional designers place a high value on empathy when making instructional strategy decisions for adult learners. The implication is that empathy for adult learners plays a strong role in instructional strategy decision-making. This implication indicates that while empathy in instructional design appears to be under-represented in the literature, as proposed by Parrish (2006), it is an important concept in the lived experiences of expert instructional designers.
- Participant experiences for this study indicated that hindrances to demonstrations of empathy exist in various forms when making instructional strategy decisions for adult learners. The implication is that hindrances to demonstrations of empathy in instructional design exist and should be acknowledged.

### Limitations and Future Research

Findings provided insight into the importance expert instructional designers place on the concept of empathy in instructional design and their experiences with empathy for adult learners. Conversely, findings did not provide insight into how novice instructional designers might view empathy when making instructional strategy decisions for adult learners. Empathy, for the participants, appeared to be something that was natural for them when making instructional strategy decisions, natural aspects of their personal and professional mindsets. Since most of the participants seemed to have an inherent inclination toward empathy, the study was limited in the sense that it did not provide insight into instructional designers who may lack a natural inclination toward empathy.

A question asked by Parrish (2006) remains after analysis of the data collected for this study and influences the recommendations for further research.

Referring to instructional designers and empathy for learners, Parrish asked, "Can they do it intentionally, or is it simply a trait they possess that shows itself in the quality of their work?" (p. 72). Recommendations for further research include the following:

- Extend this study to use a purposeful sampling strategy to include novice instructional designers.
- Conduct a Delphi study to arrive at a consensus that might help to answer Parrish's (2006) previously stated question.
- Conduct a mixed methods research study (a) to survey universities offering instructional design degree programs to determine if empathy for learners is an official course component, and (b) to investigate whether or not hindrances to demonstrations of empathy exist as a secondary component to the empathy for learners component at the identified universities.
- Further research could assess whether or not opportunities to develop, demonstrate, and discuss the role of empathy in the instructional design process, through formal instructional design training, encourages demonstrations of empathy for learners.
- Further research could survey instructional designers to determine how they might perceive the possible inclusion of demonstrations of empathy for learners as a new competency to the International Board of Standards for Training, Performance, and Instruction (IBSTPI, 2012).

## Conclusion

Participants' responses about their lived experiences provided insights about demonstrations of empathy related to decisions about instructional design strategies. The insights provided by this study's findings will help to continue the dialog about empathy in instructional design and, more specifically, empathy for adult learners and the considerations necessary to provide them with relevant, meaningful instruction. Continued dialog could lead to the empowerment of instructional designers to empathically bridge any gaps between assumptions about adult learners and practices in order to anticipate obstacles to successful online learning. Adult learners, many of whom may begin or return to higher educational pursuits in the midst of considerable personal, family, and work responsibilities, could benefit from instruction that acknowledges their authentic educational needs.

Through empathic instructional design, instructional designers can anticipate some of the frustration, confusion, and fear that adult learners may face as they engage in online higher education, a mode of learning

that for many adults may be intimidating. Limited or poor technology skills or a perception of online learning as something that is more difficult than face-to-face learning could present an initial source of intimidation for adult online learners. Empathic instructional design can become the catalyst to promote a better understanding of adult learners' authentic needs. Empathic instructional design can also help to transform the perception of the field from one of mechanics to one that empathically considers adult learners who engage with instruction to excel unhindered.

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- LINDA S. VANN, PhD is an independent instructional designer who persistently seeks opportunities, through the development of college-readiness tutorials, to support and encourage women who are new to online learning. Dr. Vann's empathy for adult learners is born of, and sustained by, a desire to assist with basic skills development related to academics and learning technology. The ways in which empathy can be incorporated into and demonstrated through the instructional design process is a continued source of motivation. She has also worked on remote instructional design teams to develop computer based training for healthcare professionals.

# An In-Depth Analysis of Teaching Themes and the Quality of Teaching in Higher Education: Evidence From the Programming Education Environments

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Education research in computer science has emphasized the research of web-based learning environments as a result of the latest technological advancement in higher education. Our research aim is to offer new insights on the different teaching strategies in programming education both from a theoretical and empirical point of view as a response to the theory-scarce nature of the subject. We have classified the teaching themes in computing education research based on the students' experience and reviewed the respective teaching methods introduced by the previous literature in the subject field. Our research results confirm that despite the benefits brought by technology to higher education and the high quality of the programming courses, there exist challenges associated with programming education environments that need to be addressed with further research. We bring up the concepts of student-centered pedagogy and personalized learning environments in response to the challenges faced by students in programming education. Specifically, we will analyze these challenges via teaching strategies and by considering the students' needs in a collaborative learning environment. Our research results are especially valuable to the understanding of the development of the programming education environment. We will open up new research opportunities in the quality management of distance learning.

As a result of technological advancement, research in web-based learning environments has become ever more important. Researchers in programming education have confirmed both the benefits and the potential of technology brought to pedagogy in higher education (Sadler-Smith, Down, & Lean, 2000). While both theoretical and empirical papers are published in the subject field, research in programming education environments is still theory-scarce (Fincher & Petre, 2004). In addition, Teague, Corney, Ahadi, and Lister (2012) showed that students start to struggle with the challenges associated with programming at the beginning of the course. This phenomenon leads to drop-outs and increasing difficulties with learning programming in the latter part of the course, and these challenges of programming education need to be dealt with further research.

Lewis (2010) states that the goal of programming education is to develop the students' programming competence and attitudes towards programming. The aim is to teach students to understand the logic behind programming. Specifically, Whalley and colleagues (2006) showed that students who learn programming successfully are able to produce correct codes and explain the purpose behind these codes. Programming skills can be measured via the level of understanding in code-tracing tasks and the code-writing abilities, which are closely related to the code-explaining ability (Lopez, Whalley, Robbins, & Lister, 2008). Nevertheless, the relationship between the code-writing abilities and the code-explaining abilities is not directly related, as novice programmers are able to write codes based on familiar templates but may find it difficult to trace codes and correct the bugs (Simon, 2009). Previous research has established that the performance

of novice students in systematically writing and explaining codes after introductory programming courses is reflected as minimal competence, and thus we will review some of the research on the challenges of programming education in the following section.

## Research on the Challenges of Programming Education

Saeed, Yang, and Sinnappan (2009) found that the technological impact on higher education has brought challenges to teaching. The authors mention that one of the primary challenges associated with the use of technology in programming education is the lack of understanding of the learners' experience during such a process and their perceptions of the technology use in supporting their understanding. Below we have summarized some of the learning challenges in programming education based on the previous literature together with the teaching strategies in the respective situations. The research work done by Fincher and Petre (2004) has served as the foundation for the learning challenges specified in Table 1. It is seen that the typical learning challenges are related to knowledge sharing from the course instructor to the students having differing backgrounds. Students' motivation to learn and expectations may also pose challenges to the course organizers. The solutions to these challenges require us to identify and overcome these student misconceptions.

## Student-Centered Pedagogy in Programming Education

Education research in computer science has emphasized the importance of studying the students' behavior as a gateway to improve the set of existing



teaching practices (Herrington et al., 2003). In other words, the teaching strategies to overcome these challenges in programming education are highly dependent on student-centered pedagogy. By studying the student experiences in programming courses, this offers important information on the design of programming education that supports student learning despite their individual differences in learning preferences. Koka and Hein (2003) observed that students' learning preferences and learning styles are affected by the teacher's feedback, learning challenges, and the intrinsic motivation to learn. Thomas, Ratcliffe, Woodbury, and Jarman (2002) found that successful learning outcomes can be explained via these different learning styles. The authors proposed that students' preference on learning and their expectations should be integrated in the design of programming courses via well-organized learning resources. This confirms the significance of our research, which is to evaluate programming education from the students' point of view.

Wolf (2002) showed that an interactive web-based adaptive learning environment, given its flexibility and dynamic nature, allows a personalized learning environment which accommodates different learning styles. A student-centered approach in teaching can be achieved through the application of andragogical assumptions. The assumptions of andragogy address the interests of the learners, cooperative learning, guided interaction, and the active role taken by the learner (Blondy, 2007). Chan (2003) suggests that the student performance can be enhanced, and some of the challenges of programming education, addressed by tailoring the programming environment according to the students' needs and individual working styles. Specifically, Bati, Gelderblom, and Biljon (2014) have found that engaging students for deeper learning, using support mechanism for improved class management, aligning assessment activities, and creating closer relationships and a sense of community among students are effective instructional strategies in programming teaching. According to the theory of constructivism, successful learning outcomes can be attained when learners' motivation is aligned with the teaching goals of the course and students can be motivated to engage in the learning process. As a matter of fact, the role of student has become more important in programming education design, as confirmed by researchers such as Herrington and colleagues (2003).

### **Further Investigation on the Themes of Teaching in Programming Education**

Below we have classified the different themes of teaching in a technology-oriented learning environment based on the previous literature. It is seen that the different themes of teaching are reflected as a result of

different teaching goals. Teaching methods that use technologies in higher education are especially significant in distance learning. Nevertheless, the integration of technologies to higher education does not always produce sound learning outcomes, and some of the advanced programming tools used in programming education seem to hinder learning when they are difficult to use. In addition to textual instructions, different visualization techniques are widely used in programming education, and well-designed multimedia messages are found to support learning. Teaching methods may also include cooperating learning and collaborative active techniques, such as pair programming, to enhance successful learning outcomes.

**Distance learning.** The use of computing technology and instructional design in learning has opened new opportunities to choose new innovative teaching methods. Especially distance learning has attained a higher importance in computer science education (Sadler-Smith et al., 2000).

**Educational technology tools.** Technological innovation has opened new opportunities for learning. Different educational technologies are utilized in teaching. Learning efficiency can be enhanced via appropriate educational technology tools (Clarke, Flaherty, & Mottner, 2001).

**Technology innovations.** Technology innovations are used to enhance students' learning experience. A measure of their success includes the extent of the skills developed by the students after the course. However, it is shown that technology innovations may not always enhance learning (Dacko, 2001).

**Multimedia learning** Multimedia learning uses words and pictures in learning. Compared to communication involving words, well-designed multimedia messages allow students to learn more deeply. Here, the design of multimedia explanation is the learning method used to achieve learning outcomes. Visualization techniques are extensively used in programming education (Mayer, 2003).

**Peer feedback.** The impact of using peers in the evaluation of student performance was found to be useful. Specifically, peer feedback was found to be meaningful and effective in higher education. A collaborative learning environment is also found to support programming education (Reese-Durham, 2005).

**Case studies.** Cooperating learning techniques can be combined with case studies in order to enhance problem-solving and decision making skills in learning. This type of learning technique is found to be more useful than lectures and non-cooperative learning (Baumberger-Henry, 2005).

**Project-based learning.** Teaching may be deductive or inductive. Deductive teaching method begins with a theory and then proceeds to the application of theories. Inductive teaching methods include inquiry

learning, problem-based learning, project-based learning, case-based teaching, discovery learning, and Just- In-Time-Teaching (Prince & Felder, 2006).

**Cooperative learning.** Compared to the traditional instructional learning approach, research results have shown that instruction based on cooperative learning yield significantly better achievement in terms of academic performance (Doymus, 2007).

**Self-directed feedback.** Mastering the learning technique of self-directed feedback, reinforcement, and remediation of knowledge is proven to have a positive effect on the transfer of knowledge, which is central to learning (Lee & Kahnweiler, 2008).

**Collaborative active learning.** When students first enroll to college and are not familiar with the course topic, collaborative active learning activities are found to be useful. Learning outcomes are measured as academic performance in terms of grades (Saitta, Gittings, & Geiger, 2011).

### Statement of the Problem

In this study, we aimed to capture themes of teaching in programming education via student experiences and observations. Our research problem was formulated as follows: how do students perceive the different teaching themes of introductory programming courses as a response to the challenges of programming education? Specifically, our research questions were specified as follows:

1. Why do students find programming education difficult?
2. What are the themes of teaching that increase student motivation to learn programming?

Our research goal was to collect data from the students' behavior in programming education environments, analyze the data in order to identify various behavioral patterns in the student experience, and produce sound research results by evaluating how those teaching in programming education can use this information to produce sound learning outcomes. Our paper is organized as follows. First, we will justify the focus of our research based on the previous literature. Next, we will compare the results obtained from the literature review with the student data in order to deepen our understanding of student-centered pedagogy in programming education.

### Method

Salinger, Plonka, and Prechelt (2008) emphasize that a qualitative research approach is especially useful in deriving meanings through conceptual description of a programming experience. Our aim in this paper is to

capture new knowledge on programming education based on the students' experience. Therefore, qualitative research was found to be useful and appropriate with regard to our research question. As the method and validity of content analysis was heavily dependent on the researcher and the context in which the information was analyzed, we made judgements on the variations and approaches that were most suitable for our particular research problem in this study. We also discuss possible limitations and delimitations of the study.

### Research Design

We used extensive student feedback collected via open-ended questions in this study as our primary empirical data. The amount and the quality of the data were chosen in accordance with the research question. Our interpretation of the data was made via inferences based on content analysis, which admittedly may result in some degree of bias. The interpretation of the outcome of data was done by two researchers. The analysis of programming education environments from the student perspective was done in stages. First, we started by using the existing learning resources on programming courses at Aalto University to collect student data. Then we developed an infrastructure that provided user modelling and personalization. Thereafter, we explored several ways to produce knowledge-based personalization of these student experiences derived from concept analysis and content indexing, which will be explained in the following sub-sections.

### Sampling

We collected student feedback from the programming courses in Aalto University in Finland from the years 2009 to 2013 through open-ended questions and surveys to be analyzed by content analysis. The programming course is arranged every year in the spring and in the autumn. In 2013 the primary programming language for the course was Python. Specifically, this course had 4 hours of lecturers, 32 hours of self-learning, 77 hours of exercises, and 20 hours reserved for the exam and exam preparation. During the sample years, the lecture format stayed the same. The teaching goal of this course was to equip the course participants with understanding in the field and the skills of programming. The course materials included both printed materials and course book. This course also included an online forum where the course participants could communicate with the course organizers. The data were interpreted based on the outcome of the student feedback per course period. In terms of variables, the average student achievement level, initial expectation of the students, and student background, as well as the course instructor, may have

Table 1  
*Learning Challenges and Teaching Approaches in Programming Education*

<b>Programming Education Environments</b>	
<b>Learning Challenges</b>	<b>Teaching Approaches</b>
The cognitive learning theory emphasizes the importance of individual differences in learning. These learning styles result in a student's unique learning preference. (Saeed et al., 2009)	Learning by doing and encourage knowledge integration such as helping students to organize their ideas are found to enhance coherent understanding. (Anzai & Simon, 1979)
Students adopt inappropriate attitudes and beliefs towards learning that interfere with the learning process and obtaining successful learning outcomes. (Lewis, 2010)	According to constructivism, learning involves the interpretation of information, and student attitude can be affected via a learner-centered approach to teaching. (Herrington, Oliver, & Reeves, 2003)
Programming misconceptions, such as linguistic misconceptions, arise from inappropriate transfer of knowledge. (Bayman & Mayer, 1983)	The instructor identifies learning misconceptions and their causes while devising ways to resolve them in a systematic manner. (Thota & Whitfield, 2010)
Previous programming experience and expectations of the course interfere with the motivation to learn and produce results. (Bonar & Soloway, 1989)	The instructor may provide interaction and social support for learning such as supervised lab activities and online collaborative discussion. (Blondy, 2007)
Computational models and syntax used in programming are difficult to understand especially for novice students. (Kahney, 1983)	The instructor may begin with simple and consistent computational models and use animations as an aid to learning algorithms. (Hundhausen, 2002)
The content and quality of the learning materials do not reflect the course goals nor do they assist students in grasping new knowledge. (Dacko, 2001)	Learning materials must support learning and the quality of the materials is reflected in learning outcomes and student performance in the exams. (Zuckerman, Arida, & Resnick, 2005)
The programming skills learned in school are context-dependent and cannot be automatically transferred and used elsewhere. (Csikszentmihalyi, 1991)	Programming skills enhance problem-solving skills and other skills which may be conducive to professional career. (Lopez et al., 2008)

changed per course base, which admittedly may have had an impact on the interpretation of results.

### Procedures

Hopkins and King (2010) confirm the benefit of content analysis for social scientists as an effective method to analyze text data. One of the main benefits of content analysis is its allowance for empirical study of a social phenomenon through documentary text data. One of the primary goals in using content analysis in this study was to categorize text patterns and literature in an unbiased and reliable manner. Therefore, formal content analysis is used to make generalizations from the student feedback via classifications. According to the Heisenberg Principle, the very research process produces the potential for bias. When it comes to the reliability of the results, it is acknowledged that content

analysis, just as other research methods, might result in some degree of bias. Nevertheless, as a research method, content analysis is a systematic and objective method of describing contextual information. The benefits of content analysis are its context-sensitive nature and flexibility in terms of research design.

In terms of the reliability and validity issues of the data analysis procedure and findings, the challenges of our research approach admittedly existed. First, reliable information was needed in the first place, for reliable analysis and student feedback may not always contain all the information needed to be studied. Using content analysis as the primary research method in the present study might have also resulted in some degree of researcher bias. We aimed to minimize the bias produced by the data and the methods via good scientific practice. Specifically, more than one researchers analyzed the collected data in order to reach

a final consensus on the outcome of the analysis. Moreover, we aimed to demonstrate the link between our research results and the data by describing the analysis process in detail. Furthermore, as the method and validity of content analysis is heavily dependent on the researcher and the context in which the information is analyzed, we made own judgments on what variations and approaches were most suitable for our particular research problem in this study.

### Summary of Results

Areias and Mendes (2007) confirm that computer programming is difficult to learn and requires extensive work from students. According to student feedback, the level of difficulty is higher for students with no prior background in programming. Therefore, the designers of programming courses need to consider program design, the complex features of the programming language, and the lack of programming experiences among novice students. As learning programming involves formulating algorithms and transferring them to a programming language, understanding the syntax of the language and being able to execute and trace different program statements were especially challenging for students with no prior experience in programming. In addition to the challenges of learning programming that are classified in Table 1, research results show that students also had difficulties in installing and using the programming environment, understanding the role of programming constructs, learning the semantics of programming structures, and finding compilation errors based on the system feedback. These students did not seem to comprehend the strictness of the programming languages and the underlying notional machine. Therefore, selecting a strategy for an initial approach to teaching programming required us to understand the students' experience of the programming courses and what kind of learning resources students found helpful in learning programming.

In 2009, we collected extensive and detailed feedback from 461 students, in 2010 from 390 students, in 2011 from 363 students, in 2012 from 229 students, and in 2013 from 212 students. The student profiles included students from different departments. That is, the student profiles included both students with and without prior programming experiences. It is interesting to note that the student profiles not only included novice students, but also students who had studied more than five years in the same university.

In 2009, 61% of the respondents were satisfied with the demand of the course. In 2010 the percentage was 66%, in 2011 the percentage was 67%, in 2012 the percentage was 67%, and in 2013 the percentage was 72%. Thus, the student satisfaction towards the programming courses has steadily increased since 2009. The student satisfaction is reflected by the incremental

improvements made in the course with regard to the quality of the lectures, course materials, supportive tools, and programming exercises. In 2009, the average grade given for the lectures was 2.82/4, the grade given for exercises was 2.98/4, the grade given for the materials was 3.16/4, the grade given for the exam was 2.73/4, and the grade given to the usefulness of the course was 2.78/4. Since then student satisfaction has increased with regard to how the course is organized. In 2013, the average grade given to the lectures was 2.87/4, the grade given to exercises was 3.36/4, the grade given to the materials was 3.33/4, the grade given to exam was 2.91/4, and the grade given to the usefulness of the course was 3.15/4.

We listed the different teaching strategies in Table 1 as a response to the typical learning challenges faced by the students. Patriarcheas and Xenos (2009) have found that some of these teaching strategies are significant in terms of the student participation and the creation of a personalized learning environment. The student experiences on the various themes of teaching described in Table 2 and Table 3 in terms of the course lectures, exercises, learning tools, and materials can be used to construct a personalized learning environment where student-centered pedagogy is emphasized to enhance the learning outcomes of programming education. Hopson, Simms, and Knezek (2001) has shown that the student-centered pedagogy in a technology-rich learning environment enhances high-order cognitive skills, which are required to learn programming. Moreover, the authors acknowledge that similarities and differences between online learning and the traditional classroom learning environment are most evident in terms of the course design, the level of interaction and the respective teaching effect on the students.

Table 2 summarizes the challenges associated with teaching of the introductory programming courses, including student motivation challenges and knowledge sharing failures, as we have shown in Table 1. Table 2 also lists the excerpts taken from student feedback in respective to the difficulties associated with the programming courses. When it comes to the course exercises, typical challenges were related to the time schedule and the varying level of difficulties of exercises. Other challenges associated with programming education included the mismatch between the student expectations and the teaching goals set by the course, as well as students having difficulties in synthesizing the topics to be learned. Table 3 summarizes the motivational themes associated with the programming courses together with the respective excerpts taken from feedback results. The themes associated with the well-designed programming courses included competent lecturers and effective course assignments. Active learning, hands-on activities, and materials having exemplary solutions helped students to

Table 2  
*Difficulties Associated with the Programming Courses*

Format	Themes	Specifications	Student Feedback
Lectures	Focus	The lecture focused too much details on the basics.	<i>"The information conveyed in the lecture was not always useful to advanced students."</i>
	Clarity	The pace of the lecture was too fast leaving gaps unexplained.	<i>"The information conveyed in the lecture was not always clear and related to the core of the course."</i>
	Usefulness	Students skipped classes and learned directly from the book.	<i>"Many of the students have never gone to the course lectures."</i>
	Quality	The quality of the lecture was poor and demotivating.	<i>"The instructor was not very motivational in terms of the course atmosphere."</i>
Exercises	Time	The students were not always given enough time to complete all the course exercises.	<i>"There was not enough time to complete the exercises."</i>
	Instruction	The exercise instructions were not clarified in advance.	<i>"The exercise instructions were difficult to understand from time to time."</i>
	Difficulty	Some of the exercises were found to be too difficult, especially for novice students.	<i>"The exercise was too mathematically intensive for novices."</i>
	Expectation	The exercise did not respond to student expectations.	<i>"Some of the exercises were too long, and thus were not expected by some of the students."</i>
Tools	Usability	The programming tool was too difficult to use.	<i>"The programming tool was difficult to use and too detailed."</i>
	Purpose	The programming tool did not enable easy finding of bugs.	<i>"The programming tool did not enable easy finding of programming bugs."</i>
	Grading	The programming tool fined too harshly for small mistakes.	<i>"Some students felt that the programming tool had allocated the points in an unfair manner."</i>
	Feedback	The programming tool did not provide enough guidance.	<i>"The programming tool did not always give instructions on how to fix the bugs."</i>
Materials	Relatedness	The course material did not relate to the course exercises.	<i>"Some of the students did not use all of the materials provided by the course."</i>
	Content	The course material contained too much texts with no key points.	<i>"For advanced programmers, the course material contained too much information."</i>
	Demonstration	The course material lacked demonstrations and visual aids.	<i>"The course materials contained too much texts, which may in times hinder understanding."</i>
	Availability	The course material was not easily available.	<i>"The availability of all the course materials was not clear to all of the students."</i>

Table 3  
*Motivational Themes Associated With the Programming Courses*

Format	Themes	Specifications	Student Feedback
Lectures	Lecturer	The lecturer was competent and knowledgeable.	<i>"The instructor is knowledgeable and presented the subject by considering the needs of the students."</i>
	Style	The lecture motivated students to participate and learn.	<i>"The examples and exercises were useful to go through with the instructor in a step-wise fashion."</i>
	Audience	The lecturer considered the background of the students.	<i>"For those novice students, the lecture was found to be well organized with a memorable beginning."</i>
	Interest	The lecture contained interesting materials not found in the book.	<i>"The instructor has gone through interesting materials not covered in the course."</i>
Exercises	Level	The exercise level proceeded from easy to difficult.	<i>"The difficulty level proceeded logically from easy at the beginning and challenging at the end."</i>
	Hands on	The exercises enabled learning by doing, which was an optimal learning style for some of the students.	<i>"The exercise enabled learning by doing."</i>
	Goal	The exercise supported the teaching goal of the course.	<i>"The exercises had good instructions and supported the course goals."</i>
	Complexity	The exercise was complex enough to capture student interest.	<i>"The exercises were found to be interesting and varied with various levels of difficulty."</i>
Tools	Online	The programming tool supported distance learning and enabled students to earn course points.	<i>"The programming tool supported distance and online learning."</i>
	Consistency	The programming tool worked consistently without mistakes.	<i>"The programming tool worked consistently without mistakes."</i>
	Technology	The programming tool reflected advanced technology.	<i>"The programming tool reflected advanced technology and is one of the best course tools."</i>
	Importance	Students participated the course because of the programming tool.	<i>"The programming tool was one of the reasons why students participated in the course."</i>
Materials	Readability	The course material was clear to read with real-world problems.	<i>"The course materials were consistent and clear to read."</i>
	Concreteness	The information of the course materials was tailored to the needs of the students.	<i>"The course material showed how to code and debug programs."</i>
	Relevance	The course materials closely followed the lecture knowledge.	<i>"Specific information was relatively simple to find from the given material."</i>
	Example	The course material contained supportive examples.	<i>"In addition to the core information, exercise examples were found to be conducive to learning."</i>

practice their programming skills. In terms of the learning tools used in the programming courses, challenges and possibilities are both associated with the usability of these tools. Finally, it is important for the course materials to be concise and clear.

### Discussion and Conclusion

Thompson (2008) defines learning programming as the process of understanding and applying programming knowledge to practice by solving computing problems in an innovative manner. Lister and colleagues (2006) found that successful programmers are able to produce innovative solutions to computing programs. Détienné and Soloway (1990) distinguished the techniques that experienced programmers use when trying to

comprehend a program. When tracing a program and analyzing its execution to determine what operations occur and how its states change, experienced programmers may use either generic or specific values when tracing a program's execution. Thota and Whitfield (2010) introduced strategies to design introductory programming courses from constructivist and pedagogical points of view that address these challenges of programming education and student misconceptions via the available learning resources. In this study we found that the course instructor may address these student misconceptions by devising sound teaching strategies to overcome these challenges associated with programming education. In fact, some of the factors that affect programming education are known to affect education processes in general, but there are also specific

ones relevant to programming courses. These factors are, for example, prior attitude and programming experiences, materials and tools used to support programming, and the active involvement of students in the programming courses via learning by doing.

Universities have developed advanced tools to support programming education. Examples include TRAKLA2, JSav, UUhistle, jsParsons, and mobile parsons. In addition to the tools that are developed to support learning, virtual learning environments and learning resources have also been integrated into programming education. As examples, the A+ learning environment integrates a number of tools under the same user interface. Innovative learning resources have been introduced for course Programming 1, CSE-A1110. Likewise, Algoviz OpenDSA learning resources have been used for Data structures and algorithms courses (Helminen, Ihantola, Karavirta, & Malmi, 2012). By adopting these tools and learning environments we are able to collect data from their usage and get regular information on the user experience of these tools and environments. Specifically, we are able to get course and task evaluation results for the course participants, submission data, course quizzes, log data about how students interact with various assignments, and log data about how students read and interact with learning resources. These collected data can then be combined in a database in order to allow easy query. Using these data, it is possible to produce adaptive guidance to best resources, adaptive textbook, adaptive visualization, and adaptive feedback in order to improve the whole learning system through personalized guidance.

Our research goals is to collect data from the students' usage of programming education environments with regard to the quality of the course. We choose to analyze the data in order to identify various behavioral patterns among the students and provide feedback to the students regarding to the usage of these tools to support their studies. The quality of the course can be analyzed via the resources allocated to the course in terms of lectures, materials, supportive tools, and programming exercises. We investigate student behavior in both treatment and control group settings, as well as longitudinal settings (Brusilovsky et al., 2010). While studying data-driven personalization in IR and Recommendation Systems areas, we have seen that all kinds of recommender approaches and content analysis (LDA) research approaches are found to be useful. We have found that successful programming courses are well organized in terms of computing exercises and learning tools.

Maloney et al. (2004) specified that web-based learning tools support student-centered pedagogy. Fernandez and Sanchez (2003) found that the benefits of using these programming tools to support learning

include the possibility to support students to study intuitively and visually. Specifically, Hundhausen (2002) found that the algorithm visualization technology is effective in programming education, offering learning exercises where students engage in visualization-related activities that are cognitively demanding. As a matter of fact, Zuckerman and colleagues (2005) stated that in teaching abstract problem domains, special learning elements and design materials with the purpose to foster learning are indispensable; examples include the use of multimedia messages and visualization techniques to support student learning.

Technological advancement has had a significant impact on higher education, especially from the teaching point of view. The challenges of programming education remain a popular topic of research; some of the challenges include poor progression and retention rates associated with introductory programming courses. We have found some of the possible explanations behind the poor progression and retention rates of introductory programming courses based on the student experiences in terms of the course lecturers, course exercises, the learning tools used in the course, and the course materials, as these themes have a vital impact on the student confidence, performance, and study habits in acquiring programming knowledge. In response to these challenges of programming education, Falkner and Falkner (2012) analyzed the student pedagogy from the social constructivist and community-based learning perspectives. The teaching methods used in constructivist learning, which are by nature collaborative, and the social aspect of constructivist learning enhance engaging and productive learning experiences as a result of group learning. We have confirmed in this study that collaboration in a programming environment via, for example, pair programming is vital and enhances learning efficiency. In terms of future research, it would be interesting to define the themes of teaching and devise ways to measure learning outcomes in distance learning, as compared to learning in a traditional classroom setting, based on the student experience. We could also expand the existing research work to include more advanced data (log) driven personalization.

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#### Acknowledgements

The author is grateful for the key comments presented by Prof. Dr. Lauri Malmi and distinguished researcher Dr. Päivi Kinnunen, as well as their valuable contribution to this study. The author would like to thank Florilla Consulting Company for funding of this project. The author is also grateful to the anonymous reviewers for their helpful and constructive comments.

## Peer / Self Assessment and Student Learning

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Effective and durable learning achievements can result from students' engagement in their own learning. This study explored students' perceptions of the mechanisms and processes through which peer and self-assessment can contribute to their learning. More specifically, the study investigated students' perceived ways in which peer and self-assessment can help engage them in their own learning, make them take responsibility for it, and develop their collaborative learning skills by promoting a positive and supportive learning environment. Students in a graduate class participated in this study. Results indicate that, according to students' perceptions, peer and self-assessment contribute to their learning through effective feedback, a supportive learning environment, and collaboration among learners. A higher level of awareness of course expectations and requirements, combined with abilities to identify learning gaps and develop strategies to fill those gaps, are the mechanisms through which students perceived that peer and self-assessment promote their sense of responsibility towards their own learning. Students' dispositions to work in groups can impact the benefits of peer and self-assessment.

Research has shown the importance of involving students in their own learning through self and peer assessment. Logan (2009) explored how peer and self-assessment can enhance teaching and learning effectiveness. According to the author, self and peer assessment can positively affect student learning by helping them develop their reflective and critical thinking skills, as well as their self-confidence as learners. Therefore self and peer assessment teach students how to learn, which "should be a key element of higher education courses" (p. 30). Reinholz (2015) defined peer assessment as "a set of activities through which individuals make judgments about the work of others" (p. 1). Self-assessment is defined as a process where "students are directed to assess their performance against pre-determined standard criteria...[and] involves the students in goal setting and more informal, dynamic self-regulation and self-reflection" (Bourke & Mentis, 2011, p. 859). From these definitions, it seems that self and peer assessment can help promote learning by establishing an environment that could engage students and help them develop a sense of internal responsibility for their own learning (Yorke & Longden, 2004). Such a sense of responsibility can promote a belief and motivation to control and direct their own learning, as well as a desire to invest the required and necessary efforts for higher learning achievements.

Prior research has investigated the central role that assessment in general, as well as self and peer assessment, can play in driving student learning (Cheng & Warren, 2005; De Grez, Valcke, & Roozen, 2012; Kearney, 2013; Rust, Price, & O'Donovan, 2003; Winne, 2003). According to these studies self and peer assessments reinforce a self-regulated learning atmosphere that positively impacts student learning, especially because they allow learners to match and amend their work with predetermined standards. Similar benefits of peer assessment were reported by

Logan (2009) who indicated that peer assessment ... gives students a better understanding of assessment criteria and leads to deeper learning" (p. 30). In Logan's study, in which he investigated students' feeling and attitudes about peer and self-assessment, participants reported that peer assessment made them become more critical and reflective about their work.

In another study that addressed students' perceptions of peer and self-assessment De Grez and colleagues (2012) reported that students indicated having observed significant learning gains as a result of being engaged in peer assessment. Cheng and Warren (2005) reported that peer assessment affected students' performance and attitudes. In their study that aimed at assessing students' perceptions of peer assessment, Planas Lladó and colleagues (2013) reported a higher level of motivation, sense of confidence in personal abilities, and engagement as the result of students' attitude changes due to peer assessment. Similarly, in a literature review of peer assessment studies, Topping (1998) also reported positive effects of peer assessment, not only on achievement, but also on students' attitudes towards learning.

Similar reviews have been conducted about self-assessment (Boud & Falchikov, 1989; Falchikov & Boud, 1989). In their review of self-assessment studies Boud and Falchikov (1989) focused on quantitative studies. Though they reiterated teachers' desire to help learners take more responsibility for their learning, the review focused more on comparing students' marks to teachers' marks.

Dochy, Segers, and Sluijsmans (1999) reviewed 63 studies and reported positive findings, including students obtaining a higher percentage of correct scores or engaging in independent learning, as a result of self-assessment, among other findings. According to Dochy et al., overall, self- assessment promoted

self-reflection, problem-solving and more responsibility for one's learning.

Bourke and Mentis (2011) took a different perspective and investigated the benefits of self-assessment with respect to inclusion. The authors reported that self-assessment can not only foster students' involvement in their learning, but it can also provide appropriate learning opportunities to all students through "inclusion in choices about their own learning" (p. 854). This is consistent with what Topping (2003) reported when he indicated that "in self-assessment, the intention is to engage the learners as active participants in their own learning....In the longer term, it might impact self-management of learning ... and tuning of learning by the learner rather than waiting for others to intervene" (p. 58).

Given the importance of feedback and the development of the reflective skills, the benefits of self and peer assessment may be more sustained when they are implemented as formative types of assessment. Research (Struyven, Dochy, & Janssens, 2002) has indicated that students' anxiety and stress might hinder deep learning when peer and self-assessment are used as summative tasks or to assign a grade. When self and peer assessment are used in a formative manner, they provide the necessary conditions to engage students in their own learning. Students who are actively engaged in their learning through formative assessment tasks are more likely to become aware of learning gaps and the need to find and use more resources to address these gaps. In other words, "formative assessment is vital for learning and that the type of formative assessment that contributes to students' development as effective learners is that which includes elements of self and peer assessment" (Logan, 2009, p. 30). Providing students with a chance to engage in formative peer and self-assessment activities make them actively involved in their learning and may positively impact their perceptions of the integration and relevance among content taught, learning expectations and assessment (Struyven et al., 2002; Vu & Dall'Alba, 2007).

While the literature might be populated with multiple studies that investigated the benefits of self and peer assessment, few or very little of them focused on students' perceptions of how self and peer assessment help them learn. Even though few studies (i.e. Logan, 2009) reported learning gains from a student perspective, their focus was not to investigate students' perceptions of the mechanisms that facilitated those learning gains.

Most of the studies reviewed above tend to focus more on comparing students' assigned grades with those of a teacher or tutor by attempting to investigate the relationship between self and peer assessment and learning gains. For example, in his review of the literature on peer assessment, Topping (1998) reported that most of the studies reviewed involved marking or

grading peers' work and aimed at either "saving staff assessment time or costs...while other projects aimed to add value in terms of cognitive, metacognitive or other gains for participants" (p. 251). Furthermore, Topping emphasized the prevalence of anonymous peer assessment and that personal contact between assessor and assessee was not necessary. Given the crucial role of self and peer assessment on student learning gains as evidenced in the literature, it is very important to understand the ways in which students think peer and self-assessment help them learn. It is to fill such a gap that the current study intends to explore students' perceptions of the ways and means through which self and peer assessment can help support and enhance their learning. More specifically this study addresses the following questions:

- Through which mechanisms, do students perceive that peer and self-assessment contribute to their learning?
- In what ways, do students perceive self and peer assessment as practices that can promote their sense of responsibility towards their own learning?

## Methods

This explorative study was exempted by the Institutional Review Board and took place in a graduate class. The study utilized qualitative methods to analyze students' perceptions of the benefits of self and peer assessment as well as the factors through which those benefits occur. An online survey was used to collect data.

## Participants

Participants were 31 students enrolled in a graduate course in a Social Science based area studies program in both Fall 2013 and 2014 semesters. Instruction in this course landed itself to peer and self-assessment activities as it involves some lecturing and seminar type work such as hands-on activities and group work. In Fall 2013 there were 12 students with 9 of them being female students. In the Fall 2014 semester, there were 19 students, and 15 of them were female students. This predominance of female students is consistent with the general trend in the university. Sixteen (51.6%) of them responded to the survey, for Fall 2013 (9 out of 12 students) and Fall 2014 (7 out of 19 students). This was a required course. Half of the respondents (8) had never used peer and self-assessment before, while five of them reported having experience with both peer and self-assessment, one student with peer assessment only and two students with just self-assessment.

The same instructor taught both Fall 2013 and Fall 2014 courses. Students were informed of the intent of

the peer and self-assessment activities through oral communications during class time. They were told that this was part of a research project but was also aimed to help improve the course and their learning.

### Procedure

For each semester students were briefed about self and peer assessment processes. This briefing highlighted the benefits of self and peer assessment in learning, what makes peer and self-assessment effective and beneficial for improved learning, and the aims of the initiative. The different steps that they need to go through to implement both peer and self-assessment were explained in class.

Assignments used for this exercise varied and included a literature review and an article critique. In the literature review assignment, students were asked to select a topic of interest and to write a brief literature review using at least 5 peer-reviewed journal articles. In the article critique, students were asked to select a research article from a list provided by the instructor or to find one of their own and write a critique about that article. For each these assignments, guidelines and rubrics detailing expectations and explaining grading criteria were also provided and explained to students.

Students were then asked to use the provided guidelines and rubrics to self-assess their work. For the peer assessment, there were two different scenarios. In one scenario students were asked to choose their own partner. In another scenario, the instructor assigned a partner to each student.

After completing the self-assessment students were asked to go back and revise the work based on their findings from using the rubric and guidelines. The revised work was then shared with a partner who reviewed it using the same guidelines and rubrics. Each student brought their feedback to class and shared it with their partner. During this time students explained their feedback, and this was also an opportunity for them to ask questions or clarifications regarding the expectations. The role of the teacher was to address questions raised by the students about the process of self and peer- assessment or other general questions. Additionally, the role of teacher consisted of frequently articulating and explaining the aims of the self and peer activities to students in order to help them better integrate these activities in the overall learning process.

### Data Collection

Data about students' perceptions of how self and peer assessment could contribute to learning and promote a sense of responsibility for their work were collected through an anonymous online survey that was sent to students (See appendix). This survey was sent

out to all students using Google Forms and via student university emails. The survey included questions about self and peer assessments' contribution to students' learning and students' responsibility for their own learning. In Fall 2013 semester, 9 out of 12 students responded to the survey. The survey was sent out again in Fall 2014 to increase the number of respondents, and 7 out 19 students responded.

### Data analysis

Students' responses on the survey were analyzed and classified into themes based on their relationships. Emerging axial coding was used in this study. As responses were being collected, emerging themes were presented and discussed with students in class for validation purposes. Additionally, thick description was also used in attempts to ensure validity.

### Results

Sixteen students responded to the survey. While the small number of respondents is acknowledged as a limitation of this study, results presented below can still provide a deeper understanding of students' perceived benefits of self and peer assessment. Further, the results can provide guidance on specific mechanisms that teachers need to keep in mind when implementing peer and self-assessment in their classrooms. Results will be discussed in the context of the two research questions that guided the present study.

### Mechanisms through Which Students Perceive Peer and Self-Assessment Contribute to their Learning

When asked about the mechanisms through which they think self and peer assessment contributed to their learning, students identified a number of elements that can be classified under mechanisms such as feedback, clarification of expectations, collaboration, and a positive learning environment. Those mechanisms are presented in themes below

**Peer / self-assessment and feedback.** Students indicated that feedback was one of the main mechanisms that helped them benefit from self and peer assessment processes. As some respondents indicated, "Feedback was very valuable and helpful." More comments about the value of feedback and how it helped students to learn include, "It was live feedback and not only written one, and usually simultaneous to the work so it was more useful," or, "Since the discussions were based on the materials that we learned together during class, the feedback received was practical and filled the gap of what I would have missed." These statements from respondents indicate that students appreciate the promptness and practicality

of the feedback. In other words, students seem to prefer feedback they can act on immediately while on the task.

In addition to the reported benefits of feedback on learning, some students (7 out of the 16) indicated that the peer assessment affected their attitude towards feedback. As one student noted, “Before I used to never accept any critique given on my work. However, after I found how beneficial it is, I started to ask from other colleagues for feedback on my work.” The impact of self/peer assessment on students’ attitudes towards feedback is also reported as helping them in “accepting criticisms and welcom[ing] them within the reasonable limits.”

**Self / peer assessment and collaboration.** The majority of students (10 out of the 16 respondents) agreed that peer and self-assessment contributed to the development of a more supportive learning environment. Some of the ways students reported that peer assessment helped promote collaboration is that it allows a better understanding of the content through interaction with other classmates. As reported by students, “it helped [to] go through the content and compare one’s understanding with other students.” This shows that having other people in the class as support for learning the content can be very beneficial in peer and self-assessment.

Students also reported that the peer and self-assessment activities in this course helped them clarify expectations and requirements for their assignment. In other words, this process contributed to the development of a more open and collaborative learning environment as reflected in this student’s comments: “Yes, sometimes, even though you do not completely understand what is being discussed, I missed the chance to ask about it. However, during the peer and self-assessment I could make use of others explanation and feedback.” Additionally, students reported that “peer assessment gives students opportunities to be more engaged, and help each other on the assignment.” Comments like this one could be an indication that students might view the collaboration generated through self and peer assessment as a two-way street. Collaboration is not only about benefitting from others, but also about supporting others in their learning. Additional comments about collaboration refer to collaborative learning: “Learning could be easy from others; it helps you understand the material from a different angle/approach.” Another advantage of collaboration included the opportunities to practice. According to respondents, collaboration provided them with “a chance to apply theory” and other learned concepts before submitting their assignment. Opportunities to practice also helped clarify expectations and requirements.

It is noteworthy to indicate that while 10 out of 16 agreed that peer and self-assessment contributed to the development of a more supportive learning

environment, the remaining 6 did not disagree but were neutral. Some of the reasons given were related to challenges inherent to working in a group, e.g., “[I]t takes time and because some of the students have to work, so they are busy to meet for the assignment.”

**Self / peer assessment and learning environment.** When asked whether engaging in self and peer assessment affected the class learning environment, most students (10 out of 16) agreed that peer and self-assessment contributed to a more open and supportive learning environment. The 6 remaining did not disagree either but were neutral and indicated reasons such “wasting time to wait for others,” or “other classmates not paying enough attention.”

Other students indicated that the supportive learning environment is promoted since “peer assessment allows to discuss different article topics with different students... and learn each other’s points of view,” or, “[I]t added to the class more energy and closer relations between students.” Self and peer assessment seemed to stimulate the class environment and promote mutual learning. Students seem to indicate that they benefited from engaging in informal discussions with their peers and that such discussions seem to positively affect the learning environment. Further students reported that self and peer assessment “create a friendly environment in terms of letting us cooperate with each other.”

### **Ways in Which Students Perceive Self and Peer Assessment as Practices That Can Promote Their Sense of Responsibility towards Their Own Learning**

The majority of students (12 out of 16) agreed that self and peer assessment allowed them to take more responsibility for their own learning. According to respondents, peer and self-assessment promote their sense of responsibility towards their own learning through a higher level of awareness of requirements and expectations, development of their evaluative skills, and helping them in identifying and locating necessary resources to fill identified learning gaps.

**Self / peer assessment and awareness of course requirements and expectations.** According to students, self and peer assessment also helped develop their sense of responsibility by making them aware of course and assignments expectations as reflected in the following student’s comments: “[C]ourse requirements and expectations were clearly explained in the rubrics for each assignment, [and] through self-assessment I understood those requirements better.” More students made similar comments about peer and self-assessment promoting students’ awareness of requirements and expectations: “[S]ome of the requirements in the course I did not understand until a peer review with other

students”, and, “Lots of things I did not hear or get from the instructor (and embarrassed to keep asking) ...I got it from peers.” Students’ awareness of expectations as a result of engaging in the process of self and peer assessment is also reflected in the following comment: “It clarifies things for me that I was not sure about.” Self and peer assessment are, therefore, activities that generate more learning resources and support in terms of helping students understand what is expected of them. These comments indicate the benefits of having a chance to discuss the course expectations with a peer when engaging in self and peer assessment and how that might help support student learning.

**Self / peer assessment and students’ evaluative skills.** Participants indicated that peer/self-assessment allowed them to take responsibility by helping them develop their evaluative skills: “Self-assessment helped me better learn the content of this course; I was able to evaluate my own assignment to the rubrics provided in the course.” The development of their evaluative skills helped students become more proactive in taking necessary actions in a sense that it allowed them “.... to understand in what aspect I have to strengthen my studies.” Students commented further that peer and self-assessment allowed them to know their weaknesses, as the following respondent’s comment illustrates: “I know where I am weak...”

**Self / peer assessment and abilities to develop strategies to fill identified learning gaps.** Another way that students’ perceived peer and self-assessment helped them take more responsibility for their learning was by helping them develop strategies to fill identified learning gaps. The heightened awareness of expectations and requirements combined with the development of their evaluative skills made it easier for students to not only identify learning gaps, but also to develop strategies to fill those gaps. Respondents indicated that peer/self-assessment helped them know exactly what was missing and what to do about it. As students commented, peer and self-assessment “help[ed] me to know what I can do and what I should do” or “made me more critical about my own work” and become more active learners: “[T]hey allowed me to develop a more interactive role rather than simply being a passive receiver of information.” Being able to evaluate their assignments prepared students to identify gaps and develop strategies to meet requirements: “If I missed something in my assignment, I would go back to the readings and try to fix it.”

As reflected in the comments above, peer and self-assessment helped students identify learning gaps and locate necessary resources to fill such gaps. As commented by some respondents, “It lets the student go back to their work revise it again,” or “After peer review, I understood the necessity of more knowledge about the topic,” Taking responsibility is also exercised

by students as a means to support their peers” “[By] receiving feedback from others, I felt the need to make myself more prepared to assist others in much the same way.” From the comments above, it appears that peer and self-assessment allow students to reflect critically, not only on what to do, but also how to do it.

While none of the students disagreed that self and peer assessment allowed them to take more responsibility for their own learning, four of them were neutral. Comments from some of the students who were neutral revealed that the teammate’s disposition to work in a group is very important: “It also depends on the member and classmates, but at this time I got tired to work with people from my class.” Other students reported being neutral because they don’t see assessment as their responsibility “I think assessment is not related with my responsibility in this case.”

## Discussion

Though the relatively small number of respondents warrants for caution in interpreting the results, discussion of these results could provide guidelines for a better understanding of students’ perceptions and opinions regarding the benefits of peer and self-assessment. Such understanding is important if educators want to place peer and self-assessment activities in the hands of their students. The findings of this study provide a basis for an expanded understanding of the ways students perceive the contributions of peer and self-assessment in their learning.

Findings from this study revealed that feedback, collaboration, and a supportive learning environment are mechanisms through which peer and self-assessment contribute to student learning. Findings also indicated that students perceive that peer and self-assessment activities promote their sense of responsibility towards their learning through a heightened awareness of course requirements and expectations, as well as the development of, their evaluative skills and strategies to fill identified learning gaps. This is in conformity with previous research that reported the positive impact of peer assessment (Dochy et al., 1999; Kearney & Perkins, 2014; Li, 2011; Planas Lladó et al., 2013) and self-assessment (Dochy et al., 1999; Kearney & Perkins, 2014; Lew, Alwis, & Schmidt, 2010) on student learning.

While findings from these previous studies indicated the benefits of peer and self-assessment on student learning, the current study adds to the literature by highlighting the mechanisms of feedback, collaboration, and a supportive environment, on student learning, through which peer and self-assessment contribute to learning according to students’ perceptions. Further, this study contributes to the

literature by providing specific examples of how students perceive and might experience the benefits of these mechanisms through the processes of self and peer assessment. Feedback, collaboration, and a supportive environment are mechanisms that can be implemented and materialized in different ways. For example, while students seem to value feedback, oral and instant feedback seems to be perceived as very helpful since it is live as they indicated. Findings from this study contribute further to the literature by revealing that providing students with opportunities to discuss feedback with their peers plays an important role in reinforcing the effectiveness of such feedback on their learning as reported by respondents. In contrast to findings from Topping (1998) that indicated that personal contact was not necessary with the prevalence of anonymous feedback, results of this study reveal that facilitating personal contact among reviewers in the self and peer assessment process can increase the positive effects that feedback can have on student learning. As respondents indicated, it is this process of discussing feedback that allowed them to clarify expectations and requirements.

The findings of this current study also contribute to the identification and understanding of obstacles that might negatively affect the benefits of peer and self-assessment in the classroom. For example, as reflected in the results, students' dispositions to work in a group could impact their willingness to engage in peer assessment, as well as their desire to collaborate with other classmates. In addition to this finding about students' willingness to work in groups, prior research (Struyven et al., 2002; Vu & Dall'Alba, 2007) has identified other challenges related to stress, anxiety, time constraints to fully discuss feedback, students' lack of confidence to accurately assess themselves and their peer's work, etc., as potential barriers to the successful implementation of peer and self-assessment. Other scholars (Papinczak, Young, & Groves, 2007) went further to raise difficulties and challenges of applying peer and self-assessment in more complex skills such as problem-solving, and they reported students' concerns about the negative impact that peer assessment might have in the learning environment.

Findings from this study also seem to be similar to those of previous studies that concluded peer and self-assessment's impacts on student learning depend on how they were introduced to students and implemented (Sandvoll, 2014). In this study self and peer assessment activities were prepared and implemented as means to help students develop higher learning but not to assign them a grade. In other words, self and peer assessment in this study were primarily used as formative assessments or assessment for learning. Therefore, respondents viewed them as opportunities to improve their learning. For that purpose, self and peer

assessment allowed students to use all the possible mechanisms and strategies available to them. Such mechanisms include collaboration with peers, feedback, a supportive learning environment, etc. This suggests that self and peer assessment can help create a learning community (Nulty, 2011) where learning is a socially developed endeavor and requires the active involvement of other peers with similar interests.

Findings from this study can also be interpreted through the lens of self-regulated learning. According to Zimmerman (1989), self-regulated students "personally initiate and direct their own efforts to acquire knowledge and skill rather than relying on teachers, parents or other agents of instruction" (p. 329). By taking responsibility for their learning through a heightened awareness of course requirements and expectations, a development of their evaluative skills, and their abilities to develop strategies to fill identified learning gaps, students seem to develop self-directed learning attitudes that allow them to diagnose their learning needs and take corrective measures on their own if necessary. Banarjee and Kumar (2014) reported a positive correlation between self-regulation attitudes and student academic achievement. According to the authors, self-regulated learning refers to a process where a learner "monitors and regulates his/her cognition, motivation, and behavior during the learning process and then reflects on his/her learning process and outcomes" (p. 330). Through the practice of peer and self-assessment, respondents from this study were able to reflect on their learning needs and direct their efforts to locate and identify necessary resources to fulfill those learning needs.

By providing respondents of this study with opportunities to fully engage in their own learning through identification of gaps and development of strategies to fill those gaps, as well as collaboration with peers, self and peer-assessment seem to have the potential to help them to take responsibility and control of their own learning. This is similar to what respondents in this study reported when they indicated that self and peer assessment allowed them to analyze and evaluate their own work to identify gaps. Further, they identified needed resources and information to fill missing information on their own. Students, in this case, are clearly exhibiting an example of taking control and responsibility for their learning since they actively engage in their learning and work with others to fulfill learning needs rather than waiting for someone else to tell them. Other research (Burkill, 1997; Huff & Johnson, 1998) has also demonstrated how taking responsibility improves not only learning, but makes students more enthusiastic about their own learning. According to findings from this study, students take responsibility not only for their own learning, but also for the learning of peers. This is reflected in students'

attitudes when they report feeling the need to be prepared so they can help each other in the same way. Therefore, self and peer assessment can help promote a learning community which can give students a sense of confidence and shared responsibility that can positively impact learning. Prior research (Dochy et al., 1999; Nicol & Macfarlane-Dick, 2006; Reinholz, 2015a) indicated the positive impact that formative assessment might have on students' self-regulated learning capabilities and sense of responsibility in their own learning.

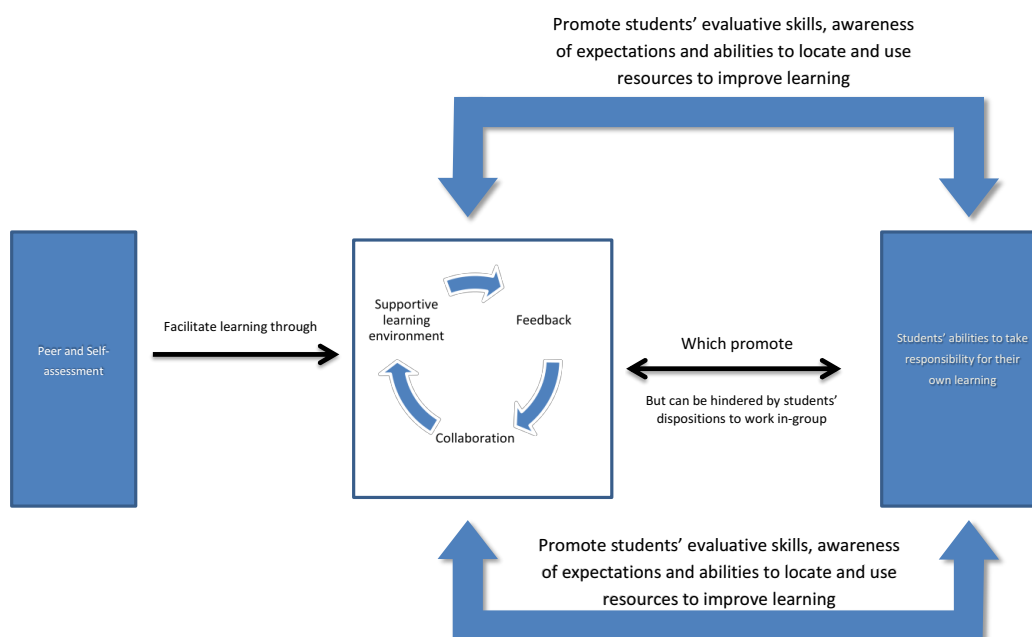
Results of this study could also be discussed through the lenses of lifelong learning. Taking responsibility and control of their learning not only allows students to become active learners but can also prepare them to become lifelong learners. By identifying gaps and thinking of ways to fill them, students are developing reflective and evaluative skills necessary for lifelong learning. In other words, they are learning to identify problems, search for relevant information, evaluate that information, make an informed judgment, and apply it to address the identified problems, as well as future situations they may encounter in real life (Boud & Falchikov, 2006; Boud & Molloy, 2012; Dochy et al., 1999). Using assessment to develop lifelong learning skills is similar to what Boud (2000) refers to as sustainable assessment which he defines as "assessment that meets the needs of the present without compromising the ability of students to meet their future learning needs" (p. 151). Benefits from self and peer assessment—such as thinking, learning more, being critical, making informed judgments,

and providing more structure—reported by respondents to this study have been identified by prior research (Boud & Falchikov, 2006; Hanrahan & Isaacs, 2001) as supportive of lifelong learning.

The effects of the mechanisms through which students perceive peer and self-assessment contribute to their learning (feedback, collaboration, and a supportive learning environment) should not be viewed as separated and independent from one another, nor should they be viewed as separate from the processes through which students seem to develop their sense of responsibility towards toward their own learning. Rather, they all should be viewed as interrelated and interdependent. In other words, the willingness and desire to seek feedback will depend on a supportive learning environment where each member values collaboration and perceives him or herself as a learning resource for their peers. Similarly, a learning environment is perceived as supportive based on the availability of feedback and the ability of the members of a community to collaborate and support each other. Willingness to collaborate is also dependent on the belief and perception that other community members are willing to contribute and help one's quest for learning.

The successful interaction of these mechanisms could also lead to the development of students' sense of responsibility for their own learning. In return, this sense of responsibility about one's learning will affect their attitudes towards using the so-called resources. All these interactions are depicted in Figure 1.

Figure 1  
Visualization of How Self and Peer Assessment Contribute to Students' Learning and Responsibility





### Implications

A major implication of this study's findings is the necessity for educators to further pursue the engagement of students in sustainable assessment through peer and self-assessment activities in order to develop lifelong learning skills. To achieve that goal, teachers need to pay special attention to mechanisms that help develop an environment that is conducive to learning where mutual support and willingness to work in groups are valued by each learner. To help students benefit fully from peer and self-assessment activities, teachers need to take into account activities and processes that promote collaboration and a cooperative learning environment as reflected in the results of this study.

More attention is also needed for the type of feedback generated through peer and self-assessment. Specific criteria to promote quality feedback need to be developed so that collaboration can be more successful and beneficial to each learner and therefore promote students' opportunities to take responsibility for their learning. Oral and instant feedback need to be emphasized and promoted based on the results of this study.

Benefits from self and peer assessment can be maximized also if activities are designed in a way that allows students to apply their evaluative skills. These evaluative skills will help students assess their work and that of others with respect to expected performance criteria in order to become active learners and better prepared to engage in lifelong learning.

While this study shows benefits of peer and self-assessment, it appears that not all students saw their interconnection and how they should build on each other. Prior research (Reinholz, 2015b) has indicated the necessity not only to establish the link between peer and self-assessment, but to make obvious and explain the mechanisms through which this linkage happens.

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## Appendix

## Peer and Self-Assessment:

Dear students

This survey is being submitted to you to collect your feedback, views and opinions regarding the peer and self-assessment we have been doing in this class. It intends to examine whether the peer and self-assessment were beneficial to you or not? Ways in which they helped if they did? Please provide your responses to the questions below. This activity is voluntary and I appreciate your time and effort in helping me improve the course as well as my practice. Your feedback and opinions are highly valued

**\* Required**

**1. Instructions provided for completing assignments in this course were clear \***

*Mark only one oval.*

- ☐ Agree  
☐ Neutral  
☐ Disagree

**2. Please describe how the peer assessment was beneficial or not to you depending on your answer above. Please provide examples. \***

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**3. Please describe how the self-assessment was beneficial or not to you depending on your answer above. Please provide examples. \***

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**4. Do you agree or disagree that peer assessment in this class affected your attitudes towards feedback received from classmates? \***

*Mark only one oval.*

- ☐ Agree  
☐ Neutral  
☐ Disagree  
☐ Other: \_\_\_\_\_

5. Based on your answer to the previous question, please explain how peer assessment in this course affected your attitudes towards feedback \*

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6. Please indicate whether the self and peer assessment helped you better learn the content of this course and in what ways. Provide examples \*

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7. Do you agree or disagree that the peer assessment contributed to a more open and supportive learning environment in this class? \*

Mark only one oval.

- ☐ Agree  
☐ Neutral  
☐ Disagree

8. Please provide an explanation for your answer to the question above \*

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9. Please select the one that describes you best from the choices below \*
- Mark only one oval.

- ☐ The peer and self-assessment were both beneficial to me  
☐ Peer assessment was more beneficial to  
☐ Self-assessment was more beneficial to me  
☐ None of the above. The peer and self-assessment were not beneficial to me

10. Please provide reasons and or explanation for your choice \*

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11. Peer and self-assessment allowed me take more responsibility for my own learning in this class \*

Mark only one oval.

- ☐ Agree  
☐ Neutral  
☐ Disagree

12. Please provide explanation for your answer to the previous question. Please provide examples if possible

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13. Peer assessment promoted interactive and collaborative learning in this class \*
- Mark only one oval.*

- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Other: \_\_\_\_\_

14. Please explain your response the previous question. Please provide examples

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15. The self and peer assessment helped me better understand course expectations and requirements \*
- Mark only one oval.*

- ☐ Agree
- ☐ Neutral
- ☐ Disagree

16. Please explain your response to the previous question. Please provide examples if possible \*

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17. The peer and self-assessment allowed to develop my reflective skills \*
- Mark only one oval.*

- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Other: \_\_\_\_\_

18. Please explain and provide examples regarding your answer to the question above \*

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19. The peer and self-assessment allowed to develop skills to evaluate my own work \*

*Mark only one oval.*

- ☐ Agree  
☐ Neutral  
☐ Disagree  
☐ Other: \_\_\_\_\_

20. Please provide an explanation and examples regarding your answer to the previous question if possible \*

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21. In peer assessment I prefer \*

*Mark only one oval.*

- ☐ To select my own partner  
☐ That the instructor assigns partners  
☐ Any of the two is fine with me  
☐ Other: \_\_\_\_\_

22. Please explain your response to the previous question and provide examples if possible \*

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23. This course significantly increased my knowledge \*

*Mark only one oval.*

- ☐ Agree  
☐ Neutral  
☐ Disagree  
☐ Other

24. Please explain if you selected other above

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25. The way this course was taught accommodated my learning needs \*

*Mark only one oval.*

- ☐ Agree  
☐ Neutral  
☐ Disagree  
☐ Other

26. Please explain your choice above

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27. What did you like about (benefits and advantages) peer assessment in this class? \*

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28. What did you not like (disadvantages or difficulties) about peer assessment in this class? \*

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29. What did you like (benefits or advantages) about self-assessment in this class?

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30. What did you not like (disadvantages or difficulties) about self-assessment in this class?

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**31. Have you ever used peer and/or self-assessment before this course? \****Mark only one oval.*

- ☐ Yes I have used both peer and self-assessment before this course
- ☐ I have only used peer assessment before
- ☐ I have only used self-assessment before
- ☐ No I have not used peer or self-assessment before this class

**32. Any additional comments about peer and self-assessment in this class**

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# Leading Change: An Organizational Development Role for Educational Developers

Cynthia Weston, Jennie Ferris, and Adam Finkelstein  
*McGill University*

While educational development has long been aligned with organizational development in the literature (Berquist & Phillips, 1975; Gaffe, 1975), in practice this link has faded with time. Schroeder (2011) has recently asserted that given the broad-based changes in teaching and learning that are taking place at universities, it is important that educational developers take an organizational development role and lead institutional level changes in teaching and learning (p. 1-2). For many of us, it has not been apparent how to initiate or clarify a leadership role in organizational development. We share the story of how we came to recognize that our role in leading an institutional change initiative to re-envision classroom spaces was organizational development. We contextualize our experience in a way that makes it meaningful for practitioners seeking to clarify or enhance their own organizational development roles. From our experience, we have gleaned lessons that might be of use to colleagues in the field. First, organizational development should become part of a curriculum for educational developers. Second, we should move from intuition to intention in our organizational development efforts.

Educational development has long been aligned with organizational development. Forty years ago, the field was conceived of as comprising interrelated areas of faculty development, instructional development, professional and/or personal development, and organizational development (e.g., Berquist & Phillips, 1975; Gaffe, 1975; Professional and Organizational Development Network (POD), 2016). The purpose of the organizational development area was generally defined as trying to foster a better institutional environment for teaching and learning. While the link between educational development and organizational development might persist in the literature, it seems to have faded in practice. Schroeder (2011) indicates how disconnected these have become when she names organizational development as the “missing prong” (p. 17) of educational development. She stresses that educational developers should not stay in the comfortable niche of instructional development, primarily providing instructional consultations, services and support, nor is it sufficient to consult about, or provide programming and resources for, institutional initiatives. Educational developers and directors must instead take an organizational development role and lead institutional change initiatives that “bring about shifts in values, boundaries, and paradigms required for broad-based changes in teaching and learning that are taking place at universities” (Schroeder, 2011, p. 1-2). For some of us, it is not apparent how or where to begin: whether we wish to initiate leadership in organizational development or clarify a role in which we are already engaged. Berliner (1992) argues that telling stories is a way to contextualize experiences to make them more meaningful for practitioners. In this paper we share one story of how we came to lead institutional change and how we later realized it was organizational development.

We recount how, as educational developers, we took a leadership role in an institutional initiative to re-envision classroom spaces. We then retrospectively examine where we made decisions and acted in ways consistent with an organizational development model and where things might have been done differently had such a model been used explicitly from the outset. From our experience we have gleaned lessons that might be of interest to colleagues in the field: first, organizational development should become part of a curriculum for educational developers; and second, we should move from intuition to intention (Weston & Gosselin, 2004) in our organizational development efforts. Until carrying out this examination of our work, we felt like the teaching and learning center director who said, “I didn’t know that was what I was doing. I didn’t know that was organizational development” (Schroeder, 2011, p. 12).

## Leading Change at the Institutional Level

Our teaching and learning center (TLC) is located at McGill University, a large, publicly funded, research-intensive university in Canada. The TLC has been in operation for several decades and has offered a large range of programs, resources, research and services to enhance teaching and learning at the University. A change in the structure and mission of the TLC in 2005 provided an opportunity for us to rethink our work.

Two areas of conversation in educational development caught our attention. The first was Taylor’s (2005a, 2005b) examination of educational development as institutional leadership. The field of faculty/educational development has changed in significant ways over the past 40 years (e.g., Gibb, 2013), and we have concurrently evolved during that time. Nonetheless, considering ourselves institutional

leaders was a confronting concept. The importance of assuming a more significant leadership role certainly resonated, but how to do so was not immediately apparent. The second area of conversation was the notion of framing levels of educational development impact (e.g., Berthiaume & Arikawa, 2006; Timmermans, Jazvac Martek, Berthiaume, McAlpine, & Arcuri, 2005). We also identified four levels of impact: (1) micro, or level of individual professors and courses (e.g., course design workshops); (2) meso, or level of departments and Faculties (e.g., curriculum design); (3) macro, or level of institutional systems (e.g., course evaluations); and (4) mega, or level of the educational development field in higher education (e.g., organization of a conference). The resulting map of TLC projects by intended level of impact (Weston, Matushita, Berthiaume, & Timmermans, 2008; Weston, Winer, Berthiaume, & Timmermans, 2010) instead of by activity (e.g., workshop, consultation, committee) revealed an abundance of projects at the micro level and far fewer projects at the meso and macro levels. We decided it was time to move into a more intentional role of leading change in departmental, faculty, and institution-level teaching and learning initiatives.

This decision coincided with an invitation from the Provost to lead an institution-wide initiative for re-envisioning teaching and learning spaces (henceforth, “classroom spaces”) on campus. In previous years, such an invitation might have been declined due to concerns about diverting precious resources from current projects and going beyond the TLC’s mission as it had been previously understood. However, given the desire to increase the TLC’s leadership role at multiple levels of the University, and to move “from the periphery to the center of the academy” (Dawson, Mighty, & Britnell, 2010, p. 69), we accepted the invitation, perceiving it as an access point for enhancing teaching and learning at the institutional level.

### Re-envisioning Classroom Spaces

At the time this story begins, 2006, many of our 475 classrooms were old or in poor condition. The Provost conceived a Teaching and Learning Spaces Working Group (TLSWG) with a mandate to craft a vision for classroom spaces based on sound pedagogical principles, as well as to create a process for aligning teaching and learning space development with the University’s strategic directions. This group would be responsible for consolidating a formerly fragmented budget process into a single central fund and allocating funds annually for all classroom renovations and upgrades. The Provost constituted the TLSWG with stakeholders from across the University. The Director of the TLC and the Director of an operations unit were appointed Co-Chairs (hereafter referred to as Chairs).

The TLSWG began meeting monthly and, as intended, it became the central source for annual requests and funding for classroom renovations. Because the majority of classrooms did not support what we currently know about how students learn (e.g., Christensen Hughes & Mighty, 2010), a vision of classroom design was created that would support student learning. Processes were developed for transparently sharing all requests and transforming the approach to classroom design. The entire working group arrived at consensus as to which classroom renovations should be funded each year and eventually established a five-year plan. This paper deconstructs the first six years of the TLSWG (2006-2012), during which over 350 of the 475 classrooms were improved.

### Using an Organizational Development Model to Re-construct the Process of Re-envisioning Classrooms

Five years later, seeking to understand if and how educational developer leadership might have facilitated the re-envisioning of classrooms, we consulted established change models (e.g., Beckhard & Harris, 1977; Kotter, 1996; Schroeder, 2011). Schroeder’s work, in particular, resonated for us. Her conception of educational development coincided with the notions of leadership and levels of impact that we had been exploring. She recommends that TLCs “merge the traditional responsibilities and services of the past several decades with a leadership role as organizational developers” (p. 7), which she defines as bringing their knowledge and skills to decisions about the institution and student learning and collaboratively planning initiatives, rather than solely programming and consulting about them (p. 6). She encourages TLCs to move towards a more institutional vision of their work, while concurrently cautioning that this should not eliminate the instructor-level role and support offered. Among the change frameworks/models she discusses, one struck us as particularly relevant for our context: Ready and Conger’s (2008) “Five-Phase Model for Enabling Visions” (p. 73). Although initially developed for corporate settings, Schroeder introduced it into conversations framing educational development leadership as organizational development.

The confluence of these concepts – leadership, levels of impact, and organizational development – led us to wonder if the approach we took to leading the re-envisioning of classroom spaces might be considered organizational development. In the next sections, we re-construct our decisions and actions according to the five phases of Ready and Conger’s (2008) model: (1) framing the enterprise agenda; (2) engaging multiple layers of the organization; (3) building mission-critical capabilities; (4) connecting the dots by creating alignment; and (5) energizing the organization through

the power of the people (p. 73). This re-construction revealed where the ways in which we led the re-envisioning of classrooms were consistent with organizational development as defined by Schroeder and with the phases described by Ready and Conger. It also revealed where things might have been done differently had such a model been used intentionally from the outset. The re-construction begins below, with examples provided for each phase.

### Framing the Agenda

This is the first phase of Ready and Conger's (2008) model. It entails three components: developing a vision by framing organizational challenges as an agenda for action, finding pathways to the future while maintaining the organization's proud heritage, and creating an organizational climate suitable to achieving the vision (p. 71).

First, several sources contributed to developing a vision for classroom spaces. The Provost's creation of the TLSWG, with stakeholders from across the University and a central budget for renovations, provided a vehicle for university-wide re-envisioning of classroom spaces. When the TLSWG began meeting, compelling stories emerged: classrooms with ventilation so inefficient it affected student concentration and led to an instructor dismissing class more than once; students sitting on lecture hall stairs because so many seats were broken; and professors feeling chained to the podium by old-fashioned corded microphones. Such stories created a collective concern about the quality of the teaching and learning environment.

The research and practice in teaching and learning in higher education was a critical source for creating the vision; we studied these to identify sound pedagogical principles and craft a vision for classroom spaces. The research describing the relationship between instructors' approaches to teaching and students' approaches to learning was crucial (e.g., Biggs, 2003; Christensen Hughes & Mighty, 2010; Entwistle, 2010; Trigwell, Prosser & Waterhouse, 1999). The well-known finding that students tend to become more active constructors of knowledge and adopt a deeper approach to learning, when instructors use teaching approaches that facilitate and guide learning, was especially important. Similarly, best practice principles for teaching and learning in higher education (e.g., AAC&U's High Impact Practices, 2008; Chickering & Gamson, 1991; National Survey of Student Engagement (NSSE), 2008) point to the importance of active and collaborative engagement for student learning. Among these, the National Survey for Student Engagement (NSSE, 2008) emerged as particularly relevant for re-envisioning learning spaces at our

institution. They consolidated a great deal of the research on student learning into clear benchmarks, and University administrators were already familiar with the benchmarks because the University was a regular participant in the biannual NSSE survey. Because these benchmarks provided a language and metric familiar and credible to academic administrators, the five NSSE benchmarks were adopted as a way to express the vision for classroom spaces: level of academic challenge; active and collaborative learning; student-faculty interaction; enriching educational experiences; and supportive campus environments. The NSSE benchmarks were subsequently revised in 2013 (McCormick, Gonyea & Kinzie, 2013).

Research on classroom spaces and the practices of peer institutions was a significant source of concepts for translating these five NSSE benchmarks into classroom design guidelines. Dori and Belcher (2004) confirmed our sense that the nature of the physical environment can influence students' experience, noting that the "fairly passive lecture discussion format where faculty talk and students listen, is contrary to almost every principle of optimal settings for student learning" (Guskin, 1994, p. 13-14). As learning spaces can be seen as "authorising and enabling certain behaviors over others" (Jamieson, 2003, p. 122), they need to be designed to foster and support behaviours that promote student learning, including "interaction, collaboration, physical movement and social engagement" (p. 121). This called into question the traditional design of large lecture halls, typically structured to support one-way communication from instructor to students, with the podium acting as a barrier between them. Peer institutions provided concrete examples of how design decisions could lead to classroom spaces that foster students' active engagement with content and with each other (e.g., University of Melbourne (Trelogan, 2007); University of Tokyo (2013), SCALE-UP classrooms (NCSU Department of Physics, 2007), TEAL classrooms (Dori & Belcher, 2004), and Active Learning Classrooms (University of Minnesota, 2009). From this research, we created a document, *Principles for Designing Teaching and Learning Spaces* (hereafter, "the *Principles*," Finkelstein, Ferris, Weston & Winer, 2016), which defined each of the NSSE benchmarks in terms of space, and provided instances of how each could be manifested in design features. For example, the themes of *active and collaborative learning* and *student-faculty interaction* led to a notion of classrooms designed with movable furniture to foster students' active engagement with the content and each other, and a reduction of physical barriers to interaction between instructors and students. We believed that transforming the physical classroom had the potential to prompt instructors and students to re-think approaches to teaching and learning. Classroom spaces are an

essential part of campus infrastructure that communicate the purpose, meaning and value placed upon the teaching and learning mission of the university (Helgesen, 1995), and students are “likely to adopt the mode of learning signalled by the existing layout and type of furniture” (Joint Information Systems Committee, 2006, p. 25). The *Principles* framed the vision simply and became a key communication tool that provided “a powerful leverage point...[that] allows us to effectively articulate to all constituents what we are trying to accomplish” (Brown, 2005, “Learning Space Implications,” para. 2).

The second component of “framing the agenda” entails finding pathways to the future while maintaining a proud heritage. We felt it was vital to honour the University’s heritage as part of re-envisioning classrooms. One aspect of our heritage as a campus-based institution was that many faculty members were accustomed to traditional methods of teaching in traditional classrooms. We did not wish to alienate professors, so extreme care was taken when introducing classroom features that supported the *Principles*. Less dramatic changes (more comfortable seating, larger work areas for students, smaller podium, larger aisles, and better acoustics) characterized the first renovations introduced in the more traditional lecture halls used by professors in many disciplines. More transformational changes (e.g., round tables, a podium in the room’s center) were made to some smaller classrooms (< 80 seats), which were renamed Active Learning Classrooms (ALCs). We invited selected professors interested in active learning and pedagogical experimentation to teach in the first ALCs. Full pedagogical/technical support was offered to these professors during the first weeks of the semester, to increase the likelihood that their teaching and learning experiences would be positive.

Finally, creating a suitable climate at numerous levels is part of framing an agenda to achieve a vision. We wanted to create a climate across Faculties that would favour acceptance of the classroom vision. Before the TLSWG, Faculties were largely unaware of renovations being funded for other Faculties. Thus, an early decision was to make the funding process more transparent and equitable across Faculties: all renovation requests were integrated in a document and shared in advance by email to provide time for representatives to review and consult. At the TLSWG meetings, discussions revolved around which requests should be prioritized and why. The inclusiveness of the TLSWG minimized the potential for feeling that funding was unfair, and ensured that stakeholders’ different perspectives and possible concerns were addressed early in the prioritization process. As well, TLSWG members were invited to annual site visits of classrooms proposed for renovation. Through these

visits, they developed a better sense of the scope of needs. Some TLSWG representatives ultimately delayed their own renovation requests after seeing the dire state of other classrooms on campus. Such sharing of resources was unprecedented and was labelled “the site visit effect.”

### **Engaging Multiple Layers of the Organization**

Phase two of Ready and Conger’s model requires authentically distributing ownership of the vision through collaboration, broad based engagement, and inviting differing views. Many of the more effective strategies for re-envisioning classroom spaces were later recognized as typical of this phase.

The initial composition of the TLSWG engaged a unique range of stakeholders from across the University (i.e., the TLC, IT, Library, Planning Office, Facilities, Provost’s delegate, and three academic staff members). Additional representatives could be invited as needed. We quickly recognized the need for additional input and began inviting associate deans and building directors from each Faculty, representatives from Enrolment Services / the Registrar, IT, Finance, and undergraduate and graduate student organizations. Their contributions were so useful that the membership was permanently expanded to more than 30 representatives, most of whom regularly attended monthly TLSWG meetings. The entire committee participated in decisions as to which classrooms would be prioritized and funded each year. When necessary, those with differing views – sceptical of the directions being proposed – were invited. For example, when a respected senior professor pushed back against the new ALC designs, out of respect, we convened a special TLSWG meeting so this professor’s concerns could be heard by the TLSWG. A spirited discussion concluded with a decision by TLSWG members to move forward with the controversial design based on its potential to foster student learning. This was a remarkable moment in the re-envisioning of classroom spaces at the University. It was clear that TLSWG members had taken ownership of the vision and that their decision was based on their understanding and commitment to supporting the student learning experience over traditional approaches to teaching and classroom design.

We also felt that it was essential for the operations side of the University (Facilities architects and project managers) to partner with academics (faculty members and educational developers) in re-envisioning classroom spaces. We launched this collaboration in an unprecedented meeting with Facilities project managers where the nascent *Principles* were shared and the implications for their work were discussed. Although the unfamiliar concepts initially caused some distress for

project managers, months later some of these same project managers were heard using the language of the *Principles* with their teams and external architects. They also began to shift their conception of “client” from a specific Faculty or department, to the TLSWG at large.

### **Building Mission-critical Capabilities**

The third phase of Ready and Conger’s model entails identifying capabilities that need to be developed and addressing capability gaps necessary to achieve the vision in a way that avoids assigning blame for those gaps. This was done in several ways that mirror the steps Ready and Conger recommend. As discussed earlier, we began building mission critical capabilities by advancing our own expertise through reading the literature, visiting classrooms and participating in intensive learning space visioning/planning exercises with colleagues from other universities worldwide.

As multiple layers of the institution were engaged in most TLSWG activities, some expertise and service gaps surfaced that were previously unrecognized because work had been done largely in operational silos. It didn’t take long to recognize that instructors required additional, and sometimes immediate, support for the new instructional approaches they were enacting, often with more sophisticated technologies, in the renovated classrooms. To respond to this need, we launched a group to envisage a comprehensive teaching support system for faculty that would integrate services provided by separate teaching support units at the University. The TLC, three IT service units, and the Library were identified as partners in teaching support. As such teaching support cuts across the traditional division between technology support and pedagogy, we engaged the units in developing a multi-unit shared vision, being extremely careful not to assign blame for any gaps in service. As a better understanding of the commonalities and differences in the views of the participating units emerged, a user-focused teaching support system was developed that remains in place today. The outcomes of this multi-unit partnership included: regular meetings among the Directors of the units, the IT groups taking a more active role on the TLSWG, the development of classroom support teams, IT training sessions for instructors in specific classrooms, and overall a higher level of support for the largest classrooms on campus, and the instructors teaching in those rooms.

Developing expertise that transcends a single unit is part of building capacity for implementing a vision. One example of this is the successful case we made for creating a project administrator role because everything required cross unit coordination. Annual renovations required cross Faculty integration, prioritization and funding. Budgeting

for renovations involved the TLC, the Budget Office, and financial officers from the different units. Scheduling renovations involved Enrolment Services, Faculties, Facilities, and the TLC. A project administrator was needed to handle the logistics involved in prioritizing classroom improvements, ensure that all parties had access to relevant information for productive conversations and decision-making and evaluation, and ensure that all processes undertaken by the TLSWG continued moving forward. As the impact of the renovations was felt across Faculties and met with largely positive feedback, the critical role of the project administrator was acknowledged by all concerned, and other units were keen to replicate this kind of support role.

### **Connecting the Dots by Creating Alignment**

The fourth phase entails aligning systems, processes and mind-sets with the vision. Educational developers intuitively addressed alignment in several ways that reflect Ready and Conger’s (2008) recommendations. For example, a robust collaboration was established between academic and administrative divisions. It became increasingly evident that the financial logistics of stewarding university-wide classroom improvements necessarily involved finance planners and administrators in multiple units, at multiple levels of the University. We began to hold twice-yearly meetings to help finance professionals better understand the vision for classrooms spaces and processes required to achieve this, and to help us better understand multi-year budgeting, use of operating funds, and other logistical considerations. Subsequently, we were able to use the terminology of the finance professionals, which greatly enhanced communication, decreased confusion, and gave way to a stronger sense of collaboration among units and collective commitment to a common vision.

Alignment is also fostered when emerging leaders exhibit cross-boundary behaviours. While many TLSWG projects included a technology component (e.g., computers, projectors, screens), regular technology upgrades were also done through university IT services. At the beginning, there was sometimes overlap between the plans of IT services and TLSWG projects, which was only made apparent once projects were in progress. To avoid this, we decided to schedule annual meetings during which the two units (who previously communicated little) reviewed all projects planned for the subsequent year. The result was a better understanding of the lifecycle needs of existing technology, and clarification of roles with regard to classroom technology for all involved.

### **Energizing the Organization through the Power of People**

Phase five of the model entails building enthusiastic support and following through to

implement and sustain the vision. This was done in a number of ways when re-envisioning classrooms.

We knew it was important for TLSWG representatives to get on board with the vision, so a decision was made to hold TLSWG meetings in classrooms slated for funding as well as those that were newly renovated. In this way, members experienced first-hand the problems in existing classrooms, such as difficulty hearing and speaking to others in the room, insufficient ventilation and lighting. Meeting in a classroom after renovation provided an entirely different experience. Representatives talked enthusiastically with each other and pointed out design features in the room that they had helped design.

We made it a point to share the classroom vision and positive feedback about classroom transformations in meetings with departments and Faculties, University committees, at national and international conferences (e.g., Finkelstein, Tovar, Ferris & Weston, 2011; Finkelstein, Weston & Ferris, 2013; Weston, Ferris & Finkelstein, 2012), in invited presentations, and with local and international visitors. Images of classrooms provided concrete examples of how the *Principles* were being implemented. We held events in the new classrooms where professors demonstrated how they used the new spaces and technologies to enhance their teaching. We also documented instructor and student perspectives about teaching and learning in active learning classrooms (e.g., video commentaries [<https://www.mcgill.ca/tls/spaces/alc>], teaching snapshots [<https://www.mcgill.ca/tls/spaces/alc/videos>], which were effective communication tools that were also inspiring and widely shared. Our five ALC videos have received over 54,700 views collectively on YouTube in the last five years, which points to the interest they have garnered within and beyond our university. These videos and snapshots were powerful in communicating that the new spaces were achieving what the vision and *Principles* intended. Positive comments received during and after presentations were energizing and motivating for us, for TLSWG representatives, and for members of the University at large.

### Discussion

We have provided examples of our role in leading an institutional initiative to re-envision teaching and learning spaces during its first six years. Our decisions and actions have been re-constructed using Ready and Conger's (2008) five phase model to assess how the ways in which we led the initiative were consistent with the model. We now summarize these and consider where things might have been done differently, had such a model been used explicitly from the outset.

A number of decisions and actions were consistent with *framing an agenda for action*. The development of

research based *Principles for Designing Teaching and Learning Spaces* served as a simple statement of the vision for classrooms. A suitable climate for achieving the vision was created and pathways for renovating classrooms were developed while maintaining the University's proud heritage. Upon reflection, the *Principles* for re-envisioning classrooms should have been identified from the outset as "a new vision for teaching and learning spaces." Because an agenda/vision was not explicitly named, we essentially operated "under the radar" (Schroeder, 2011) rather than explicitly as change agents for classroom spaces. Schroeder strongly cautions against staying in this comfortable niche to avoid the potential conflict of being identified as change agents, and instead encourages us to step fully forward from the "margins" into an institutional leadership role.

*Engaging multiple layers of the university* was an area in which decisions and actions were most consistent with Ready and Conger's recommendations. The decisions to expand the composition of the TLSWG meetings to include over 30 representatives and to partner Facilities and academics engaged multiple levels of the University in authentic broad-based collaboration. Those who had succeeded under the old model were intentionally included in discussions, and became supporters of the new vision (Ready & Conger, 2008, p. 73). Notably, there was almost no attrition on the large committee over the six year period. The language of the *Principles* provided common ground for cross-unit collaboration, buy-in and agency. These were essential for engaging multiple layers of the organization and "distribut[ing] 'ownership' of that vision" (Ready & Conger, 2008, p. 73). Even so, in retrospect, we should have been more intentional in making connections between TLSWG representatives and their Faculties. This might have accelerated the change process.

*Mission-critical capabilities were built* by identifying and addressing capability gaps necessary to achieve the vision, in a way that avoided assigning blame for those gaps. We first advanced our own knowledge about learning spaces, then encouraged development of the knowledge base of the TLSWG, which exposed some expertise and service gaps. New positions and processes were developed to address these gaps. Increased classroom technology support for instructors and the creation of a TLSWG administrator position to coordinate logistics and communication about learning spaces across the institution allowed for development of expertise that transcended individual units.

Ready and Conger (2008) emphasize the importance of identifying and nurturing a sufficient number of suitable, competent individuals in order to execute strategies (p. 7), and add that sometimes this doesn't happen because leaders do not pay attention to

the connection between talent requirements and capability requirements. In retrospect, the educational developers should have done better in identifying and nurturing talent pools among TLSWG representatives.

*Alignment was created* through robust collaboration among divisions (e.g., financial, operations and academic arms of the University) and emerging leaders were encouraged to exhibit cross-boundary behaviours. Ready and Conger (2008) indicate that alignment of vision and processes can be reinforced by changing organizational structures and support mechanisms (p. 75). New support mechanisms fostered the alignment of the vision with the University teaching mission, classroom infrastructure, and the budget processes. An important change to organizational structure was when budget signing authority was given to the Director of the TLC, greatly enhancing alignment of vision and budget. One alignment issue remained unresolved during the first six years of the initiative. Some Faculties persisted in self-funding classroom renovations outside of the TLSWG process and therefore didn't feel obligated to take the *Principles* into consideration. If the alignment phase had been explicitly named in the re-envisioning of classrooms, perhaps we would have addressed this lacuna more directly.

The *University was energized* to implement and sustain the vision in a number of ways. A program of major and minor renovations ensured that each Faculty benefitted annually, which garnered support for the vision. Members of the TLSWG were stunned when experiencing first-hand the sad state of many classrooms across campus, and later became enthusiastic upon seeing these same classrooms renovated based on their own decisions and design principles. Finally, the decision to document perspectives of professors and students using new classrooms resulted in a better understanding of the significance of the classroom vision and its impact on teaching and learning.

Regarding the *sequence of the model*, Ready and Conger (2008) state that their "five critical activities [phases], performed in sequence...together form a systems approach to enabling visions" (p. 71). They lay out the five phases as roughly following a continuum from inspiration (*Framing the Agenda*) to implementation (*Energizing the Organization through the Power of People*) (p. 76). Based on their research with around 40 companies across the globe, they recommend that the phases be undertaken in sequence, as each phase builds upon and is supported by the previous phase(s) (p. 71, 72).

The sequence presented in this paper represents a reconstruction of decisions and actions in relation to Ready and Conger's phases, rather than the sequence in which these actually occurred. In retrospect, naming the phases

and carrying them out in sequence would likely have made actions more intentional and efficient. The very act of naming the phases from the beginning would have brought awareness and intentionality to the overarching purpose of each process as it was undertaken. Further, had we carried out the phases in sequence, it is possible that this would have improved efficiency. For example, if we had made connections between TLSWG representatives and their Faculties early on (*Engaging multiple layers of the university* phase), we might have been more effective in *Creating alignment* with Faculties. Then these Faculties might have been more inclined to partake in the TLSWG process instead of self-funding renovations of some classrooms that did not take the *Principles* into consideration.

### **Conclusions: Organizational Development as a Key Role for Educational Developers**

Organizational development has been defined as a planned, organization-wide effort that is led from the top, which involves working with beliefs, attitudes and structures, leading to increased organizational effectiveness (Beckhard, 1969; Bennis, 1969; Cummings & Worley, 2014). Such leadership takes a "vision from its birth to a new way of doing business" (Ready & Conger, 2008, p. 76). Within the field of educational development, Schroeder (2011) defines organizational development as bringing educational developer knowledge and skills to decisions about the institution and student learning, and collaboratively planning initiatives, rather than solely programming and consulting about initiatives.

Accepting leadership for the initiative in 2006 was an intentional decision to move into a multi-level approach to educational development. Interestingly, this corresponds with Schroeder's (2011, 2015) later proposals that educational developers serve as multilevel change agents. We drew on our professional knowledge and skills to lead institution-wide decision making about classroom design. The vision, as represented in our research-based *Principles for Designing Teaching and Learning Spaces*, was implemented through carefully crafted processes that favoured inclusion, transparency and fairness for all stakeholders. This vision and these processes resulted in new approaches to the conception, design, construction, financing, and support of classrooms that would better support what we know about how students learn. The new connections and partnerships created were positive and productive: it was sometimes said that the TLSWG was one of the best committees on campus because members felt they were making a contribution and things really got done. Documented perspectives from students and professors in some renovated classrooms demonstrated that they came to re-think their own

approaches to teaching and learning. Evidence of impact at the institutional level was also demonstrated when, two years after the timeframe being explored in this paper, a new Principal picked up on the importance of teaching and learning spaces, and on the notion of active and collaborative learning that we had sought to embed in the University's vision of teaching. This language was reflected in the Principal's major priorities, which included "improving the University's classrooms and teaching labs [...] and including 'active,' collaborative and innovative teaching environments" (Fortier, 2014, p. 1).

Schroeder (2011) draws on Land's (2001) work to suggest that by looking for "hot button issues", educational developers can have an attitude of vigilant opportunism as they work to identify strategic events and opportunities for impact (p. 56). The invitation to lead the re-envisioning of classroom spaces provided just such a strategic access point, not only to enhance the environments in which professors teach and students learn, but as a way "to influence the strategic direction of teaching and learning" within the institution (Jamieson, 2003, p. 123). This examination of the decisions and actions during the first six years of the initiative leads us to conclude that our role in re-envisioning classroom spaces was organizational development. Our intention in telling this story was to contextualize our organizational development experience for ourselves, and hopefully for others, in a way that might make it meaningful for practitioners seeking to clarify or enhance their own organizational development roles. Two lessons have emerged from our experience.

First, organizational development should become part of a curriculum for educational developers. Despite the early alignment with organizational development concepts and language, a formal knowledge of organizational development practices, interventions, and strategies is not necessarily part of the common knowledge and skill base of developers (Schroeder, 2011, p. 25). Although educational development might not yet have an agreed upon curriculum, researchers are making progress in that direction (e.g., Dawson, Britnell, & Hitchcock, 2010; Diamond, 2005; Taylor & Rege Colet, 2010). Common knowledge bases include learning theory, instructional design, adult learning, and higher education. Organizational development leadership should be added to this developing curriculum. For example: the relationship of organizational development to the more traditional aspects of our work (e.g., Diamond, 2002, 2005; Gaffe & Simpson, 1994; Gillespie & Robertson, 2010); our institutional leadership role (e.g., Dawson et al., 2010; Schroeder, 2011; Taylor, 2005a, 2005b); and organizational change/development models (e.g., Beckhard & Harris, 1977; Cummings & Worley, 2014; Kotter, 1996; Ready & Conger, 2008; Schroeder, 2011).

Second, it is necessary to move from intuition to intention in organizational development. We, like many educational developers, did not have formal knowledge of frameworks for change and organizational development leadership. Our specific decisions and actions were intentional based on our knowledge, competencies and experience as educational developers. But the manner and sequence in which the initiative evolved were based on intuition and common sense. Trowler, Saunders and Knight (2003) warn that "common sense thinking about change is fit for some purposes but can be very limiting" (p. 11). Because it is often difficult to articulate what is being done as a practitioner due to its tacit nature (e.g., Schön, 1983), reflecting on educational developer actions and decisions within the frame of an established model can make things explicit and intentional. Doing so made explicit for us things we had done but hadn't named, and that were so intuitive they were invisible. Schroeder (2011) asserts that:

Although this organizational role is clearly emerging, this field as a whole seems hardly conscious collectively that its role is changing. It appears to have one foot in and one foot outside the threshold between fully stepping forward and maximizing the potential of an institutional leadership role and remaining comfortably in a niche it has successfully carved...there is a price to be paid as a field for an organizational development role to remain unnoticed and indistinguishable from the instructional work traditionally done (p. 12).

To that end we recommend reflecting upon and examining our work with reference to a chosen model in order to identify and name where actions and processes are consistent with recommended organizational development practices, and where they differ. Further, model(s) should be used to intentionally frame our organizational development efforts.

In some situations, educational developers need to get out of the way to facilitate change and allow participants to flourish (e.g., Timmermans, 2014). Our examination suggests that educational developers need to get *in* the way as organizational developers, to lead institutional change initiatives that impact teaching and learning.

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## Tapping into Graduate Students' Collaborative Technology Experience in a Research Methods Class: Insights on Teaching Research Methods in a Malaysian and American Setting

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This case study used qualitative and quantitative methods to investigate challenges of learning and teaching research methods by examining graduate students' use of collaborative technology (i.e., digital tools that enable collaboration and information seeking such as software and social media) and students' computer self-efficacy. We conducted virtual focus groups and surveyed graduate education students taking required research methodology courses in Klang Valley (Malaysia) and Florida (USA). A thematic analysis showed learning research methods evoked emotions for students, students used collaborative technology for learning primarily at one university, and students needed support to access online literature and data sources. Survey results indicated that all students, however, had high levels of computer self-efficacy. Overall results showed that Malaysian women had the strongest computer self-efficacy belief. Our study suggests that collaborative technology for learning and teaching research methods may be underutilized to engage student learning and that faculty responsible for teaching methods courses need to be aware of the emotional side of learning and offer supports, such as collaborative technology, to connect students.

Preparing future researchers and consumers of research in a technologically rich era is a responsibility of higher education faculty worldwide. Graduate programs in education typically require a research methods course and many offer computer-assisted instruction, as is the case for Klang Valley (KV, Malaysia) and Florida (FL, United States), our study sites. We cannot assume all graduate students aspire to become critical consumers and producers of high quality research, yet the field of education has been criticized for not generating quality research that is applied to practice (Lagemann, 2000; Walters, Lareau, & Ranis, 2009). Faculty today are challenged to meet the diverse needs of learners using communication technologies (Barrett & Lally, 2000) while integrating methods knowledge and skills across the curriculum (Willison, 2012). Our study aimed to expand our understanding of how best to teach research methods.

Scholars are investigating ways to strengthen educational research and better prepare graduate students in research methods for our complex, technologically advanced society (Lagemann & Shulman, 1999; Maxwell, 2012; Page, 2001; Pallas, 2001), and literature on teaching research methods is growing (Earley, 2014; Kilburn, Nind, & Wiles, 2014). Some authors, however, point to the lack of formal pedagogy (Wagner, Garner, & Kawulich, 2011), and others to limited empirical evidence on teaching research methods from a constructivist learning perspective (Drago-Severson, Maslin-Ostrowski, Ashhar, & Steubner Gaylor, 2015). A key to constructivist practice is discussion whereby students reflect, elucidate prior knowledge, and collaborate (Bridges, 1988; Foote, Vermette, & Battaglia, 2001;

Good & Brophy, 2000). Researchers have begun to explore the use of collaborative technology, such as blogging, to support collaborative learning among university students (Jimoyiannis, Tsiotakis, & Roussinos, 2013) and how to enhance collaboration when working with students from different cultural backgrounds, specifically the socio-cultural influences when using online discussion forums (Van der Merwe & De Villiers, 2012). With the advent of Web 2.0, the internet was transformed from a storehouse of information to an interactive and collaborative venue where "knowledge is decentralized, accessible and co-constructed" (Greenhow, Robelia, & Hughes, 2009, p. 247). Given the proliferation and popularity of collaborative technologies (e.g., social networks like Twitter, Facebook and LinkedIn), it would be beneficial to know how this is relevant to learning and applied in a research methods class.

The purpose of this case study was to expand our understanding of the challenges and opportunities of teaching and learning research methods in education by investigating how collaborative technology supports students' learning in required introductory graduate level research methods classes and by examining students' computer self-efficacy in the context of this learning. We define collaborative technology as digital tools that enable collaboration and information seeking, such as software and social media. We define computer self-efficacy as the perceived ability to use computer applications to complete assignments, perform academic tasks, and seek digital information.

Our guiding research questions were: How do graduate students in education use collaborative

technology to support learning research methods? What is their computer self-efficacy?

### **Theoretical Framework**

The study is built on the assumption that learning research methods is interdependent with learning abilities and computer self-efficacy. We address the literature on learning research methods, technology, and self-efficacy.

### **Learning Research Methods and Technology**

Scholars suggest that students learn research methods best by doing and going through the research process (Simon & Elen, 2007). This is consistent with a constructivist learning approach. Constructivist learning theory posits that (a) learners construct their own learning in ways that makes sense to them, (b) new learning is contingent upon current understanding, (c) learning occurs by engaging in real-world endeavors, and (d) learning is enabled by social interaction (Bruner, 1990; Dewey, 1938; Vygotsky, 1978).

Kilburn and colleagues (2014) identified three inter-related pedagogical goals for teaching research methods. First, engage students in the many facets of research methods so the research process becomes evident. Second, offer opportunities to conduct research to facilitate learning, and third, foster critical reflection on research practice. When faculty nurture a supportive learning environment, students may feel comfortable and inspired to collaborate, and to construct and control their own learning (Confrey, 1985; Foote et al., 2001).

Researchers and research methodology faculty routinely integrate software and web-based tools into their research practice and teaching. Such integration is believed to improve educational research and instruction, assist university students with academics, and enhance motivation (Güzeller, 2012; Tang & Austin, 2009). Furthermore, access to digital technology allows students to seek information (Laurillart, 2009; Strayhorn, 2009) and support collaborative learning.

Studies indicate that while students are comfortable utilizing technology there is discomfort with using more complex databases. Researchers found that graduate education students preferred regular internet sources, including non-education databases, rather than complex library databases for obtaining information (Blummer, Watulak & Kenton, 2013; Catalano, 2010; Earp, 2008).

### **Computer Self-efficacy**

Self-efficacy refers to a person's judgment of his or her ability to perform a certain task or activity (Bandura, 1986). Torkzadeh, Koufteros, and

Pflughoeft (2003) highlight the essential role of computer self-efficacy and its likely impact on usage of information systems technology. Torkzadeh and colleagues (2003) tested the validity of a revised four-factor computer self-efficacy scale (CSES) created by Torkzadeh and Koufteros (1994). We used the revised CSES to determine if students would feel efficacious using computers, for example to access digital information and databases.

Previous research found that gender differences play a significant role in relation to student self-efficacy and motivation and that male students tend to have higher computer self-efficacy than female students (Ates, 2011). Self-efficacy beliefs can explain gender differences in motivation and achievement (Ross, Scott, & Bruce, 2012). Wong, Teo, and Russo (2012) found significant gender differences in the "effect of computer teaching efficacy on perceived usefulness and attitude toward computer use" (p. 1203). In Malaysia, female university students were "more strongly influenced by their ... ability to teach with computers, and ... their belief about using computers as effective teaching methods to improve students' performance" than males (p. 1203). This meant that, unlike men, women would be more strongly influenced by their own ability to teach with technology. Online learning can be lonely and frustrating due to limited social interaction (Williams, Duray, & Reddy, 2006), and it requires strong motivation (Tai as cited in Rienties, Tempelaar, Van den Bossche, Gijssels, & Segers, 2009). Using social media as a tool to enhance students' motivation has been suggested (Tananuraksakul, 2015). Social media could also help motivate students and support learning in traditional (e.g., class meets on campus) and hybrid (e.g., a mix of on campus and online learning) research methods classes.

### **Method**

We used a case study design to study a case within a real life setting (Stake, 1995; Yin, 2013). The study was bounded by graduate students taking required introductory methods courses at two universities. We collected data using a survey, focus groups, and document analysis. Figure 1 illustrates the study phases, procedures, and data analysis.

### **Research Setting**

We collaborated with two large public universities in Malaysia and the United States, the University of Malaya (Klang Valley) and Florida Atlantic University (Florida), that offer graduate programs in education and require coursework in research methods. The universities had convened for scholarly exchanges, and this relationship inspired the site selections. The





grant two-and four year academic degrees (Higher Education Coordinating Council, 2012). FAU is a public institution that offers baccalaureate, masters, specialist, and doctoral degrees. There are five campuses with an overall enrollment of 30,000 students. The College of Education has 1,111 graduate students (FAU Banner Database, 2016).

### Sample

The study utilized a purposeful survey sample of 43 graduate students enrolled in required introductory research methods courses for education programs and a focus group sample of 18 graduate students across the two sites. The focus groups constituted a sub-set of the survey sample. The classes selected were required introductory methods courses for masters' degree students and prerequisites for doctoral students. Classes were not screened in advance for their use of technology and collaboration. Instead we invited all instructors to e-mail the invitation to their students regardless of class format. There was no incentive for participation or penalty for nonparticipation.

Of the combined survey sample (N=43), 20 in Klang Valley (KV), Malaysia and 23 in Florida (FL), USA completed the survey. Thirty students were enrolled in a face-to-face course delivery format, 12 in a fully online course, and one in a hybrid course. A majority of students (25:43) were between 35-44 years old. There were 14 male and 28 female students. Students enrolled in these classes were preparing for advanced degrees in a variety of programs in education, such as educational leadership, curriculum and instruction, school counseling and exceptional student education.

Focus group participants were recruited on the survey, as mentioned. Students who completed the survey were invited to send an e-mail to the research team if interested in participating in a follow-up focus group. This step ensured anonymity on the survey. Six students from KV, Malaysia and 12 students from FL, USA responded and participated.

For document analysis, instructors provided the course syllabus. Some syllabi were available on the university web sites. Each program used a standardized syllabus for these required introductory courses, thus curriculum was consistent across the different sections of university classes regardless of delivery format.

### Data Sources and Analysis

**Focus group.** We used a virtual version of focus groups rather than the traditional in-person focus group (to be described further) with graduate students in each setting in order for them to reflect on how collaborative technology supports them to collaborate and learn research methods. For some people, focus groups

provide a safer and more supportive atmosphere than the individual interview and are traditionally used to gather in-depth information from participants who share commonalities (Porter, 2012; Steward & Shamdasani in Parker & Tritter, 2007). Focus groups collect the most data when compared to other face-to-face methods. They are cost efficient (Parker & Tritter, 2007), as was the case for us, given the geographic distance between sites. Our insights on adapting a focus group to a virtual format are shared in the discussion of focus group findings.

We conducted one hour audio-recorded virtual focus groups using Skype with video for a total of two hours. A standardized protocol with 13 open-ended questions and probes was created. Questions included: "Can you recall when you first began to use computers? How, if at all, do you use social media...? In what ways have you collaborated with other students in the class? Reflecting on your experience in this course, what would you do differently to improve your learning?"

Scheduling the focus groups entailed consideration of different international time zones and ensuring appropriate technology was available. Although we have extensive experience conducting focus groups, this was our first experience using a synchronous virtual format (Stewart & Williams, 2005). It meant we had to rethink our interview approach and how to observe participants (Garcia, Standlee, Bechkoff, & Cui, 2009; Nicholas et al., 2010).

In focus groups, facilitation of discussion is essential to ensure a successful group interaction and data collection; this is especially challenging virtually. The researcher becomes the facilitator and at times is accompanied by another individual or "observer" to assist in recording data, such as non-verbal gestures (Parker & Tritter, 2007), as we did. The virtual format required having a support person present on site with the group (i.e., an instructor) to manage logistics while the researcher conducting the interview was in a different location, on Skype. The support person was responsible for making room arrangements and having a computer with Skype set up by the start of the interview. We assigned this person the role of common ground holder. Chairs for participants were arranged in a semi-circle around the computer screen to simulate the traditional group interview setting of sitting in a circle or at a table.

Informed consent was obtained in writing with help from the onsite instructor. Interviews were digitally recorded with permission and later transcribed. The onsite instructor provided a paper copy of the questions for students. Although all instruction at MU is in English, we thought it was important for them to have the protocol. We used a round robin interview approach to allow each student the opportunity to respond to all questions and varied the order of students. The researcher-facilitator encouraged participants to

share their views. There was some spontaneity in student responses (i.e., out of order).

For focus groups, data analysis entailed reading transcripts and coding for central concepts, first within and second across cases (sites) in order to identify themes and patterns (Miles, Huberman, & Saldana, 2014; Saldana, 2013). The focus groups captured rich and thick descriptive responses. For validity, researchers independently coded the transcripts, followed by data triangulation. We began with open coding and after discussion created a master code list for a total of three cycles of coding and refining codes.

**Survey.** We administered a ten-minute internet-based survey that measured computer self-efficacy (Torkzadeh & Koufteros, 1994). We also collected demographic information on gender, age, and location. The Likert-type survey was disseminated using Snap Survey Software. The original computer self-efficacy survey had four sub-scales: *Computer Beginning Skills* (CB), *Computer Advanced Skills* (CA), *Computer File and Software Skills* (CFS) and *Main Frame Skills* (MF). To meet the needs of the current study, we modified the language of some items in the original scale (e.g., instead of using “floppy disk,” we used “flash drive / thumb drive”). Additionally, we replaced Main Frame Skills with a *Computer Research Skills* (CR) section for appropriateness. This subscale included items that referred to the perceived ability to share and utilize digital information for research purposes. The *Revised Computer Self-Efficacy Survey* had 28 Likert-type items.

Students were asked to rank their level of agreement or disagreement on statements regarding (e.g., “Using the computer to write a research paper, literature review or a critique” (CB), “Accessing electronic databases,” and “Using spreadsheets (e.g. Excel, SPSS) for data management and analysis” (CR)). Scores range from 1 (strongly disagree) to 5 (strongly agree).

Internal reliability coefficients from the pilot study yielded alpha coefficients of .96 (Beginning skills), .90 (File and Software), .92 (Advanced Skills) and .87 (Research Skills). For validation purposes, before using the instrument, three faculty members provided feedback regarding appropriateness and clarity of the instrument. For survey data analysis, given the small sample size, analysis was limited to descriptive statistics and comparisons across groups.

**Document analysis.** We conducted a document analysis of course syllabi using a document summary protocol to help determine how, if at all, technology and collaboration were incorporated into the research methods courses. We were interested in the ways collaboration was infused in the curriculum, as reflected in the syllabus, for example requiring students to collaborate with each other beyond the classroom on a group research project, and, specifically, how collaborative technology was

infused, such as an expectation to join an online group meeting. We recognize that a syllabus may not represent what actually occurs in the class (e.g., there may be more or less requirements at the discretion of the instructor, there may be unintended changes due to a host of reasons, there could be spontaneous collaboration not outlined on the syllabus, and so forth); however, it can be thought of as a learning contract between the instructor and student. The document analysis was used to extend and corroborate or contradict how students experienced the course as expressed in focus groups.

**Delimitations and limitations.** The study is delimited to graduate education students enrolled in required introductory research methods classes at two universities. Study limitations include a small sample and no observations. Findings, however, may apply to similar graduate settings.

## Results

### Focus Group Findings

Virtual focus groups were conducted to understand how collaborative technology supports these students to learn research methods. We interviewed 18:43 graduate students ( $n=18$ ) who had completed the survey (Six in KV, 12 in FL). We discuss four findings from our within and cross site analyses. Representative statements were selected to capture the meaning and spirit of the findings in the voices of students. We close by sharing what we learned about using virtual focus groups.

**The methods course evokes emotion.** Across borders, enrolling in a required introductory graduate level research methods course evoked positive and negative emotions in these students. Although we did not ask about emotions, when responding to a question about their expectations for the course and throughout the interviews, students (6:6 from Klang Valley and 7:12 from Florida) readily expressed their emotions about the learning experience. These ranged from having no anxiety to a little apprehension, to excitement, and to feeling considerable anxiety and fear.

For example, a student in Klang Valley told us, “This is my first research course. I’m pretty excited and interested in carrying out research studies,” and another said, “I’m actually anxious at the same time I’m also very excited...” In Florida, a student said, “[I] expected to hate it because research in my mind is tedious.” A classmate agreed, stating she hates statistics and worried, “[I] was going to do really bad because I’m bad at math.” Yet another Florida student reflected how her feelings about the course changed over time and that she “would definitely tell students



not to panic because I panicked on every assignment and ended up doing well.”

**Graduate students experienced with computers and internet.** Whereas some students had no prior coursework in research methodology, all participants said that they entered the classes having had prior experience using computers and the internet. They were familiar and comfortable with technology. Given the wide age range of students (21 to 55), it is not surprising that some reported being introduced to computers as early as pre-school and others as late as on the job after graduation from college; regardless, no one expressed anxiety over using technology in the methods course.

All students used e-mail. Social media for personal use was very popular across groups. Facebook was specifically mentioned by 5:6 Malaysian and 9:12 US students. Additionally, students said they used Yahoo Groups, Google Groups, blogs, Twitter, Yahoo Messenger, chat rooms, and Skype. In stark contrast, a single student in Florida stressed that she is “anti-technology” and shuns social media. Like her peers in Florida and Klang Valley, however, she has the capacity to use technology and the internet for learning research methods.

**Mixed use of technology for collaboration.** Primarily students at one site worked together with the support of collaborative technology to learn research methods. When asked, “Did you collaborate with other students in the class, and if so, in what ways did you collaborate?,” all six from the Malaysian university and a minority (2:12) in Florida said that they discussed and shared course information with classmates to assist learning. A collaborative learning environment was prominent in the view of KL students, yet notably, interactions occurred mostly outside the classroom and were not built into the curriculum.

Based on document analysis, we identified technology-related activities in all course syllabi at both sites. This included preparing and submitting electronic assignments, accessing the web for academic searches, use of electronic databases, and communication, along with availability of an online learning platform such as Blackboard. According to what students said in the focus groups and confirmed by reviewing course syllabi, however, there were no group assignments or projects requiring students to collaborate. Also, no one mentioned in-class learning activities that required them to reflect and interact with peers, nor was this indicated in the syllabi.

Students in the Florida focus group who said that they collaborated, used technology to support this interaction. They connected to each other in various ways including e-mail, text messaging, and the telephone. One student said that she collaborates “...via text messaging panicking about if I was doing stuff

right to a number of people, ‘Is it right?’ or ‘Is it going to be that?’ I’m very shaky towards research. I don’t feel confident in it, so I definitely asked for advice.” Yet most students participating in Florida did not have much to say about collaborating: “I didn’t really collaborate with anyone outside of the class, but in the class I would see that everybody was not knowing what to do like me, and I felt a little bit more at ease knowing that everybody else was having these questions about how to proceed as I was.” She summed up, “There was not much collaboration outside the class.” Or inside for these students.

Students in this group were more apt to use e-mail to contact the professor directly (8:12) regarding a question than go to their peers (2:12). No student mentioned using a discussion board or group chat room even though those were available to them via the course online platform.

In contrast to the Florida focus group, students in Klang Valley regularly engaged with each other to extend learning outside of class. This occurred even though it was not expected, according to a review of the syllabus. A student’s comment captures their collective learning experience:

I collaborated with other students by taking part in discussions, sharing ideas and information through phone, sms, internet and, of course, it really helps me a lot ... My friend helped me, told me how to use SPSS, and now I’m really good at it.

Students reported benefiting from a number of different collaborative technology options, as outlined earlier.

Students in Klang Valley made a point about using not only technology to connect to other students, but also engaging in face-to-face meetings outside of class. A student said, “We get together before class begins, we discuss something, share the knowledge, whatever we gained the previous night. At break time and after the class also, we always share and do discussion and find ... information for our research.”

**Students need preparation to access online literature and data sources.** A gap in preparation on how to access literature and data sources using today’s technology was identified by students in both focus groups. A concern about utilizing the “new library” was voiced by 6:6 in Klang Valley and 11:12 in Florida. The following was a typical comment from the KL focus group:

...[T]he big challenge for me is to find more material on the research topic. Okay, my challenge is the library is quite far. I’m staying quite far from the university and we have limited materials on the topic...I have to know more technology that I can use to help me find more materials.

Similarly, a graduate student in Florida remarked:

I wish I had more access to more scholarly publications, articles out there because I know there are tons more out there. I am sure there is a way but I personally can't, so I felt that I was slightly limited in what I could access and I wish I could have gotten more.

In contrast, one student in Florida declared, "I don't have a problem accessing articles at all..."

**Insights on virtual focus group technique.** While focus groups are used and written about extensively, little information is provided on the process itself (Massey, 2011). Our process involved a common ground holder on site and a virtual facilitator. The common ground holder managed the classroom space while the facilitator set the tone for an emerging synergy. It was advantageous that the facilitator and students could see and hear each other at all times and that no technical problems were encountered.

We exclusively employed the round robin questioning technique to ensure each student could contribute and to assist with facilitation over Skype. In varying order, students took turns answering a question and could pass, but no one did. Students expanded on what others said and directly made references to previous statements. There was, however, much less cross talk than what we have experienced in traditional face-to-face focus groups. We were able to obtain their shared group opinions, for example that the course evoked emotions, and shared beliefs, for example that they were technologically proficient. Yet perhaps more than technology this questioning technique may have diminished synergy across participants, a distinct advantage of focus groups. For future virtual focus groups we recommend planning time for spontaneous responses to questions.

Hydén and Bülow (2003) suggested that focus group participants can constitute themselves in different ways as talking individuals. One way is as a group talking together (a group), and another is as individuals that are not a group (an individual). Individuals must share some set of values and common ground experiences if they are to interact as a group. We noted that the students at both sites shifted between the two modes of interacting while sharing common ground as graduate education students taking the same course. Students in KL appeared to talk more as a group than their counterparts in FL.

### Survey Results

A survey was used to establish the graduate students' computer self-efficacy. We report the descriptive statistics and comparison across groups of

students at the two universities enrolled in required introductory research methodology courses.

Measures of central tendency were computerized to summarize data for the computer self-efficacy (CSE) subscales. Measures of dispersion were calculated to understand the variability of scores for CSE subscales. The following are the results of this analysis. The Computer Beginning Skills (CB) average score for the 42 participants was 4.50 ( $SD = .74$ ) across groups, the *Computer File and Software Skills* (CFS) mean was 4.27 ( $SD = .82$ ), and the means for *Computer Advanced Skills* (CA) and *Computer Research Skills* (CR) were as follows:  $M = 4$ ,  $SD = .83$  and  $M = 4.16$ ,  $SD = .78$ , respectively (See Table 1). Females reported to have stronger overall computer self-efficacy skills ( $M = 4.30$ ,  $SD = .78$ ) than males ( $M = 4.17$ ,  $SD = .56$ ). In terms of location, Malaysian students' scores ( $M = 4.43$ ,  $SD = .37$ ) were higher than the American students' scores ( $M = 4.14$ ,  $SD = .87$ ) (See Table 2). Most of the students (95%) in the Malaysian group were between 35 and 44 years old. More than half of the students (52%) in the American group were between 25 and 34 years old.

Overall, it appears that most students in both locations reported feeling strongly efficacious regarding computer skills and use. Interestingly, Malaysian women were reported to have the highest score in computer self-efficacy ( $M = 4.57$ ,  $SD = 2.85$ ).

### Discussion

Our study explored how collaborative technology was applied to support student collaboration and learning in the context of a graduate education required introductory research methods course. We discuss our five findings next.

These graduate students considered themselves adept and comfortable using computer technology. They perceived that they had the ability to use computer applications to complete assignments, perform academic tasks, and seek digital information. Using technology was not a significant barrier for these adult learners. For them, the learning curve was how to use technology for research purposes and how it could assist their learning. Courses at the two universities, according to our review of the syllabi and students at the focus groups, did not require collaborative learning activities. There were no small group exercises or team research projects, for example, thus it is not surprising that with or without technology some students said they never collaborated with others (either in or out of class) to improve learning. An interesting finding in this study was that these female students in Klang Valley reported higher computer self-efficacy beliefs than males, which was not supported by literature of gender differences in computer self-efficacy (Ates, 2011; Wong et al., 2012). It may be that this small group of female graduate

Table 1  
*Means and Standard Deviation of the Computer Self-efficacy Scales Across Sites*

CSE Subscales	Across Sites	
	Mean	SD
CB	4.50	.74
CFS	4.27	.82
CA	4	.83
CR	4.16	.78

Table 2  
*Means and Standard Deviation of the Overall Computer Self-efficacy Between Sites*

	Mean	SD
Klang Valley	4.43	.37
Florida	4.14	.87

students is an outlier, or perhaps computer self-efficacy gender differences are diminishing. Further research is needed in this area.

Students who interacted with peers to reflect on their experiences and to discuss what they were learning found it to be beneficial, consistent with a constructivist approach to learning research methods (Vygotsky, 1978). Yet the level and depth of interaction varied across sites. Students from KL engaged in discussions about learning while for other students, particularly in FL, the exchanges were simply about verifying if something was being done “right” or confirming assignments. Although the latter type of communication may not have advanced learning, it may have helped a student to cope with negative emotions associated with the methods course (e.g., to alleviate anxiety over an assignment).

These students in Klang Valley routinely engaged with each other outside of class to improve learning, contrary to the Florida students. This took place based on their own volition (i.e., it was not a course requirement or expectation). During the focus groups, KL students appeared to talk more as a group than their counterparts in FL, perhaps because of their greater engagement through collaboration and cultural tendencies. These findings suggest that students in Klang Valley and Florida may fall into Hofstede’s cultural dimensions of collectivism and individualism when discussing differences in eastern and western cultures (Hofstede, 2001; Yoo, 2014); however, we are cautious to make any generalization. Collectivism refers to the degree to which individuals are integrated into groups and look after each other within a group. Individualism refers to societies in which ties among individuals are loose, and they look after themselves and their immediate family (Hofstede, 2001).

Students primarily connected with each other in two ways: by using collaborative technology outside of class and meeting face-to-face immediately before or after class. Regarding anything class related, those who connected used popular collaborative technologies like Yahoo Groups, Google Groups, chat rooms, and Skype, whereas social media, including Face Book, were primarily for personal use. Previous research (Alloway, Horton, Alloway, & Dawson, 2013; Junco, 2011) found a negative relationship between use of social networks (e.g. excessive time devoted to personal use) and academic achievement; however, that was not supported in our study.

These students found accessing scholarly information and databases to be especially challenging, signaling that this technical skill set needs attention in the methods curriculum. They preferred using internet searches to obtain information rather than more complex library resources to support their research. As they recognized, this diminished their ability to retrieve information for academic purposes. The way these students used electronic databases was similar to previous research (Blummer et al., 2013, Catalano, 2010; Earp, 2008). Given that the students were enrolled in introductory methods courses, there may be plans in place for them to acquire the requisite skills later in the programs.

For these graduate students, emotions were integral to their personal experiences of learning research methods. Across sites and unsolicited, students talked about how they felt and took time to describe their emotions as learners. As students anticipated the class, actually encountered it, and looked back on challenges along the way, they described an experience colored by positive and negative feelings. This finding corresponds with previous research identifying

students' anxiety and uneasiness when taking a research methods course (Braguglia & Jackson, 2012; Deem & Lucas, 2006) and has implications for faculty responsible for teaching the courses.

Finally, we wonder if there would be other learnings if a different virtual focus group process was used, such as allowing participants to speak in no particular order, and having more time. Limitations of the virtual approach include choice of available technology, access to appropriate personnel at the study site, and challenges of virtual facilitation to foster rapport and synergy among participants.

### **Recommendations**

#### **Recommendations for Practice**

Recommendations are as follows:

1. Faculty are encouraged to consider incorporating a constructivist approach to teaching research methods supported by collaborative technology. Graduate students are well positioned to engage in experiential learning activities like team research projects and to apply collaborative technology to interact with peers on assignments.
2. We urge faculty to provide opportunities for students to talk safely about what they are learning: for example, create study groups and virtual discussion forums. Communicating with classmates about challenging learning experiences may help students to cope with negative emotions, like fear and anxiety, associated with research methods courses.
3. It is essential that universities ensure that the technology infrastructure has support systems to meet adult learner needs and to support their continuous learning.
4. Faculty are advised to review programs to insure graduate students are introduced to the modern library and new media resources. This could be part of orientation, a topic of special workshops (online or face-to-face, mandatory or voluntary), and/or an incorporation into introductory research methods classes.

#### **Recommendations for Future Research**

Recommendations for future research are offered:

1. We recommend studying research methods classes, virtual and face-to-face, to gain a better understanding of how students of different generations learn and how collaborative technology supports their

learning. Also, it would be important to consider cross cultural contexts when studying learning experiences across different countries, such as how gender and cultural norms influence learning, as well as considering the implications of cross-cultural differences within the university settings.

2. There remains a need for research on curriculum and instruction of research methods, specifically course structure and use of collaborative technology. We recommend future research to see how infusing collaborative technology in the curriculum—in conjunction with assignments that require collaboration, discussion and reflection—improves learning research methods. Specifically, it would be useful to know if there were quantifiable gains (such as final course grade) and qualitative gains (such as confidence in analyzing research) when students engage in a constructivist learning environment and use collaborative technology in contrast to those who do not.
3. We recommend expanding the pilot survey sample to groups that are matched by major.
4. Virtual focus groups offer a convenient and economical way to conduct interviews that might not otherwise be possible. More research is needed to examine strengths, weaknesses, and cultural aspects. For future focus groups we suggest opening with a round robin approach but to not be confined by this.

### **Conclusions**

Our study shows not just what we can gain from a partnership between universities but has implications for graduate programs and the faculty responsible for teaching research methods. Collaborative technology to support students when learning research methods may be an underutilized resource. The small group of students who were informally using collaborative technology to connect with their peers and seek information considered it advantageous to their learning experiences, yet this was not part of the formal curriculum and may have been helpful to others as well. Today, higher education faculty will need to adapt their curricula to the new technologies available and eventually to teaching students who are digital natives.

We examined introductory research methods classes and found that they relied on traditional teacher-centered teaching methods (lecture and independent student work). Yet students may benefit from a learning environment (physical and virtual) where they actually work on a class research project and have opportunities to reflect, share work, discuss, and



collaborate with each other in constructing knowledge. This could be accomplished, in part, with the assistance of collaborative technology.

Students may enter graduate programs today with a solid foundation of computer experiences and arrive confident about their capability to use technology, as we found, yet they will need university support to learn applications to research and to advance their skills and use of complex databases.

Finally, these graduate students disclosed how taking a required research methods course triggered a range of emotions, encompassing anxiety, panic, and fear for some. It is important that faculty be aware of the emotions associated with learning research methods and that they support students in harnessing their emotions for a quality learning experience.

Tapping into graduate students' comfort with collaborative technology and their already strong academic motivation has the potential to enrich their learning experiences. Creating opportunities in the curriculum for students to reflect and engage with the help of collaborative technology can be an important source of student support and development. Significantly, students may become more active participants in shaping their own learning. Improving approaches to teaching research methods may help prepare graduate education students to become quality researchers and discerning consumers of research as practitioners and policymakers, thereby contributing to a better education for current and future generations.

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#### Acknowledgements

We acknowledge Professor Ira Bogotch at Florida Atlantic University for his thoughtful critique of this manuscript. We also thank the graduate students that participated in our study.

## Introducing “The Matrix Classroom” University Course Design That Facilitates Active and Situated Learning Through Creating Two Temporary Communities of Practice

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This paper illustrates a radical course design structured to create active and situated learning in which students participate in communities of practice within the classroom, replicating real-life work situations. This paper illustrates the approach through a People Management module, but the approach is also used across a range of disciplines such as History and Psychology. The Matrix Classroom is a two-stage format which organizes students, firstly into specialism groups developing expertise in a specific aspect of knowledge, and secondly into applied task groups in which they apply their knowledge to a particular case, industry, time-period, or event. The design creates two temporary communities of practice which allow students to participate by both taking leadership roles and acting from the periphery, thereby gradually increasing their exposure and confidence in authentic work situations. This structure creates a peer support network of elected student leaders from whom they can gain “specialist” support. The active nature of the student-led activities are designed to re-contextualize abstract concepts into specific problem situations, thus preparing students for graduate life.

Erica McWilliam’s call to “unlearn” our habits of teaching (McWilliam, 2008) encourages a re-think of what university teaching looks like and to move away from the “sage” and the “guide” approaches (King, 1993), which are firmly based on the transmission of knowledge from the teacher to the student. The transmission model is very well suited to lecture and tutorial format, as well as essays and exams type assessment, but it is very much based on the notion that *what* students learn is of greatest importance. As McWilliam (2008) points out, in the new “liquid modernity” to which Zygmunt Bauman refers, fixed knowledge sets and disciplinary content have a limited shelf life. Higher education in the 21<sup>st</sup> century needs to prepare students for solving new problems in an unpredictable world rather than simply acquiring knowledge.

In this paper, the authors illustrate a radical approach to course design that seeks to create an environment where students are in greater control of their learning and peer interaction rather than being overly reliant on the tutor for direction and content. This paper is an instructional paper and is not attempting to provide a theoretical development of these concepts, but this section will introduce the conceptual framework being adopted before illustrating the design.

The social-cultural model of learning is based on a social constructionist view of the dynamic between agency and structure such that knowledge is created in participation with others within a specific social and cultural context (Bassot, 2012; Quay, 2003). Bassot (2012) makes two key points about the nature of such learning: that people learn through activity which involves their whole person, and secondly, that change happens within “communities of practice.” A lecture in which the expert in the room is guiding all discussions

and content is not enabling the creative participation of the student cohort, but rather the engagement (or not) with lecturer-defined content.

Redesigning learning experiences to move towards student-centered learning is therefore likely to involve a broad range of tasks such as group work, short writing tasks, discussions, role-plays, simulations, and games which are aimed at decreasing the role and prominence of teacher-centered activity and increasing student participation. Furthermore, the relevance of these tasks to the discipline is important in developing a subject-specific community of practice; for example, students of business management need to develop and learn credible ways of being, speaking, and interacting that are transferrable to the business or organizational context.

As Cavanagh notes, “the benefits of active learning in lectures are maximized when tasks are authentic and reflect how knowledge is used in real life” (2011, p. 24). This involves a lessening of the importance of teacher-centered knowledge and as Quay (2003) notes, situated learning involves a shift in focus away from the individual as learner to learning as participation in the social world and therefore “decenters” the teacher.

‘No longer is the teacher a person of authority imparting knowledge as information. The teachers in this process are other participants in the community of practice...Every experience of the learner is educative in some way’ (Quay, 2003, p. 109).

A critical aspect of the situated learning model is the notion of the apprentice observing the “community of practice.” Lave and Wenger (1991) propose that participation in a community of practice can, in the first instance, be observation from the boundary or



“legitimate peripheral participation.” As learning and involvement in the culture increase, the participant moves from the role of observer to fully functioning agent. Legitimate peripheral participation enables the learner to progressively piece together the culture of the group and what it means to be a member. “To be able to participate in a legitimately peripheral way entails that newcomers have broad access to arenas of mature practice” (p. 110). They propose that the main functions of legitimate peripheral participation are to enable the learning of the language and stories of a community of practice, as well as to learn how to speak both within and about the practice. This process also honors the principle of Vygotsky’s (1978) “zone of proximal development” such that the student is enabled to learn the next step which may be more easily accessed through peer support than tutor instruction.

While the lecture and seminar format becomes plainly inadequate to the task of building such communities of practice, it is also not enough to simply “bolt on” extra group exercises or case studies after the usual lecture. As Herrington and Oliver (2000) note, it is the creation of usable knowledge that is more applicable and transferable to other contexts. This requires universities to re-think their separation of learning and context and to provide learning experiences that allow students to re-contextualize abstract concepts into specific problem situations. Integrating such elements of whole person, real-life learning requires a wholesale review of the design of the course. This is more radical change as indicated by Hagopian’s call for “[r]ethinking the structural architecture of the college classroom” (2013). It is the overall architecture of the course which is perhaps given insufficient attention in the design and delivery of courses.

As a module leader working with a set of validated documents that prescribe the learning outcomes for a course, there is perhaps a tendency to move quickly to fill a series of weekly sessions with content-led learning activities. The design considerations that led to the approach described here were an intermediate step before focusing on such content or activities. There is perhaps a danger that once the formal aspects of the macro-level features of a course are agreed and validated, the delivery team may well go straight into planning the details of delivery. While validated documents seek to move beyond knowledge into skills development, there often remains a focus on subject content and learning outcomes, which perhaps privileges content as the primary focus for subsequent course planning. Intermediate curriculum design features are perhaps given less consideration than either the validation process at institutional level or the design of learning activities by the course leader.

Intermediate curriculum design decisions may involve course teams’ reflection on the learning process

and skills outcomes and the creation of supportive learning networks between students, as well as with the tutors. This requires the design process to involve careful selection of key concepts, as well as the sequencing and pacing of these into the overall learning experience (Ntshoe, 2012). The authors acknowledge the importance of this stage of planning to arrive at a radical course re-design such as the one described here.

### **Radical Course Re-Design: Introducing the Matrix Classroom**

This model was developed through a learning and teaching collaboration across History and Business subject areas at Leeds Trinity University as a result of a peer observation process and in alignment with strategic aim of delivering more innovative learning, teaching, and assessment approaches. It has been trialled in a Business course on People Management, which is the specific example described here, and also in History and Psychology courses. Further colleagues are now exploring the technique based on our early successes.

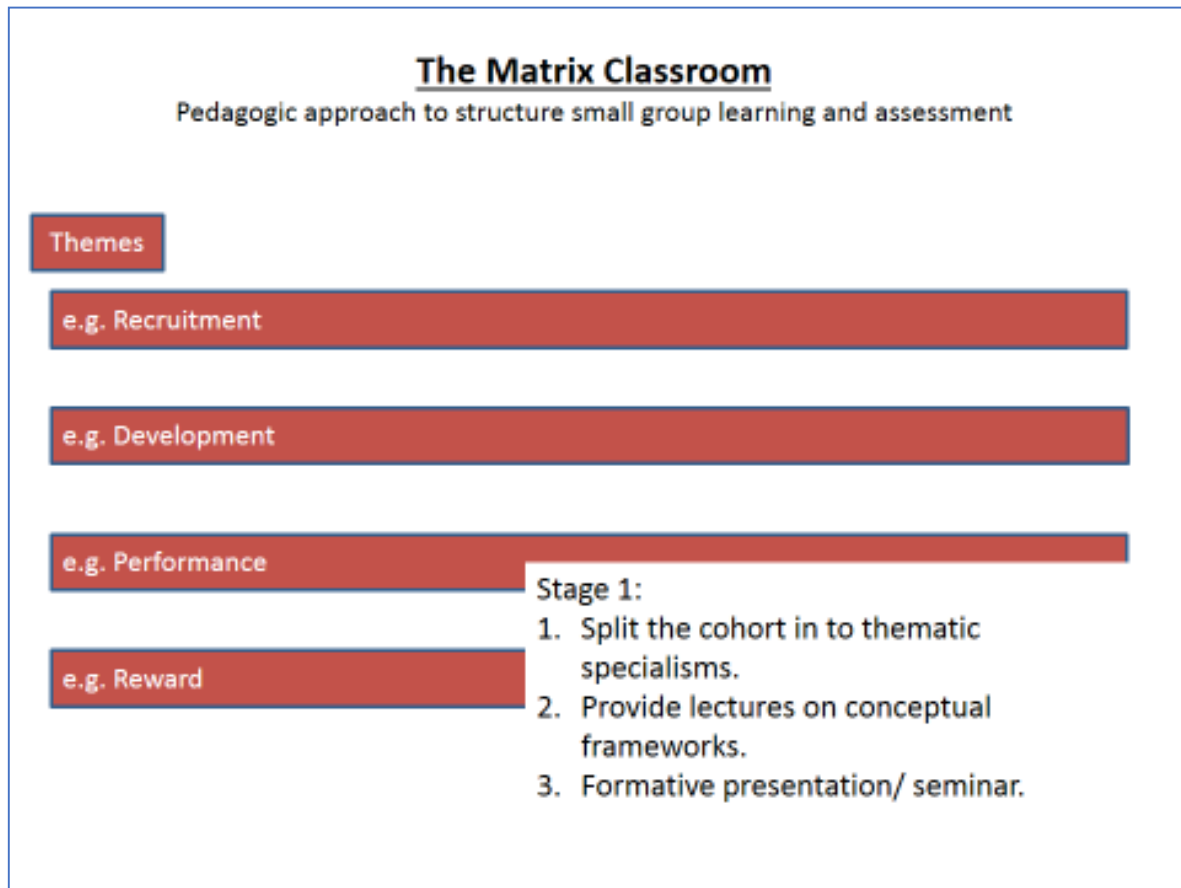
As a course leader of Business and Management programs, one of the authors, Roberts, was seeking to deliver learning experiences for students in which they formed meaningful communities of practice and engaged in realistic preparation for graduates seeking to use such knowledge in the workplace. It was evident that existing lecture and seminar formats and ubiquitous case study analyses remained limited preparation for real-life situations. While students were able to memorize materials and write essays about, say, people management, they were less able to transfer such knowledge to their workplace problems.

The instructional problem in this context was for students to understand a range of Human Resource Management policy areas while also appreciating the interpersonal, structural, and managerial issues involved in people management. The illustration below of the Matrix Classroom was a deliberate attempt to carefully re-contextualize the concepts and theoretical frameworks appropriate to the study of People Management within a classroom situation. However, this approach has also been applied in a History module where students have specialized in various historical techniques using sources such as oral testimony or texts before applying them to specific student-generated hypothesis testing.

### **The Matrix Classroom: Illustration of Application in a People Management Course**

The Matrix Classroom provides a model for an over-arching course structure that creates a two stage process in which the tutor identifies four to six main themes and a range of suitable applications or contexts

Figure 1  
*Stage 1 of The Matrix Classroom design –specialist themes*



in which students may apply such knowledge. In this illustration, the People Management courses included some learning outcomes relating to group work, and the first assessment was a group presentation, the second an individual report. The model also allowed the tutor to build in real experience of some basic concepts such as recruitment or staff development by building into the structure an experience of students “recruiting” the groups of students to an assessment team and providing these teams with development activity. It is suggested that maximal student choice be built into this process while the tutor provides structural guidance and support. That is to say, the students feel like they are learning first-hand about the problems involved in recruitment, and yet this experience has been structurally designed to create this perspective.

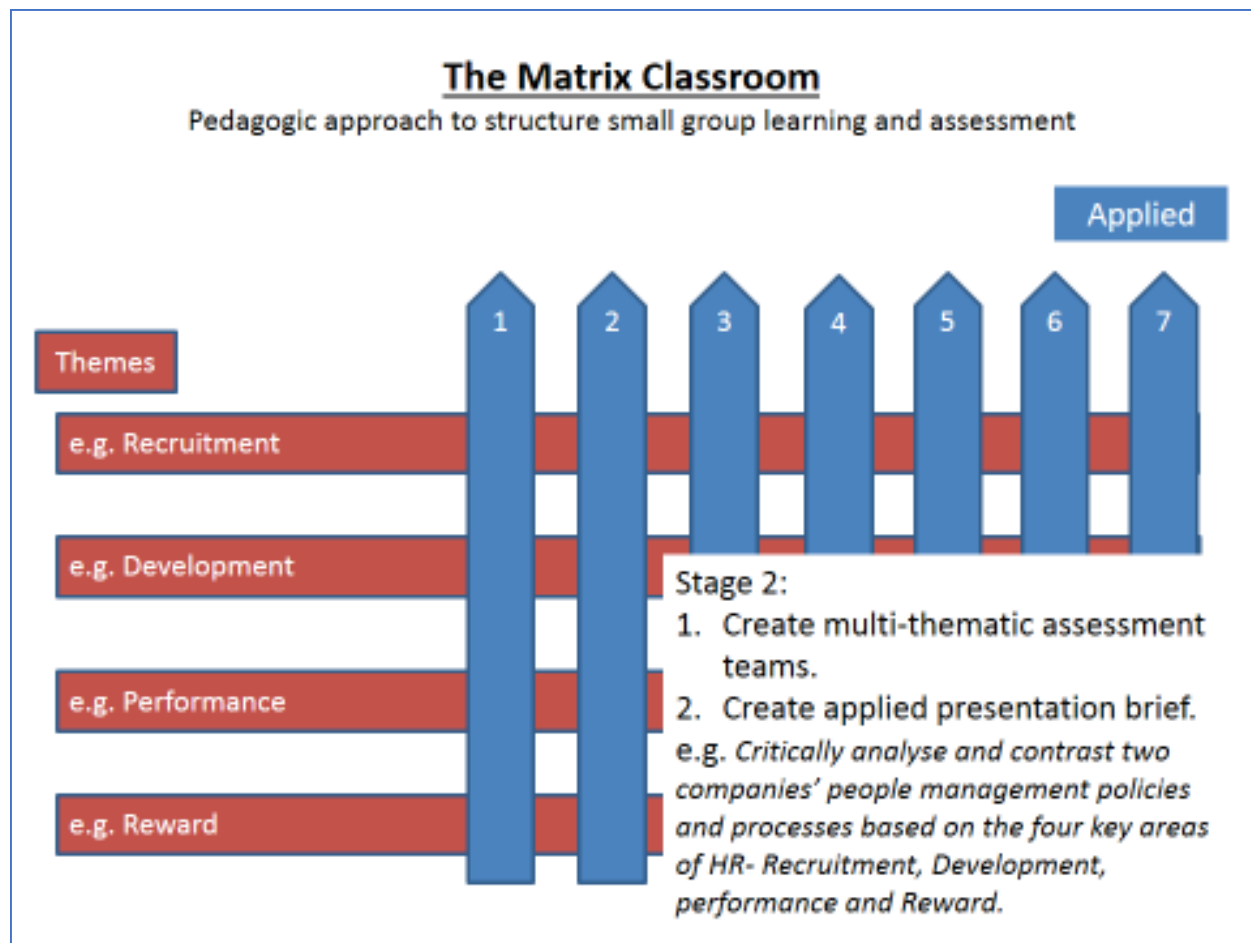
**Stage 1- Setting specialist groups.** Firstly, the tutor identifies four to six main themes that together capture the broad content of the module. These do not need to be all-encompassing, but rather serve as the first scaffold that weak students may grasp. In the People Management example illustrated, the four broad themes

used were Recruitment, Development, Reward, and Performance, as shown in Figure 1.

The early task of the student group is to split fairly evenly into each of these “Specialisms.” An overview lecture may be provided to allow students to make an informed choice, but essentially students are entering such groups on the basis of interest and aspiration rather than already having any expertise. It has been found helpful to the course leader to ask students to elect a Head of Specialism and Deputy Head at this stage. This allows easy access and “steer” to the groups even when the tutor is not in control of the whole class at any one time. The appointment of deputies minimizes the potential for complete lack of leadership and also increases the numbers of students able to try out leadership roles.

The first two weeks of the course can now be spent in various tasks and challenges, thus helping the groups to develop expertise in their specialism. For example, first you may ask the groups to produce a quick five-minute presentation to the whole group by the end of the session. This flushes out the “Wikipedia type” answers and can

Figure 2  
*Stage 2 of The Matrix Classroom design – Cross-cutting assessment teams*



allow the tutor and other students to provide some early feedback on how the specialist group can increase the quality of their work. Following on from this, they could be asked to produce a factsheet of key academic concepts relating to the theme, including an overview of some key articles that the tutor has provided. Finally, they may prepare a twenty-minute presentation ready to deliver to the remainder of the class in the next session. All of this may take two or three weeks of scheduled class time and ends with the whole class having received a student-generated lecture on all four themes, plus a factsheet of key concepts and articles written by students and for students.

Throughout these first three weeks, the tutor may consider some short, twenty minute lectures on key concepts and frameworks that may help students organize their thinking. This is essentially a stretching exercise for those highly able students in the groups who can take the lead in organizing the material for the presentations and factsheets and allow them to make

sense of the articles. The remainder of the group may only have a partial understanding of these concepts at this stage but crucially, not only do they have notes, factsheets and articles for future reference, they also have two elected leaders from whom they can gain 'specialist' support at any point in the remainder of the course.

**Stage 2- Cross-cutting assessment teams.** The second stage in this course structure is to allow students to form assessment teams made up from one or two students from each specialism. This is illustrated in Figure 2. These are essentially multi-functional teams and are highly realistic of the kinds of work teams in which students will be expected to excel in post-graduate jobs. Again, it is suggested that this element can be student-led. For example, one of the specialist groups might be allocated the responsibility for this and asked to explore ways to make this fair and equitable for the cohort size and then to carry out the team allocation. Such experience can often be demonstrably

relevant to learning outcomes related to team-working and may also be assessed through some reflective element of assignment.

Given that one of the specialist groups is now conducting extra “team-building” work for the cohort, it is worth explaining that there will be other tasks required of the other groups at later stages. For example, a group may be asked to devise some team building exercises for the first time the teams get together in the following session. Another group may be asked to decide on a peer-grading system by which all members of the team can allocate each other marks for a portion of the grade. A fourth task may involve a consideration of what kinds of leadership a team needs to function effectively and conduct an exercise with the groups to ascertain their leadership needs and gaps. All of this can serve as a way of building confidence, rapport and familiarity as they prepare to leave what is now a familiar and functioning specialism group. This preparation phase into the main “twist” of the structure is an important time for transitioning into a new team for the second time in this course. These specialist groups remain a source of relational support for students for the remainder of the course. It will also be helpful to allow time to deliberately ask leaders to present their suggestions to the group and ask for feedback. At this point, the tutor role has receded in significance to the students as they are no longer the key person making decisions.

The classroom time in approximately week four will be moving into the new teams, according to the decisions and allocations made by the students. This session can be a variety of team-building exercises, electing new Team Leaders and Assistants (or any term that differentiates from the specialist “heads”), and starting to discuss the assessment brief.

At this point the tutor can identify a suitable brief that asks students to apply all four themes to a specific context or case study. Alternatively, this could also be handed over to the students as an element they could negotiate and create themselves. In the People Management example, the brief was to apply the four areas to any two companies. Students then negotiated their own titles as follows:

- Team 1: Critically analyze and contrast two companies’ people management policies and processes based on the four key areas of HR-Recruitment, Development, Performance, and Reward.
- Team 2: Compare and contrast two companies HR policies in the four key areas of HR: Recruitment, Development, Performance, and Reward. Critically analyze the link with strategy and objectives of the business and make suggestions for improvement.
- Team 3: Design effective people management policy and process to support a new retail business based on the four key areas of HR-Recruitment, Development, Performance, and Reward. Demonstrate and critique the link with strategy and objectives of the business.

As can be seen, there is a huge amount of similarity, and yet there remains room for creative exploration on the part of some teams.

This second process of team building now offers students an authentic, work-like group experience to produce a multi-faceted piece of work for which they have some specialist knowledge. There are evidently challenges in this part of the process and further opportunities can be created to help students fall back on their specialist groups for help and support. For example, the next few weeks – five to seven – may include some time in specialist groups again briefly to share problems, clarify ideas, and gain support. The bulk of this time, however, will be geared towards producing a high quality assessed presentation, which again is work-relevant and can be assessed efficiently.

The key interventions by the tutor during this period is to provide key lectures on specific concepts which are more advanced and critical. This allows the better students to organize and build critiques of this knowledge set using appropriate tools, models and frameworks. Again, key academic articles can be provided for teams to consider during class time when the tutor can roam the room addressing questions and misunderstandings.

In the example of the People Management course, a mock presentation opportunity was provided for all groups, again during class time. During this feedback the key message given is, “What is your argument?” The main aim of this stage is to help teams structure their presentations with a greater academic judgement and emphasis rather than merely being descriptive.

**Individual assessment.** In this example, the course concluded with an individual assignment which required an overall understanding of the topic area:

“Critically analyze the role of HR in developing a coherent approach to people management. Use case studies to illustrate your argument.”

The wording of the brief was deliberately kept succinct such that students needed to have participated the course in order to know how to unpack the statement. Students will have worked on this task as part of a group but now are required to understand the whole subject and present a coherent analysis and argument.

### Main Features of the Matrix Classroom Approach

The main features of this approach can be described as follows:

**1. Real-life learning through re-contextualizing abstract concepts.** Tasks in both stages of the Matrix Classroom design reflect how knowledge is used in real life. Multi-functional teams are a normal part of working life and require members to bring specialist knowledge. The application of concepts to a relevant context or case study in the second stage assessment team reinforces the authenticity of the assessment tasks to students.

**2. Shifts the student approach to teacher-centered knowledge.** This design reduces the time spent listening to teacher-centered knowledge by simultaneously shifting the focus to students' extant knowledge, yet also increasing student awareness of key concepts as directed by the tutor. Given the challenging nature of the tasks, students find that the structure and academic content provided by the lecturer is valuable and helpful. Students are motivated to engage with these concepts to help analyze and articulate a specific problem. In the final stages of assessment preparation, the frameworks provided guide students in tackling a challenging and succinct assignment brief which requires a confident understanding of a wide subject area.

**3. Communities of practice.** The two temporary "communities of practice" created allow students to participate by both taking leadership roles and observing and acting from the periphery, thereby gradually increasing their confidence in exposure to authentic work situations. Legitimate peripheral participation allows students with little business or management experience to see other students tackle the challenge and observe the roles and patterns of behavior from the periphery. The experience of team leadership and team work is thereby "scaffolded" for the student in a way which enables attendance, engagement, and achievement across a range of ability levels.

**4. Can accommodate student choice through Matrix design.** The Matrix approach is structured loosely enough such that maximal student choice can be built into this process. The groups quickly develop into semi-autonomous units that respond well to being given choices, e.g., assessment brief, team building, or peer assessment process. Since communication between groups can also be facilitated and encouraged through the elected leaders, it is possible to efficiently reach whole cohort agreement.

**5. Peer support structure.** A key feature is the degree and range of peer support that the Matrix approach created. As well as being part of two separate teams, there is a peer support network of two elected leaders from both stages from whom students can gain support at any point for the duration of the course. It also allows each group a second chance to set up positive team working behaviors in preparation for the assessment.

Nevertheless, there is some perception by students that they have been abandoned by the tutor and pushed to grapple with this knowledge alone. While a by-product of the group based class sessions means that a high degree of social support and camaraderie can develop alongside on-task behaviors, there remain some elements of student dissatisfaction with such a teaching approach. This has been discussed by one author in a previous paper (Roberts, 2016) and serves to reinforce the importance of creating opportunities for peer support.

## Conclusion

Higher education in the 21<sup>st</sup> century needs to prepare students for solving new problems in an unpredictable world rather than simply acquiring knowledge. It has been argued that radical course re-design is needed to decenter the teacher, create communities of practice and re-contextualize the learning of abstract concepts. Bolt-on measures that only supplement the traditional lecture and seminar format are arguably unable to provide students with repeated and prolonged exposure to interactive and student-led learning that is required to transform graduate behaviors. We have argued for the importance of the intermediate phase of course design that moves beyond the macro, institutional-level validation issues and needs to occur prior to the detailed micro-level course tutor development of content.

During this phase of course design, we have argued that course teams can consider radical re-design of courses that does not privilege transmission of content over student experience and application of such content. The Matrix Classroom as one such example of this approach is a two-stage design which shifts the central experience of students away from teacher-centered knowledge to shared and created knowledge. It has been shown that fundamental to this design is the in-built peer support created by these two temporary communities of practice.

Further empirical research is planned to explore the student experience of this approach across multiple disciplines such as History and Psychology. The authors are interested in establishing if there is an impact of such approaches on resilience levels in students given the requirement for them to rely on themselves and each other more than the tutor.

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## Fostering Undergraduate Research Through a Faculty-Led Study Abroad Experience

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This case study contributes to the higher education curriculum development literature by showing how a faculty-led short-term study abroad experience can become the catalyst for student research and offer students an international perspective. The authors analyze students' reflections and provide data collected over the years of taking undergraduate business and economics majors on a study abroad course to China to learn about the country's political, social, and economic dynamics. The paper argues that a faculty-led study abroad program provides a unique platform that helps students find appropriate research topics, gather quantitative and qualitative data, and develop meaningful relationships among observed phenomena. We find that the whole experience of involving students in research through a faculty-led international course enhances the students' understanding of research, broadens their intellectual horizons, and enhances their interest in, and facility to, understand international issues. Recommendations from the authors' experiences with curriculum development through a faculty-led study abroad course are offered to show how the undergraduate research experience can be enhanced.

The purpose of this study is to demonstrate how undergraduate research can be fostered through an academic faculty-led short-term study abroad (FLSTSA) experience. Offering international education, a FLSTSA program takes students beyond a basic understanding of the cultural, socio-economic, and political dynamics that is usually achieved in a classroom-based academic course. Rather, it offers a cross-cultural comparison that can evoke a strong interest to investigate the issues existing in a foreign country and thus provide a positive educational experience. Given growing enthusiasm with which higher education institutions in the U.S. have been treating their study abroad programs, one might assume that there is considerable evidence in the curriculum development literature on how undergraduate research can be encouraged and implemented through a FLSTSA experience. In fact, the opposite is true. While intercultural and transformational aspects of study abroad have been discussed by a number of researchers (Cameron, Freudenberg, & Brimble, 2013; Carlson, 1990; Savicki, 2008; Shostya & Morreale, 2013), there seems to be limited literature on how a study abroad experience can stimulate undergraduate research. This study enriches the current higher education literature by demonstrating how a faculty-led short term study abroad program can be used as a vehicle for stimulating student interest in scholarly research, providing students with an international perspective, and building stronger student-mentor relationships.

The academic literature demonstrates the importance of a "high impact" learning experience. Kuh (2008) summarized four types of essential learning outcomes: (a) knowledge of human cultures and the physical and natural world; (b) intellectual and practical skills such as critical thinking, written and oral communication, and quantitative literacy; (c) personal and social

responsibility (eg., civic engagement and ethics and values); and (d) integrative learning in analyzing complex real-world problems. A study abroad program yields a variety of such educational outcomes, including stimulating curiosity and critical thinking, gaining insights into a new cultural perspective, and putting classroom knowledge into real world practice (Colpitts, 2014; Cameron et al., 2013; Shostya & Morreale, 2013). Researchers agree that a study abroad experience holds greater potential for transformation in learners through intercultural comparisons and closer relationships between the faculty and the students travelling together (Green, 2012; Savicki, 2008). It also builds a bridge between academic learning and experiential learning (Hunter, 2008; Savicki, 2008). Numerous study abroad programs offer various types of learning experiences, use different pedagogical and program formats, and have diverse features (duration, settings, and faculty-led or not). While these international programs may not necessarily imply different degrees of cultural immersion, they certainly vary in their capacity to expose students to undergraduate research.

Similarly to study abroad, educators view undergraduate research as a "high impact" activity that creates vast opportunities for the educational gains that are greater than those from traditional academic formats. Past studies have cited numerous and far reaching benefits for undergraduate students who get involved in research in a variety of disciplines, including but not limited to psychology (Stoltenberg et al., 2000; Wayment & Dickson, 2008), medicine (Murdoch-Eaton et al., 2010), biology (Labov, Reid, & Yamamoto, 2010; Reynolds, Smith, Moskowitz, & Sayle, 2009), as well as other practice-dominated sciences (Hunter, Laursen, & Seymour, 2007). Although undergraduate research in economics is still in an early stage, it is a fast growing

movement (DeLoach, Perry-Sizemore, & Borg, 2010; McGoldrick, 2008). Existing studies provide evidence that the undergraduate research experience is characterized by a high level of student-mentor interactions that benefit students on a personal and professional level (Hunter in Savicki, 2008; Kuh, Kinzie, Schuh, & Whitt, 2010; Lipka, 2007; Seymour, Hunter, Laursen, & DeAntoni, 2004) and directly impacts students' satisfaction and learning (Austin, 1993). Additional studies verify that the collegial and collaborative partnership of undergraduate students and faculty members contributes significantly to the personal and professional gains reported by students as a result of their research experience (Hunter et al., 2007; Seymour et al., 2004). Deep engagement in undergraduate research also improves students' grades and motivation and paves the way for success in graduate schools and/or labor markets (Barlow & Villarejo, 2004; Kuh et al., 2010; Russell, Hancock, & McCullough, 2007).

Although there is a growing body of literature discussing benefits of study abroad and off-campus learning experiences in general, there seem to be very few studies offering insights into research opportunities and experiences that can be generated through study abroad programs. Yet, in view of the present interconnectedness of global labor markets and expansion of business operations on a world-wide level, it is important for college graduates, especially those with an economics or business major, to be able to combine research skills with knowledge of international issues and global economies (Gamble, Patrick, & Peach, 2010; Olson, Evans, & Schoenberg, 2007). The present paper argues that a FLSTSA program provides a unique learning experience compared to other off-campus activities (such as internships, service-learning, international integrated university study, etc.). This is because it combines two types of research modes – “curiosity-led research” and “issue-led research” (the former one focuses on an issue isolated from its economic or social context and does not necessarily relate to practice as the latter one does) – and allows students to put their research into a larger “global” context (Fillery-Travis & Lane, 2008). In addition, it engages students in meaningful reflective practices (under the guidance of their mentors) that can help them to discover deeper meaning in their studies and formulate strategies that lead to more informed actions in addressing hotly debated issues and critical questions.

The model that we developed suggests that a faculty-led international course can help students find appropriate research topics in an international setting, gather both quantitative and qualitative data that otherwise would have been unavailable to them, and form meaningful relationships between the observed phenomena. Our own experience of leading a FLSTSA course to China and engaging business and economics students in undergraduate research suggests that this

type of study abroad works particularly well because it builds stronger relationships between students and their mentors, helps students better utilize local resources and experts to further their research, and allows the faculty to provide timely and constructive feedback and assess the impact of research experiences abroad on student learning and development in a more direct way. It is also important to assess the impact of the FLSTSA course on student research engagement. We thus offer a comparison of research engagement among those students who had the travel experience and those who did not. We provide practical insights and helpful lessons learned from our experiences with both undergraduate research and study abroad programs.

### **Development of the Faculty-led Short-term Study Abroad Program to China: Description, Goals, and Structure**

In this section of the paper, the authors draw from their own experience of teaching a FLSTSA course to China. Why was China selected and not another international destination? During the last several decades, China has turned into a global economic and political superpower and modern economics and business students need to be able to understand the intricacies of China's business environment, its financial markets and institutions, and its progressing economic development. Because they offer a first-hand experience in a major advancing country that has been increasingly gaining attention in the world economy for more than a decade, study abroad programs to China have become a popular component of college curricula in the U.S. (Bhandari & Chow, 2007). The authors of this paper have created a team effort to offer a new program focused on Chinese economic, historical and cultural development and the increasing role of China and USA relations in the world economy. The team has had extensive experience in teaching and travelling to China and has worked together in a collaborative effort over the past five years.

With the support of the department chair, the dean, and the Confucius Institute (a public educational organization established by Chinese government in the U.S. to promote Chinese language and culture and facilitate cultural exchanges), we have created a focused China economic studies track. It consists of a five course sequence that includes the following courses: ‘China And US Economic And Political Relations: Past, Present And Future’; ‘Rising Powers: China's Economic Growth And Development’; ‘Political Economy Of Developing Nations’; ‘China's Financial System’; and a two week Travel Course entitled ‘From Wall Street to the Great Wall’. The latter faculty-led course was designed to add a new dimension to the learning experience in the track. The course is also a writing-enhanced course, which



requires students to complete a series of short writing assignments on topics covered in the course. Each course in the track is offered every two years; and the students are required to take any one of the courses prior to enrolling in the travel course. Upon their return from China, students who are interested in pursuing the China economic studies track complete the rest of the courses.

The goal of the faculty-led international course to China is to help students learn about the current political, social, and economic dynamics that are impacting China's society and institutions, raise the students' awareness of the vexing issues modern China has been facing and that need economic investigation, and pave the way for future undergraduate research activities. Engaging in an international travel course with all the logistical issues is not easy, and there are definitely some practical issues and precautions the faculty leading the course would have to consider (Shostya & Morreale, 2013). We believe that it is necessary that the students are well-rehearsed on cultural, economic, and historical aspects of the country in question. This is especially important in the case of traveling to a country with a culture and language vastly different from those of the home country. Therefore, the course starts off with bi-weekly meetings of the student group and the faculty during the spring semester (February-May). The one-and-a-half hour in-class discussions of different aspects of the Chinese economy, business practices, history, and culture are designed as preparation for the two-week travel component at the end of May and early June.

We find pre-travel meetings while still in the US to be an excellent platform for forming students' expectations and stimulating their interest in the country they are expected to visit, in this case, China. During the bi-weekly meetings, we cover specific aspects of China (such as its history, culture, and political and economic system), invite speakers who are natives from China, and assign readings from texts, magazines, and academic journals. Learning some basic foreign language skills is also a necessary prerequisite, and so students are required to attend at least one Chinese language class offered by Pace's Confucius Institute. The students also are required to write up summaries of each week's reading assignment and class discussion.

The following list is taken from the travel course syllabus and outlines the structure and topics of the pre-travel component of the course.

- Week 1: Introduction to China and its People
- Week 2: A Brief History of China: 5000 Years!
- Week 3: Communist China; Transition Reforms; The Chinese Economy
- Week 4: Culture of China; Oracle Bones; Cultural and Personal Etiquette

- Week 5: China in the World Economy and Business Practices
- Week 6: What is the Chinese Economic/Political Model?
- Week 7: Going to China

During the two weeks in China, students attend classes at the University of Shanghai for Science and Technology (USST) in English and Chinese, explore Shanghai, and travel to Beijing and Suzhou. The students keep logs and draw comparisons and contrasts to the information learned in the course prior to the travel component. At the end of the travel experience, each student is required to write a lengthy reflective paper on his/her study abroad experience. This reflective paper often serves as a culmination of the educational and personal gains of their travel experience and often forms the basis for further research that is carried out in the capstone senior course. We also use the reflective paper as qualitative evidence of the benefits of the travel course experience.

To engage in research with an international context, students often need to learn about identifying and utilizing local resources and experts of the country they are to visit. Perhaps the best way to identify and utilize these resources and experts is through the local institutions/agencies while they are abroad. Thus, the host university has an important role to play in the travel and research aspects of the experience. Our host university assists us with hotel reservations, local logistics, and tours. In addition, it offers lectures on Chinese language, culture, and business. It also organizes trips to local factories where students can learn the practical aspects of conducting business in China, as well as some issues that are faced by managers and employees. The host university, therefore, helps students to immerse into the local environment, stimulate their analytical inquiry, and initiate ideas for a research topic. We find opportunities to communicate and exchange ideas with Chinese scholars and students in a Chinese University particularly valuable for research purposes as they are a great source of inside knowledge about Chinese culture and Chinese economic and political structures. Such close connections with the host university help to mitigate the initial culture shock and ensure that the "high-intensity dissonance" that most students experience upon their arrival to a country that is radically different from their own in fact leads to a transformative learning (Brewer & Cunningham, 2009; Kiely, 2005). Students experience what Mezirow (1997) termed "a change in perspective," that is, a reconsideration of their understanding of how the world works.

### Practical Considerations

Teaching a FLSTSA course to any country is challenging, and so it requires additional teaching skills for the professors involved. Some studies discuss the

pitfalls of focusing mostly on the content of the travel course without taking into consideration the psychological aspects and adjustments that accompany a group of students traveling together under conditions that are often uncertain and stressful (Ornstein & Nelson, 2006). Various studies have reviewed some precautionary measures that should be taken to address potential emergencies and minimize the risk of crisis (Colpitts, 2014; Ornstein & Nelson, 2006; Shostya & Morreale, 2013). These include pre-screening students through interviews by the faculty to determine their mental and physical fitness for a trip to China before they are given permission to register for the course. We, in fact, do this routinely in selecting students for our China course. The International Office at our university also requires a minimum of 3.0 GPA for students to be eligible for any study abroad program. The students who take our course are typically upper-level sophomores and juniors.

In addition, traveling to another country also is associated with some country-related dangers. Taking students to China, in particular, means that the students will most likely be exposed to air pollution, water contamination, high population density, and lack or inferiority of sanitary necessities. It is, therefore, vital to warn the students about these potential dangers and guide their behavior in such a way that they are able to enjoy the trip and learn in a safe educational environment. We also recommend to other educators who wish to set up a travel course to create a list of DO's and DON'Ts that could be given to the students at the last pre-travel meeting, to ensure that they understand the safety considerations of traveling to another country. There is also the need to build some comradery among the students before they travel. This helps in creating cohesiveness of the group and reinforces the common experience in which they will be involved.

### **The Outcomes and Findings**

The authors of this study found a FLSTSA course to China to be a perfect vehicle for implementing key steps in the Undergraduate Research Model and meeting the proficiencies identified by Hansen (2001). A Hansen's proficiency approach ultimately shapes educators' expectations of what economics majors have to learn in order to be able to apply the knowledge and skills learned in college to the tangible experience of life after their graduation. Salemi and Siegfried (1999) show that undergraduate research creates opportunities for active learning, forcing undergraduate students to "do economics" (active learning) rather than "learn economics" (passive learning). McGoldrick (2007) advances this approach by showing that Hansen's proficiencies can be linked directly to the research process. Table 1 summarizes McGoldrick's mapping

strategy of Hansen's proficiencies with learning objectives and outcomes of our course which are taken from the FLSTSA course syllabus.

Studies indicate that "awareness is first and foremost key to success in engaging the undergraduate student" (Madan & Teitge, 2013). One of the travel course goals is to make students aware of social, economic, and political issues that modern China has to deal with, as well as the differences between the U.S. and China's economic and political structures and frameworks. We found that our international course to China, therefore, is especially conducive for the first two steps in undergraduate research – identifying issues and developing the research question (see Table 1). This is because it offers a direct exposure to a number of opportunities to students that go beyond just a set of facts, concepts, and readings. While traveling in China, the students live in an environment in which they are more likely to ask pertinent and penetrating questions and get involved in productive discussions with each other, as well as with the faculty travelling with them.

In addition, a FLSTSA course helps students understand and utilize the published literature in a more informed way, identify the sources of data pertaining to their topic, and advance their research skills (these are steps 3 and 4 in the undergraduate research model, see Table 1). Being exposed to the relevant literature, as well as to the real life phenomena that they can observe while in China, students are more likely to identify a research area for potential study (step 5). Student-travelers can obtain economic data using local resources and academic experts for possible use in their future research (step 6). Keeping a daily journal of travel experiences while in China helps students draw conclusions about the economic phenomena they are interested in, compare those conclusions to the literature they had reviewed during the pre-travel component of the course, and apply their analysis to the existing policy issue (steps 7, 8, and 9). The last step of the undergraduate research model (presenting research to peers and/or faculty) can take place once the students are back in their home country. Upon their return we require our student-travelers to attend and participate in various workshops in which they share their knowledge and experience with other members of the academic community of the home institution.

Our experience shows that the research pursued by our travel abroad students can take a variety of forms. Students get engaged in research that might involve sophisticated econometric analyses and theoretical models, and others might do more qualitative analyses which are equally stimulating and rewarding. In fact, we estimated that about one-third of each cohort of students who took the FLSTSA course to China got engaged in some sort of research project (outside of the capstone course required for the majors). Some of the

Table 1.  
*Undergraduate Research and Hansen's Proficiencies (McGoldrick, 2007) as Reflected in a FLSTSA Course Objectives and Learning Outcomes*

Key Steps in the UR Model	Hansen's Proficiencies	Course Objectives and Learning Outcomes
1. Identifying economic issues	Accessing existing knowledge	Students are expected to learn more about the role that China plays in the world politics and world economy; analyze and critically evaluate the key differences in the economic systems of the U.S. and China; understand the logic behind Chinese reforms and the uniqueness of China's transition and its economic implications; understand business opportunities, challenges, and problems in China and their implications to American investors. Students are also expected to be able to identify development problems and evaluate the strengths and weaknesses of state-led and market-led development models.
2. Developing a research question	Asking pertinent and penetrating questions	Students are expected to participate in productive discussions related to economic, social, and cultural differences between China and the U.S. and developmental issues faced by modern China and identify their interests for potential research papers
3. Undertaking a literature search 4. Summarizing relevant literature	Displaying command of existing knowledge	Students are expected to write up summaries of each week's reading assignment and class discussions. Students are also expected to summarize the dimensions of a current economic policy issue as reflected in the reading assignments
5. Identifying an area of potential contribution	Interpreting existing knowledge	Students are expected to improve analytical techniques such as logical inquiry and comparative analysis; understand the relationship between economic theories and practical problems and apply current economic theories to the analysis of China's economy
7. Drawing conclusions 8. Comparing conclusions to identified literature 9. Applying analysis to current policy issues	Applying existing knowledge	Students are expected to keep a daily journal of travel experiences while in China that will help them to draw meaningful conclusions about observed economic phenomena.
10. Presenting research to peers and/or faculty	Creating new knowledge	Students have to write a reflective essay upon returning from China on the knowledge and experience gained. They are also expected to attend and participate in a coming together workshop gathering in early September with various members of the Economics Faculty and Confucius Institute Staff. Students who are interested in continuing doing research should contact the faculty about their project's topic, time-table and type of activity.

students who were enrolled in our faculty-led international courses participated successfully in essay competitions sponsored by the New York Chinese Opera Society (NYCOS), a nonprofit organization the primary goal of which is to preserve the ancient culture of the Beijing Opera. The papers won first and second

places, and the students and their mentors (the authors of the present study) received awards from the NYCOS.

The authors of this study also found that half of the students (50%) who collaborated with faculty in the Economics department through the special undergraduate research program funded internally were

those who had a study abroad experience, and all of them did research on different aspects of the Chinese economy. One student, for example, conducted a study of China's transitioning to a more consumer-driven economy. The student's choice of topic was a direct outcome of her travel experience. She was fascinated by the speed and magnitude of the economic transformation in China and had decided to investigate this issue further through econometric research. As we can see, the student's first-hand experience in China triggered the first two steps of the research process and addressed the related Hansen's proficiencies (see Table 1). Another faculty-student pair was interested in the differences between Chinese and American college students' study habits. Through the FLSTSA program, the student who was involved in this project had an opportunity to communicate and exchange ideas with students in the Chinese University. Yet, another student who received a university grant together with the faculty member, did a research project on Chinese students' incentives to study abroad. During the two weeks in China, he had an opportunity to interact with the local students, many of whom expressed desire to go to study abroad. Based on these discussions, our student decided to collect data first-hand (this is one of the research steps, see Table 1). He designed a survey instrument, distributed the surveys among the USST students, and tabulated the results when he got back to the US. His and other students' studies were presented at university-wide research conferences and national economics conferences. Some of them were submitted to peer-reviewed journals.

Another way to assess research outcomes of the FLSTSA program is to see if students enrolled in such programs are more likely to choose an international topic for their capstone research project than those who do not have such experience. The study abroad experience is not required of all economic majors, but the capstone is. This provided us with a way to draw comparisons between the students. We recorded the topics of two cohorts of students who were enrolled in our study-abroad program (19 and 16 students respectively) and completed successfully the senior capstone research course. We compared them with the topics used by the control group (a comparable group of 35 graduating seniors with the same majors, similar GPAs, and similar ethnic/origin background) who did not have any study abroad experience but completed the senior capstone research course. The results suggest that students with short-term FLSTSA experience are much more likely (47% of the total) to choose an international topic for their research than those without study abroad experience (18% of the total).

The authors also used self-reflective comments by the students to assess the learning outcomes. The students involved in student-faculty paired research

expressed their opinions about the role of the study abroad course in their undergraduate research experience and their choice of the topic. Here are some excerpts from students' blogs and research papers:

I chose this topic because I took professor ...'s travel course and visited China last year.

The professor has guided me and encouraged me to make progress in this research project. I gained much new knowledge by doing quantitative econometric analysis. I learned how to create a model from economy theory, collect data and using regression analysis to project my models for each country (U.S. and China) and then compare and explain the results.

I think I found such a connection with China that a part of me will stay there forever and I will always carry China in my heart. I continue to look forward to the final outcome of the project that my professor and I are working on.

Research allows us to apply theories and concepts that we learn in classrooms onto tangible life experiences. In addition, research has often life-changing implications. The research topic that my professor and I chose has important implications for my future career.

The undergraduate research program at our university has been a very rewarding and positive experience for me thus far. I feel fortunate I have been chosen to part-take in such an amazing program.

We believe that the preliminary assessment data demonstrate the impact of a study abroad experience on developing undergraduate research focused on international topics and issues.

### Conclusions and Recommendations

While undergraduate research is not really a new pedagogical practice, doing undergraduate research in an international context is a newly emerging trend. Short-term programs (two to eight weeks) are becoming the most common type of overseas study for U.S. students today, and the number of students in business, economics, and other related fields going to study abroad have risen dramatically (Institute of International Education, 2013). Therefore, it is imperative for educators to realize that such short-term travel experiences provide unique additional learning outcomes.

In this case study, the authors share evidence on student learning and outcomes about engaging in research

with business and economics students in international settings. The model that we developed suggests that a Faculty-Led Short-term Study Abroad (FLSTSA) program can help students find appropriate research topics in an international setting, gather both quantitative and qualitative data that otherwise would have been unavailable to them, form meaningful relationships between the observed phenomena, and draw important conclusions and insights from the research. In addition, it helps establish longer term relationships between students and faculty from the home university to pursue further research and collaboration.

The authors of this study find a FLSTSA program to be an ideal vehicle for implementing key steps in the undergraduate research process that help students to develop practical skills and knowledge. This is especially important for economics majors who have to be proficient in six important learning objectives and outcomes (described as Hansen's proficiencies) if they are to compete in modern contemporary labor markets. Such an international experience allows then to carry out undergraduate research in a variety of forms, such as course-based activities, course-based projects, capstone experiences, and collaborative research with faculty. This study also offers some practical considerations drawn from the authors' teaching and research experience with undergraduates. We discuss the importance of pre-travel discussions and readings, the role of the host university, and connections with local experts, as well as some assessment tools.

DeLoach, Perry-Sizemore, and Borg (2011) make four recommendations to departments that wish to either create an undergraduate research program or improve an existing one. They suggest that departments should integrate Hansen's proficiencies into lower-level courses, create a laboratory environment, introduce a research methods course, and finally make a research experience a required part of the senior capstone. We extend their list with a recommendation of a FLSTSA course to be incorporated into the curriculum. We believe that such a course can expand the opportunities offered by the traditional academic experience of the capstone course or collaborative research. It can capture the transformational potential of study abroad programs and build global awareness that can lead to greater career opportunities. Most importantly, it can prepare students for a multicultural workplace and a global labor market offering many more career opportunities.

Overall, we also find the whole experience of involving undergraduate students in research via a faculty-led sojourn to China to be extremely gratifying both for the faculty involved and the students who take the course. It expands students' horizons and opens them up to a culture that is very different from their own. Witnessing firsthand a growing, expanding, and vibrant society and economy sparks a real interest in students to engage in

some research pertaining to Chinese culture and its economy. The students become more aware of the vexing issues faced by the Chinese government and the sharp differences between Chinese and American economic and political systems. This ignites a desire in them to do much more in-depth study of China, its culture, economy, and its people. The international experience has additional effects on students' choices of international topics for future research. This is reflected in their capstone experience and often results in collaborative faculty-student research activities. Finally, the products of the research are often presented at a university colloquium, competitions, and national conferences.

This model is not limited to economics and business students only. Engaging students in research via short-term study abroad would benefit students in other disciplines because such an international experience would enhance the students' understanding of research and broaden their intellectual horizons. Although Hansen's proficiencies target specifically economics majors, they can be applied to other social sciences and humanities disciplines. A FLSTSA program offers students and faculty with similar interests in any discipline an opportunity to work together on a research project. Faculty can also build on their own international research interests, connections, and projects to develop opportunities for their students. Working closely with a professor while gaining hands-on experience allows students to gain more knowledge and a deeper appreciation for their chosen academic field, as well as strengthen their research, critical thinking, and analytical and writing skills.

This study has some limitations. One problem is a selection bias: students who enrolled in the study abroad program to China may have had a pre-existing interest in international issues, so they could have engaged in global-oriented research in spite of our program. Another area for improvement is the assessment methods to assess the practical learning outcomes and improved quality of the students' research. The findings of this study can be expanded by follow up studies and interviews with students on the impact of the faculty-led international course on research/learning outcomes. Future research on the focus of this study should also address the comparative impact of the FLSTSA experience on the undergraduate research involvement vs. other types of experiences, such as internships, service learning, capstone experiences, and other domestic programs that can create opportunities to enhance students' research skills.

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## A Workbook for Scaffolding Mentored Undergraduate Research Experiences in the Social and Behavioral Sciences

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Research mentors strive to ensure that undergraduates gain research skills and develop professionally during mentored research experiences in the sciences. We created the SURE (Specialized Undergraduate Research Experience) Workbook, a freely-available, interactive guide to scaffold student learning during this process. The Workbook: (1) identifies mentees' relevant strengths and areas for improvement, (2) encourages effective long-term goal setting, (3) ensures clear communication to facilitate a positive mentor-mentee working relationship, (4) exposes mentees to all phases of the research process, (5) develops mentees' autonomy for research and related professional experiences, and (6) offers mentors a concrete assessment tool to evaluate student participation and development over the course of the research experience. Hands-on research experiences can be invaluable and transformative in undergraduates' professional development, and we predict that the additional structure and standardization provided by the SURE Workbook will help maximize student learning and performance during such experiences. Thinking ahead, mentees who cultivate positive attitudes about research by using the SURE Workbook may be more inclined to pursue research professions and effectively mentor others when they graduate.

Daphne was thrilled to begin her junior year as a research assistant. Unfortunately, her faculty mentor's frequent traveling made him unavailable to mentor her, and he assigned Daphne to work with one of his graduate students. Daphne came into the lab each week and completed her assigned tasks, but she rarely saw the graduate student or the faculty mentor, except at weekly lab meetings. Consequently, she failed to develop any new skills or ideas and felt discouraged that she was used for the tedious lab tasks nobody else wanted to do. At the end of the semester she decided research was not for her and took a different path.

Daphne's friend, Allison, was equally excited to begin a mentored research experience. Allison's semester was quite unlike Daphne's. Her mentor met with her regularly one-on-one and gave her opportunities to learn about various phases of the research process. Allison, like Daphne, worked hard to complete each task, but she was always aware of the long-term study goals. In doing so, she developed many useful skills and was inspired to apply to graduate school to continue doing research.

Although these specific stories are fiction, many undergraduates report similar positive and negative experiences (e.g., Linn, Palmer, Baranger, Gerard, & Stone, 2015). One of the most important factors in undergraduate student development is the nature and quality of students' interactions with faculty beyond the classroom (Astin, 1993). In the social and behavioral sciences, hands-on research experience outside of the classroom (i.e., not part of a research methods or other course)—either in an experimental laboratory or in the field—is vital for preparing students for graduate school or other professional endeavors. The National Science Foundation reports that such experiences are “one of the most powerful of instructional tools” (NSF,

1996, p. 6). Collaborations between students and faculty have even been described as the “pedagogy for the twenty-first century” (e.g., Dotterer, 2002, p. 81).

In the present paper, we highlight why undergraduate research participation is important, including the benefits to undergraduates and their mentors, and how we as mentors can increase the likelihood that undergraduates have a positive and well-rounded research experience. We then present a learning tool we developed to address some of the common challenges faced by mentees and mentors in the behavioral and social sciences: the SURE (Specialized Undergraduate Research Experience) Workbook, available in the Supplementary Materials. This interactive guide scaffolds learning in the seven major phases of the research cycle (i.e., beginning with the literature review and ending with dissemination of findings and professional development), and it is intended to be used by mentors as a structured assessment technique for undergraduate researchers.

### **The Benefits and Popularity of Mentored Research Experience**

Undergraduates benefit from hands-on research experience (e.g., McConnell, Albert, & Marton, 2008). Likewise, research mentors—whether they are faculty, post-doctorates or graduate students—benefit from having undergraduate research collaborators. In theory, undergraduate science majors should develop an understanding of the research process and have an opportunity to explore a research area to see if it is one in which they wish to pursue a career. Such research experiences transform students into self-learners (Wolfe, Reynolds, & Krantz, 2002). Through hands-on research, students experience a higher level of engagement



compared to traditional lecture-based instruction (Elmes, 2002), and a higher level of engagement has been demonstrated to improve student learning (Bluestone, 2007). Participating in mentored research experiences engages students in experiential learning (Benson & Blackman, 2003; Bluestone, 2007; Longmore, Dunn, & Jarboe, 1996) and has been shown to increase students' self-reported interest in applying to graduate or professional programs (e.g., Eagan et al., 2013).

Additionally, there are practical benefits to undergraduate research. For example, during mentored research experiences, students develop technical and interpersonal skills, such as analytic, logic, synthesis, writing, speaking, and reading skills (Wolfe et al., 2002), as well as independent learning skills (Ishiyama, 2002; Kardash, 2000; Landrum & Nelsen, 2002). These foundational skills are transferrable across disciplines and beyond the classroom. Research experiences also increase students' marketability for graduate programs and employment (American Psychological Association, 2007; Elmes, 2002; Kierniesky, 2005). Beyond these practical benefits, collaborative research experiences improve students' academic achievement, interpersonal interactions, and self-esteem (Prince, 2004). Thus, it is not surprising that students view research experiences positively (Chapdelaine & Chapman, 1999; Gibson, Kahn, & Mathie, 1996; Landrum & Nelsen, 2002). In fact, graduating seniors often advise first-year students to get involved in research (Norcross, Slotterback, & Krebs, 2001).

Given the benefits of participating in research experiences, one might expect (and hope) all students participate in at least one mentored research experience during their undergraduate careers. Indeed, undergraduate students commonly participate in research, most often toward the end of their undergraduate careers; however, the nature and number of opportunities for undergraduate research varies greatly across institutions. One study found that out of 3,200 students surveyed in SBES disciplines (social, behavioral, economic sciences), about half participated in undergraduate research experiences (Russell, Hancock, & McCullough, 2007). For contrast, in the field of psychology, most departments in four-year institutions *require* undergraduates to participate in at least one course-based laboratory or structured research experience, and between one-third to half of all psychology departments require an individual research project (e.g., Cooney & Griffith, 1994; Terry, 1996).

### **The Development of the SURE Workbook**

#### **Purpose and Objectives**

We have been involved in undergraduate research experiences as mentees and as mentors at both teaching-focused and research-focused institutions. We

have worked with dozens of undergraduate students in five laboratories with 20 years of combined mentoring experience. Such experiences include supervising students on independent and honors thesis projects, supporting student conference presentations, and publishing work with undergraduates at conferences and in refereed journals. Based on our personal experiences, as well as a careful examination of Linn and colleagues' (2015) review of effective mentoring, we identified the following six goals as crucial for a mutually beneficial experience for both mentors and mentees: (1) identify mentees' relevant strengths and areas for improvement (e.g., scientific writing, using library resources), (2) encourage long-term goal setting (e.g., improve time management skills, become familiar with a new statistical method or software program), (3) establish clear communication to facilitate a positive mentor-mentee working relationship, (4) expose mentees to all phases of the research process, (5) develop mentees' autonomy for research and related professional experiences, and (6) offer mentors a concrete assessment tool to evaluate student participation and development over the course of the research experience.

In an effort to improve and structure undergraduate research experiences, we kept the above objectives in mind and created the SURE Workbook assessment tool (see Table 1 for the SURE Workbook table of contents; see Supplemental Materials for a full copy of the Workbook). Along with ensuring at least three one-on-one meetings per semester between mentors and mentees (i.e., preliminary, mid-semester, and final), the SURE Workbook was designed to scaffold learning in the six major phases of the research process: conducting a review of relevant literature, following ethical research guidelines, identifying the design and methodology for the project, analyzing data, discussing implications of the findings, and developing professionally (see Figure 1 for sample page). We designed the Workbook to be flexible for any science mentor and undergraduate researcher, including students joining a project at different stages of completion or taking on a small or large number of roles within a project. Regardless of the research stage or the mentee's role, the Workbook is designed to make mentees mindful of the entire research process by asking them to become familiar with the project's topic and research design.

We intend for mentors to also benefit from using the SURE Workbook with their mentees. First and foremost, the Workbook fosters communication by providing mentors with discussion points to strengthen the mentor-mentee working relationship. In addition, the Workbook ensures that mentees are knowledgeable of the project as a whole. Knowing more about the project is likely to enhance the mentee's feelings of ownership, which should increase mentees' effort and

Table 1  
*SURE Workbook Table of Contents*

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1. <b>Preface</b>	
2. <b>Student Self-Assessment of Current Knowledge and Mentoring Style</b>	
a. Report knowledge, skills, and comfort levels on various aspects of the research process	
b. Determine preferred mentoring style and mentee work ethic	
3. <b>Early Semester Meeting with Research Mentor</b>	
a. Establish expectations of student and research mentor	
b. Set realistic goals and a timeline for the semester	
c. Optional contract between mentor and mentee	
4. <b>Mid-Semester Meeting with Research Mentor</b>	
a. Reevaluate goals, set new goals	
b. Talking points to discuss student's experiences	
5. <b>Final Meeting with Research Mentor</b>	
a. Reassess original goals and timeline, discuss accomplishments	
b. Student and mentor share constructive feedback	
c. Identify and discuss student's future goals	
6. <b>The Research Process</b>	
a. Literature review	
b. Research ethics	
c. Methodology	
d. Analyses	
e. Discussion	
f. Professional development	
7. <b>Suggested Resources for Students and Mentors</b>	
a. Recommended readings and websites for students	
b. Recommended readings and websites for mentors	
8. <b>Answers to Self-Assessment Questions</b>	
9. <b>Appendix</b>	

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attention to detail (Todd, Bannister, & Clegg, 2004). We assert that the difference between a research "assistant" and a "collaborator" is the level of investment. Whether mentees are entering into an established research program, or developing independent projects, the SURE Workbook allows mentees to become research collaborators by fostering a global understanding of the research process with respect to the project on which they are working. Once completed, the Workbook is also a written record of a student's contributions over the term. Thus, mentors can assign sections as a form of assessment if a letter grade is to be assigned to the experience, and use the contents of the completed Workbook to enhance letters of recommendation, if requested.

### **Uniqueness of the Workbook**

The name *SURE* was chosen to reflect our goals for the Workbook. It is *Specialized* to each student's needs. The Workbook begins with a self-assessment of students' research skills and personal work ethics. The questions are designed for a psychology student, but the downloadable Word

Document can easily be modified for other disciplines. From the results of the self-assessment, the mentor-mentee team can work to create short- and long-term goals for the experience and beyond. As described earlier, the Workbook is flexible in that it can be used at various phases of the project, from its inception and design, to its final publication. Further, students can describe their specific roles in the project and track progress towards their learning goals throughout the experience.

Next, the SURE Workbook aims to help *Undergraduate* researchers who are interested in improving their research skills through hands-on mentored research experience. To this end, we provide a professional development section with tips for applying to graduate school and jobs in order to aid in the transition to post-graduation life (see Figure 2). We intend for the Workbook to be a useful resource for students beyond the research project.

The *Research* and *Experience* components of the *SURE* title are self-evident. The overarching purpose of the SURE Workbook is to expose students to the major phases of the research process while aiding in the

Figure 1

Excerpt from SURE Workbook Analyses section. The section asks mentees to first consider how raw data will be organized, what statistical software will be used, details of hypothesis testing, and effect size. The section ends by asking mentees to sketch an appropriate figure representing the results of one of their statistical tests.

The Research Process – Analyses

Using the sample below as a guide, fill in the chart to organize the statistic(s) for each research prediction. Provide as much detail as possible. Continue on another sheet of paper if needed.

Research Prediction	Analyze Data with Descriptive Statistics?	Analyze Data with Inferential Statistics?	Why?
Mean scores for Group A will be higher than for B and C on the task.	Yes- Mean, median, mode, range, standard error, standard deviation	Yes- One-way ANOVA	Three levels of the independent variable; analyzing means.

**Writing Exercise.** Practice reporting some of your results in APA format. Consult the APA Publication Manual, 6<sup>th</sup> Ed. wherever needed. Remember, to clearly communicate what you found, include (1) the statistical test used, (2) the result of the test in words, (3) the result of the test in numbers, and (4) a measure of effect size. For example:

“A one-way ANOVA showed that mean scores on the spatial cognition task were significantly different across Groups A, B, and C,  $F(2, 49) = 5.77, p = .002, \eta^2 = .53$ .”

**Keywords in Writing Results**

The best way to become a clear mechanical writer is practice! Here are a few tips that we have picked up:

- ✓ A statistic with a  $p$ -value that is above the critical value is not “insignificant” because it is still telling you something important! However, it is written as “statistically non-significant.”
- ✓ Hypotheses are never “proven,” “true,” or “wrong.” They are either “supported” or “not supported” by your data.
- ✓ When a  $p$ -value hovers around significance (e.g.,  $p = .06$ , if the critical value is .05), it is fair to say that there is a “trend” in the direction you predicted, but it is still statistically non-significant. This is often a good time to think about possible Type II error!
- ✓ In the Results, “data” is followed by a plural verb, as in, “The data were collected in a lab-setting.”

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development of a fulfilling working relationship with a faculty, post-doctorate, or graduate student mentor. In addition, the Workbook is a testament to the mentee’s hard work and visible progress, which otherwise may be overlooked or forgotten in a busy

laboratory setting. Finally, and perhaps most critically, the SURE Workbook is a method of assessing learning outcomes and ensuring achievement of the six goals of research mentoring, which we outlined above.

Figure 2

Excerpt from SURE Workbook Professional Development section. The section includes information on résumé/CV updating, tips for writing a personal statement, etiquette in requesting letters of reference, and avenues for communicating research findings.

**The Research Process – Professional Development**

- ✓ Identify important characteristics of individuals in your field (e.g., leadership, creativity, critical thinking), and how you embody those characteristics.
- ✓ Discuss career and long-term goals. Show that you are thinking for the future and how acceptance into their program will help you reach those goals.
- ✓ Include a hook-line in the beginning to draw your reader in and make admissions committees remember you and want to keep reading about you.
- ✓ Be original in your thoughts and how you portray yourself.
- ✓ Proofread for grammar and spelling errors!
- ✓ Weave in examples to show that you are aware of the research being done in your field (or by the major professor or specific employer with whom you would like to work).

**Requesting Reference Letters.** Requesting letters of reference can be a sensitive subject even if you feel comfortable with your research mentors. We recommend that you follow three steps to ask your mentors if they are willing to write you strong reference letters.

**Step 1:** Prepare your CV/résumé, as well as detailed descriptions of your relevant lab and class experiences with your mentors. This Workbook is a great place to start for ideas. Also, if you worked closely with graduate students, ask them to write a brief, informal reference letter.

**Step 2:** Set up individual meetings with your mentors. During the meeting, describe your application plan. Provide your mentors with your prepared materials (described in Step 1). Ask them to email you if they feel they could write you strong letters of reference. Ask your mentors, "Can you write me strong recommendation letters or would it be better if I asked someone else?" This gives your mentors an "out" if they do not feel able. Also, be sure to mention that you will provide them with additional materials for writing your reference letters—such as instructions and envelopes (described in Step 3)—if they agree.

**Step 3:** If your mentor agrees to write, the following are *crucial* to making the process go smoothly:

- Remember your mentor is taking time to do you a favor, so convey your appreciation
- Allow your mentor ample time to write. A good rule of thumb is *at least 4-6 weeks*.
- Create a personalized spreadsheet for your mentor. For each application that requires a letter, include: 1) specific reference instructions so that your mentor knows which areas (e.g., your research ability, leadership qualities, character) to focus on when writing, name of the school, name of the program, name of particular individuals with whom you'd like to work, 2) clear submission deadline dates, 3) the method of submission (e.g., specific website, through email) and the mailing or web add, and 4) notes about anything specific you would like your letter-writer to say in his/her letter about you..
- The cleaner your application folder, the happier your mentor will be. Happy mentors write happy letters!

**Trouble Shooting**

*What if my mentor won't write me a letter of recommendation?*

- Do not take it personally! Your mentor may have too much going on to commit to writing for you.
- No matter how curious you are, asking your mentor for the reason he or she refused is unprofessional.
- Reflect on potential reasons for the refusal. Did your mentor not know you well enough? Did you do the bare-minimum work? Did you not seem interested or invested in your project?

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### Addressing Undergraduate Researchers' Challenges

Although research opportunities for undergraduates are common and many students have positive experiences, negative experiences are not uncommon (Linn et al., 2015). We, too, observed this following an anonymous survey at a highest research-focused doctoral institution (see Appendix). We developed this

survey to obtain information about graduate students' histories conducting research as undergraduates. We primarily focused on their perceptions of their research experiences, the quality of their research training and contact with mentors, and anecdotes that captured their experiences. After obtaining approval from the institutional review board, we surveyed 24 graduate students who participated in research experiences as

undergraduates. The survey was administered online. Students described their home institutions as baccalaureate liberal arts institutions (31%), higher research activity doctoral institutions (4%), and highest research activity doctoral institutions (65%). They also reported their undergraduate institutions considered research to be “not important” (4%), “slightly important” (12%), “important” (23%), “very important” (15%), and “extremely important” (46%). These data suggest a range of mentoring quality, campus cultures/values, and research experiences.

Respondents described their overall research experience as “neutral” (13%), “positive” (29%), or “very positive” (58%), with no participants reporting a “very negative” or “negative” experience. A variety of positive emotions and feelings were noted (e.g., excited, challenged, prepared for graduate school, appreciated, important). Further, only one respondent described their experience as “not significant” to their academic development. Despite mostly positive perceptions, 67% of respondents reported at least one negative emotion or feeling (e.g., overworked, neglected, abused, disappointed) associated with their time as an undergraduate researcher.

Six themes emerged from the negative emotions and feelings that were reported. We used these themes to further enhance the Workbook. In the next section, we review the negative experience themes our student participants reported and briefly describe how the SURE Workbook addresses the challenges perceived by undergraduate researchers.

### **Lack of Time or Resources**

The relationship between undergraduates and their research mentors is time-bound and therefore requires that mentors prioritize their time to work with their mentees (Anderson & Shore, 2008). Additionally, mentors must use caution not to take on too many mentees, as mentors must be willing to devote a substantial amount of time and resources (e.g., access to computers, research equipment) to each mentee. Given Behar-Horenstein, Roberts, and Dix’s (2010) recent findings that mentees can feel neglected and shuttled off to unofficial mentors in the lab (e.g., mentor’s graduate students), accountability for the mentor would be beneficial. The SURE Workbook is designed to preemptively address issues of accountability. It reassures undergraduates that they will meet with their faculty mentor at least three times during the semester to discuss their projects and to set and evaluate feasible goals for the experience. In addition, the optional mentor-mentee contract establishes meeting frequencies at the beginning of the term so that both mentor and mentee can agree on the commitment (see Figure 3).

### **Inadequate Support**

An effective mentored research experience requires guidance (i.e., structured support, scaffolding of learning), but this amount may vary with the developmental level of the mentee, the complexity of the tasks, and the goals of both the mentor and mentee. Consequently, the supervision style utilized by the mentor may either be too much (e.g., micromanaging) or not enough (e.g., mentor traveling and unavailable for regular meetings). To complicate matters, young adults are often unaware of the amount of guidance they require or may feel uncomfortable asking for additional support from mentors. In the Workbook’s provided self-assessment, the mentor and mentee will get a sense of the mentee’s entering research knowledge and skills. This should help the mentor tailor tasks and responsibilities to the student’s intellectual level and motivation. Also, during the first meeting, the SURE Workbook asks mentors and mentees to reflect on and discuss issues such as work ethic and expectations for the term. This represents another way the Workbook serves as a communication facilitator, effectively building a positive rapport between mentor and mentee.

### **Misunderstanding**

Disappointments and disagreements often result from failures to communicate expectations (Young & Perrewé, 2000). Mentors and mentees must explicitly share their thoughts at the beginning and throughout the term. Mentors need to listen to mentees and be sensitive to both verbal and nonverbal communication, especially signs of frustration or distress. As explained above, one of the defining features of the SURE Workbook is the emphasis on communication and accountability. Through the provided discussion points, structured meetings, reflective self-assessment, commitment contract, and goal setting, the mentor-mentee partnership is enhanced by the Workbook’s communication-building exercises.

### **Intellectual Contributions and Authorship**

To better engage undergraduates in the research process, mentors should give mentees some freedom to define and guide their research experiences. The SURE Workbook is designed to facilitate these discussions during the first mentor-mentee meeting. Encouragement, incorporation, and acknowledgement of mentees’ ideas are three important steps towards making mentees feel valued. If mentees’ contributions are significant, some discipline-specific organizations like the APA state that undergraduates should be given authorship. This authorship may take the form of publishing in an undergraduate journal (e.g., *Psi Chi*

Figure 3  
Optional SURE Workbook mentor-mentee contract to be filled out during initial meeting.

Mentor-Mentee Contract

**Mentor and Mentee Contract**

*"Better than a thousand days of diligent study is one day with a great teacher."*  
— Japanese Proverb

**We agree to the following terms for our mentor/mentee relationship:**

Duration of mentorship: \_\_\_\_\_

Anticipated duration of project: \_\_\_\_\_

Frequency and type of meetings (e.g., lab meeting, one-on-one): \_\_\_\_\_

\_\_\_\_\_

Preferred modes of communication (e.g., phone, email): \_\_\_\_\_

Number of hours per week mentee should spend working on project: \_\_\_\_\_

Major goals of mentee and mentor: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Mentee Printed Name and Signature	Date
Mentor Printed Name and Signature	Date

20

*Journal of Psychological Research*), presenting at conferences, or publishing in peer-reviewed journals. Although undergraduates can earn authorship, some mentors vary in their willingness to include undergraduates as co-authors (Fine & Kurdek, 1993). The Workbook's initial self-assessment addresses research ethics, including authorship conflicts, to educate mentees. We agree with others (e.g., Fisher,

2003) that authorship conflicts often occur because of inadequate communication at the start and periodically throughout a project regarding the merits of authorship, expectations, and agreement on how the work shall be divided. The Workbook ensures both the mentor and mentee share and track their goals for the term, minimizing the potential for such conflicts.

### **Depth of Experience: Balancing Productivity and Learning**

Mentors are described as being both “talent scouts” and “gatekeepers,” according to Anderson and Shore (2008). That is, mentors seek out mentees with exceptional skills and strengths, and they match mentees’ strengths to appropriate research tasks. At the same time, mentors can selectively exclude certain mentees from becoming involved in various research assignments if mentees are perceived as not being worthy of the investment. Thus, mentors are in a position of authority over mentees and may—perhaps without awareness—use this power to exploit them (Blevins-Knabe, 1992; Green & Bauer, 1995). Undergraduate mentees, compared to graduate students, may be less capable of recognizing and advocating for themselves when confronted with situations in which they may be taken advantage of (Anderson & Shore, 2008). For example, a mentor may ask a mentee to do tasks outside of the scope of the project, or academics in general, which would clearly be inappropriate (e.g., babysitting the mentor’s children). In addition, mentors may fail to integrate undergraduates into the entire research process (e.g., understanding of the background literature, theoretical motivation). In part, the cause of such problems may be that the primary goal of undergraduate research for some mentors is productivity (Kierniesky, 2005). This narrow focus can be highly detrimental to the quality of a student’s experience. Mentors must be constantly mindful of this potential conflict of interest. The SURE Workbook helps by making the student’s learning explicit and visible throughout the research process, while also encouraging the student to communicate any concerns they might have.

### **Organized Assessment for Mentored Research Experiences**

Departments need to better integrate undergraduate students into ongoing research (Wayment & Dickson, 2008), and we think students’ research experiences need more oversight, evaluation, and structure (i.e., organized support, scaffolding for learning). In some research settings, the only requirements are that the work must be educational, and/or that students must work for a certain number of hours per week for each credit hour earned. Such requirements allow for great flexibility which, in some cases, may be useful, but which can also increase the possibility that a student might not benefit in the specific ways they expected going into the experience. Further, students may receive only vague feedback (e.g., satisfactory/unsatisfactory grade) lacking a structured assessment with personalized and constructive feedback. For students

who are designing and conducting independent studies, assessment may come in the form of a written research report. However, for students who are assisting with a project that is already in progress, assessment can be more difficult. Mentors who use the SURE Workbook have a standard assessment that can be used to assign a letter or satisfactory/unsatisfactory grade. At the end of the semester, mentees can turn in their Workbook for review and mentors can evaluate the extent to which the student has progressed through the stages of the research process with respect to the project.

Many programs and departments assume that mentors are focused on students’ learning (Kardash, 2000). While exceptionally skilled mentors exist and achieve great success in navigating undergraduates through the research process, other mentor-mentee pairs may benefit from an assessment tool for guidance and standardization for both the mentee and mentor. For this reason, department heads or undergraduate coordinators may wish to implement the SURE Workbook for all undergraduate researchers as a preventative measure against “absentee mentors.” Also, as we mentioned, there can be issues with communication between mentors and mentees when either party fails to discuss expectations of the other, or expectations of the research experience itself. Our tool may also prove to be a useful resource for research mentoring programs for graduate students to learn about the expectations for effective mentoring (e.g., Loyola University Chicago’s Research Mentoring Program, Horowitz & Christopher, 2013). Time management tips, a goal-setting section, and a midterm progress report are all provided in the Workbook, and regular one-on-one meetings between mentors and mentees are encouraged.

### **Conclusions and Future Directions**

Recent papers, such as Linn and colleagues’ (2015) meta-analysis, highlight the need for a standardized measure for assessing the quality of undergraduate research experiences. We think that the SURE Workbook holds promise for accomplishing this goal. The Workbook allows for pre- and post-testing of students’ skills in self-identified areas for improvement, encourages open communication regarding expectations, involvement, and tailored goal-setting for the experience, and, when completed, can stand alone (or accompany a lab notebook) as a testament to the student’s development over time. While devising a tool to facilitate these outcomes is our goal, some assert that there is insufficient research on what actually makes a mentoring program effective (e.g., Gershenfeld, 2014)—indicating the need to formally test the SURE Workbook’s effectiveness.

We are interested in exploring the extent to which the SURE Workbook may influence mentors' and mentees' research experiences across different types of institutions, including teaching-focused and research-focused schools. In addition, we think it is important to assess how this tool affects mentees at various points in their undergraduate degree (i.e., new freshman through experienced senior). As we continue to use and refine the Workbook, we also hope to learn more about the Workbook's ability to enhance learning and communication for extrinsically (e.g., participating for course credit) versus intrinsically (e.g., optional independent study) motivated students. Finally, we are interested in obtaining mentors' perceptions of the Workbook, and how the Workbook changes their mentoring experience and research productivity.

As mentors, it is our responsibility—and also our privilege—to engage in mutually-beneficial research collaborations with undergraduates. Without undergraduate researchers and assistants, many research programs would simply not be possible. Rather than treat undergraduates as an exploitable resource, mentors should strive to ensure students are achieving valuable learning outcomes from these experiences. Given our careful consideration of goals for undergraduate research experiences, as well as perceived challenges these students face, we predict that the SURE Workbook will serve as a user-friendly experiential learning tool for scaffolding learning and, ultimately, for improving the overall quality of research.

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#### Acknowledgements

Special thanks to members of the University of Georgia's Psychology Educator Development Association for feedback on earlier drafts of the SURE Workbook.

## Appendix

## Graduate Student Survey

**1. What type of undergraduate institution best describes the one you attended? (If you attended more than one, pick the one you attended the longest.)**

- A) Liberal arts college/university
- B) R1 (public or private)
- C) R2 (public or private)
- D) Community college

**2. How important was research at this institution?**

- A) Not important
- B) Slightly important
- C) Important
- D) Very important
- E) Extremely important

**3. Were you involved in research, outside of class (e.g., PSYC 4800), as an undergraduate at this institution? If you answer "no" you may submit the survey now.**

- A) Yes
- B) No

**4. Select your most memorable research experience (e.g., PSYC 4800) at this institution. How would you rate it?**

- A) Very negative
- B) Negative
- C) Neutral
- D) Positive
- E) Very positive

**5. How much contact did you have with the faculty supervisor (i.e., the person who gave your grade), specifically for this research experience?**

- A) Multiple times per week
- B) Once per week
- C) Once per month
- D) Once per semester
- E) Never

**6. How would you rate your faculty supervisor's contribution to your academic development (e.g., research skills) for this research experience?**

- A) Not significant
- B) Slightly significant
- C) Significant
- D) Very significant
- E) Extremely significant

**7. Check all of the following adjectives which describe how you felt during this research experience.**

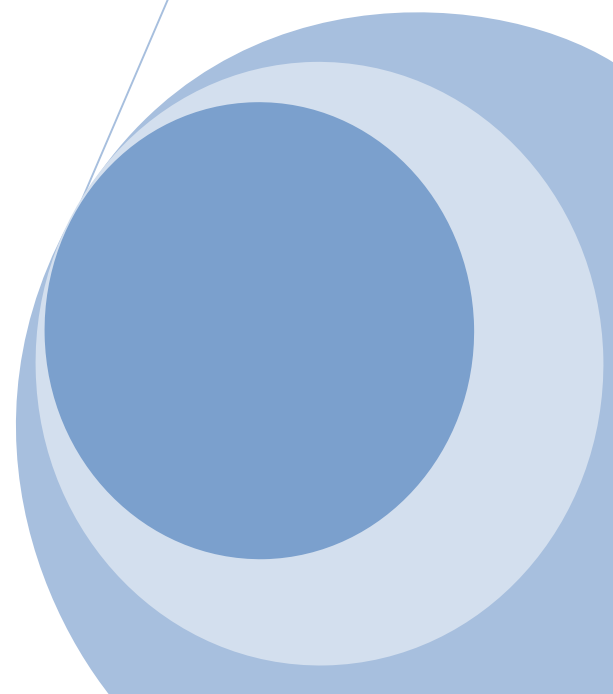
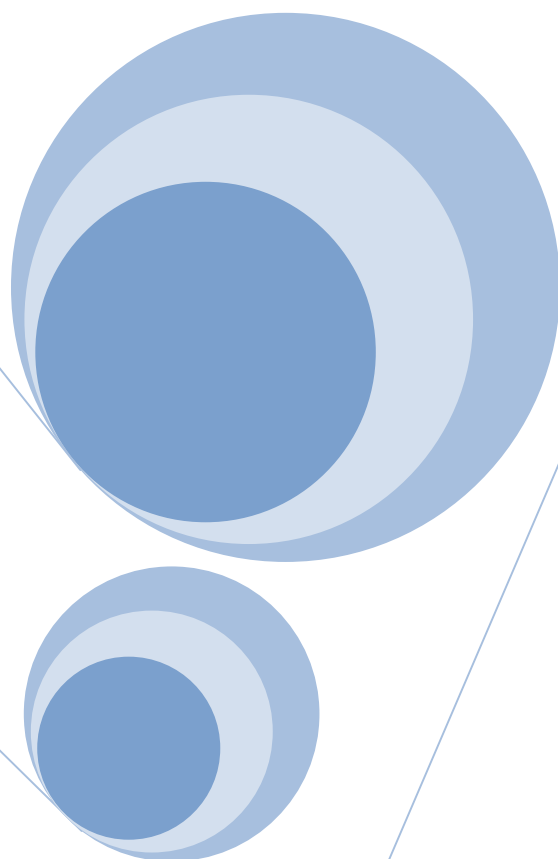
Disrespected	Neutral	Overworked
Disappointed	Neglected	Heard
Sad	Abused	Ignored
Excited	Happy	Overwhelmed
Bored	Appreciated	Respected
Enriched	Valued	Clueless
Challenged	Supported	Confused
Unprepared for graduate school	Contributory	
	Involved	
Prepared for graduate school	Important	
	Equal	

- 8. Of those that you selected above, which 5 adjectives did you feel the most frequently during this research experience?**
  
- 9. Optional: Please use this space to share additional information about the research experience above, such as: "I worked primarily with graduate students," "My supervisor was my friend, but not a good resource," or "I still keep in touch with my undergraduate supervisor."**

# **The Specialized Undergraduate Research Experience (SURE) Workbook**

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## **The SURE Workbook**

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### Preface

Whether they go on to graduate school or straight into careers, undergraduates benefit from having hands-on research experience. Likewise, primary investigators (PIs) benefit from having undergraduate researchers to assist them at all levels of the research process. It is the joint responsibility of the mentor and student to ensure a mutually positive experience. Both individuals need some assessment tool to track research progress and learning.

At our graduate alma mater, the University of Georgia, the purpose of an undergraduate research experience is “to give psychology majors the opportunity to learn research by doing it. This means becoming familiar with the relevant research literature, understanding and formulating hypotheses, participating in the design of experiments, collecting and analyzing data, and writing reviews and reports.” While this allows for much flexibility among labs, it also increases the risk that a student might not benefit in ways he or she expected.

Our diverse research experiences have given us unique insights into the positives and negatives of undergraduate research. As undergraduates, we participated in research experiences at R1 (high research-focused doctoral) and liberal arts schools. As senior graduate students, we worked with dozens of undergraduate students in four different laboratories. Today, we are now Assistant Professors of Psychology, at a liberal arts university (ECW) and at an R1 university (EAS). Based on these experiences, we see the following goals as crucial to a mutually beneficial experience for both mentor and student\*:

- Enhancing student learning through interactive research experience
- Identifying the mentee’s relevant strengths and weaknesses
- Encouraging long-term goal setting throughout the experience
- Improving communication to facilitate a positive student-mentor working relationship
- Ensuring exposure to all components of the research process
- Developing research autonomy on the part of the student

In an effort to improve and structure undergraduate research experiences, we created the SURE (Specialized Undergraduate Research Experience) Workbook. This interactive guide outlines the research process, beginning with the first meeting between research mentor and student, and culminating in the identification of professional development goals for the future.

**To the Mentor:** Your role is to guide your students as they independently tailor their research experience. By encouraging your students to use this workbook, they will become more proactive in their learning and therefore more invested in the project(s). An invested student is no longer an assistant, but a collaborator.

**To the Student:** Your role is to use the Workbook to become aware of your strengths and areas for improvement, and to communicate your expectations to your mentor. Throughout the Workbook you will be encouraged to discuss aspects of your project with your research mentor(s) who can be faculty, post-docs, graduate students, or more experienced undergraduates. In other words, do not feel like you are limited to only discussing your project with your assigned mentor. Regardless of your previous research experience, we hope you will find the SURE Workbook helpful in producing quality research and tailoring your learning about the research process.

Finally, we welcome your constructive feedback about the SURE Workbook. If you would like to be kept up-to-date on newer versions, as they are released, please email us.

Dr. Erin Colbert-White (ecolbertwhite@pugetsound.edu)  
Dr. Elizabeth Simpson (simpsons@miami.edu)



\*APA Guidelines for the undergraduate psychology major. <http://www.apa.org/ed/precollege/psn/2014/09/career-counselor.aspx>

## Student Self-Assessment of Current Knowledge and Mentoring Style

Before you set goals for the semester, and even before you meet with your research adviser at your first meeting, it is important to assess your entering knowledge about the research process, as well as your overall preferred mentoring style. This self-assessment contains two parts. The first part is designed to make you aware of the foundational concepts of research methods and data analysis. The second part asks you to self-reflect upon characteristics important to the mentoring experience. If you respond honestly—as opposed to using google or responding how you think an ideal mentee would—both you and your mentor will gain the most from the assessment. Bringing to light your research skills and your “working self” will allow you to better set your goals and determine which skills are the most important for you to develop during the semester.

Aim to complete the self-assessment within one hour. Your mentor will not grade it. Keep in mind, the research methods and analysis part will be further developed during the course of the semester as you work your way through the SURE Workbook, so do not worry if you do not recognize some of the material. The self-assessment answers are on Page 47.

### PART I: THE RESEARCH PROCESS AND PROFESSIONAL DEVELOPMENT

#### A) Literature Review

**1. Rate your level of confidence on each of the following skills associated with reviewing the literature. Use a scale from 1 (strongly disagree) to 5 (strongly agree). Skills that you have little to no experience with may be good places to start when filling out the long-term goals section which begins on Page 6.**

- Determining the difference between scholarly and non-scholarly sources
- Searching for journal articles using Google Scholar or other Library databases (e.g., JSTOR, PsycINFO)
- Searching for print versions of journal articles at your institution’s library
- Retrieving out of print or inaccessible articles using Interlibrary Loan
- Citing sources in 6<sup>th</sup> edition APA style

**2. Rank the following according to their reliability as scholarly sources:**

- |   |                                   |
|---|-----------------------------------|
| a) Peer-reviewed book chapters                  | d) Peer-reviewed journal articles |
| b) Magazines such as <i>Scientific American</i> | e) Newspaper articles             |
| c) Books written by Ph.D.s                      | f) Theses and dissertations       |

**3. Identify the errors in this 6<sup>th</sup> edition APA journal article citation:**

Colbert-White, E. N., and Simpson, E. A. (2010). “Self-Assessment of Undergraduate Research Knowledge.” *Journal of Self-Assessment*, vol. 3(2), 13-16.

#### B) Research Ethics

**1. Rate your level of confidence with skills associated with research ethics. Use a scale from 1 (strongly disagree) to 5 (strongly agree).**

- Determining whether a research procedure is unethical for participants/subjects
- How to fill out an IRB or IACUC form
- The review process for research proposals
- Avoiding plagiarism of ideas

**2. Decide whether each scenario qualifies as research dishonesty.**

- a) Sarah does not submit an IRB form because she will never interact with her participants. She is observing window-shopping behavior in a local shopping mall.
- b) Chantel opens her research subject pool to everyone in town. When one man arrives, Chantel can easily tell that his native language is not English. Chantel provides him with a consent form which he signs, and he is allowed to participate.
- c) Brian is an undergraduate working in a lab where he developed a research project, carried it out, analyzed the data, and wrote it up. His academic adviser later publishes the work and Brian is not an author on the publication.

**C) Methodology**

**Read the scenario and answer the True/False questions that follow. If the statement is false, correct it in the space provided.**

Darrell designed an experiment to test his research hypothesis that women are more sensitive to shades of colors than men due to women's evolutionary history as "gatherers" in ancestral societies (where choosing the wrong color fruit could have been lethal), while color sensitivity would not have been as important for "hunter" males. To test his hypothesis, Darrell shows male and female college students 20 different color swatches and asks them to verbally provide a color name for what they see. His hope is that women will show more variations for a particular color (e.g., "chartreuse" or "vermillion" for the green color swatch) than men will. If so, Darrell says it would indicate that women are more sensitive to color variations than men.

1. Darrell's experiment design is between-subjects.
2. The null hypothesis in Darrell's experiment is that males and females will report the same number of color variations.
3. Darrell has two independent variables: gender (two levels) and color swatch (20 levels).
4. The dependent variable is the total number of color variations given by the two genders.
5. The design of Darrell's study is a true experiment because he is manipulating variables.
6. Experimenter bias could be a potential problem in Darrell's study.
7. Color-blindness and education levels are extraneous variables in this study.
8. Darrell's study has high internal validity because if women are more sensitive to colors then they should be able to readily produce different names for them.

**D) Analyses**

**Rate your level of confidence with skills associated with analyzing data. Use a scale from 1 (strongly disagree) to 5 (strongly agree). Skills that you have little to no experience with may be good places to start when filling out the long-term goals section which begins on Page 6.**

- Entering data into a spreadsheet
- Using Microsoft Excel functions and shortcuts
- Creating tables and graphs in Microsoft Excel
- Working with a statistical software package (e.g., R, SAS, SPSS, Minitab, SigmaPlot)
- Deciding whether data requires parametric vs. non-parametric statistical tests
- Concept of the  $p$ -value (i.e., alpha value, critical value)
- When to use  $t$ -tests
- When to use ANOVAs
- When to use regression analysis
- Writing results quantitatively and qualitatively

#### E) Discussion

**Consider Darrell's experiment described earlier in the Methodology section of this self-assessment. Read the continuation of his study and answer the questions that follow.**

Darrell collected his data and found that for the 20 different color swatches, women used a total of 54 unique color names to describe them and men used 26. A statistical test showed that these scores were significantly different. Darrell concludes that the "hunter/gatherer" lifestyle differences in ancestral male and female humans led to today's men being less sensitive to color shade variation than women.

1. What do Darrell's results mean with respect to his hypothesis?
2. Are Darrell's results relevant to the scientific community? Why or why not?
3. Give one future direction Darrell could take with his results.
4. List some limitations of Darrell's study.
5. How would you respond if Darrell said that his study proved his hypothesis was true?
6. Is Darrell's conclusion convincing? Why or why not?

#### F) Professional Development

**1. Rate your level of confidence with various aspects of professional development. Skills that you have little to no experience with may be good places to start when filling out the long-term goals section which begins on Page 6.**

- Building your résumé or curriculum vita
- Updating your résumé or curriculum vita
- Writing a personal statement
- Setting goals for the short-term future
- Setting goals for the long-term future

- Narrowing choices for where to apply for jobs or graduate school
- Applying for jobs or graduate school post graduation
- Networking with other academics or professionals in your field of interest
- Requesting references from faculty members or other professionals
- Speaking in front of an audience

## **PART II: MENTORING STYLE AND WORK ETHIC**

### **A) Self-Inventory**

**Rate each statement on a scale from 1 (strongly disagree) to 5 (strongly agree). Some of your answers may be good discussion points during your first meeting with your research**

General

- I hold very high standards for myself in school.
- I meet most academic/professional deadlines.
- I often over-commit myself to too many things.
- I become emotional under stress.
- I use time and resources effectively.
- I have healthy work habits.
- I always follow-through when I make a commitment.
- I am able to prioritize to get tasks accomplished.

Knowledge

- I am a naturally curious person.
- I am familiar with the area of research in which I will complete my project.
- I have read publications by my mentor.
- The area of research in which I will complete my project is one that is very interesting to me

Skills

- I would like to learn new skills.
- I am proactive in seeking out the skills I want to learn.
- I am not afraid to ask when I do not know how to do something.
- I am well organized.

Communication (This is one of the most important aspects of collaborative research!)

- I appreciate constructive feedback.
- I am good at keeping in touch with collaborators.
- I am an honest and direct communicator.
- I like to meet at least once a week.
- I work independently.
- I seek help when I need it.

## B) Preliminary Expectations

What are your current expectations of your mentor?

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*“Make something of yourself. Try your best to get to the top, if that’s where you want to go, but know that the more people you try to take with you, the faster you’ll get there and the longer you’ll stay there.” – James A. Autry*

What do you think your mentor expects of you?

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### Trouble Shooting

*What do I do if I encounter mentorship dysfunction?*

- Avoid reacting emotionally
- Evaluate your contribution to the problem
- Ask a trusted peer, supervisor, or professional
- Be polite and friendly in all communication
- Make yourself aware of departmental procedures for reporting problems
- Document problem behaviors, and the steps you took to resolve them



### Reference

Johnson, W. B., & Huwe, J. M. (2003). *Getting mentored in graduate school*. Washington, DC: American Psychological Association.

## Early Semester Meeting with Research Mentor

Early establishment of good rapport and open communication among collaborators is an important part of the research process. Feeling comfortable enough with your mentor to talk to him or her about the project's progress, your feelings about the workload, and your goals for the semester all contribute to whether the experience is a positive or negative one. Often times, undergraduates may feel unimportant, abused, or disconnected from the projects on which they are working. The purpose of this section is to break the ice by starting a dialogue about expectations and work ethic. In addition, there is an interactive section that allows you and your mentor to fill out goals that you have for the time you are working in the lab. We strongly encourage you to complete this section so that you and your mentor can tailor your research experience to ensure you meet, and perhaps even exceed, your goals.



**Breaking the Ice.** Below is a list of questions designed to open communication between you and your research mentor on the first day. Before your meeting, take a few minutes to look over the questions below and prioritize those that are the most important to you. Add others if you would like.

### Questions Posed to the Student

- How did you become interested in this lab?
- Do you have any previous research experiences? If so, what kind and for how long?
- What are your future career plans?
- What do you expect from me as your research mentor?
- Describe your work ethic (e.g., prefer working alone or in groups, collaborative or independent projects, procrastinator)
- Describe your course load for the semester.
- What are your academic strengths and weaknesses?
- Ultimately, what do you expect to get out of this experience?
- What is the best way to contact you? (e.g., phone, email)

### ***Why should I try to build a positive working relationship with my mentor?***

- ❖ Learn about relevant organizations and conferences in the field.
- ❖ A strong mentor-mentee relationship can usually result in a strong letter of recommendation.
- ❖ Returning students who show interest and investment in the project could be included on publications.
- ❖ Because they are putting their time and energy into mentoring YOU!

### Questions Posed to the Mentor

- What is my role as your undergraduate researcher?
- How will my work fit in to the larger project? How independent am I expected to be?
- Should I come to you when I have problems or concerns, or is there someone else?
- What do you expect for me to accomplish while I'm working with you?
- What is your approach to mentoring undergraduates and what is your preferred style?
- What skills would you like for me to develop during my time in your lab?
- Are there specific times of day that you expect for me to be in the lab? What is the best way to contact you?
- Others?



**Establishing Goals for the Semester.** The SURE Workbook is designed to encourage a fulfilling research experience. Now that you have completed the self-assessment, you should have an idea of your strengths and weaknesses regarding the research process and professional development. During your meeting with your mentor, record realistic goals for each of the components of the research process. We have purposefully allotted a full page for each section so that you are able to tailor the SURE Workbook to your own needs. Do not feel pressured to fill out every available goal slot. Instead, try to focus on 3-4 goals. After the goals pages is an optional contract to document the agreed upon features of your research experience. Take a look at it with your mentor and decide if it is something you would like to complete. **Use the three-point format shown below to detail each of your goals on Pages 7-18.**

**1. Goals:** Detailed, measurable, relevant accomplishments that you would like to see yourself reach by the end of a specified timeline. They can be short-term (e.g., learning how to conduct an ANOVA test) or long-term (e.g., improving APA formatting skills). We have included details of the different sections at the bottom of this page to help with goal-development.

**2. Potential Barriers:** All goals have obstacles to attaining them (e.g., busy course/work schedule, procrastination, fear of learning something difficult). By making known the barriers for a specific goal, you should be better able to think of ways to eliminate them.

**3. Taking Action:** List of ways that you intend to set a goal into motion.

Example:

**Goal:** *Improve my knowledge of APA formatting by the end of the semester.*

**Potential Barriers:** *Unpredictable work schedule, busy applying for graduate school and studying for GRE, long-time struggle with procrastination.*

**Taking Action:** *1. Purchase APA Publication Manual, 6<sup>th</sup> Ed.; 2. Organize my schedule into blocks of time for graduate school applications, GRE studying, and skimming the manual's major sections; 3. Use the manual to guide a brief write-up of my project.*



### Components of the Research Process

1. **Literature Review:** Developing strategies for finding relevant literature; interpreting sources; library/internet skills; developing a research question from past research.
2. **Research Ethics:** Ensuring the safety and well-being of all participants involved in the study (human and non-human); IRB/IACUC forms.
3. **Methodology:** Developing an appropriate experimental design; sampling; avoiding experimenter and participant bias; controlling outside conditions; validity and generalizability.
4. **Analyses:** Selecting appropriate statistical tests; using statistical software; communicating results, both in words and visually.
5. **Discussion:** Interpreting the results; implications behind the findings; limitations; future directions and sharing the work with the scientific community.
6. **Professional Development:** Updating résumé/CV; writing a personal statement; requesting reference letters; communicating findings at meetings.

## **Literature Review Skill-Development Goals**

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**Goal #1:**

**Potential Barriers:**

**Taking Action:**

## **Literature Review Skill-Development Goals**

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**Goal #2:**

**Potential Barriers:**

**Taking Action:**

## **Research Ethics Skill-Development Goals**

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**Goal #1:**

**Potential Barriers:**

**Taking Action:**

## **Research Ethics Skill-Development Goals**

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**Goal #2:**

**Potential Barriers:**

**Taking Action:**

## **Methodology Skill-Development Goals**

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**Goal #1:**

**Potential Barriers:**

**Taking Action:**

## **Methodology Skill-Development Goals**

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**Goal #2:**

**Potential Barriers:**

**Taking Action:**

## **Analyses Skill-Development Goals**

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**Goal #1:**

**Potential Barriers:**

**Taking Action:**



## **Analyses Skill-Development Goals**

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**Goal #2:**

**Potential Barriers:**

**Taking Action:**

## **Discussion Skill-Development Goals**

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**Goal #1:**

**Potential Barriers:**

**Taking Action:**

## Discussion Skill-Development Goals

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**Goal #2:**

**Potential Barriers:**

**Taking Action:**

## **Professional Development Goals**

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**Goal #1:**

**Potential Barriers:**

**Taking Action:**

## **Professional Development Goals**

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**Goal #2:**

**Potential Barriers:**

**Taking Action:**

## Mentor and Mentee Contract

*“Better than a thousand days of diligent study is one day with a great teacher.”*  
– Japanese Proverb

### We agree to the following terms for our mentor/mentee relationship:

Duration of mentorship: \_\_\_\_\_

Anticipated duration of project: \_\_\_\_\_

Frequency and type of meetings (e.g., lab meeting, one-on-one): \_\_\_\_\_

\_\_\_\_\_

Preferred modes of communication (e.g., phone, email): \_\_\_\_\_

Number of hours per week mentee should spend working on project: \_\_\_\_\_

Major goals of mentee and mentor: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Mentee Printed Name and Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Mentor Printed Name and Signature

\_\_\_\_\_  
Date

## Mid-Semester Meeting with Research Mentor

As with any long-term project, taking a step back and reassessing your progress and feelings about the project is a must. Has your schedule changed since you first established your goals? What about your work ethic, motivation, goals, or even mentor? The mid-semester mark is a great opportunity to sit down with your research mentor (especially if you have not done so since your first meeting) and communicate with him or her about what you have been doing since the semester began. Whether or not you have been having regular meetings with your research mentor, now is a good time to contact them and let them know that you would like to schedule a meeting to specifically discuss your progress and feelings about the project.

**Below is a list of discussion questions that might help your mentor better understand your experience. Be open and candid so that any concerns can be effectively handled.**

- How do you feel about the project you have been given?
- What do you like the most so far?
- What do you find the most challenging? Can your mentor help with those challenges?
- Do you have any new project ideas or suggestions for your current one?
- Are you working with graduate students and/or other undergraduates? How is that going?
- What have you learned that you did not expect to learn?
- What aspects of the research are still unclear?
- How do you feel about the amount of contact you have with your research mentor?

**Goal Reassessment. Take a few minutes to look back at your goals from the last few pages. Document your progress in the chart below.**

Goal (in brief)	Progress Since Created	Next Steps

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**Are you finding it particularly difficult to achieve any of your goals? What barriers are standing in the way?**

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**What can you consciously do to help you overcome these obstacles?**

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**What can your research mentor do to help you overcome these obstacles?**

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#### **Tips for Managing Your Time**

- ✓ Create a visual schedule for yourself with blocks of time allotted to each of your responsibilities.
- ✓ Don't spread yourself too thin. Allow at least 30 minutes between time commitments.
- ✓ Try to avoid procrastinating.
- ✓ Learn how to say "No" when time commitments start to pile up.
- ✓ Prioritize. The small stuff can wait!

**Mid-Semester Goals (Optional).** Now that you are at the half-way point, are there any new short-term goals that you would like to create? Is there a methodological technique that you were recently exposed to that you would like to learn more about? Would you like to get feedback from a knowledgeable source regarding your résumé or CV? Record those new short-term goals on the space below, following the Goal, Potential Barriers, Taking Action format from earlier.

#### **Celebrating Diversity in Your Research Lab!**

In general, college is a hub for diversity. Your research colleagues or mentor may differ from you in any number of ways, including ethnicity, sexual orientation, spirituality, or geographic origin. This mentoring experience is a great opportunity to realize that variety really is the spice of life!





## Final Meeting with Research Mentor

As your research experience comes to a close, schedule a final meeting with your research mentor. This last mentor-mentee meeting section of the SURE Workbook will walk you through sharing feedback with your adviser about the experience, assessing your goals from the semester, as well as identifying goals for the future. Whether you have two years remaining or are graduating in a few weeks, it is never too early (or late) to think about your future plans. Do not forget to consult the Resources page towards the end of the workbook to get some advice and ideas about how you can use the skills you gained during your research experience to make yourself a more marketable candidate for jobs and graduate school positions.

**Sharing Feedback about the Experience.** Below is a list of discussion points to encourage a candid dialogue about your thoughts and experiences from the past semester.

- Describe the most salient positives and negatives about the experience.
- Did the student's involvement in the research process live up to his or her expectations? Why or why not?
- What could have been done differently (e.g., allow students to choose the project they work on, more or fewer deadlines)?
- How involved did the student feel?
- Choose five adjectives to describe the experience as a whole.
- Did the student work with graduate students or post-docs? How was that experience?
- What did the student like the most about working in that particular lab?
- Are there any aspects of the research process that are still unclear?
- Does the student have any suggestions for future undergraduates who work in the lab?

**Goals.** Return to your goals list from Pages 7-18 and 21 (if new goals were added mid-semester). Consider each goal in turn.

- Was the goal accomplished?
- Is the student satisfied with their progress on this goal? If not, what can be done to change this?
- Did the student develop some skill as a result of setting this goal?
- Were other notable skills developed or achievements made that do not directly relate to a goal?

**Consider your future plans.**

What are your post-graduation plans?

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How does this experience play into these plans?

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How will the skills that you developed help you with your future plans?

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Can your mentor help you with your future plans in any way?

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**Take a few minutes to jot down one or two future goals that you would like to achieve in the future. These goals can be as broad as increasing time management or as specific as getting into your first-choice graduate school. Do not forget to include details about important timelines and deadlines as well!**

**Goal #1**

**Potential Barriers**

**Taking Action**

**Goal #2**

## **Potential Barriers**

## **Taking Action**

## Literature Review

Whether you are just starting a new project, or joining an ongoing project, you can benefit from becoming familiar with the literature on your topic. As Aristotle put it, “He who sees things grow from the beginning will have the best view of them.” A literature review is important because it familiarizes you with what is already known about your topic. It can give you new ideas and inspiration. A literature review can also help you avoid mistakes others have made in the past. The purpose of this section is to guide you through the process of finding, reading, and summarizing the literature on your topic. If you have not yet decided on a specific research topic do not worry; conducting a literature review can help you to narrow down your topic. If you already know your specific project topic, you may find some revisions to your proposed study necessary as you learn more about research in this area.

**Independently complete the following steps, keeping one primary research project in mind. You may find it helpful to refer to your institution’s Library’s website. Take time to discuss your responses with your research mentor(s).**

### Step 1: Brainstorm.

**Brainstorm words and phrases that you could use to search for research on your topic. For example, if you are studying “rat laughter” you may also wish to search for the phrases “rodent laughter” or “rat emotions.” Come up with as many key words and phrases as you can.**

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### Step 2: Locate Relevant Literature

General Tips:

- ✓ Use more than one search engine. Our favorites are PsycINFO and Google Scholar.
- ✓ Examine different sources: journal articles, books, book chapters, and the internet.
- ✓ Plan to make at least one trip to the library.
- ✓ Rely on primary sources (original articles); avoid popular press (e.g., *Psychology Today*).
- ✓ Keep detailed notes. Save PDFs with detailed titles so you can easily find them again.
- ✓ If you copy someone’s words, put them in quotation marks and write the source and page number.
- ✓ Find other relevant literature by examining the reference sections, and looking at who has cited that reference.
- ✓ Examine both research studies—which contain original data—and literature reviews—which review a large number of studies on a topic, but contain no original data.





**Found a great article, but cannot access the PDF? Do not pay for the PDF!**

Instead, try Google Scholar. You can set up your preferences on your computer to take you directly to the PDF if your library subscribes to that journal. Instructions: <https://scholar.google.com/> then click on “Settings” and “Library Links”

**Find at least 3 sources and list them in APA format. Identify the type of source (e.g., journal article, book chapter, website). Is it a research study or a literature review?**

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

**Caution!** A popular procrastination strategy is to take detailed notes on every source related to your topic. This is not a realistic approach when you are limited on time. Instead, find a few articles, then ask your research mentor(s) if they can recommend additional literature relevant to your project.

**Step 3: Evaluate Empirical Studies**

**Critically read each of your sources and take notes using the following questions as a guide (adapted from Maher, 1978). You will probably need to use your own paper.**

**Introduction**

- Why is this study important?
- What are the research questions and hypotheses?

**Method**

- What is the method?
- Who are the participants? Were there biases in sampling? Was informed consent obtained?
- Are there confounds? Was a control group used? Was there random assignment?
- Were measures reliable and valid? Might there be order effects? Was inter-observer agreement assessed?
- Were participants and/or researchers blind to the conditions and/or predictions?
- Are alternative explanations ruled out?

- Are there any limits to the external validity?

#### Results

- Were appropriate statistical tests used?
- Do the effect sizes indicate the findings are of practical importance?
- Was the probability of making a Type I error considered?
- Are means and measures of variance reported?

#### Discussion

- Are alternative explanations considered?
- Are limitations discussed? How do these affect the generalizability of the findings?
- Were the authors able to reject the null hypothesis?

### Step 4: Summarize and Organize

There are many strategies for summarizing and organizing a literature review. We recommend:

#### A) Write a preliminary outline

Think about what topics you want to cover, what order you want to cover them in, and how much space (number of lines, words, or pages) you want to devote to each section.

#### B) Next, create an annotated bibliography

An annotated bibliography contains all of your references, in APA format, followed by a short paragraph about each, usually summarizing the main findings, then linking in some way to your main ideas (i.e., current research project).

#### C) Finally, write the introduction for your project

While you do this, keep in mind your audience (e.g., will this be discussed at a lab meeting? Published in a poster presentation? Published in a research journal?)

#### How to Cite in APA Style:

- <http://www.apastyle.org/>
- APA Publication Manual, 6<sup>th</sup> Ed.
- [https://twitter.com/APA\\_Style](https://twitter.com/APA_Style)



### A Note of Caution: Avoiding Plagiarism

The Merriam-Webster Online Dictionary defines plagiarism as, “to steal and pass off (the ideas or words of another) as one's own” or “to use (another's production) without crediting the source.” Learn more about your institution's Academic Honesty Policy and how to avoid plagiarism. For example:

[http://www.miami.edu/sa/index.php/policies\\_and\\_procedures/honor\\_code/](http://www.miami.edu/sa/index.php/policies_and_procedures/honor_code/)

**Additional Reading (Optional):** Galvan, J. L. (2004). *Writing literature reviews: A guide for students of the social and behavioral sciences* (2<sup>nd</sup> ed.). Los Angeles: Pyrczak.



**STAY ON TRACK!**

Refer back to the Literature Review goals you created on Page 7. Are you on track to accomplishing them? Remember to track your progress in developing your skills in reviewing relevant literature.

Maher, B. A. (1978). A reader's, writer's, and reviewer's guide to assessing research reports in clinical psychology. *Journal of Consulting and Clinical Psychology*, 46, 835-838.

**Why is a thorough literature review important?**

*"A month in the laboratory can often save an hour in the library."*

-Frank H. Westheimer, Professor

## Research Ethics

As a researcher, it is your responsibility to ensure the safety and well-being of your participants—whether they are humans or animals. The purpose of this section is to introduce you to the guidelines that must be followed for research with humans and animals.

### Part 1. American Psychological Association (APA) Ethics Code

Visit [www.apa.org/ethics/code/index.aspx](http://www.apa.org/ethics/code/index.aspx) and the APA Ethics Code (2010). There are five general principles. **Describe each one in your words, and explain how it is important for your research project:**

*"Ethics and science need to shake hands."*

-Richard Clarke Cabot,  
American physician



read  
own

➤ *Beneficence and Non-Maleficance* \_\_\_\_\_

\_\_\_\_\_

➤ *Fidelity and Responsibility* \_\_\_\_\_

\_\_\_\_\_

➤ *Integrity* \_\_\_\_\_

\_\_\_\_\_

➤ *Justice* \_\_\_\_\_

\_\_\_\_\_

➤ *Respect for People's Rights and Dignity* \_\_\_\_\_

\_\_\_\_\_

### Part 2. Ensuring Protection of Research Participants

Will you be working with human participants, animal participants, or both?

**A) Human Participants.** Your institution's Institutional Review Board (IRB) must approve all research with human participants. Applications can be submitted online.

1. Most institutions require **training through the CITI Program (Collaborative Institutional Training Initiative)**: <https://www.citiprogram.org/>

All researchers working with human participants—including undergraduates—must complete this online training prior to starting. You will read some short excerpts, and then answer multiple-choice questions. If you do not receive a high enough score you are allowed to re-take the test. There are different tests,



depending upon which population you are working with (e.g., adults, minors, prisoners). All student researchers working with human participants should complete “Group 1” and “Conflict of Interest” modules. Additional sections should be completed for working with special populations. If you are unsure, ask your research mentor.

2. Have you obtained **IRB approval** to conduct your project?

→ **YES!** Great! If you were not involved in this process (e.g., it was completed by the time you started the project), make sure you understand the steps of an IRB application. Check your institution’s Research Website and go over the requirements with your mentor.

For example:

<http://uresearch.miami.edu/>

→ **No.** You will gain valuable skills and knowledge through completing this process. Start by learning about the application and the different parts of the application by going to your institution’s Research Website (see above) and go over the requirements.

### Commonly Asked Questions

— *What is the IRB?*

Each institution has its own IRB, made up of five individuals, including faculty members from more than one department, one member of the community, and one nonscientist. All research with human participants is submitted to the IRB group, who reviews the proposal to ensure compliance with the APA Ethical Guidelines. You may be asked to make one or more revisions to your proposal.

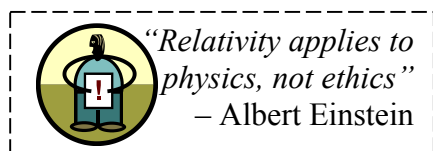
— *How long does it take to get IRB approval?*

Typically it takes about a month. The IRB usually meets a few times per semester, so the timing of approval will depend upon when you submit your proposal. For a schedule of meeting times and submission dates to be considered, visit your institution’s IRB website.

— *What do I need to submit for IRB approval?*

1. Application. Download the application from your institution’s website and complete all of the fields. Your research mentor will be the Principle Investigator (PI).
2. Consent form. Human participants are given information about the study so that they can decide whether or not they wish to participate. Ask your research mentor for some sample consent forms, so you can see what they look like.
3. Additional materials. If you are using a questionnaire, or any other materials to which the participants will be exposed (e.g., fliers advertising your study, phone script for recruitment, cover letter), then you will need to include these with your application.
4. Debriefing. After the experiment, the experimenter should answer any questions the participant has. The experimenter also describes the purpose of the study. Sometimes this is given in writing. If any deception was used, the participant must be informed at this point, as specified in the APA Guidelines: “[I]f scientific or humane values justify delaying or withholding this information, psychologists take reasonable steps to reduce the harm.”

**B) Animal Participants.** Your Institutional Animal Care and Use Committee (IACUC) must approve all research with animal subjects. Applications can be submitted online.



- ✓ There may be additional individual training for researchers who will handle the animals. Check with your PI.

**Federal Guidelines.** To learn more about animal research in the U.S., visit the AAALAC International (Association for Assessment and Accreditation of Laboratory Animal Care):

[www.aaalac.org/resources/studentinfo.cfm](http://www.aaalac.org/resources/studentinfo.cfm)

Understanding Animal Research: <http://www.understandinganimalresearch.org.uk/>

**Three primary areas need to be considered when conducting research with animals. Discuss with your mentor:**

1. *Justifying the study* – What is the scientific value of the study relative to the degree of risk to the subjects? If there is discomfort to the subjects, how will this be minimized? Can appetitive procedures (e.g., positive reinforcement) replace aversive procedures (e.g., punishment)? If examining animals in their natural habitat, how will you ensure that you are only minimally disturbing their habitat?
2. *Caring for the animals* – Is there a veterinarian caring for the animals you will be using? Will they need access to food or water during your experiment? What will be done with the animals when you are finished with your project?
3. *Using animals for education* – Are the animals used for teaching (e.g., in the classroom to illustrate specific behaviors)? Might it be possible to use fewer animals than what you plan to use? Could a simulation be used in place of a live procedure?

### Commonly Asked Questions

— *What is the IACUC?*

This is a committee made up of professors from multiple disciplines—including non-sciences disciplines—as well as one member from outside the university.

— *Do I have to worry about catching or spreading diseases or illness to/from the animals with which I work?*

Depending upon the species you work with, there may be specialized procedures or clothing to wear to ensure your safety and the safety of the animals. Check with your PI.

— *Do I need to complete the Occupational Health and Safety (OHSP) Program?*

Yes, probably if you are routinely entering into facilities where animals are maintained.

— *How long does it take to get IACUC approval?*

Typically it takes about a month. The IACUC typically meets a few times per semester, so the timing of approval will depend on when you submit your research proposal.

### Part 3. Plagiarism

The Merriam-Webster Online Dictionary defines plagiarism as, “to steal and pass off (the ideas or words of another) as one's own” or “to use (another's production) without crediting the source.”

Individuals at all levels of academia can plagiarize, both intentionally and unintentionally. However, this does not alleviate anyone of the responsibility to check sources and credit authors as deserved. A number of resources exist to help researchers understand and avoid plagiarism. It is up to you to inform yourself about plagiarism. Here are a few tips:

- ✓ When taking notes from a source, place quotation marks around any copied portions as well as a note to go back and paraphrase.
- ✓ When paraphrasing, do not look directly at the source. If you are unable to paraphrase, reread the source before you try to paraphrase again.
- ✓ Using your word processor's thesaurus to find synonyms is not a sufficient paraphrasing strategy.
- ✓ If you are unsure about how to paraphrase an idea, ask your mentor.
- ✓ When you know you want to cite an idea but do not have the reference handy, make a note (we type “CITE” and highlight it).
- ✓ Avoid direct quotations as much as possible.

#### Additional Reading (Optional):

APA Ethics Office: <http://www.apa.org/ethics>

APA books on ethics:

- Ethical Conflicts in Psychology ([www.apa.org/pubs/books/4312009.aspx](http://www.apa.org/pubs/books/4312009.aspx)) The 4<sup>th</sup> Edition of this classic book describes the fundamental ethical dilemmas embedded in the psychologist's array of roles.
- Ethics Desk Reference for Psychologists ([www.apa.org/pubs/books/4312011.aspx](http://www.apa.org/pubs/books/4312011.aspx)) This book is an easy-to-use pocket guide that aids psychologists in identifying and avoiding ethical dilemmas.
- Health Care Ethics for Psychologists ([www.apa.org/pubs/books/4312002.aspx](http://www.apa.org/pubs/books/4312002.aspx)) This book explores the ethical questions encountered most often by practitioners in health care settings.

#### Resources for Understanding and Avoiding Plagiarism

- ✓ 6<sup>th</sup> Edition APA Manual, Chapter 6, “Crediting Sources”
- ✓ Your institution's Academic Honesty Policy
- ✓ Your institution's Library Website → Services for Undergraduate → Writing and Citing



#### STAY ON TRACK!

Refer back to the Research Ethics goals you created on Page 9. Are you on track to accomplishing them? Remember to track your progress in developing your knowledge of research ethics.

## Methodology

Ivan Pavlov had three answers when he was asked what it takes to be a great scientist: (1) being systematic in the search for knowledge, (2) being modest in recognizing one's basic ignorance, and (3) passion. Specifically, Pavlov said, "Science calls for tremendous effort and great passion. Be passionate in your work and in your search for truth" (Babkin, 1949, p. 110). For scientists across all fields, a solid methodology is the foundation of any strong research project. A poor research design can jeopardize the integrity and validity of an entire project, and design errors cannot be undone after the fact. For these reasons, it is imperative to develop your skills in research methods. Of course, with a strong background in methods come other benefits such as enhanced critical thinking, problem solving, communication, and computer skills, as well as the ability to be a more informed consumer of information.

**Independently complete this section, keeping one research project in mind. Some of the questions may not apply to your project, and that is okay! If you are unfamiliar with terms, refer to your research methods textbook. Check responses with your mentor(s).**



- Is your research basic, applied, or both? Describe the potential benefits to society or humankind.

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- Is your research qualitative, quantitative, or both?

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- What are the research questions?

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- What are the research predictions (include null and alternative/experimental)?

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- Why is this study important?

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- What are the independent variables (include levels) and dependent variables (include operational definitions)? Include scales of measurement (i.e., nominal, ordinal, interval, ratio).

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*"Research is formalized curiosity. It is poking and prying with a purpose."* - Zora Neale Hurston

- Describe any extraneous/confounding variables that need to be controlled or considered.

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- What design(s) are you using (e.g., experiment, quasi-experiment, naturalistic observation, case study, survey, archival)?

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- Is your experimental design between-subjects, within-subjects (i.e., repeated measures), mixed, or neither?

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- Describe your participants/subjects (e.g., number, age, species, exclusion criteria).

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- How are your participants/subjects selected (e.g., random, stratified, convenience, research pool) and assigned to conditions if applicable (e.g., random, matched, natural groups)?

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- List your primary materials (e.g., software, equipment, testing environment).

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- Briefly describe the data collection procedure for a participant/subject in your study.

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- What is your role in your project's methodology?

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- Based on what you know about your project, what improvements can you suggest for the design?

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### Surviving Repetitive Tasks

Repetitive tasks are crucial to the research process and must be performed accurately without sacrificing your sanity! Here are some tips:

- ✓ Listen to music, chew gum, or sip your favorite beverage
- ✓ Take frequent short breaks and work on more challenging tasks
- ✓ Ask others for tips and shortcuts
- ✓ Keep detailed notes (e.g., don't assume you'll remember something)
- ✓ Keep in mind your energy level and the time of day
- ✓ Set small goals and reward yourself when you accomplish them
- ✓ Keep track of your speed and accuracy and watch as they improve
- ✓ Make sure you know why this task is important



**Additional questions to discuss with your mentor(s):**

- Does this study have strong external validity (i.e., will your results be generalizable to your target population)?
- Why are you using this sample size? Why not larger or smaller? How do you know you have sufficient power?
- What are some limitations of my study (e.g., what may jeopardize the internal validity, concerns about experimenter bias)?
- Are there concerns about reliability?

**Making connections (Optional):**

- How would you answer your research question with a different design?
- How would changing your sample alter your study?
- Are there other dependent measure that would be interesting to look at?
- Identify one confounding variable and create a way to study it.
- If you alter the setting (e.g., laboratory or field), how would that change your study?

**STAY ON TRACK!**

Refer back to the Methodology goals you created on Page 11. Are you on track to accomplishing them? Remember to update your progress to chart your development of methodology skills.

**Reference**

Babkin, B. P. (1949). *Pavlov: A biography*. Toronto, Canada: The University of Chicago Press.

## Analyses

The data have been collected and you are anxious to see if your research predictions will be supported. Now comes the hard part! Selecting the appropriate statistic to run on your data can be affected by everything from one participant dropping out of the study to the measurement scale that was decided upon months ago. Nonetheless, statistics are extremely important to psychologists and must be used correctly to validate the claims that we make. Mark Twain put it best, “There are lies, damned lies, and statistics.” The purpose of this section is to familiarize you with various aspects of the data analysis process. If your project’s data will not be ready for analysis during your semester, that is okay! You should still be able to talk about the statistics that *will* be used, and use your own predicted results to do the writing and visual representation exercises on the following page.



**Independently complete this section, keeping one primary research project in mind. If you are unfamiliar with any terms, refer to your statistics textbook. Take time to check your responses with your research mentor(s).**

- How is your project’s raw data organized (e.g., spreadsheet, software program, videotapes)?

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- Does the raw data need to be coded or transformed before it can be analyzed?

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- Describe the statistical program/software that you are using to analyze your data.

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- Are the statistics you are using parametric, non-parametric, or both? Why?

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- For parametric statistics, are the tests be one-tailed or two-tailed?

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- What is the  $p$ -value being used for your statistical tests, and why was it chosen?

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- If results are statistically significant, is the effect size small, medium, or large? What does this tell you about the practical significance of your findings?

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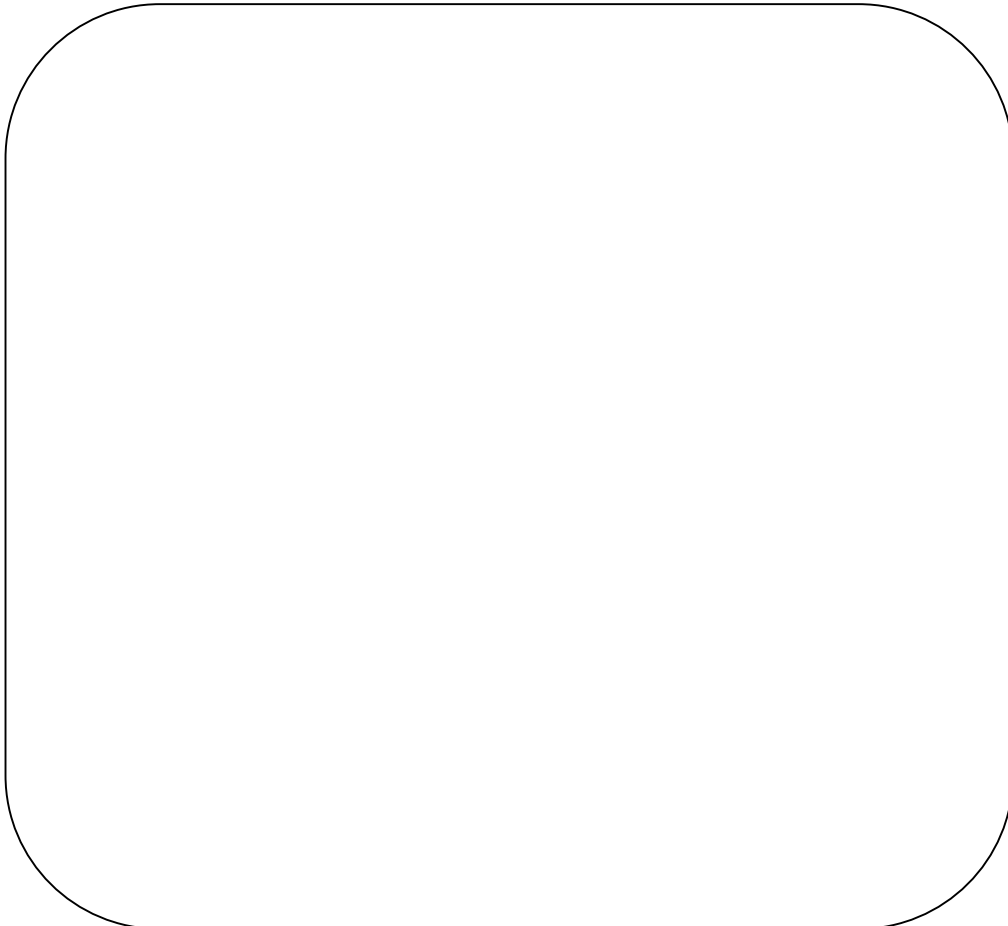


**Keywords in Writing Results**

The best way to become a clear mechanical writer is practice! Here are a few tips:

- ✓ A statistic with a  $p$ -value that is above the critical value is not “insignificant” because it is still telling you something important! However, it is written as “statistically non-significant.” A humorous site on this topic: <http://www.academiaobscura.com/still-not-significant/>
- ✓ Hypotheses are never “proven,” “true,” or “wrong.” They are either “supported” or “not supported” by your data.
- ✓ When a  $p$ -value hovers around significance (e.g.,  $p = .06$ , if the critical value is .05), it is fair to say that there is a “trend” in the direction you predicted, but it is still statistically non-significant. This is often a good time to think about a possible Type II error!
- ✓ In the Results, “data” is followed by a plural verb, as in, “The data were collected in a lab-setting.”

**Chart/Figure Exercise.** Information is often better understood when presented visually. This could be a table, a bar or line graph, a scatterplot, a sketch showing differences in brain structures before and after a treatment, etc. Select one of your findings and create a visual representation. You may use the space provided or attach a separate page.



**STAY ON TRACK!**

Refer back to the Analyses goals you created on Page 13. Are you on track to accomplishing them? Remember to update your progress to chart your development of data analysis skills.

## Discussion

The purpose of this section is to provide you with ideas for interpreting your findings, relating your findings back to your predictions, and critically examining the implications and limitations of your results. Focus on your hypotheses (re-state them generally) and the most interesting results. There are different ways to organize your discussion section. Discuss the results in a logical fashion, which usually involves going through them in the same order in which they were presented in the results section. The discussion section can be challenging to write, and may require several attempts. It is especially important to get feedback from your mentor(s).

**Independently complete the following sections, keeping one primary research project in mind. You may need more space than what is provided here.**

**Summarize Your Findings.** Open by providing a statement of support or nonsupport for your original hypotheses. Describe the major findings of the study. Avoid using any statistical jargon. Write your findings so that an educated layperson could understand them. Do your results support your hypotheses?

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### Common Problems with Discussion Sections

Make sure you:

- ✓ Skip discussing non-significant results
- ✓ Avoid causal language
- ✓ Do not equate statistical significance with effect size
- ✓ Only discuss data that are in your results section
- ✓ Go beyond regurgitating results; interpret
- ✓ Do not over-interpret your results
- ✓ Avoid engaging in unwarranted speculation
- ✓ Do not inflate the importance of your findings
- ✓ Remain on-topic and do not go on tangents
- ✓ Stick with conclusions supported by your data



**Redundancy and Wordiness**

The italicized words are unneeded:

- they were *both* alike
- *a total* of 68 participants
- four *different* groups saw
- instructions, which were *exactly* the same
- *absolutely* essential
- has been *previously* found
- small *in size*
- *one and* the same
- in *close* proximity
- *completely* unanimous
- *just* exactly
- *very* close to significance
- *period of* time
- summarize *briefly*
- the reason is *because*
- *there is* a link between
- *we are able to* conclude



Adapted from the APA Publication Manual, 6<sup>th</sup> Ed.

**Interpret Your Findings.** Be sure to address each of your findings individually: interpret, synthesize, analyze, and think critically about your findings. Are there alternative explanations to your findings? Are there sources of potential bias? Is there some amount of error in your measurement? What were your effect sizes?

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**Contextualize.** What is the broader literature to which your findings relate? Is there a theoretical framework from which you derived your predictions?

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**Length?**

There is no “optimal” length for the discussion section, nor any part of your project. Your goal should be to communicate your ideas effectively in as few words as possible. As the saying goes, “less is more.”



**Consider Implications.** These are recommendations. Based on your findings, what advice would you give society? What do your results mean? Why are they important? Are they useful in some way? Are applications warranted? Are there theoretical implications? Are there methodological implications? Are there applied implications?

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**Address Limitations.** All studies have limitations (e.g., small sample size, third-variable problem, internal or external validity, measurement validity, inter-observer agreement, fatigue effects, statistical issues). Think about the limitations of your project. What should the reader keep in mind? Are there reasons why the results did not turn out as expected?

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**Future Directions.** Some of your limitations might lead to future research. What would be interesting to do next? Make suggestions for future research.

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**Conclusion.** The “take-home” message. Leave the reader feeling that this is an important topic.

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**STAY ON TRACK!** Refer back to the Discussion goals you created on Page 15. Are you on track to accomplishing them? Remember to track your progress in developing your skills in writing a complete discussion.

#### Reference

American Psychological Association (2010). *Publication manual of the American Psychological Association* (6<sup>th</sup> ed.). Washington, DC: American Psychological Association.

## Professional Development

You are nearing the end of your research experience. Now what? Report your findings! This section details updating your résumé/CV, writing a personal statement, requesting references, and finding outlets for communicating your research results. A one-semester project has the possibility to springboard you into a career's worth of opportunities. This may be a great section to discuss with your research mentor and/or graduate students that you have formed strong working relationships with during your research experience.

**Résumé/CV Updating.** If you have been keeping up the mini-assignments in the Workbook, you should have a well-documented account of the work you have done. You deserve recognition! The best way to let potential employers or graduate school acceptance committees about your work is to detail it in your résumé or CV, so not forget to update it. There are significant differences in the formatting and content of a résumé and CV. Our brief description at right, while helpful, is not an exhaustive list of the differences.

### Résumé vs. Curriculum Vita (CV)

- *Résumé*: Job market; emphasizes relevant work-related experiences; education and awards/honors condensed
- *CV*: Academia; highlights research experience, education/scholarships, and awards received from institution

with  
now  
done.  
  
know  
do  
  
or CV.

When updating your résumé or CV, remember:

- Be concise but informative
- Play up the significance of your presence in the laboratory
- Include your mentor's name (potential graduate advisers may be impressed to know that you did your research training under a faculty member with whose work they may be familiar)

Other aspects of your research experience worth noting in your résumé or CV:

- Was the research you worked on submitted or accepted for publication? Provide a proper citation and explain your role in the project.
- Did you receive any special honors for your work in the lab or in the department?
- Were you able to transform your work into a CURO or academic conference presentation? We will address this again later in the Workbook.

### Haven't put together your résumé or CV yet?

1. Your institution's Career Center has samples of student résumés.
2. Most graduate students and faculty members have uploaded their CVs to your department's website.
3. Take a look at the Suggested Resources at the end of the Workbook to get an idea of other resources for developing your résumé or CV.



**Tips for  
Writing  
a**

**Personal Statement.** Graduate and professional school applications often require a statement of purpose in the form of a free-writing essay or answers to directed questions. Here are a few tips that we think are the most helpful. A longer list can be found on your institution's Career Center.

- ✓ Describe personal experiences or character qualities that set you apart from other applicants.
- ✓ Especially if your GRE, LSAT, or MCAT scores were not as high as you would have liked, emphasize the importance of having hands-on experience in your field (then discuss your time as a research assistant).
- ✓ Identify important characteristics of individuals in your field (e.g., leadership, creativity, critical thinking), and how you embody those characteristics.
- ✓ Discuss career and long-term goals. Show that you are thinking for the future and how acceptance into their program will help you reach those goals.
- ✓ Include a hook-line in the beginning to draw your reader in and make admissions committees remember you and *want* to keep reading about you.
- ✓ Be original in your thoughts and how you portray yourself.
- ✓ Proofread for grammar and spelling errors!
- ✓ Weave in examples to show that you are aware of the research being done in your field (or by the major professor or specific employer with whom you would like to work).

**Requesting Reference Letters.** Requesting letters of reference can be a sensitive subject even if you feel comfortable with your research mentors. We recommend that you follow three steps to ask your mentors if they are willing to write you strong reference letters.

**Step 1:** Prepare your CV/résumé, as well as detailed descriptions of your relevant lab and class experiences with your mentors. This Workbook is a great place to start for ideas. Also, if you worked closely with graduate students, ask them to write a brief, informal reference letter.

**Step 2:** Set up individual meetings with your mentors. During the meeting, describe your application plan. Provide your mentors with your prepared materials (described in Step 1). Ask them to email you if they feel they could write you strong letters of reference. Ask your mentors, “Can you write me strong recommendation letters or would it be better if I asked someone else?” This gives your mentors an “out” if they do not feel able. Also, be sure to mention that you will provide them with additional materials for writing your reference letters—such as instructions and envelopes (described in Step 3)—if they agree.

**Step 3:** If your mentor agrees to write on your behalf, the following are *crucial* to making the process go smoothly:

- Remember your mentor is taking time to do you a favor, so convey your appreciation
- Allow your mentor ample time to write. A good rule of thumb is *at least* 4-6 weeks.
- Create a personalized spreadsheet for your mentor. For each application that requires a letter, include: 1) specific reference instructions so that your mentor knows which areas (e.g., your research ability, leadership qualities, character) to focus on when writing, name of the school, name of the program, name of particular individuals with whom you’d like to work, 2) clear submission deadline dates, 3) the method of submission (e.g., specific website, through email)



### Trouble Shooting

*What if my mentor won't write me a letter of recommendation?*

- Do not take it personally! Your mentor may have too much going on to commit to writing for you.
- No matter how curious you are, asking your mentor for the reason he or she refused is unprofessional.
- Reflect on potential reasons for the refusal. Did your mentor not know you well enough? Did you do the bare-minimum work? Did you not seem interested or invested in your project?



and the mailing or web add, and 4) notes about anything specific you would like your letter-writer to say in his/her letter about you..

- The clearer your application folder, the happier your mentor will be. Happy mentors write happy letters!

**Communicating Your Findings.** This is the final, and arguably most important, step in the research process. If researchers did not communicate their findings, we would be constantly repeating each others' work and science would be at a standstill. Below is a brief list of avenues for presenting your findings:

- A local undergraduate-focused convention or research meeting held in your department or at your institution, or even at a nearby institution
- Professional society's meeting or regional conference (e.g., Western Psychological Association) held in a city to which you could travel
- Consider asking your mentor if you can present your findings at the next lab meeting

#### ***Great references for conference posters:***

- <http://www.apa.org/gradpsych/2011/01/poster.aspx>
- Ask graduate students for templates
- Posters hanging in your lab or in the building hallways

Many undergraduates find speaking in front of graduate students and faculty to be intimidating. As you prepare, remember:

- Practice makes perfect. Solicit friends and family to listen and ask questions about your talk.
- Predict the types of questions you could be asked about your project and prepare answers.
- Relax and do not forget to breathe! Everyone gets nervous!

- The only experts in the room with respect to your research project are you and your research team.
- Everyone who is listening is eager to hear what you have to say.
- Be honest. It is perfectly okay to admit when you do not know the answer to a question, or to preface unsure responses with, "I do not know, but my best guess would be..."

*"There are only two types of speakers in the world. 1. The nervous and 2. Liars."*  
-Mark Twain



**STAY ON TRACK!** Refer back to the Professional Development goals you created on Page 17. Are you on track to accomplishing them? Remember to track your progression in professional development skills.

## Suggested Resources for Students and Mentors

### For Students

#### Careers:

Basalla, S. E., & Debelius, M. (2007). *"So what are you going to do with that?" Finding careers outside academia*. Chicago, IL: The University of Chicago Press.

Landrum, R. E. (2009). *Finding jobs with a psychology bachelor's degree: Expert advice for launching your career*. Washington, DC: American Psychological Association.

Sternberg, R. J. (2006). *Career paths in psychology: Where your degree can take you* (2<sup>nd</sup> ed.). Washington, DC: American Psychological Association.

#### Graduate School:

American Psychological Association. (2007). *Getting in: A step-by-step plan for gaining admission to graduate school in psychology* (2<sup>nd</sup> ed.). Washington, DC: American Psychological Association.

American Psychological Association. (2016). *Graduate study in psychology, 2016 edition*. Washington, DC: American Psychological Association.

Asher, D. (2000). *Graduate admission essays: Write your way into the graduate school of your choice*. Berkeley, CA: Ten Speed Press.

Buskist, W., & Burke, C. (2007). *Preparing for graduate study in psychology: 101 questions and answers*. Malden, MA: Blackwell Publishing.

Kracen, A. C., & Wallace, I. J. (2008). *Applying to graduate school in psychology: Advice from successful students and prominent psychologists*. Washington, DC: American Psychological Association.

#### General:

Alley, M. (2003). *The craft of scientific presentations*. New York, NY: Springer-Verlag.

Landrum, R. E. (2008). *Undergraduate writing in psychology: Learning to tell the scientific story*. Washington, DC: American Psychological Association.

Reed, J. G., & Baxter, P. M. (2003). *Library use: Handbook for psychology* (3<sup>rd</sup> ed.). Washington, DC:

American Psychological Association.

Silvia, P. K., Delaney, P. F., & Marcovitch, S. (2009). *What psychology majors could (and should) be doing:*

*An informal guide to research experience and professional skills.* Washington, DC: American Psychological Association.

Williams-Nickelson, C., Prinstein, M. J., & Keilin, W. G. (2008). *Internships in psychology: The APAGS*

*workbook for writing successful applications and finding the right fit* (2<sup>nd</sup> ed.). Washington, DC: American Psychological Association.

#### **At your institution:**

Undergraduate psychology adviser

Career Center

Library

Office of Undergraduate Research



#### **For Mentors**

Crisp, G., & Cruz, I. (2009). Mentoring college students. A critical review of the literature between 1990 and 2007. *Research in Higher Education*, 50, 525-545.

Dolan, E., & Johnson, D. (2009). Toward a holistic view of undergraduate research experiences: An exploratory study of impact on graduate/postdoctoral mentors. *Journal of Science Education and Technology*, 18, 487-500.

Forehand, R. L. (2008). The art and science of mentoring in psychology: A necessary practice to ensure our future. *American Psychologist*, 63, 744-755.

Landau, J. D., Druen, P. B., & Arcuri, J. A. (2002). Methods for helping students to avoid plagiarism.

*Teaching of Psychology, 29*, 112-115.

Temple, L., Sibley, T. Q., & Orr, A. J. (Eds.) (2010). *How to mentor undergraduate researchers*.

Washington, DC: Council on Undergraduate Research.

Monte, A. (2001). Mentor expectations and student responsibilities in undergraduate research. *Council on Undergraduate Research Quarterly, 21*, 66-71.

Shea, G. F. (2000). *Mentoring*. Menlo Park, CA: Crisp Publications.

Shellito, C., Shea, K., Weissmann, G., Mueller-Solger, A., & Davis, W. (2001). Successful mentoring of undergraduate researchers: Tips for creating positive student research experiences. *Journal of College Science Teaching, 30*, 460-464.

Wright, G. D. (2016). *The mentoring continuum: From graduate school through tenure*. Syracuse, NY: Syracuse University Press.

Zachary, L. J. (2000). *The mentor's guide: Facilitating effective learning relationships*. San Francisco, CA: Jossey-Bass.

**Resources on the web:**

Association of American Colleges & Universities

<https://www.aacu.org>

Council on Undergraduate Research

[www.cur.org](http://www.cur.org)

Psi Chi, The International Honor Society in Psychology

[www.psichi.org](http://www.psichi.org)

American Psychological Association

[www.apa.org](http://www.apa.org)

Association for Psychological Science

<http://www.psychologicalscience.org/>

## Answers to Self-Assessment Questions (Pg. 1)

### Literature Review

2. Peer-reviewed journal articles (d)—Peer-reviewed book chapters (a) are also highly reliable; popular science magazines (b) often have references to peer-reviewed journal sources at the end; because books written by Ph.D.s are often not peer-reviewed, they should be considered with caution; newspaper articles (e) and theses and dissertations (f) are the least reliable because they are not peer-reviewed.

3. There are five errors: (1) No hanging indent, (2) & is used to separate authors, (3) no quotation marks around journal article titles, (4) Only capitalize the first letter and letters appearing after punctuation marks in a journal article title, (5) “vol.” does not appear in an APA style citation.

### Research Ethics

2. (a) While there is debate, it is always best to obtain participant consent for observational data that has been collected. (b) This is not ethical. Chantel is required to make sure that her participants read a consent form that is in their native language. Otherwise, there is a risk that individuals do not completely understand what will be asked of them in the experiment. (c) Publication decisions are made based on the level of contribution to the project, so Brian’s adviser did not behave ethically. Discussions about authorship between the research adviser and undergraduate should always happen before the project begins to avoid problems such as this one.

### Methodology

1. T

2. T

3. F- One (gender, two levels)

4. T

5. F- Quasi-experiment, gender cannot be manipulated

6. T

7. T

8. F- see Question 7, Darrell’s study is most likely not assessing what he set out to look at.

### Discussion

1. Darrell’s results support his hypothesis.

2. No, Darrell’s research design was not carefully done, resulting in numerous confounds. A study such as Darrell’s does not add to the literature due to its problems with internal validity and therefore cannot be considered relevant to the scientific community.

3. Darrell could consider removing as many confounds as possible and replicating the study if it is worthwhile.

4. Internal validity, no mention of screening participants, does not generalize well to all age groups.

5. Hypotheses are never proven; they are either supported or refuted.

6. No, there are too many flaws in his research design for him to be able to make such a claim

## Re-Writing Interpersonal Communication: A Portfolio-Based Curriculum for Process Pedagogy and Moving Theory Into Practice

Summer Cunningham, Mariaelena Bartesaghi, Jim Bowman, and Jennifer Bender  
*University of South Florida*

How does one create a class where the theoretical concepts emerge through classroom practice and engagement? This is the question that Mariaelena posed to herself when taking over the position of Director of the Interpersonal Communication course at the University of South Florida. In this essay we describe how we worked through a new way of teaching—and doing—interpersonal communication that captures Carey's (1989) focus on the centrality of process over product. We did so by way of some important tools of what is alternatively known as critical or process pedagogy (e.g., Elbow, 1986; 2013): an interpersonal dynamic that includes ongoing grading, writing to learn, and the portfolio method. This semester-long, process-oriented portfolio assignment is effective and beneficial because it facilitates an important shift in the power dynamic of the classroom by disrupting students' expectations for evaluation and shifting the learner's orientation from product to process. We share our portfolio method because we believe it can be adapted to fit the unique cultures and needs of other humanities and social sciences courses, instructors, and institutions.

A few years before composing this paper, I, Mariaelena, found myself eliciting the customary beginning of semester introductions from my students. One declared himself “a graduating senior in interpersonal communication.” A mere heartbeat later, he reprised: “but...I don't even know *what* that is” and, “no offense!” Once the elephant in the room was acknowledged, the next speaker took her chance to tame it: “Me too, I'm graduating in interpersonal...whatever that is, exactly.” I took no offense, but I certainly took note.

At that time, I was trying out my new role as supervisor for the Interpersonal Communication course. I considered how the Graduate Teaching Assistants (GTAs), some of whom were second or third-timers teaching the course, had been no less polite (and just as frank) as the students in my class in voicing their lack of...*something*. This something, as I could best reconstruct it, had two components. The first was a way to teach interpersonal communication concepts as process rather than outcome, as emergent, fluid, and relational. The second component was a renewed focus on writing *as* interpersonal communication—something that would not end with a paper written “for” the instructor but that could be ongoing, dynamic, and an outcome of joint action or shared intentionality (Shotter, 1995). In his proposal for writing as relational and contingent, Thomas Kent (1989, 2) similarly argues for “paralogic know-how,” a hermeneutics of writing that cannot be reduced to a series of rule-bound conventions, but rather is dialogic, interpersonal engagement with others, which are:

. . . momentary, tentative, and tenuous resolutions that help us shift ground in our continual efforts to communicate with the other, even if the other is us. Only through these tenuous and fleeting resolutions

may we acquire the background skills necessary to know how to shift ground and how to reinvent our hermeneutic strategy in order to produce other dialogic interactions that will create different resolutions, more background knowledge, and, finally, what we hope will be more effective hermeneutic strategies. Through our dialogical guessing, we learn what it takes to get things done in the world.

This orientation demands a different approach to teaching interpersonal communication.

My own re-vision, and thus re-writing of Interpersonal Communication emerged from two pedagogical traditions. The first, communication social construction (Bartesaghi & Castor, 2008; 2009; 2010; Bartesaghi, 2012) conceives of communication as embodied and situated relational practice, where interpersonal communication theory emerges in the praxis of multiple, reflexive and ongoing conversations. Shotter (1995) calls this *knowing of the third*, a constantly shifting and mutable Wittgensteinian language game, where the objective is to keep playing: an intersubjective mutual awareness of “how to go on” (Wittgenstein, 1953). I wove a second thread into this fabric: that of process or critical pedagogy.

Process pedagogy emphasizes learning as ongoing inter-action, in which the instructor's is one voice among many, and not the most important or loudest. In collaborative learning (e.g., Bruffee, 1999) writing is not for a grade, but the central link for connection among class peers. Using a variety of tools from writing pedagogy – especially peer review, workshop and consensus building – students are continuously accountable to *each other* while also coming to appreciate, by practicing it, the interpersonal basis of knowledge and its value as social capital (Freire, 1972).



I looked to improve writing by *writing to learn* (Elbow, 1986): writing that is not just for demonstrating learning, but as an ongoing, nonlinear and recursive process in working out ideas. At the same time, I developed a process-based curriculum where learning is ongoing and evaluated by consensus. Rather than look to the instructor for authority (and grades), students learn the value of looking to each other as a knowledge community (Bruffee, 1999; Kent, 1989). Writing becomes a way to communicate with each other in the course of learning, in terms of tools and strategies for the achievement of goals within the community (Flower, 1994).

Finally, the course I created is a way to learn about writing from within the discourses of interpersonal communication by practicing and naming its worlds (Freire, 1972), as active members in and of generative discourse communities (Kent, 1989) and not by learning a one size fits all skill set. By this I mean that writing assignments become opportunities for students to discover wor(l)ds, strategies and social implications of their writing within a discipline (as well as ways to enable them to invoke and test the disciplinary discourses), and, reflexively, to appreciate the forms of knowing these activities create. The semester-long portfolio-based project is thus a means to constitute and facilitate the as yet emergent collaborative, process-based curriculum described above. We, (Summer, Jennifer and Jim, as Graduate Teaching Assistants and Mariaelena, as Course Supervisor) have each incorporated this semester-long activity in our interpersonal communication classrooms and have seen that it indeed facilitates an innovative and collaborative learning space.

### A Portfolio for Project Pedagogy

In this section, we discuss the portfolio project design and its key component: the hybrid grading contract. It is imperative that the contract be featured prominently in the course syllabus and that the instructor explain both the contract and the portfolio project to the class on the first day. The first day of class is also when instructors emphasize to students that their peers are essential to making every aspect of the class work and to achieving a better grade, for it is students who are accountable, not only to their work, but to the work of others. Having this conversation up front helps set the tone and expectation for a collaborative, co-constructed and student-centered classroom where interpersonal communication becomes both the subject matter and incarnate, material and consequential to the learning process.

### The Grading Contract

To be faithful to process pedagogy, we set aside exams and points and opted instead for a grading

contract. There are a variety of approaches to contract grading, however, the guidelines used in the *Interpersonal Communication* (IPC) course at the University of South Florida are adapted from Danielewicz and Elbow's (2009) work on unilateral grading agreements.

Our contract specifies the criteria students must meet to earn the grade they desire. They begin the class with a "B" and are guaranteed a "B" at the end of the semester as long as they participate fully in class and complete all assignments. As our contract explains, "a 'B'-range grade is behavioral. It means that a student has participated in the class by attending, commenting on the readings as appropriate, that she has worked collaboratively with her peers, and that she has effectively shared her work informally during the course of the semester or more formally during class presentations." For a student to earn an "A," s/he must fulfill all the requirements for the "B" and must demonstrate substantial revision between the first draft and portfolio version of their work. Students who do not meet the "B" criteria receive a letter grade lower than a "B." Thus, grades are not assigned until the end of the semester and are based on each student's "final portfolio": a collection of all the work and re-work completed over the course of the semester.

Like Danielewicz and Elbow (2009), we have found that when students participate in the course and complete all the work necessary required to maintain the "B," "their writing improves enough to *warrant* a B" (p. 250). Attendance and participation facilitate the dialogic interaction that is key to this improvement, and thus are critical to students' writing development. However, monitoring attendance and facilitating participation just becomes another "B" behavior, meaning students are in-charge of their behaviors in these areas, and does not create a greater workload for instructors. We do take attendance daily as we would in any other class, however, because the method itself involves consistent in-class workshops and interaction, participation is both a requirement and a direct outcome of this approach. While we see that this works in our classrooms, where the students average around 35, we also believe that grading contracts could be tailored to fit the unique cultures and requirements of other humanities and social sciences courses, instructors, and institutions; starting at a "B" is not a requirement, but we strongly recommend it based our experiences and the literature that informs the structure of our IPC course.

### Portfolio Papers and Writing Activities

The portfolio project itself consists primarily of four short (2-3 page) essays that are developed and reworked over the course of the semester via a series of

consensus-based workshops. Each workshop involves peer review, class-generated evaluation criteria and criteria for an “A” that can be adduced to all student work for a particular paper, and subsequent revision(s). Papers (as well as workshops) can be tailored to fit the nature and relevant concepts of the course. Recently, our department has gone through an institutional “Global Pathways” recertification of General Education courses, and Interpersonal Communication is among them. Our four essay assignments now have a cultural focus that actually enhances our pedagogical objectives of creating conversational and emergent knowledge. Below, we offer two detailed examples and then proceed to explain the role of workshopping.

*Example One: Ethnography: Observation and narrative.* The goal of the assignment is for students to perceive, imagine and make sense of interpersonal relationships that unfold before them. They will choose a culturally identifiable and meaningful social setting in which they can observe in detail a relationship between friends, a parent and child, a couple, work colleagues, etc. and take notes in as much detail as they think important, on the communicative acts they are observing and hearing. After reflecting on their observations, they will write a story of two to two and a half pages, about the inferences they have drawn. The story should convey who these people are to each other and what the significance of this moment is in the context of their relationship within the larger cultural context in which it takes place

*Example Two: A Cultural and Relational Conflict.* Part 1: The students submit anonymous letters (1-3 paragraphs) to our web interface (e.g., Blackboard, CANVAS) describing a conflict that they or someone they know are facing because of their positioning in one or more social categories (such as sex, gender, ethnicity, class, disability, nationality, race, immigration status, age, etc.). The letter can be written like a Dear Abby letter, except that it should be addressed to Dear SPC 3301. In the letter, the students present the conflict according to multiple interpersonally signified aspects of culture (ideological, linguistic, historical, technological, structural, etc) and pose specific questions that they would like answered in order to solve the conflict. The instructor prints the letters and chooses several for the class to focus on.

Part 2: In class, the students work together to write a response to the letters. Using their expertise in conflict, power, and change in interpersonal relationships, they answer their letter by (1) explaining their understanding of what is going on in the relationship and (2) offering their advice on how

the couple can make a change that will improve the relational interaction between them. (3) Each pair submits a completed response to the web and presents their work in class. In writing and presenting, students highlight and apply key terms that are found within the textbook, clearly examining how they illustrate culture-specific issues and how communication may bridge these tensions.

Writing workshops occur during class on the day that a paper is due. Because they are designed to build consensus and student collaboration, demonstrating how the instructor is only a facilitator in the dialogics of writing as part of the interpersonal learning process, they are a critical step toward the final portfolio. Our workshops are an important occasion for us to show the students that writing is not representation or transmission, but interpersonal dynamic. Similarly, Kent (1989) distinguishes between dialogic and monologic forms of writing, explaining that monologic writing “(occurs) when the student cannot identify the other and, consequently, cannot converse with the other” whereas dialogic writing “occurs when a writer responds to the other” (p. 37). We find that at the start of the semester, most of our students approach writing as a monologic; thus, writing workshops help students understand writing as dialogic: as interpersonal communication. While there are multiple ways to facilitate writing workshops, we draw on many of Chisholm’s (1991) ideas, including the incorporation of a peer review worksheet for a constructive conversation and reflection around student’s (own) writing. Referring to the two essay assignments above, questions that are useful to have on the worksheet include:

- In your own words, what is the thesis or main idea of this paper? Write it here in no more than a sentence OR if you are not sure what the main idea is or how to find it in the essay, say so and say why you cannot. Be specific.
- How do you think the main idea could be made stronger or clearer OR, if you cannot find it at the beginning or are a bit confused: what do you think it might be?
- Once you have identified the thesis or the main idea:
  - what do you think the author could do without (be specific)?
  - What do you think the author needs more of (be specific)?
- If you could ask the author one WHY question, what would it be?

Workshops facilitate writing as interpersonal communication by fostering dialogue. In a workshop, and over the course of several workshops, students

accomplish three important things: they understand that writing is communication meant for others, and not for one instructor (we make it so that asking the instructor “what do you want” becomes nonsensical); they work to build consensus and accountability as to what count as criteria for revision; and they allow us, as instructors, to act as facilitators and model how to offer constructive feedback. For example, on workshop day, we provide students with a copy of two student papers which the instructor reads aloud to the class as students follow along. The class then breaks into smaller groups and, using the questions above as a guide, discusses the papers. After the small group discussion, we return to a larger class discussion about each paper. During this portion of the workshop, we collaboratively provide substantive feedback about each paper, a process that models to students how they can provide constructive, generative feedback for one another during individual peer-reviews. We also use this portion of the workshop to create consensus-based evaluation criteria for what constitutes a strong or “A” paper. Thus, workshops generate the criteria and the momentum that students use to re-vision and rework their papers for their final portfolio. We recommend that the instructor provides formative feedback to student papers after conducting this workshop so that the class discussion and collaboratively generated evaluation criteria becomes the context for the feedback provided. After the workshop, the instructor can also assign peer review of individual papers as homework or create additional class time for partner or small-group peer review that allows each student to engage in a discussion about her writing. The same questions can be used as a guide for these reviews as well.

Whether peer review takes place inside or outside of class, the role of the instructor is to monitor and guide students on how to provide substantive feedback to their peers, while being careful not to overtake the dialogue, meaning-making and community emerging from this interactive process. After workshops and peer review, students revise their work outside of class and submit as many versions as they desire in the final portfolio. In our IPC classes, instructors decide if they will require students to revise all four papers or a lesser number depending on the overall student workload in the class. The original draft, instructor and peer feedback, any additional drafts, and a “final” revised copy of each paper are included in the portfolio that is collected at the end of the semester.

In our classrooms, we devote a significant amount of time to workshops and the writing process because it is integral to this pedagogical method. The writing workshop described above requires a full 75 minute class-period (our class period length in a twice per week course) and will, at minimum, account for about 15% of the overall semester’s in-class time. However, we find

that we also devote class time to other parts of the writing process, such as pre-writing, brainstorming, and follow-up discussion and activities. We also recommend incorporating one-on-one or small group peer review, which can be conducted either inside or outside of class depending on time constraints. Thus, overall, about 25% of in-class time is devoted to dialogic writing processes. We find that spending this much time on writing, however, is not a loss when it comes to course content. In fact, it enhances development of course concepts by creating space for collaborative discussion and application while continuing to facilitate the very interpersonal communication processes which comprise the subject-matter of the course. Finally, while these writing processes are of key importance to this method, our exact means of accomplishing it is not meant to be prescriptive. The portfolio method invites flexibility; in our IPC classrooms as well as other communication classrooms, we have each experimented with different in-class writing ratios, number of papers assigned, and peer-review/workshop methods. The key for success when approaching the writing in this method is to a) emphasize to students that writing is central to the course and allocate class time accordingly, and, b) ensure the writing workshops and activities – whether in class or out of class – are interactive, dialogic occasions.

### **Reflexive Essay**

Together with the content essays, students are to include in their portfolio a short reflexive essay, typically one to three pages in length. In this essay, we want students to address the choices they made with regard to their revisions, and also direct them to reflect on their class experience, contributions, and take-aways. This essay invites students to consider what they have learned about processes of interpersonal communication and writing over the course of the semester and provides a space for them to consider how or if their understanding of these processes has changed over time.

### **Additional Portfolio Items**

Instructors can also have students include supplementary materials such as notes, journal entries, in-class activity documents, or anything else that would help the student in not only seeing their improvement throughout the course of the semester, but also in having a concise, well-organized product containing a semester’s worth of work. The additional documents included in the final portfolio also create an opportunity for students to demonstrate their level of participation, particularly for those who might be hesitant to speak-up during class discussions, and to present documentation to account for excused absences. In short, it is a tangible record of the semester-long process and

progress as well as an artifact that makes an argument for their desired grade. The portfolios can be collected in class or can be collected in an office or mailbox as they tend to be heavy to carry, depending on the size of the course. The instructor can, then, evaluate the contributions the student made in the course and can note improvements in writing and also provide some further comments about how students provided peer feedback to one another.

### Variations

The portfolio assignment can be utilized to teach classes other than Interpersonal Communication. Collectively, we have successfully implemented this assignment in other writing-intensive Communication classes such as Women and Communication, higher-level relational classes such as Love and Communication, and even Public Speaking. Ultimately, we have each experimented with different ways to run writing workshops and conduct peer reviews, and throughout various trials we find that the portfolio assignment continues to meet our course objectives as well as our personal pedagogical goals and expectations. We especially like the way this method facilitates engagement and collaborative knowledge communities within our classrooms, and, thus, believe college teachers across the humanities and social sciences would also enjoy the classroom dynamic facilitated via this portfolio-based, process-oriented approach.

### Evaluation of the Method

I, Mariaelena, have trained graduate teaching assistants (GTAs) to embrace the principles of process pedagogy and the portfolio-based method for teaching Interpersonal Communication outlined above for the last nine years. At the beginning of the semester, I hold a three-hour training session and workshop where those who have taught IPC before lead workshops and discuss their experiences to new recruits. Throughout the semester, I will visit GTA's classrooms and, at the end, we meet to evaluate the experience and to discuss how to evaluate the portfolios for the purpose of entering final grades. The topic of evaluation in process pedagogy is of course an important one, for it goes against the grain of quizzes and exams.

Since the inception of this method, we have found its efficacy validated in multiple ways. The first and most telling evidence of success is found in the student portfolios themselves, which provide tangible documentation of the change and progress students make over the course of the semester. Because the portfolio contains a collection of student writing over time, as individual instructors, we can easily see substantive

improvements in the quality of student writing as well as gauge development and competency with course concepts and ideas. Students also include a course reflection in their portfolios; thus, we are also able gain insight into their perception of the this method, including their level of engagement with the process. In addition to and separate from the portfolio, the authors have invited students to provide anonymous qualitative feedback about the course. This qualitative feedback provides insight into what students have learned about (writing as) interpersonal communication, and the ongoing, collaborative and consensus based learning processes in which we've engaged over the course of the semester. Below is a composite of responses in six categories universal to each of the course's student evaluations. We note that not all students respond positively to the portfolio assignment—in particular, some comments do indicate that students experience uncertainty about their performance in contract grading. Accordingly, we believe that any instructors who implement this method should anticipate pushback from some students; remember, this is likely the first time they are experiencing this type of pedagogy. This is why we recommend that you explain that contract grading is not withholding of grades, but actually ongoing grading, and the ability to know and be accountable for one's grade every step of the way. We also find that we receive a great deal of positive student feedback in response to this method, including comments about how the portfolio/contract grading system fosters increased investment in the class, and a significant improvement to experiment within a discourse community and (thus gain confidence) with their writing.

### Portfolio/Contract Grading – Positive

"I really enjoyed the grading style because it forced student investment in the class when working towards an A grade."

"I think having a B and working toward an A is a good incentive and it made me get into my papers and try to make them better."

### Portfolio/Contract Grading – Negative

I wasn't sure if I was making my grade better by editing my papers or making them worst <sic> sometimes.

### Writing – Positive

"Good flexibility for creativity to be expressed on assignments."

"The paper workshops were a big help to revising my final papers."

"I learned more about the writing process in this course than I did in my English comp courses."

“Loved the autoethnography/scholarship essays – it made learning the concepts personal and I connected with some of my peers on a personal level through the papers. It was a new perspective of Interpersonal Communication.”

### Writing – Negative

“Not a fan of writing in the first place, least of all writing about me. Seemed a little narcissist <sic>.”  
 “Still not convinced auto-ethnography is valid.”  
 “Was sometimes unsure if I was going the right direction on papers even with peer group.”

The next type of evaluation for this process occurs via group assessment(s). All IPC instructors meet at the close of each semester to debrief and reflect on what we have learned from teaching the course that semester. At this time we compare the change we see in our student portfolios, share the feedback from student reflections and course evaluations, and also complete the Southern Association of College and Schools (SACS) assessment of the learning outcomes for this course. Each semester, six ( $n=6$  per semester) student portfolios are randomly selected and assessed separately by two evaluators on a 4-point scale (poor, satisfactory, excellent, and outstanding) in four different categories: mastery of interpersonal communication concepts, insight into/application of interpersonal communication concepts, creativity/risk-taking, and writing abilities as developed. This systematic assessment has been employed semester-after-semester for the past nine years to determine whether course learning outcomes are achieved, and results have indicated that outcomes are not merely satisfied but typically exceeded. Based on this assessment, we feel confident asserting that this is an effective method for teaching interpersonal concepts and developing writing, but what this particular assessment cannot do is account for the other, less tangible successes of this approach.

Much like the process of communication itself, our greatest success might be less measurable. It is nonetheless manifest in the embodied experience of a cohesive classroom community – a knowledge community – and lasting relationships among our students. IPC classrooms *look* and *feel* much different than other classes in our department. Our students form interpersonal relationships with one another over the course of the semester because, through the use of this method, they are learning and practicing interpersonal communication. Thus, we would especially like to emphasize that, when we are evaluating the efficacy of this course, we are not merely concerned with seeing improvement in student writing and demonstration of theoretical competency; rather, we are also observing the way this process helps constitute interpersonal

relationships and a knowledge community that is connected to a larger discourse community. In short, we observe that over the course of the semester, as a result of employing this method, that one of the most successful outcomes of the course lies in the constitution of new connections and relationships: discursive relationships, interpersonal relationships, and epistemological relationships. Ultimately, it is the culmination of various types of feedback, assessments and our observations as instructors in the classroom that leads us to evaluate this method as a very effective. In this way, the activity fosters the process, experiences and outcomes Mariaelena was hoping to achieve when she designed the course. These include: engendering increased student investment/ownership of their work, an understanding of writing as interpersonal communication, and a fresh, personally meaningful understanding of interpersonal communication concepts in/as process for use in everyday life.

### Discussion and Conclusion

This process-oriented portfolio assignment is effective and beneficial because it facilitates an important shift in the dynamic of the communication classroom. First, it places the onus of the grade on the student as part of a relational dynamic—the student (as part of a learning community) is always in control of the grade. Second, and most important, the nontraditional grading schema—the grading contract—disrupts students’ expectations for evaluation, shifting the learner’s orientation from product to process. Because grades are not assigned throughout the writing process or on any other assignment, students are freed from the burden of worrying about their grade, and, thus, are able to focus instead on the content of the writing and the writing process itself.

This shift in orientation does not happen immediately. Instructors wishing to implement the portfolio method should be prepared for students’ initial skepticism or apprehension, particularly when their papers are returned to them with no grade, just comments. Once students let go of the expectation for a grade, however, they are truly able to engage and participate in the class differently. They look forward to review, workshops, and feedback (whether it is coming from their instructor or peers), and learn to understand re-vision – a way of seeing and acting differently upon their work – as part of the process. In fact, it is through these interactive aspects of the writing process that students experience a second benefit of the portfolio assignment: they begin to understand that writing is itself a form of (interpersonal) communication.

Through the process of interactive writing workshops, peer review, and class discussion students come to understand that they are always writing to, with

and for others. This dialogic orientation to writing is not taken-up by students immediately, but, rather, it is something that emerges gradually from the process itself. As instructors, we help facilitate this shift in orientation by constantly reinforcing (in workshops, during class discussions, and in assignment descriptions) the idea that writing is not for a teacher but for a (particular) public; in this case the community is the one that emerges in the classroom. Thus, throughout the semester, we continually use the process to emphasize how writing, like other forms of communication, is a collaborative, interactive process with no beginning or end. We can see evidence of this shift in orientation in the portfolios based on *how* our students writing changes over time. Further, by the end of the semester, we consistently observe the emergence of new interpersonal relationships and knowledge communities. Thus, this portfolio method for process pedagogy does not merely provide a view of communication-as-process, it performs the very communicative model that we strive to teach students in our *Interpersonal Communication* classroom. This interactive, interpersonal process also prompts students to become reflexive and accountable for *what* and *how* they choose to communicate within their writing. Thus, the portfolio system facilitates student accountability and reflexivity at the level of their grade and at the level of their communication.

Finally, the portfolio is a document (albeit always incomplete, because the end of the semester is an artificial deadline) that provides a record of a process. The collection and compilation of work over the course of the semester allows instructors and students to see and evaluate both process and, in most cases, progress. The ability to *comprehend* their learning process provides a rich and meaningful course experience that students are able to take-away with them. In sum, the portfolio disrupts students traditional learning expectations to foster a learning experience that emphasizes student accountability and reflexivity, collaborative engagement, and provides for both the theoretical and applied understanding of writing as process and writing as interpersonal communication. We share our portfolio method because we believe it can be adapted to fit the unique cultures and needs of other humanities and social sciences courses, instructors, and institutions.

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## Student Choice and Higher-Order Thinking: Using a Novel Flexible Assessment Regime Combined With Critical Thinking Activities to Encourage the Development of Higher Order Thinking

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Flexibility in assessment is usually achieved by giving students choice over the assessment weighting, type or format, the timing, the criteria, or the overall assessment result. This study, however, demonstrates the development of a flexible assessment regime where students were given the choice to invest in within-semester tasks designed to encourage the development of higher order thinking skills. This was accomplished by incorporating two compulsory summative assessments and two optional tasks focused on the process of learning. Students could choose whether to invest extra time to complete all four tasks, or to concentrate their effort only on the compulsory assessments. Evaluation of the flexible assessment regime was conducted using a survey incorporating quantitative and qualitative questions. The data showed that students came to value the flexible assessment regime by the end of the semester. Qualitative responses indicated students thought they had developed their higher order thinking skills, but were unaware of how these skills were of benefit in their disciplinary context. A follow-up interview study was conducted to further understand students' responses. These discussions indicated that students thought the assessment options allowed them to scaffold their learning throughout the semester, reduced overall student stress, and encouraged the development of higher order thinking skills. This study therefore demonstrates that flexibility in assessment allows students to take a proactive role in their learning. When combined with activities designed to develop critical thinking, this assessment strategy can be effective in developing higher order thinking skills.

Educators need to prepare students to become professionals in their chosen field of study by teaching both academic content and transferable skills (such as critical and analytical thinking, academic writing and research skills, as well as organizational and time management skills). Approaches to improve tertiary curricula often focus on improving the workplace transferability of the content being studied or on addressing the assessment and feedback strategies (Bradley, Noonan, Nugent, & Scales, 2008). However, universities are still heavily reliant on the use of more traditional forms of assessment such as essays, tests, and exams. In a continually changing graduate environment, teaching staff need to develop innovative assessment regimes that shift priorities from formulaic approaches of content learning to tasks that focus on the *process* of learning. Additionally, it is increasingly important to develop assessment tasks that both encourage students to develop transferable skills and allow them to see the practical application of these skills gained throughout their studies.

Student engagement is considered central to effective educational practice in higher education (Biggs, 2012; Devlin & Samarawickrema, 2010). One of the most important elements of student engagement is participation in learning. Institutions have made considerable progress in seeking ways of engaging students by improving universities' approaches to teaching and learning. These alternative approaches include blended learning, peer and social learning, problem-based learning, experiential learning, and learning through self-discovery. Strategies for improving engagement with assessment tasks at a tertiary level

usually focus on improving the authenticity of the assessment tasks. This is done by ensuring constructive alignment of the tasks to the course and unit objectives, graduate attributes, and learning experiences (as first described by Biggs, 1996), leading to alternative assessment types that are more authentic to students' future workplaces. Examples of authentic assessment tasks include internship projects, alternatives to written assessments (such as class mini-conferences and podcasts), simulations, and problem-based tasks. A previous study has for example shown that incorporating constructively aligned skills development in a problem-based assessment task resulted in improved overall authenticity and increased problem-solving skills development (Pretorius, Bailey, & Miles, 2013). Additionally, this approach allowed students to better see the transferability of the skills they learned for their future career (Pretorius et al., 2013). Designing assessment tasks that focus on the process of learning and foster students' higher order thinking skills by promoting critical thinking, reasoning, reflection, and metacognition require further innovation.

Metacognition is often defined as "thinking about thinking" (Livingstone, 2003, p. 2). However, a more comprehensive definition is necessary due to metacognition's relationship with self-regulated learning. Self-regulated learning involves students setting goals and working to monitor, regulate, and control their own learning, motivation, and behavior in order to achieve these goals (Pintrich, 2004; Wolters & Taylor, 2012). This comprises the use of several strategies that are considered metacognitive, including self-monitoring, questioning, reflection, and



self-assessment (Gourgey, 1998). For the purposes of this paper we have defined metacognition as the students' ability to engage and monitor the cognitive processes involved in their learning. Similarly, various definitions of critical thinking have been proposed depending on the researcher's theoretical perspective. We consider critical thinking to involve the ability to engage a range of cognitive skills such as interpretation, evaluation, analysis, and synthesis in order to solve problems and draw conclusions (Alghafri & Ismail, 2014; Dixon, Prater, & Vine, 2004; Kurfiss, 1988). In this paper we define reflection as the students' ability to analyze and evaluate their learning experiences and actions in order to foster self-discovery and growth. Since reflection incorporates elements of analysis and evaluation, it is considered to be a higher order thinking skill (Pretorius & Ford, 2016).

### **Flexible Assessment**

One area of assessment that has received less attention is how students can be more actively involved in the assessment process itself. It has been suggested that students' higher order thinking can be improved through assessments that allow increased learner flexibility and control during the assessment process (Irwin & Hepplestone, 2012). There are several terms for these approaches in the literature, including flexible assessment, student choice, and selected assessment. In order to provide some clarity to the meaning of flexible assessment practices, Rumsey (1994, p. 20) suggests that "assessment practices are flexible if they can accommodate the scope of knowledge and skills encompassed by the assessment criteria, the variations in context in which assessment may be conducted, and the range of needs and personal situations of potential candidates."

Studies describing different approaches to implementing flexible assessment in practice show that such assessments can incorporate student choice or autonomy in assessment weighting, type or format (Irwin & Hepplestone, 2012; Varsavsky & Rayner, 2012), timing (McCurdy, 2000), as well as the assessment criteria or the overall assessment result (Francis, 2008). Literature also suggests that students appreciate being given autonomy or empowerment in the assessment process and that they are generally highly receptive to flexible assessment (Cook, 2001; Francis, 2008). By offering students some form of choice they become active participants in the assessment process, taking responsibility for their own learning. Allowing students a degree of flexibility also appears to positively impact upon their attitude and motivation toward the task (Pacharn, Bay, & Felton, 2013). Flexibility in assessment has also been suggested to reduce student stress (Cook, 2001).

In this paper we aim to investigate whether flexibility in assessment can be achieved by allowing students the opportunity to invest in optional tasks. We also aim to investigate how this flexible assessment approach affects students' approaches to study. This study demonstrates that flexibility in assessment allows students to take a proactive role in their learning. When combined with activities designed to develop critical thinking, this assessment strategy can be effective in developing higher order thinking skills.

## **Methods**

### **Learning Context**

The flexible assessment regime described below was applied to a large second-year undergraduate subject focused on management accounting. This subject is a core component of the accounting major and is required for membership to professional accreditation bodies. Topics covered in this unit include costs and cost behavior, product costing, cost allocation, cost-volume-profit analysis, and the use of cost information for management decisions. This unit is delivered twice a year, and enrollment numbers per semester vary between 200 and 350 students, including students from culturally and linguistically diverse backgrounds. We applied the flexible assessment regime with three different cohorts of students with a combined enrollment of 895 students. The subject design and instructor for each iteration of the unit were the same, allowing for the grouping of all three cohorts for data analysis.

### **Flexible Assessment Design**

The flexible assessment regime in our unit was comprised of four assessment tasks. Two assessment tasks were compulsory for all students and were focused on the final product of the students' learning. These compulsory tasks were familiar to students and similar in design to their other subjects. The first compulsory task required students to submit a short written response to a set question on three separate occasions during the semester (weeks 4, 7 and 10). These summative coursework tasks were designed to measure the students' understanding of a particular concept discussed during the preceding three weeks. The second compulsory assessment required students to complete a three-hour closed-book examination at the end of the semester.

The other two assessment tasks were voluntary and focused on the process rather than the final product of learning. These process-focused assessment tasks were designed to foster higher order thinking and assist students in their learning throughout the semester. The first voluntary assessment task required students to

Table 1  
*Assessment Weighting Depending on Student Choice.*

Assessment task	Choice 1 <i>Completion of all four assessment tasks</i>	Choice 2 <i>Completion of only the two compulsory assessment tasks</i>
Coursework tasks (compulsory)	15%	20%
Exam (compulsory)	60%	80%
Pre-lecture quiz questions (optional)	10%	Not applicable
Critical thinking questions (optional)	15%	Not applicable

answer a series of short pre-lecture quiz questions each week. Students were also required to attend the lectures as part of their assessment, so their student numbers were recorded at the start of each session. The second optional activity was specifically aimed at developing students' critical thinking skills. For this task, students were required to generate a series of "critical thinking questions" related to an identified discussion topic prior to attending a tutorial. During the tutorial students worked together in groups to find answers to these student-generated questions. Student questions were also assessed by the tutors, and answers were discussed during the seminars. This assessment task aimed to foster critical thinking by encouraging students to reflect on their learning needs prior to class, question their existing knowledge, and identify gaps in their understanding. Additionally, this approach is likely to encourage self-directed learning, as students take control of their own learning during class time. All students participated in the teacher-facilitated tutorial discussions about the student-generated questions and possible answers. Consequently, this was also a time for shared learning, encouragement of critical thinking, and development of metacognitive skills such as questioning and problem-solving.

Rather than exercise tight control over students by requiring everyone to complete all assessment tasks, our assessment regime gave students autonomy to choose to invest in the optional tasks. Students were therefore given the opportunity to take control of their learning trajectory throughout the semester by choosing which tasks they would complete. The students who completed all four assessments were not disadvantaged in terms of their final mark, as their overall grade depended either on just the two compulsory tasks or on all four assessments, whichever was higher. Consequently, the optional assessment activities would only contribute to the final result if their effect was to increase a student's overall mark. The assessment grading was designed in this way so that students were not deterred from choosing to attempt the process-focused assessment tasks. Students who chose to

complete only the compulsory assessment tasks were also not disadvantaged because of their choice, as their final grade only depended on their work in the two summative tasks. However, these students may not have developed the same higher order thinking skills as those who completed all four tasks, as they did not devote time to generate critical thinking questions. This means they were likely to have reflected on their learning needs to a lesser extent than those students who elected to complete the additional assessments. It should be noted though that critical thinking development may still have occurred during shared learning in class time, as all students were involved with answering the student-generated questions.

Depending on a student's choice and the semester in which they completed the unit, assessment tasks were weighted differently. If students chose to complete all four assessments (Choice 1), and if the effect of the optional assessments was to increase the overall grade for the student, the assessments were weighted as shown in Table 1. If students chose to only complete the compulsory tasks (Choice 2), or if the effect of the optional assessment tasks were not beneficial to the student grade, the exam was weighted at 80% and the coursework tasks at 20% (see Table 1). It is important to note that the assessment weighting described in Table 1 was the preferred model for this assessment regime. In the first iteration of the new assessment regime, however, the exam weighting had to comply with what was presented to students in the previous year's unit handbook. Consequently, in the first and second semesters that this new assessment regime was implemented, the coursework tasks were weighted at 40% and the exam at 60% for Choice 2. The preferred weighting model was implemented on the third occasion after the unit handbook was amended.

While students were not required to inform staff of their choice, it is possible to gauge choice by examining the percentage of students whose unit score was based on two assessments as compared with all four assessments. Based on this information, there was no difference in the number of students who participated in the voluntary assessments

for either weighting model, so we do not feel that the change in weighting altered the students' choice. Consequently, we combined the data from these two weighting models for further statistical analyses.

### Research Design

The design, data collection, and analysis procedures described in this study were approved by the University's Human Research Ethics Committee. All participants provided informed consent, and all data were de-identified before analysis. This study describes an evaluation of the flexible assessment approach using a mixed-method quantitative and qualitative research design. Quantitative data were obtained using an anonymous online survey created using Google Forms®. The full survey can be found in the Appendix. A total of 252 completed surveys were collected across the three semesters. All questions in the survey were optional, so each question has a different response rate, as indicated in the results section of this study. Results were similar from each of the teaching semesters, so results have been combined for the purposes of data analysis. All results were analyzed using Microsoft® Office Excel® 2010.

In addition to the quantitative data, qualitative data were obtained through an open-ended question at the end of the survey which asked students to identify possible improvements in the flexible assessment regime design or the unit more generally. A total of 90 responses were received, and responses were similar for each cohort of students. Flyvbjerg (2011) highlights that a combination of quantitative and qualitative methodologies allows the researcher to investigate a phenomenon in both depth and breadth. This question was therefore included to examine students' experiences in the unit, as responses can be considered as a reflection of the students' overall impression of the unit. We applied a thematic analysis approach to assess the responses to this question, incorporating steps designed to enhance the credibility of the study. The theme analysis was conducted by a researcher not involved in the assessment design or teaching of the unit. All responses were read in order to gain a general understanding of the main concepts identified by each student. Each response was then organized into a theme cluster, which can be considered as expressing the latent content of each student's responses (Graneheim & Lundman, 2004). Agreement among co-researchers was sought, and quotes from the responses are included to enhance the credibility of the research findings. In total, three themes were identified: flexible assessment structure, incorporation of higher order thinking skills, and technical issues associated with the unit.

After data analysis we were interested in further examining the responses from the survey respondents using an in-depth interview approach. However, as the surveys were conducted at the end of each teaching semester and data analysis was not done until the next year, longer-term

follow-up of students was problematic. It was therefore not possible to conduct large-scale in-depth qualitative interviews about the students' survey responses, as many students would have either already graduated or were no longer contactable. However, five participants were identified that were still available for follow-up discussions. While five participants represents only a small percentage of the overall cohort, discussions with these students could still prove useful to provide some context for the survey responses. As such, we decided to conduct informal discussions with these students using a semi-structured interview approach to allow students to independently identify topics for further discussion. These discussions can be considered as small case studies aiming to gain a deeper understanding of the students' experiences in relation to the flexible assessment regime. Flyvbjerg (2011) notes that case studies can add more detail, richness, and completeness regarding the understanding of a phenomenon under investigation, providing the researcher with deeper insight. While the data from these case studies cannot be extended to the whole cohort, we believe the data still provide a valuable insight into the students' experiences, so excerpts from the students' responses have been included in this study. Participants were both male and female, represented domestic and international students, and had received a range of grades for the unit. Interviews were conducted by a staff representative who was not involved in the teaching and grading of the unit. Students were not provided with any incentives for participating in the study. We applied the same thematic analysis approach as described above to assess the content of the case study interviews, incorporating appropriate steps to insure credibility of the study. In total, three key themes were identified from the student interviews: changes in study approach and scaffolded learning, usefulness and limitations of the assessment regime, and the development of higher order thinking skills.

## Results

### Students' Participation in the Flexible Assessment Regime

Completion of all four assessment tasks (Choice 1) was the preferred regime choice for students. In total, 66.4% (594 students) chose to complete both the compulsory and voluntary assessment tasks. Another 31.4% (281 students) chose to complete only the compulsory assessment tasks (Choice 2). The choice of twenty of the students (2.2%) was unclear, as these students did not complete the compulsory final exam.

### Students' Understanding of the Flexibility in the Assessment Regime

Prior to assessing the effects of the flexible assessment regime on students' grades and approaches to study, it was

necessary to establish students' overall understanding of the flexible nature of the assessment regime. Survey responses indicated that 89.0% of the students were aware of the flexible nature of the assessment model (Table 2). It was also of interest to determine when students felt they had clearly understood the nature of the assessment regime. The majority of survey respondents (59.1%) reported that they clearly understood the flexibility of the assessment regime by the third week of the semester (Table 2). A further 21.6% of respondents indicated that they understood the assessment regime by the middle of the semester (Table 2). Only five students reported that they had never clearly understood the assessment regime (Table 2).

### Students' Receptiveness to the Flexible Assessment Regime

As this was the first unit in the students' overall course that incorporated flexible assessment, we were interested in determining whether students approved of the flexible assessment regime in the unit. Survey responses showed that 67.5% of respondents identified the flexible assessment regime as a "very good" or "good" idea by the end of the semester (Table 3).

Data from the qualitative survey responses indicated that students were generally receptive to the idea of flexible assessment ("flexible coursework is reasonable and helpful to most student[s]"; "the regime is fine"; "no improvements need to be made"). However, students also felt that the weighting of the exam in Choice 2 (see Table 1) was too high ("the percentage on [the] exam can be lower"), which decreased the likelihood that students would choose that option ("yes it was flexible, but in what way is it fair if

one of the options was that the exam is worth 80%?").

All five case study interviewees thought that the flexible assessment regime was "really helpful" and "interesting". Students felt that the flexible nature of the assessment regime gave them "more freedom" as they had "more than one option." Two students also commented that the flexible nature of the assessment reduced student stress during the semester and exam time.

In the end-of-semester survey several students commented on technical difficulties associated with the flexible assessment regime. In particular, students did not like attendance checking ("do not have attendance for the lecture"; "no compulsory seminar attendance"). One of the case study interview participants also commented that technology difficulties and attendance checking throughout the semester negatively impacted upon their experience. Several of the case study interviewees also commented that the unit was "difficult" and that the amount of content covered during the semester was "a bit of overload." One student also discussed the extra pressures placed upon students from international backgrounds, particularly in relation to study costs ("But I need to pass. It's very expensive to fail the unit.") and language barriers ("Most people spend like an hour? I spend two hours because I have language barriers.").

### Effect of the Flexible Assessment Regime on Student Grades

The average grade for students who completed all four assessment tasks was 63.4% (n=594). Students who completed only the two compulsory tasks had an average grade of 51.4% (n=281). This represents a 12% difference in mark between Choice 1 and Choice 2. Survey respondents were asked to self-report their final

Table 2  
*Students' Understanding of the Flexible Assessment Regime.*

Survey question	Response	Number of responses	Percentage
Were you aware that the coursework assessment regime was flexible?	Yes	211	89.0%
	No	26	11.0%
Approximately when during the semester did you first clearly understand what flexible coursework assessment meant?	At the Start of the Semester	101	59.1%
	About Halfway Through the Semester	37	21.6%
	Towards the End of the Semester	28	16.4%
	Never	5	2.9%

Table 3  
*Students' Receptiveness to the Flexible Assessment Regime.*

Survey question	Response	Number of responses	Percentage
Now thinking back over the semester, to what extent do you approve of the idea of a coursework assessment regime being flexible?	I now think the idea was a very good one	46	22.7%
	I now think the idea was a good one	91	44.8%
	I now think the idea was unimportant and pointless	39	19.2%
	I now think the idea did not make sense	15	7.4%
	I now think the idea was a very bad one	12	5.9%

Table 4  
*Grade Distribution of Survey Respondents and the Overall Student Cohort.*

Grade	Survey respondents	Overall cohort
High Distinction (80-100%)	12.6%	7.4%
Distinction (70-79%)	19.1%	16.3%
Credit (60-69%)	27.6%	30.3%
Pass (50-59%)	22.0%	24.6%
Did not pass (below 50%)	12.6%	21.4%
Prefer not to say	6.1%	Not applicable

grade. Overall, students' results approximated a normal distribution (see Table 4). The grade distribution of survey respondents can be considered representative of the overall grade distribution for the whole cohort of students (Table 4).

It was also interesting to see whether students felt that their final grade represented their understanding of the unit content. The responses to this question were approximately equally distributed between yes and no (52.2% and 47.8% respectively). We also examined the students' perceptions of the effect of the flexible assessment regime on their final grades. Approximately half of the students (49.5%) responded that the flexible assessment regime did not affect the final result they had achieved. This may reflect that students were not aware that the critical thinking exercises were designed to prepare them for the summative assessment tasks. A total of 26.9% of respondents felt it contributed positively to their results (see Table 5). Interestingly, 23.6% of students indicated that the flexible assessment regime negatively impacted their final result (Table 5) despite the fact that the assessment regime was designed so that participation in the voluntary assessment tasks would not negatively affect the overall grade the student received.

It was not possible to determine the mark students would have achieved if they had opted to complete all four tasks rather than just the two compulsory tasks.

However, in order to determine whether the voluntary tasks positively affected students' final grades, we compared the grades for students' who had completed all four tasks. This allowed us to determine whether the students' grades would have been higher if they had just completed the compulsory tasks, or whether the inclusion of the compulsory tasks positively influenced the overall unit grade. In the full cohort of students, the voluntary tasks contributed positively on 65.0% of students' grades. As mentioned earlier, in those cases where the voluntary tasks did not contribute positively, the overall grade the student received was determined by only using the grades for the compulsory tasks.

### **Impact of the Flexible Assessment Regime on Students' Study Approaches and Learning**

It was of particular interest to examine how the flexible assessment regime affected students' approaches to study during the semester, as well as their overall learning in the unit. The end-of-semester survey responses showed that 56.5% of survey respondents felt that the flexible assessment regime had no effect on their overall study approach (Table 6). Approximately equal amounts of respondents decided to place extra emphasis either on the voluntary tasks or the

Table 5  
*Perceived Effect of the Flexible Assessment Regime on Students' Grades.*

Survey question	Response	Number of responses	Percentage
To what extent did the fact that the assessment regime was flexible influence the result you achieved for the unit?	It was the main reason I did as well as I wanted	14	7.7%
	It was a significant reason I did as well as I wanted	35	19.2%
	It had no effect	90	49.5%
	It was a significant reason I did not do as well as I wanted	22	12.1%
	It was the main reason I did not do as well as I wanted	21	11.5%

Table 6  
*Effect of the Flexible Assessment Regime on Students' Approaches to Study.*

Survey question	Response	Number of responses	Percentage
Which of the following best describes the effect that the flexible assessment regime had on your approach to studying the unit?	It made no difference	113	56.5%
	I placed extra emphasis on the voluntary tasks	39	19.5%
	I concentrated on the compulsory coursework tasks	33	16.5%
		15	7.5%
	None of the above		

compulsory tasks (19.5% and 16.5% respectively, see Table 6).

In the qualitative responses of the end-of-semester survey, only one student noted the reason why they thought the flexible assessment regime did not affect their study approach: "I really think it [had] no effect on me as I am always going to take [the] route that makes the exam weight lower." Four of the case study interview participants said that they had altered their study strategy in response to the flexible assessment regime. In particular, students commented that the assessment tasks throughout the semester required them to continually pay attention to their studies, allowing them to "learn something every week." The interviewees felt that changing their study approach in this way was beneficial as it helped them to scaffold their learning, allowing them to "study little by little" and earn marks "step by step" throughout the semester. One student highlighted that she did not feel the flexible nature of the assessment regime altered her study approach:

Just because it had flexibility I just didn't think, like, OK, I would just like get marks in the exam rather just like you know committing my time for internals. I didn't think like that, I just did my internals at my best and also my exam..."

It is important to note, however, that while this student thought that she did not make a choice, completion of all four assessment tasks does indicate a choice on her part. This student also commented that she thought the flexible assessment regime would be beneficial to other students:

I think like, um, some people prefer doing things like getting more marks and doing things internally, like [throughout] the semester. Those who prefer that would go for like 60% and 40%. Yeah. Those who just [want to], like, score in the exam, they would just go for the 80% and 20% regime.

### **Impact of the Flexible Assessment Regime on Students' Higher Order Thinking**

Irwin and Hepplestone (2012) suggest that students' higher order thinking and reasoning can be improved through flexible assessment. We therefore wanted to see whether our assessment approach evoked the development of such skills. Qualitative responses to the end-of-semester survey were very interesting and indicated that many students were not aware of the overall benefits of higher order thinking and reasoning in learning. Students identified that they had learned

higher order thinking skills: “It forced me to read more and think more.” Also, they noted that generating critical questions helped them develop a deeper understanding: “Every week I will spend an hour to find the correct [questions and answers], since it also [gave] us the little marks on our [final] mark. I’m happy to do so since it is good for my understanding.” However, a large number of responses negatively commented on the critical thinking questions and the metacognitive strategies required in the unit. Several students also commented that it would be better if the teacher provided the answers to the critical thinking questions instead of encouraging the students to discover the answers for themselves. Students thought that “not all [students] have critical thinking ability,” that it is the “lecturer’s job to help [them] understand the content [rather than] to teach [them] how to think,” and that critical thinking was not something that was necessary in accounting or in a second-year subject:

Accounting is not an Arts subject. It should be taught like most other accounting subjects. The critical thinking sought is not something that should be taught in a 2<sup>nd</sup> year core subject, but perhaps as a 3<sup>rd</sup> year elective.

To further examine these results, transcripts from the case study interviews were examined. All of the interviewed students commented on the incorporation of critical thinking and metacognition into the curriculum. Students felt the flexible assessment regime taught them to “ask more questions” and to use their “critical thinking side,” allowing them to learn how to apply their knowledge instead of “just memorizing” or “just giving an answer.” Students also commented that this ability to apply critical thinking in their work will be applicable to their future study. Similar to the previous findings, one of the students commented that while higher order thinking is useful, it would have been better to study theory instead of asking and answering the critical thinking questions: “If the tutors can conduct some..., like theoretical, I mean knowledge stuff during the tutorials, like explain more instead of like asking questions cause that’ll be better....” Together, these results suggest that the benefits of higher order thinking skills should be made more explicit to students. Furthermore, it should be made clearer that the critical thinking tasks were designed to help prepare them for the summative tasks throughout the semester.

### Discussion and Conclusion

The assessment regime described in this study is likely to be novel. In this study we demonstrate an assessment regime where students make a private conscious choice as to whether they will invest in two

voluntary within-semester assessments. We demonstrate that flexibility in assessment allowed students to take a proactive role in their learning. When combined with activities designed to develop critical thinking, this assessment strategy was effective in developing higher order thinking skills.

The assessment tasks in the unit were divided into product-focused and process-focused activities. The product-focused tasks were compulsory for all students and allowed them to demonstrate the final product of their learning. The process-focused assessment tasks were voluntary and designed to foster higher order thinking as well as assist students in their learning throughout the semester. Students could therefore choose whether or not to invest extra time and resources to complete these voluntary activities. We believe this encouraged the development of self-regulated learning by allowing students to take control of their own learning trajectory. This incorporates strategies that can be considered metacognitive, such as self-monitoring and reflection. Research suggests that self-regulation can improve learning and deepen understanding, as well as increase achievement and problem-solving (Azevedo, Moos, Johnson, & Chauncy, 2010; Plant, Ericsson, Hill, & Asberg, 2005; Pretorius & Ford, 2016; Sandi-Urena, Cooper, & Stevens, 2012; Schraw, Crippen, & Hartley, 2006). Development of critical thinking and metacognitive skills was encouraged for all students during peer-learning in the tutorials. Finally, successful completion of the optional activities required regular reflection on learning in order to generate critical thinking questions prior to class. This was designed to foster the development of analysis and evaluation skills, essential elements of higher order thinking.

Results regarding the benefits of this flexible assessment approach were interesting. Students were aware of the flexibility in the assessment approach (see Table 2) and decided to approach the assessment regime in different ways (see Table 6). Some students stated that they had placed special effort only on completing the compulsory product-focused assessment tasks, while an approximately equal amount said they paid particular attention to the voluntary process-focused tasks. Approximately half of the students stated that the flexible assessment regime did not alter their study approach. After completion of the unit, two-thirds of students reported that they now thought the flexible assessment regime was either a “good” or “very good” idea (Table 3), indicating that students came to discover the benefits of the flexible nature of the assessment regime later in the semester. The students who were interviewed thought the flexibility in the assessment regime was beneficial, as it provided them with more “freedom” and a “second-chance.” They also felt that the process-focused assessment tasks helped them “learn something every

week,” allowing scaffolded learning throughout the semester. This indicates that these students were motivated to continue with the process-focused tasks throughout the semester because of the benefits they discovered for their overall learning.

Students’ end-of-semester survey and interview responses highlighted the development of their higher order thinking skills throughout the semester, most notably critical thinking and metacognition. Data from the end-of-semester survey showed that while students clearly thought they had learned critical thinking and metacognitive strategies, they did not clearly understand the benefits of these skills in relation to their discipline or their overall learning. This indicates that teachers should place more emphasis on explicitly articulating the benefits of higher order thinking in tertiary settings. Interviewees felt that the process-focused assessment tasks helped to develop their “critical thinking side,” taught them “how to think,” and demonstrated to them how to apply their knowledge and “ask more questions.” This may have also arisen from the overall teaching approach of the unit, since application and questioning was promoted throughout the unit. While the interview data cannot be applied to the whole student cohort in this study, it has been previously shown that authentic assessment strategies can be used to promote higher order thinking by emphasizing application of knowledge rather than factual recall (BoarerPitchford, 2014; Darling-Hammond, Aness, & Falk, 1995; Ennis, 1993; Huba & Freed, 2000; Irwin & Hepplestone, 2012; Morris, 2001; Palomba & Banta, 1999; Pretorius et al., 2013). Combined with the data from the end-of-semester survey we therefore believe that flexible assessment can be an effective strategy to develop higher order thinking skills such as critical thinking and metacognition.

Most of the end-of-semester responses and the case study interviews also highlighted limitations of the assessment approach. In particular, students highlighted technical issues, attendance checking, and the impact of the within-semester tasks on overall student workload. While technical issues are not always within the teacher’s control, it is true that use of novel online tools can sometimes cause technical issues for students unfamiliar with the technology. It may be possible in the future to use software that students are more familiar with in order to overcome some of the technical issues. It was also clear from student feedback that attendance checking was not popular. Attendance at lectures are not compulsory in our university, however one of the voluntary assessment tasks required students to attend lectures. Attendance was therefore taken to insure that students received credit for their presence in the lecture. It is currently unclear how this limitation can be overcome. There may, however, be more efficient ways of taking attendance that would be

quicker and less cumbersome for students. It is also important to note that requiring students to attend the lectures would likely have affected performance and skill development, and could also have impacted on students’ decisions on whether or not to participate in the optional activities.

The interviews highlighted that the perceived workload required for this unit was considered high. This is true and is likely explained by the use of teaching methods aimed at achieving higher order thinking. We feel that this prepared the second-year students for the level of study required for their third-year units and also demonstrated the importance of developing effective organizational and time-management strategies. It has been previously shown that students are much more likely to follow a study schedule if the program they are studying is demanding in nature (Ford et al., 2015). It may, however, be possible to streamline some of the within-semester tasks so that they only need to be completed every second week. This would still ensure students are learning content and critical thinking skills throughout the course, but it may reduce the workload placed upon students. A greater focus on organizational and time management skills at the start of the semester may also be of benefit to the students in this cohort.

Limitations of the study should be noted. Firstly, this study represents only one unit in one discipline and can therefore not be considered representative of all tertiary contexts. We do, however, believe that the assessment approach can be applicable across disciplinary contexts, as higher order thinking skills are essential in all fields of study and are considered key employability skills. Secondly, it would have been useful to be able to determine which assessment choice the survey respondents had made, as this would have provided valuable insight into the students’ answers. Due to the anonymity of the survey, however, this was not possible in our study. Thirdly, data from the case study interviews cannot be more broadly applied due to the small self-selected sample size. The data from these interviews do, however, present an insight into the actual learning experiences of the students. Finally, future studies should examine whether students who had completed all four assessments performed better in the final exam of the unit. Our study showed that completion of all four assessments was associated with a higher overall grade. The reasons for this, however, are likely to be multi-factorial, influenced by various confounding factors including student competency and skill development in previous units. If the confounding factors could be controlled in future studies, this would provide further evidence that the process-focused tasks were effective in developing deeper thinking ability in students.



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#### Acknowledgements

The authors would like to acknowledge Dr. Phillip Dawson and Clifford Amoako for assistance in conducting the student interviews described in this study. Additionally, the authors would like to thank Dr. Allie Ford, Basil K.C.D. Cahusac de Caux, Cuong Hoang, Cho Kwong Charlie Lam and Ricky Lau for helpful discussions during the preparation of this manuscript.

## Appendix

## End-of-Semester Quantitative Survey

1. What grade did you achieve in this unit?

- a) High Distinction
- b) Distinction
- c) Credit
- d) Pass
- e) Not passed
- f) I prefer not to say, or I don't know yet because I'm doing the deferred exam

If answer = f, skip to question 3

2. Do you think your grade is a good indicator of your understanding of the unit?

- a) Yes
- b) No

3. Were you aware that the coursework assessment regime was flexible?

- a) Yes
- b) No

If answer = (b), skip to Q9

4. Which of the following best describes the effect of the coursework assessment regime being flexible had on your approach to studying the unit in the early to middle weeks of the semester?

- a. It made no difference, I approached Critical Thinking, the first Coursework task, and Lecture Engagement in the same way I would have if the assessment regime was not flexible
- b. Because the assessment regime was flexible and on the understanding they would improve my performance in the Coursework tasks and the exam, I made a special effort with the Critical Thinking and Lecture Engagement assessments
- c. Because the assessment regime was flexible, I decided my time would be spent most effectively if I concentrated on the Coursework tasks, and paid less attention to Critical Thinking and Lecture Engagement
- d. None of the above

If the answer is not (d), skip to Q6, else do Q5

5. Since you answered 'None of the above' to the previous question, would you like to comment on the effect flexibility had on your approach to studying the unit?

6. The coursework assessment regime being flexible means that your unit result was based on the exam (60%) and all 3 assessments (Critical Thinking 15%, Lecture Engagement 10%, and three Coursework Tasks 15%), or the exam (80%) and only the three Coursework Tasks (20%), whichever gave you the higher score. Approximately when, during the semester, did you first clearly understand what flexible coursework assessment meant?

- a. Never, I did not understand that flexibility meant this
- b. Early in the semester; between O-Week and Week 3
- c. Between Week 4 and Week 7
- d. Between Week 8 and Week 12
- e. During the exam study period

7. To what extent did the fact the coursework assessment regime was flexible influence the result you achieved for the unit?

- a. It was the main reason I did not do as well as I wanted
- b. It was a significant reason I did not do as well as I wanted but not the main reason
- c. It had no effect
- d. It was a significant reason I did as well as I wanted but not the main reason
- e. It was the main reason I did as well as I wanted

8. In theory, the introduction of flexible assessment is believed to encourage students to study more effectively. Now thinking back over the semester, to what extent do you approve of the idea of a coursework assessment regime being flexible?

- a. I now think the idea was a very good one
- b. I now think the idea was a good one
- c. I now think the idea was unimportant and pointless
- d. I now think the idea did not make sense
- e. I now think the idea was a very bad one

Skip to Q10

9. The coursework assessment regime being flexible means that your unit result was based on the exam (60%) and all 3 assessments (Critical Thinking 15%, Lecture Engagement 10%, and three Coursework Tasks 15%), or the exam (80%) and only the three Coursework Tasks (20%), whichever gave you the higher score. In theory, the introduction of flexible assessment is believed to encourage students to study more effectively. Now thinking back over the semester, to what extent do you approve of the idea of a coursework assessment regime being flexible?

- a. I now think the idea was a very good one
- b. I now think the idea was a good one
- c. I now think the idea was unimportant and pointless
- d. I now think the idea did not make sense
- e. I now think the idea was a very bad one

10. What improvements to the flexible coursework regime or the unit generally would have helped you perform better in this unit?

11. How many times have you undertaken this unit?

- a. Once only
- b. Twice
- c. 3 or more times

12. Are you happy to talk about your answers to these questions with a researcher who is not involved in teaching this unit? If so, please provide both your name and email address.

## Building Understanding of High School Students' Transition to College

Nelson Nunez Rodriquez, Jacqueline DiSanto, Antonios Varelas,  
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A cohort comprised of high school and college teachers met for one year to build understanding of the critical transition of high school students to college. The seminar analyzed how current reforms in both systems will impact student skill development and preparedness for college work. The discussions highlighted the need to clarify expectations for college freshmen regarding syllabus policies, deadline observations, and the importance of defining consistent classroom management strategies. This program also focused on the need to increase the dialogue between high school teachers and college professors as there exists reciprocal unawareness regarding curricular changes and the learning environment faced by students at both academic levels.

A productive and longstanding dialogue between high school and university systems is an essential partnership for any educational scheme, yet it often remains elusive in practice (Baker, 2001). This dialogue is critical to develop a deep understanding of the expectations, issues, and changes in secondary education by the higher education faculty. The high school educators must also cultivate reciprocal awareness. In this regard, the implementation of the Common Core School Standards (CCSS) in high schools across the United States (US) reinforces the need for this dialogue. This reform defines expectations for the skills high school students must gain in English Language Arts, Literacy, and Mathematics in order to be college- and career-ready when they graduate from high school (Mathis, 2010). These uniform standards of proficiency inform teachers and parents on student learning objectives and achievements, and they create linkages between expectations from pre-K through college completion. Students impacted by CCSS will populate US college classrooms in the near future. As a consequence, there is a need for dialogue between high school and urban public universities, including community colleges, serving this student population in the US. A successful passage from the former to the latter requires building mutual understanding regarding current trends and ongoing reforms within respective curricula. The alignment of secondary and higher education curricula can also serve to motivate and engage students as they transition to the college (Jenkins, 2011). Indeed, the level of preparedness of first-year student populations has a significant impact on the student retention and completion in the US higher education system (Roderick, Nagaoka, & Coca, 2009).

What are the challenges and opportunities in making these plans work within individual classrooms and across high school and college campuses? Are college faculty members prepared to communicate classroom expectations to incoming first-year students based on general and specific high school experiences

resulting from CCSS? And, as public universities constantly revise the curriculum, what lessons have we learned? What challenges remain? Do our respective experiences inform one another?

This work describes the findings from a one-year seminar between community college faculty at an urban university in the northeast US teamed with teachers from local high schools to discuss pedagogy, the CCSS, and the skills and habits of students transitioning from secondary to higher education. This partnership provided real-life information derived from the professional experience of the high school teachers working with critical issues related to CCSS implementation to which the college faculty had not been fully exposed. This experience explored ways to understand student transition into post-secondary education and created a seminar model that helped to build mutual understanding of high school and university cultures. Overall, this practice aimed to improve college faculty understanding of high school reforms related to the development of student critical thinking, scientific literacy, and engagement; expose the high school teacher to pedagogical practices used to develop academic skills at the college level; and enhance the knowledge about assessment strategies and curriculum design used in both arenas. In summation, it sought to build mutual understanding about the progression of student skills development from high school to college-level developmental, introductory, and higher order college courses.

### Methodology

A year-long program brought together six faculty members at Hostos Community College, which is part of the largest urban public university in the US, and six teachers working in high schools located in the same urban area where the community college is located. On one hand, college faculty who participated belonged to chemistry, education, history, and psychology disciplines and included untenured and tenured faculty at assistant

and associate professorial ranks. On the other hand, high school teachers belonged to biology, English, and mathematics. This variety of content specialties and years of experience in the profession brought different viewpoints and naturally enriched the conversation. Indeed, one of the college faculty participants led the institution Center for Teaching and Learning for several years and other faculty participants were part of this center's faculty council. Therefore, all these instructors had been involved in several previous collaborations and knew each other's interest in these types of dialogues (Nunez Rodriguez, Brennan, Varelas, & Hutchins, & DiSanto, 2015; Varelas, Wolfe, & Ialongo, 2015). This acknowledged interest served as the initial criterion to select college faculty participants.

The selection of high school faculty required collaboration from many, including the Office of Institutional Research, Department of Education (DOE) liaisons, Graduate NYC! personnel, high school principals, and adjunct faculty from the participating college who teach in high schools. These college's high school faculty were approached first. Being unable to participate, the program developers—two participant college faculty—reached out to the Office of Institutional Research for data to examine the high schools from which most of the college freshmen come. Simultaneously, the DOE and Graduate NYC! liaisons were identified because these representatives had a long-standing collaboration with the New York High school system. These liaisons graciously identified principals who were willing to nominate and support their high school faculty. Further, the program developers used their collegial networks to recommend high school instructors as possible participants. The high school faculty who committed early also helped in the recruitment process by nominating their colleagues who expressed interest in participating after learning about the seminar.

The college is surrounded by many high schools. However, the differences in the school and college class schedules, the modest incentive being offered to participants, and the regularly scheduled monthly seminar meetings seemed to pose a bigger challenge to potential participants than originally expected. The college campus was established as the only meeting place for the seminar meetings, which meant that the high school faculty had to leave their institutions at the final bell and navigate all the obstacles associated with urban commuting to arrive in a timely manner. As an additional incentive, the college faculty secured funding to provide dinner for the participants at each meeting. Each high school faculty also received a roundtrip Metro Card and a modest stipend at the end of the seminar, both of which were funded by the Graduate NYC! grant.

The commitment of six high school faculty was crucial to the design of the seminar. The program director wanted a truly collaborative learning environment and so designed the seminar facilitation to be generated by pairs of faculty, one high school faculty with one college faculty. The even match-up was successful in creating a safe and supportive environment where educators learned from one another.

The setting was the South Bronx, one of the poorest Congressional districts in the United States. The college involved in the program serves almost 7,000 students. The majority of this population is low-income and first-generation. Additionally, 60 percent are Hispanic, and 22 percent are African-American. Most—86 percent of students—require remediation in at least one basic skill area, whether mathematics, reading, or writing (Office of Institutional Research, 2014).

Taking into consideration this student body profile, the seminar was intended to dissect assignment and assessment tools, thus reconciling college faculty expectations and high school student preparedness. Each month one college instructor and one high school teacher facilitated a topic-based session centered on common challenges and opportunities in preparing students to successfully transition from high school to college. Some of the topics discussed were: concrete curriculum design, dissecting assignment and assessment tools, reconciling college faculty expectations and high school student preparedness, and understanding non-academic factors that influence student achievement.

Seven monthly meetings took place during the 2013-2014 academic year. Two instructors facilitated each meeting: one high school teacher paired by shared interest with one college faculty member. This arrangement organically created ownership of the process during each session as all participants could choose their facilitated topic and the group member with whom to work. Meetings took place on Thursdays after the public school day ended and were held for 90 minutes at the involved college. This time frame considered both cohorts' availability. The seminar sessions started at 4:15 pm to allow teachers from nearby schools to reach the college campus. This consideration was critical to sustaining the long-term goals of the seminar overtime. A final presentation open to all college faculty and high school representatives was held at the college. All participants filled out a pre-experience survey during the first seminar and a post-experience survey during the last seminar session (Appendix A).

A regular custom of the seminar meetings was for all participants to share their thoughts at the conclusion of each session by writing in a journal. Each session devoted the last ten minutes of the meeting to this reflective practice. The journal booklets were collected

so that these entries could be shared with the presenters of the subsequent session. This allowed the presenters to consider these notes during their preparation of the next discussion that they would facilitate. Thus, subsequent presentations were built, in part, on previously shared outcomes. Furthermore, following the completion of the seminar, the program director and two faculty participants analyzed all of the written reflections and the pre- and post-surveys to compile a final report summarizing all program take-aways. This analysis revealed common themes expressed by all of the participants, as well as the ideas that each cohort took from the other and from the collective discussions.

### **Program Outcomes**

#### **The Seminar Format as a Product**

It was agreed during the first seminar meeting that a different pair of faculty would be facilitate each of the following sessions. In doing so, all participants took ownership of the project while nurturing a safe atmosphere between both cohorts. Indeed, during the first seminar all participants from the high school and college provided feedback for the initial organizational plan. As a result, the seminar timeframe and discussion topics emanated from this collective discussion. Table 1 illustrates the topics discussed. Seminars were developed based on short presentations and extensive conversations among participants. This created a healthy atmosphere for discussion as both high school and college teachers realized that they are facing similar challenges. Written comments from the participants reinforced the critical value of dialogue and idea sharing in the processes of successfully assessing and changing teaching strategies. Both high school and college faculty cohorts celebrated the opportunity to have a collaborative space for individual and collective reflections on teaching practice. They also noticed the value of having a safe space to conceptualize their work while remaining purposeful and mindful regarding the class syllabus. This was also reflected in the attendance of meetings, which was 70 percent or higher.

Our seminar arrangement generated a safe atmosphere that also embraced dissimilar preparation among participants to address the CCSS reform changes. The lack of requisite training of instructors to implement CCSS reform and other initiatives at both college and high school levels usually generated reluctance and fear about exploring new alternatives. Systematic faculty development initiatives should embrace faculty safe spaces to discuss and reflect on pedagogy. In this regard, the seminar developers clarified that all discussion should revolve around reform effects on student preparation. Other appropriate venues should be used to address the lack

of consensus that usually arises from any new program implemented in education systems.

#### **Take-Aways**

The seminar structure allowed each participant to reflect in writing at the end of each session. This strategy was critical to document participants' beliefs and ideas as the seminar progressed and the final thoughts of the participants at the end of the program, in addition to the pre-survey and post-survey that all participants filled out at the beginning and at the end of the seminar, respectively. Overall, survey results demonstrate that most participants (11 out of 12) either agreed or strongly agreed that, at the end of the seminar, they had a better understanding of the expectations that high school instructors have of graduating seniors. All participants indicated strong agreement that there is value in cross-institutional conversations that explore teaching practices at the high school and college levels. Most faculty members (11 out of 12) also indicated that they had at least some flexibility to adjust curricula based on ideas generated in this collaboration; they were either willing or very willing to change teaching practices based on ideas generated by this collaboration. All participants indicated they would be willing to participate in similar collaborations in the future. Only two faculty members had had past experience with cross-institutional collaborations like this one. All participants felt that this project either met or exceeded expectations.

#### **Participant Beliefs about Teaching and Learning**

Participants emphasized the need to balance faculty and student responsibilities in the learning process. It was recommended that faculty shift in practice from lecturers to facilitators; the group sought an increased role for student engagement in the learning process. In this regard, several participants developed awareness about the need to use creative classroom strategies to foster debate and discussion in both math and humanities classes. A college instructor shared an experience about successfully implementing a debate/disagreement interactive class format that helped students to better understand complex concepts and material. Other aspects discussed in the seminar included the ongoing debate between teaching skills or knowledge, syllabus creation, lesson planning, deadline policies, and non-academic factors influencing student learning.

**Content versus skills.** The emphasis on content or skills is a longstanding debate among educators (Tinto, 1999). The conversation and feedback revealed that college faculty still struggle to find the right balance of teaching content and developing skills such as reading comprehension. This debate has been part of nation-

Table 1  
*Summary of Meeting Topics and Schedule*

Meetings	Topics
Meeting 1 Facilitated by two college instructors	<ul style="list-style-type: none"> <li>- Pre-survey to assess teacher and faculty attitudes, and expectations</li> <li>- What Are Common Core Standards and current university curriculum revision, and how does each shape the high school/college classrooms and learning environments?</li> <li>- Seminar structure discussion: Ideas from all participants shaped final seminar structure</li> </ul>
Meeting 2 Facilitated by a college instructor and a high school instructor	<ul style="list-style-type: none"> <li>- Syllabus structure   instructional planning</li> <li>- Alignment of course outcomes, assignments and assessment tools with university curriculum revision, college or high school student learning- outcomes, and Common Core Standards in high school or skill core-competencies in college</li> </ul>
Meeting 3 Facilitated by a college instructor and a high school instructor	<ul style="list-style-type: none"> <li>- Fostering curiosity/motivation to learn (factors that generate it in both faculty and students)</li> </ul>
Meeting 4 Facilitated by a college instructor and a high school instructor	<ul style="list-style-type: none"> <li>- Class expectations (for both students and faculty)</li> <li>- Class objectives (connection with course objectives, Common Core, and core competencies)</li> </ul>
Meeting 5 Facilitated by a college instructor and a high school instructor	<ul style="list-style-type: none"> <li>- Assignment Design</li> </ul>
Meeting 6 Facilitated by a college instructor and a high school instructor	<ul style="list-style-type: none"> <li>- Course Assessment (its connection with current university curriculum revision)</li> <li>- Post survey to assess teacher and faculty attitude, expectation, and pedagogical changes based on the seminar</li> </ul>
Meeting 7 Facilitated by all participants and open to college faculty and high school communities	<ul style="list-style-type: none"> <li>- Seminar outcomes: participant change regarding teaching beliefs, types of assessment, and strategies used in high school and college</li> </ul>
Meeting 8 Dissemination Plan All Participants	<ul style="list-style-type: none"> <li>- Final report with recommendations was submitted to the funding agency</li> <li>- Findings were presented at a university-wide conference</li> </ul>
College Faculty College Faculty	<ul style="list-style-type: none"> <li>- Findings were presented at a national conference</li> </ul>

wide conversations in the US about pedagogy. Recommendations from the Association of American Colleges and Universities (AACU) brought attention to the need to attune higher education with our volatile and interdependent world (AACU, 2007). Based on these reports, our society expects from college

graduates critical thinking, quantitative reasoning, problem solving, and cultural competencies regardless of the specific majors. Many seminar conversations revolved around alternative ways to improve student skills in math and language arts. One high school instructor shared that CCSS represents an opportunity



to teach and understand mathematics as a process/inquiry-based subject rather than a right-or-wrong answer approach. In this regard, high school teachers found an advantage in recategorizing the overall objective of a content area to explain the complexity of reading comprehension in high school. One secondary teacher reported that students were more receptive to the statement, “I am not going to teach you how to read; I will help you to better understand what you are reading.” This culture shift is particularly helpful for English language learners who simultaneously are learning a new language and new content. The awareness of these math and English high school instructors regarding the need to develop student cognitive skills plus disciplinary knowledge in preparation for the college transition found a certain level of reluctance among parents, as the instructors reported. However, the high school instructors participating in the seminar celebrated that college instructors validated these secondary school interventions fostering better preparation for student transition to college.

**Syllabus versus lesson plan.** College faculty expressed that they are more likely to pay greater attention to the content of a syllabus whereas high school teachers articulated a strong focus on lesson planning. College faculty understand syllabi as living documents, and revisions during the term are discussed with students; therefore, they trust the information found in the syllabus. College faculty participants who teach introductory courses reported that first-year students experience a shock when transitioning from a structured classroom based on lesson plans to college classrooms that rely on the broader syllabus. Students usually do not assimilate excessive syllabus information during the first days of class. Weekly updates regarding class pace and expectations were recommended. In this regard, initial classroom experiences appear to be critical in clarifying student and instructor expectations, defining class tone, and creating a safe atmosphere for learning. Several first-day-of-class strategies to learn student names and appraise their knowledge, background, and attitudes toward learning were shared (Mortiboys, 2012).

**Deadline policies.** College faculty working with new students recognized the need to reinforce policies and deadlines as first-year students bring little understanding about necessary college skills. College faculty assume students bring habits related to deadline observations, maintaining good attendance, and other policies shared in syllabi, and this assumption is not necessarily accurate. High school instructors recognized the need to develop a culture of deadline observation. However, further dialogues are required with high school administrators regarding this point as it seems that a change of culture at the administrative

level is required to support high school instructors who are willing to reinforce this policy.

**Non-academic factors.** Both the college and high school cohorts recognized the need to decrease social distance between students and instructors as a way to address their social needs, backgrounds, and expectations regarding college education (Argaugh, 2001). For college faculty, it is a constant challenge to find the right line to maintain a balance among academic rigor, engagement, and establishment of rapport with students (Nunez Rodriguez, 2013). How can we reconcile the social and cooperative learning habits that high school students are bringing to college? Is this factor influencing the first-year student experience? Student fear and lack of confidence should be acknowledged by building environments that increase academic and social proximity between student and instructor and help them to develop a sense of belonging to higher education (Tierney, 2004). Evidence suggests that, if students with lack of preparation for college work connect somehow with the higher education system, they persist and develop a sense of belonging regardless of the academic barriers (Jensen, 2011). These aspects influencing student persistence are particularly critical in the student population served by institutions involved in this seminar.

**Classroom management.** Both high school and college instructor cohorts referred to the need to convert problematic situations into teachable moments. We should validate the role of mistakes in the learning process and build an atmosphere based on mutual trust and respect by valuing honest student feedback throughout the semester. Seminar discussions pointed out the need to maintain systematic and clear communication with students about class expectations. Otherwise, class management can be disrupted as students consistently misunderstand the instructor expectations. This approach opens several questions such as the role of note taking today. What is its usefulness during this digital learning era, as many students prefer taking pictures of the board or recording the instructor’s voice? Many faculty post recorded lectures on different digital platforms. Other students, as auditory learners, need to listen before writing in order to understand (Raupers, 2003; Roberts, 2003). It seems that both high school and college instructors assume that students will have learned how to take notes—and the importance of doing so—at some point during their academic journey. The same applies for appropriate behavior in academic settings. Clear guidelines regarding classroom behavior in academic settings should be explicitly explained to students when transitioning from high school to college. Many higher education institutions implemented a freshmen seminar as a high-impact educational practice intended to develop all these college skills in newly enrolled students (AACU, 2010). In this regard, several high-

impact practices such as first-year seminars and experiences, learning communities, and common intellectual experiences develop students' college preparedness at academic, behavioral, and social levels. These practices reinforce expected college behavior and prepare students with the intellectual and practical competencies such as critical inquiry, frequent writing, information literacy, and collaborative learning required in any college major (AACU, 2010). As a result of these conversations, the incongruence between college faculty expectations and high school students' academic preparedness and attitude toward learning in a college environment appeared as a critical barrier to a successful transition from high school to college.

### **Moving Forward: Impact on Future Practices of College Faculty**

College faculty agreed on the need to better clarify deadline policies. High school students bring the idea that deadlines are always flexible. It appears that high school administrators should play a supporting role embracing high-school instructors who want to reinforce deadline policies. College faculty recommended using weekly updates regarding class pace and expectations, concept maps, and weekly syllabus reminders to keep the class pace as expected. Appendix B shows interventions in a psychology class intended for first-year college students after the instructor's participation in this seminar. The instructor now takes into consideration the need to introduce entering freshman to the college culture. She stresses the nature of deadlines being inflexible for many college faculty and how she feels that it is important to learn to meet deadlines, so she accepts late work but with penalties. Additionally, she now presents the syllabi in smaller chunks rather than presenting the entire course calendar, which can be overwhelming to a new student. An additional change she has made is reminding students of due dates and upcoming deadlines rather than relying on students to keep track of the deadlines themselves. She has noticed a lot of students do not even put due dates in any type of calendar, even their phones. These changes should help students adjust to the increasingly demanding requirements of college courses.

Overall, the question regarding the extent to which college professors have to motivate students at all times requires further exploration. The resultant intervention in a psychology class after this seminar was one of many other ones reported by participants. Indeed, the high school teachers were invited one year later to a one-day seminar at the college to share how their work was impacted by the initial seminar. Several college faculty members started reporting even before the initial seminar concluded that they were revisiting their deadline

policies and other classroom management strategies to better support the first-year college students. It was a learning moment for all participants as we acknowledged the importance of clarifying expectations at the beginning of the course and verifying that students understood the message clearly. Specifically, several college faculty participants immediately incorporated a weekly discussion of the syllabus pace and content. Overall, participants recognized common classroom management challenges regardless of discipline and the need to have a systematic dialogue sharing effective classroom practices. Although higher education faculty, staff, and administrators recognize the importance of engaging and motivating students (Kuh, 2007), faculty feel they must find a balance between engaging in such motivation and insisting that their students are more self-directed and self-empowered in their college education.

The high school teachers agreed to develop strategies to allow students to create their own assignments and emphasize college expectations regarding classroom behavior and assignment mechanics. It means that more college-like assignments must be implemented at the high school level and that firmer adherence to deadlines must be a priority.

### **Collective Message**

All participants agreed on the need to increase the use of conceptual maps in the class (developing it in the class with students), and weekly syllabus reminders to keep the class pace. This will humanize the sometimes overwhelming college syllabus. Students also have to be exposed to academic environments that foster their capacity to take risks and develop their capability to act as free thinkers.

### **Pre-College Intervention**

One means of addressing the lack of preparedness of college freshmen students with regards to classroom behavior, deadlines, note-taking, and understanding a syllabus would be creating some forms of pre-college intervention with the local high schools. Specifically, this would involve a visit to the high schools by a college professor who would address the seniors regarding college expectations. Ideally, the visiting college professor would discuss with the high school teachers beforehand the high school's policies regarding classroom behavior, deadlines, etc., and then point out to the students what they should expect when they get to college that is different from their experiences. Handing out a sample syllabus and going over the requirements for behavior and deadlines, as well as explaining the grading scheme and the various components that make up the students' final grade, could also be a good way to acclimate students to college. Of course, these individual interventions would be

immeasurably improved if there were some formal relationship between local high schools and the college, wherein best practices for these interventions could be recorded, refined, and shared with an ever-increasing number of professors who could do such work in the most efficient and far-reaching manner possible.

### National Convening and Beyond

The question of how skills-based success, specifically under the CCSS, could be secured was posed to representatives from ten states at a national convening. The solution was posited as including the following: a) direct PreK-12 involvement with higher education; b) direct higher education involvement with PreK-12 curriculum; c) ongoing conversations; and d) the inclusion of arts and sciences faculty in mutual PreK-12/higher education involvement (J. DiSanto, personal communication, September 23-24, 2014). This discussion took place exactly one year *after* the high school teachers and college faculty began their conversation in the Bronx.

As the new normal in education must maintain widespread involvement across the academic stakeholders, and as states begin revising the standards and their application to provide more effective instruction, partnered conversations such as those discussed in this article will add additional support to faculty as they strive to bridge the gap between high school accomplishment and college expectations.

Although this collaboration took place before the convening and was born from mutual interest within the local community to strengthen the ability of high school graduates to succeed in college-level courses leading to an associate's degree, its existence was serendipitous as it provided the groundwork for addressing CCSS at the college. Over the past two years, at least 20 college instructors have attended a workshop on incorporating CCSS into lesson planning in courses across the content areas. Discussions included using the language of the standards in directions for assignments, beginning each session with a short writing assignment, and including benchmarks in rubrics that address specific language arts skills.

The intent behind these workshops is that incoming freshmen, who have worked under the CCSS while in high school, will be more comfortable with the language and objectives in their collegiate coursework and, therefore, be better able to meet post-secondary academic expectations. As part of a separate grant received by faculty in the Early Childhood Teacher Education program, the directions, rubrics, and materials were revised to incorporate specific Language Arts/Literacy standards.

### Final Thoughts

The majority of seminar members reported having a better understanding of high school expectations regarding graduating students. Both high school and college groups overwhelmingly support the need for continuing this type of dialogue. Seminar participants showed great willingness to implement as many of the above-discussed ideas in their curriculum as their syllabi and lesson plans allow. No attendee had prior experience participating in an exchange about high school and college culture. This seminar made all of us cognizant of how strongly dialogue and understanding are needed among high school and college cultures. Members of both cohorts are eager to investigate other challenges and opportunities. Future professional-development initiatives for high school and college instructors should consider the dynamic changes of both systems and how these constantly affect first-year college students. Their transition to higher education settings is a critical step in their success.

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#### Acknowledgements

Authors acknowledge the financial support from Graduate NYC! College Readiness and Success Project.

## Appendix A

## Evaluation Tool: Post-Project Survey for Participants

**The College or High School I am from is:**

**I have a better understanding of the expectations that high school instructors have of graduating seniors.**

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

**I have a better understanding of the State Common Core Learning Standards for English Language Arts & Literacy.**

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

**There is value in cross-institutional conversations that explore teaching practices at the high school and college levels.**

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

**To what degree is there flexibility to change curriculum based on the ideas generated by this collaboration?**

☐ A great deal of flexibility ☐ Some flexibility ☐ Neutral ☐ Little flexibility ☐ No flexibility

**To what degree would you be willing to change your teaching practices based on the ideas generated by this collaborations?**

☐ Very willing ☐ Willing ☐ Neutral ☐ Somewhat willing ☐ Not willing

**I have, prior to this project, participated in cross-institutional conversations that explored teaching practices at the high school and college levels.**

☐ True ☐ False

**Why did you agree to participate in this project? What do you see as the most important outcome of this project?**

**Did the project meet your expectations? Please explain**

**Would you like to participate in similar collaborations in the future?**

**Any final thoughts that can help to further develop future and similar initiatives?**

## Appendix B

### Psychology 101 Syllabus Fall 2014: Class Intervention

#### **Interventions at Classroom Management Level**

- Improve communication regarding observing assignment deadlines, attendance, punctuality, class work, and class participation;
- Improve guidelines regarding student engagement linked to online assignments (critical for the below hybrid course syllabus);
- Improve explanation regarding class etiquette, cheating.
- Based on conversation with high school teachers, a detailed explanation of the syllabus the first day of classes and handing a copy of it do not seem enough. Weekly reminder in class or in blackboard works better.

#### **College Work Preparedness**

- To improve communication regarding assignment expectations. It means find ways to clarify if students really understood assignment mechanics and expectations;
- To improve communication regarding assigned readings and text comprehension;
- To refine assignment mechanics in order to harmonize course level expectation with student preparation. Either a common assignment or common rubrics might be explored to align all course sections.

## Competency-Based Education in a Traditional Higher Education Setting: A Case Study of an Introduction to Psychology Course

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This paper presents a case study of a Competency-Based Education Introduction to Psychology course conducted in a small, private, traditional university in the western United States. Two competency-graded sections were offered, one online and one in the classroom. Eleven undergraduate students completed the online section, and 24 students completed the classroom-based section of the course. For both sections, we present the course design including learning outcomes, course projects, grade assignments, instructional methods, and both student and instructor reflections on learning outcomes. This case study illustrates how competency-based courses can be designed and executed in a traditional academic environment in both online and classroom-based courses.

Competency-Based Learning (CBE) is a relatively new development in traditional higher education (Morcke, Dornan & Eika, 2013), but it has been in use since the 1990s in secondary education (e.g., Sullivan & Downey, 2015), adult degree completion programs (e.g., Klein-Collins & Olson, 2014), and medical education (e.g., Harden, Crosby & Davis, 1999). Course development in CBE consists of establishing standards for mastery of knowledge, skills, and abilities that demonstrate learning, as opposed to a “seat time” model that uses student time in class to grant credits toward college graduation (Council for Adult and Experiential Learning, 2013). CBE also differs from traditional “input” models where a good deal of the focus and planning priority is given to instructional process (i.e., teaching) instead of more focus on results (i.e., demonstrable learning outcomes; Harden et al., 1999). The purpose of this paper is to examine elements of CBE through the literature and a case study of a course in a traditional higher education semester, as well as to make recommendations for future use of CBE.

During the 1990s, medical education served as a precursor to the CBE approach because it was largely focused on measuring skills doctors needed to practice medicine successfully (Albanese, Mejicano, Mullan, Kokotailo, & Gruppen, 2008). As a result, peer-reviewed literature on CBE in higher education is largely limited to vocational training (e.g., Smith, 2010) and clinical/medical settings (e.g., Ten Cate & Billett, 2014). In the professional training literature, CBE is conceived of as a developmental progression through which students achieve skills, knowledge, and attitudes with the ultimate goal of serving the public as competent professionals (Hatcher et al., 2013). While there is research focused on professional training, a search in PsycINFO®, the primary database in the field of psychology, for the terms “Teaching Methods,” “College Students,” and “Competency-Based Education” with a peer-reviewed limiter yielded 0 results. Non-peer-reviewed case studies appear to be the primary source for information for Competency-Based Education in a traditional college

setting (e.g., Klein-Collins & Olson, 2014).

In recent years, a critical mass of literature on CBE-styled competencies and assessment has emerged (Council for Adult and Experiential Learning, 2015); however, there remains a paucity of peer-reviewed literature on CBE-based curriculum design that can bridge the gap between competencies and assessment. As expressed by Morcke and colleagues (2013), CBE is “tightly linked to the assessment and regulation of proficiency, but less clearly linked to teaching and learning activities” (p. 851). In essence, there is rising interest in CBE for higher education (Seifert & Chapman, 2015) but a dearth of literature to demonstrate how to implement CBE, such as through project-based learning. In this paper, we describe two competency-based sections of an Introduction to Psychology course, one online and the other classroom-based. Both were taught in an American liberal arts university setting within a traditionally-graded semester structure. Not only is this the first paper to demonstrate CBE Implementation in such a setting, it is also the first to wed all three essential aspects of CBE (i.e., competencies, implementation, and assessment) in one model.

### Project-Based Learning as CBE Platform

Project-based approaches focus on the student’s use of knowledge, skills, and abilities to design a product, “deliverable,” or experience that offers meaningful solutions to relevant questions (Lee, Blackwell, Drake, & Moran, 2014). The connection between project-based learning and competency-based learning offers a promising link and was the primary approach used in the course we discuss in this paper. The project-based platform requires that students move beyond *stating* what they have learned to *using* what they have learned to create change and advance solutions. Exams are not used to measure outcomes: outcomes are measured via projects that demonstrate the student’s knowledge.

The tie between CBE and project-based learning can be traced to a case study that appeared in the *Teaching of*

*Psychology* in 1978 (Dilendik). In the case study, Dilendik described how he used projects to form a teaching and learning platform as well as “competency statements” to evaluate those projects (1978). Though this “first mover” case study made explicit the connection between projects and competencies, few competency-based courses and programs use projects as a basis for attaining competencies (C. Seifert, personal communication, December 22, 2015).

Students whose learning is accomplished by completing projects have been shown to learn more than their counterparts who experienced traditional methods of teaching and learning (e.g., Barak & Dori, 2005). For example, undergraduate chemistry students who engaged in a computer-based project that required them to seek scientific information, apply chemistry theories, and create molecular models on the computer scored better on a final examination than students who worked on traditional problem sets (Barak & Dori, 2005). Summers and Dickinson (2012) found that high school students who learned social studies through project-based instruction performed better on measures of social studies achievement than students who learned through traditional methods, such as lectures and tests. Additionally, the high school students who learned through projects showed better career readiness than their traditionally-instructed peers (Summers & Dickinson, 2012). Jiang, Parent and Eastmond (2006) showed that project-focused, competency-based learning graduate courses showed a higher completion rate than quiz-focused CBE courses.

### Learning Advantages in CBE

In a CBE model, students determine the pace and focus of the learning process; they continuously gauge their own progress and are responsible to select individualized and targeted learning activities (Harris, Snell, Talbot & Harden, 2010). Students identify and adjust to their learning needs to attain competencies and, through achieving competencies, they gain self-reflection about their learning needs (Harris et al., 2010).

Students seem to have heightened engagement in the learning process with the CBE model. High school students who participated in a competency-based program were viewed by their teachers as working together, engaging in peer teaching, taking responsibility for learning, and attending class more frequently than in a traditional model (Sullivan & Downey, 2015). Dilendik (1978) found that students identified more personal relevance in their learning in a project- and competency-based Educational Psychology course. Sullivan and Downey (2015) noted a high level of engagement among teachers as

well as more relevance, significance, and meaning in the delivery of content in a CBE setting.

### Rubrics in CBE

Competencies are not only the basis for learning in CBE, they are also the basis for evaluation and feedback. When feedback goes beyond mere correction, it is fluidly intertwined with, and a key element of, instruction (Hattie & Timperley, 2007). Rubrics as a vehicle for conveying expectations and sharing feedback are especially well-suited to the CBE model, because they can readily be framed in such a manner to evaluate the degree to which or whether students have demonstrated competencies. Furthermore, rubrics provide a structure for targeted, relevant, and detailed instructor feedback to students. At its most ideal levels, the process of feedback and evaluation becomes not only the endpoint of learning, but also the motivator and method of learning.

Shute (2008) noted that feedback is successful when it is task-based, specific, manageable, and focused on learning. Furthermore, Carless, Salter, Yang, and Lam (2011) and Shute (2008) found that feedback that is written or computer-based is more beneficial because it promotes objectivity. Specifically, students value rubrics because of the transparency and fairness they provide, as well as the clarification about the goals for their work and knowledge about their progress (Reddy & Andrade, 2010). The CBE approach may be ideally suited to the use of rubrics because competencies are readily rendered into a specific, concise, and measurable form. Rubrics and competencies that include feedback and expectations about processes and needs for student self-regulation are more likely to benefit students in the learning process than feedback about students' traits, or “self” (Carless et al., 2011; Hattie & Timperley, 2007).

### Challenges Posed by CBE

A competency-based approach to a course requires careful work to identify target competencies and to create appropriate metrics for determining the degree to which competencies are achieved (Rivenbark & Jacobson, 2014). This process presents a range of challenges. Sullivan and Downey (2015) noted that instructors and administrators who participated in a program for development of competency-based courses found the work to be highly time-consuming and labor intensive (Sullivan & Downey, 2015). The need for collaboration and buy-in for competencies was identified as a challenge for groups of administrators and instructors approaching a competency-based process (Steele et al., 2014).



As happens with any curriculum change, faculty resistance to CBE is a challenge (Roberts, 1976). Faculty may resist implementing CBE due to objections with assessment practices that focus on student learning outcomes. Most relevant to rubric use are concerns about the time-intensive nature of developing systems for evaluation and, for some, concerns that learning is too complex to be measurable (Linkon, 2005). Reddy and Andrade (2010) posit that a lack of understanding about rubrics may contribute to instructor resistance to using them for evaluating learning in their courses. This “rubric resistance” could prevent a number of faculty from exploring CBE due to the central role of the method for evaluating learning. Other faculty may misperceive that including learning outcomes on a syllabus constitutes a competency-based approach, without understanding the in-depth process required for CBE (e.g., Rivenbark & Jacobson, 2014). Because of these and similar concerns, any CBE development process should be approached with acknowledgement of the difficulties associated with it and will likely require considerable attention to the concerns of faculty.

Steele and colleagues (2014) identified the need for skillful, creative, and engaged teaching in CBE classrooms. CBE instructors need to engage students in active learning, center instruction around students, allow flexibility in course design, and assure that learning activities are appropriate for work that will be assessed (Harris et al., 2010). CBE also creates demands for strong assessment of courses and programs to determine what students are learning so that it is a “basis for providing guidance, rather than blundering blindly in the dark.” (Gauthier, 2013, p. 438). In order to engage in a successful CBE process, instructors need to possess the traits and experience necessary to organize, support, and evaluate student learning.

Another challenge with CBE comes when applying it in a traditional classroom. To date, no published work has addressed this issue. It is important and timely to bring CBE to the traditional grading structure, structured academic calendar, and classroom setting upon which most universities rely. Doing so brings CBE into the “here and now” of higher education and bridges a gap between online and classroom based instruction, making it applicable in the present academic environment.

### Aims of the Project

In this paper, we outline the development and implementation of two sections of a competency-based Introduction to Psychology course, one online and one in-person, that employed a project-based approach. The questions posed were:

- How can CBE work in a traditional undergraduate semester-based setting?

- How can a letter grade requirement be achieved in a competency-based model?
- Do CBE outcomes differ between online and classroom-based environments?
- What CBE learning experiences are reported by students accustomed to more traditional college classrooms?
- What were the course design and instructional experiences and challenges faced by the course designers and instructors?
- What do the authors recommend for others approaching a CBE design and course delivery process?

### Case Study: Competency-Based Introduction to Psychology

An institutional grant award committee selected Introduction to Psychology as an appropriate course to which a competency-based model could be applied. The majority of students in the course are typically first-year undergraduates with 25-50% of students in sophomore (2<sup>nd</sup>) to senior (4<sup>th</sup>) years. Majors represented in the course range widely from psychology to nursing, business, and education. Class size is capped at 25. The classroom-based section was nearly full to the 25-student cap with 24 students, while 11 students were enrolled in the online section. A month prior to the start of the semester, an email was sent to students registered in the CBE sections (see Appendix A).

In recent years, many professional associations, such as the American Society for Microbiology, American Association of Colleges in Nursing, and American Statistical Association and have created curriculum guidelines for undergraduate majors in their related discipline (American Association for Colleges of Nursing, 2015; American Society for Microbiology, 2015; American Statistical Association, 2015). The American Psychological Association (APA), the professional association with which Psychology departments are aligned, likewise developed guidelines for undergraduate majors (American Statistical Association, 2013). The APA Guidelines for the Undergraduate Psychology Major: Version 2.0 (2013; hereafter referred to as “Guidelines”) delineated goals, outcomes, and indicators at foundational and baccalaureate levels that describe and define undergraduate psychology education.

The Guidelines contain 19 student outcomes that are evidenced by dozens of measurable indicators. We selected 42 indicators from the Guidelines (2013) to use as course competencies, based on their relevance to an Introduction to Psychology course. The 42 indicators were organized into six different learning goals: Scientific Investigation, Information Literacy, Ethical/Social Responsibility, Effective

Table 1  
Descriptions of Badges.

Name of Badge	Description
Scientific Inquiry	Explaining why psychology is a science, using scientific reasoning, and understanding research principles
Information Literacy	Asking questions to effectively use databases for locating and using high-quality sources and academic literature as a basis for understanding.
Social & Ethical Responsibility	Understanding diversity, as well as challenges and recognition of the role of culture and other differences in research and in life. This badge includes advocating for outcomes that can benefit individuals and society.
Effective Communication	Citing, writing, presenting, and relating with others.
Academic Best Practices	Understanding and using high levels of academic integrity, fostering curiosity, displaying professionalism, and assessing one's progress.
Applied Content	Knowledge and accurate use of principles and terms, asking questions and understanding methods, and application of content to real-life situations.

Communication, Academic Best Practices, and Applied Content.

For the sake of organization and clarity, we used a gamification principle to use badges to represent groups of competencies with each of the six learning goals (See Table 1 for a description of badges) (Urh, Vukovic, Jereb, & Pintar, 2015). The practice of gamification is the application of elements of board or video games in educational practices. One commonly used strategy in gamification, earning badges, increases motivation through visible forms of learning achievement (Huang & Soman, 2013). For a middle-level of organization between specific competencies and broadly defined badges, we grouped the competencies into Psychology Achievement Knowledge and Skills sets that we called *PAKS*.

### Badges and Grades

There were five required student projects in the course. Projects were completed in two steps, both of which were framed by detailed instructions. In the first step, the students submitted a written plan for the project. After the instructor provided feedback on the plan, students began work on their project. While students were engaged in their project work, instructors actively provided guidance and feedback. In the second step, the students submitted their

"deliverables," which ranged from a written advocacy statement to a narrated slideshow. Students also submitted learning reflections with their project "deliverables." Following the first submission of the project, students had the opportunity to submit a revision, incorporating instructor feedback from their first draft. Though this process was both writing-intensive for students and grading-intensive for instructors, it allowed for the iterative and developmental process of learning.

A rubric was used to evaluate the competencies on each Plan and Project. Because a traditional letter-based grade was needed for each student at the end of the course, each rubric specified the standards for meeting competencies at three different quality levels. Gold reflected excellent/outstanding levels of achievement, Silver reflected proficient/good achievement, and Bronze reflected marginal, but passing/adequate, achievement. Table 2 outlines the number of earned badge levels that translated into different course grades. To pass the course, students needed to earn each badge at the minimum of a bronze level.

Each plan and project was designed to demonstrate multiple competencies within Badges. Therefore, by the end of the semester students demonstrated most of the competencies multiple times. See Appendix B for the full competency grid used for grading.

Table 2  
Course Grades for Performance on Quality Levels for Badges

Gold Badges	Silver Badges	Bronze Badges	Course Grade
6	0	0	A
5	1	0	A
5	0	1	A-
4	2	0	A-
4	1	1	B+
			...etc

Table 3  
Content Coverage and Project Types

Project Title	Project Summary Description	Deliverable/ Work Product	Associated Content Unit
Thinking & Writing Like a Psychological Scientist	“To correct mistaken beliefs about the field of psychology, to understand psychology as a science for more sophisticated and realistic views of the field, and to exercise critical and analytic thinking skills when reading about psychological research reported in the popular media through comparing popular press accounts of a study to the actual research report.”	Written analysis of how psychological myths are based on poor scientific thinking. Written comparison between good and poor quality popular press research reports and between popular press and peer-reviewed sources for the same study	Thinking & Writing Like a Psychological Scientist
Mythbusting	“To expand on your ideas begun in the Thinking & Writing Like a Psychological Scientist project about mythbusting and to create mythbusting information to share publicly.”	Three blog posts on a myth in the content area, including one myth that has social justice implications.	Cognitive Psychology & Neuroscience by group consensus in both sections for the first project.
Curation	“To collect and critique internet information about a topic in a content area covered in this course.”	Content curation website with critique/ commentary at <a href="http://www.scoop.it">www.scoop.it</a> .	Varied by student choice.
Advocacy	“To use psychological methods, sources, and content to promote civic, social and/or global outcomes that benefit others.”	Mock congressional testimony or position paper.	Varied by student choice.
Observational Research	“To conduct a small study from start to finish using observation as a method of collecting data.”	Narrated slideshow research report.	Varied by student choice.

### Content Coverage and Project Types

Learning material was divided into the five units believed to be most fundamental for an Introduction to Psychology course. This represented a significant paring down from the typical Introduction to Psychology course. It was a deliberate decision to favor depth over breadth. The first unit focused on the process skills of thinking & writing for psychology and the latter four units on content areas that are most fundamental and commonly covered in

Introduction to Psychology Courses. The content areas were Developmental Psychology, Social Personality Psychology, Cognitive Psychology & Neuroscience, and Clinical Psychology. Projects are described in Table 3.

### Project Example

Given the novelty and complexity of the design, it may be helpful to describe one of the projects. The purpose of the Advocacy Project was to use psychological methods,

sources, and content to promote civic, social and global outcomes that benefit the mental health of others. The Advocacy Project could take many forms and the objective was to convey evidence-based recommendations to organizations or lawmakers (e.g. a letter to an editor, a letter to a representative, a meeting with a representative, a white paper for a non-profit). Before starting, students received detailed instructions for the Advocacy Plan and the Advocacy Project. As with all the projects, the instructions are designed to define expectations, provide background information, and delineate the connections between the project and the competencies. The rubric for the Advocacy Project illustrates how multiple competencies are demonstrated at multiple levels in the project. Table 4 shows sample elements from the Advocacy Project rubric and Table 5 outlines which PAKS and badges were addressed through the project.

### Online and Classroom Course Designs

Learning was paced differently in the online and classroom-based courses. In the online course, student progressed through the content and projects at their own pace. Though they needed to competently complete all projects by the end of the semester, they could complete project work up to 2 weeks prior to each milestone deadline. The online course used the Canvas Learning Management System by Instructure to present modules to students that became available at least a week prior to the relevant time frame during the semester. Modules included general information (e.g., syllabus and grading information), project descriptions, and then each of the content units that consisted of a road map (see Table 6) that led students through content enhancements to assigned reading.

Table 4  
Advocacy Project Rubric Sample Competencies

Advocacy Project Rubric Areas of Achievement	Level of Achievement: Gold	Level of Achievement: Silver	Level of Achievement: Bronze	Competencies
Academic Articles	Use of peer-reviewed article shows reasonable accuracy and initial understanding.	Use of peer-reviewed article shows some initial understanding	Use of peer-reviewed article shows some limited initial understanding.	2.2a Read and summarize general ideas and conclusions from psychological sources accurately
Database Strategies	Research demonstrated very good use of databases and sources of information	Research demonstrated good use of databases and sources of information	Research demonstrated adequate use of databases and sources of information	2.2c Identify and navigate psychology databases and other legitimate sources of psychology information
Scientific Reasoning	The position paper/mock testimony and advocacy work demonstrate strong reliance on scientific inquiry rather than myths, emotion, or personal values.	The position paper/mock testimony and advocacy work demonstrate very good reliance on scientific inquiry rather than myths, emotion, or personal values.	The position paper/mock testimony and advocacy work demonstrate reliance on scientific inquiry rather than myths, emotion, or personal values.	2.1B Develop plausible behavioral explanations that rely on scientific reasoning and evidence rather than anecdotes or pseudoscience
Principles and Terms	Use of terminology is effective to convey explanation of behavior that relates to the issue.	Use of terminology is adequate to convey explanation of behavior that relates to the issue.	Use of terminology conveys explanation of behavior that relates to the issue.	1.1a Identify basic biological, psychological, and social components of psychological explanations (e.g., inferences, observations, operational definitions, interpretations)

Table 5  
Advocacy Project Badges and PAKs Addressed

Badges	PAKS (Psychology)
Scientific Inquiry	Scientific Reasoning
Information Literacy	Academic Articles
	Database
	Quality Sources
Social/ Ethical Responsibility	Advocacy
Communication	Citing
Academic Best Practices	Feedback
	Professionalism
Applied Content	Principles & Terms
	Application

Table 6  
Example Road Map to Guide Students Through Content Units in Online Course

Read	Extend Your Learning
[Textbook] Module 9: Developmental Issues, Prenatal and Newborn Development Optional: Quiz Yourself	Learn from the video on conception and birth and from the TED talk on prenatal learning.
[Textbook] Module 10: Infancy and Childhood Optional: Quiz Yourself	Watch videos to see infant development research in action. Learn about temperament, the (more) biological foundation of personality, from a recorded lecture.
[Textbook] Module 11: Adolescence Optional: Quiz Yourself	Listen to chair of the Neuroscience Department, discuss “What’s Up with Your Brain?” Printable handout here. Optional: TED talk on the adolescent brain.
[Textbook] Module 12: Adulthood Optional: Quiz Yourself	Learn about how career counselors work with young adults. Explore Views on Aging

In the classroom-based version of the course students were required to move as a group through the process on a predetermined course schedule that ran the duration of the semester. After students completed foundational reading for a new unit, the students engaged in classroom-based discussions and activities that sought to integrate, apply, and extend their reading. This portion of each unit looked similar to what one might find in a conventional classroom. During this phase of each unit, students completed “One Minute Papers” summarizing their classroom based learning

and “Reading Reflections” summarizing the learning they gained from the required reading. Once the students, as a whole, seemed able to effectively use the foundational content, the instructional model shifted to a laboratory design. Students used class time to work on their individual projects that related to the content unit. This portion of the classroom-based section was led by an instructional team that included the instructor and 3 course assistants (1 graduate assistant and 2 advanced undergraduate students) who were available to provide support and guidance to students while working on their

individual projects. Once a student successfully completed a unit project, attendance at the remaining lab sessions for that unit became optional. This flexible model required “real time” feedback on student projects and was “high touch”; the instructional team needed to track each student’s progress through projects.

### **Student and Instructor Outcomes**

#### **Student Reflections**

At the end of the course, students were asked to evaluate their learning experience in the CBE format. Although the final reflections were assigned as a course requisite, they were not read until after the conclusion of the course and therefore did not influence the students’ final grades. Overwhelmingly, the students found the CBE format to be both helpful in solidifying their learning, as well as requiring significantly more time management than a traditional course structure.

Students reported that adjusting to being graded on the achievement of several learning goals, rather than receiving a single letter grade for the entire assignment, was initially challenging and, as they adjusted to meeting the expectations of the assignment rubric, the grading standards became clear. One student described, “I believe that [CBE Grading] is a much more valuable and efficient way of determining the quality of an individual’s work.” When describing how a CBE class is different from a traditional class, students emphasized that the grading system is based on how well students understand and apply the material rather than how well they have memorized content.

The students recommended that incoming students be prepared to carefully read the grading rubrics and be prepared to self-motivate and work independently. Students recommended the following for peers who undertake CBE course work for the first time:

- “I would advise to another student to be prepared to invest a proper amount of time for the assignments given. There is no way that a project could be done in a small amount of time. Be prepared to think outside of the box and be willing to take advantage of the resources given to you.”
- “Aim to get as many golds as possible, always do revisions, and allow yourself plenty of time to work on the projects.”
- “I would tell a student who is taking a CBE course for the first time that they should focus on truly understand the information given in class and in the required texts.”

Student advice for preparing in advance, having goals for high grades, using resources, and learning from reading

could be found in most university courses. This is an indication that, while CBE is a novel format for students in a traditional higher education setting, the learning process shares similar qualities with most any pedagogy.

More unique to this format, students also noted that secondary learning was achieved through the CBE format, and that this increased their competence in other classes and work environments. Students said that the project-based format provided the secondary gain of increasing their time-management and planning skills. Seemingly, the consistent project rubric requirements, such as the use of proper citations and supporting claims with scientific evidence, increased students’ attention to these competencies, which increased their knowledge acquisition in these competency areas. A student noted that by working toward earning the Social and Ethical Responsibility badge, he was better able to “appreciate all the blessings in my life and come at issues from a different point of view.” When reflecting on how the skills acquired in the CBE format could be applied to other classes or profession settings students described that they learned to value feedback as a learning tool for improvement and to effectively manage their time to meet deadlines. Students also frequently reflected that they thought they benefitted more from having to apply course concepts to projects, rather than memorizing material for the purpose of passing a test.

Perhaps most importantly, students said that they learned more in the CBE course than they believe they would have learned in a traditional course. From the online course, one student said, “I think that the CBE style was a very effective way to learn and I am positive I learned as much if not more than I would have from a traditional style class. I say this because of the way we had to do our projects to fit the CBE style.” Students reported that they learned auxiliary skills, such as creating a blog or how to create an advocacy campaign, from the project requirements. Further, students reported that they benefitted from being able to revise their assignments to better meet all standards of the grading rubric, which allowed them to improve specific areas of weakness. Students also reported that they gained a greater depth of knowledge from the CBE format than they would have gained from a class model that did not rely on projects as the demonstration of knowledge.

The project-based learning model required students to exercise greater time management skills, which seemed to become easier to master as the semester progressed. Students found that the amount of work required for each project varied, and that the first projects were more difficult because of the amount of work required. Although students expressed that they disliked the amount of work required for the project proposals, they benefitted from completing a large volume of the final work ahead of time. The classroom

course section was asked, “On a scale of 1-10 (1= “no way!”, 10= “absolutely!”), how likely are you to recommend this course to others?” Students responded with scores between 7-10, and they also commented that if they would have been asked the same question earlier in the semester, they would have responded with a lower score. It seemed that as students acclimated to the different learning and grading model, their affection for the model increased.

### **Instructor Experiences**

We noted that the course required a large investment of time and attention to detail. A higher degree of accountability was required to successfully implement the CBE curriculum because of the specificity and volume of the grading and revision process. Additionally, explaining the evaluation process, which was markedly different from the standards of grading in a traditional course, required considerable effort. Students seemed to have difficulty understanding how projects translated into badges and how badges translated into a final grade.

In both the online and classroom sections, instructors found that they spent an extraordinary amount of time evaluating and documenting competencies for each assignment. The amount of time required to accurately record earned competencies throughout the semester was due to the need to create and maintain a user-friendly system to represent student progress. For example, in order to earn the Scientific Inquiry Badge, there were 7 competencies that could be earned a cumulative total of 16 times during the semester. Not only did the instructors have to maintain meticulous records of student progress, but also individual learners needed to understand a complicated spreadsheet to assess their progress toward course completion and a grade. Course assistants were integral to keeping the competency spreadsheets updated.

Although the instructors had used grading rubrics in other courses, the rubric’s level of specificity and detail required significantly more time and attention than the norm. Also, because *all* assignments were graded on a rubric, and nearly all of the assignments could be resubmitted for revision, instructors graded as many as 15 projects per student during the semester (5 proposals, 5 projects, 5 revisions). The time required to effectively evaluate assignments can be understood as a requisite to instruct a CBE course.

Although instructing both the online and classroom sections required additional time commitment, the satisfaction we felt as instructors was noteworthy. The students’ response to the CBE model served to motivate us to complete our work. During the semester we found that the students were motivated to work on their projects and spoke with excitement and pride about

their artifacts and the achievements they represented. It seemed clear that students were engaging with the material in a manner that demonstrated that they could not only apply the course concepts, but that they could also analyze the material they were learning. In short, student learning far exceeded the basic accumulation of knowledge. At the conclusion of the course, instructors felt an increased sense of pride that they had successfully engaged students in a learning model that they reported enabled them to learn more than in a traditional course.

### **Recommendations**

We learned some valuable lessons while teaching this course. The following recommendations are based on student and instructor feedback and are designed to maximize student understanding and engagement.

#### **Instructor Preparation**

CBE courses require a high level of instructor commitment (Sullivan & Downey, 2015) and course development. Instructors need to be comfortable with, and competent in, the use of rubrics. This issue is critical: the literature suggests that a significant portion of instructors may resist the use of rubrics (Linkon, 2005; Reddy & Andrade, 2010).

#### **In-Person Orientation to CBE and the Course**

Students struggled to understand the CBE model in the early weeks of the course; therefore, a half-day orientation would allow discussion and clarification of the CBE model. It would enable students to adjust to the model with the support of their student colleagues. In addition to community- and comfort-building, the orientation would provide a way to set clear expectations and convey suggestions from previous students. Additionally, an optional technology training could help students learn how to use the online course platform and avoid technology frustration.

#### **Hybrid Format**

Initial confusion about the CBE model in the online format could have been minimized by periodic in-person meetings with instructors in addition to the orientation recommended above. In-person meetings were held between individual students and online instructors, but typically after heightened frustration and misunderstanding. It would be preferable to schedule in-person or online meetings between instructors and students at the beginning of the semester. A hybrid model, that combines live introduction to and discussion about the model and periodic, live group check-ins

would provide a better basis for students to gain comfort with the CBE model.

Initially it was difficult to determine how to reconcile time and project flexibility with the scheduled nature of the classroom-based section. To address this, as the semester progressed, a plan emerged that within each unit we would segue from a discussion-based and experiential group learning format to a laboratory format after basic comprehension of unit content was attained.

### **Accountability for Content Learning**

Students were held accountable for content learning through reading reflections and one-minute papers in the classroom-based section, but these “content checks” were not used in the online format. In some cases, students’ initial submission of projects in the online section contained little to no content basis or connection to the unit at hand. Based on this, we recommend online quizzes or reading reflections to make sure students have read and learned essential content.

### **Projects as Vehicles for Mastery of Competencies**

Similar to findings by Dilendik (1978) and Jiang and colleagues (2006), the student and instructor experiences in this course were that projects successfully engaged students as a platform for gaining skills, knowledge, and abilities.

### **Explicit Connection to General Academic and Workplace Skills**

A fortunate by-product of process-oriented competencies and project designs was that students reported benefits from the course that they anticipated using in future coursework and workplaces. Adding clear connections from competencies to outcomes that extend beyond the semester would enhance this aspect of the course for all students.

### **More Streamlined Competency Tracking**

Recording badge levels (gold, silver, bronze) for each competency using as individual spreadsheet for each student in a cloud-based spreadsheet program could best be described as “clunky.” The process was time consuming and was the source of initial confusion for students. Future applications of CBE where letter grades are required would benefit greatly from an instructional technology application or program to make this process easier for instructors and more understandable for students. Perhaps this is functionality that can be added to online course management systems.

### **Applicability to Other Disciplines**

Some disciplines have formal guidelines, developed by their professional associations, that delineate learning goals, outcomes, and indicators for academic majors (e.g., Harden, Crosby & Davis, 1999; Klein-Collins & Olson, 2014; Sullivan & Downey, 2015). In those cases, the process of establishing CBE curriculum is streamlined. However, many disciplines do not have formal guidelines. In those cases, we suggest that faculty might begin the CBE process by extracting learning goals from prior course syllabi and, using those goals as a starting point, consult with a behavioral scientists, likely a psychologist, and/or assessment professionals about identifying, defining, and measuring learning outcomes as competencies.

### **Implications for Future Research**

This case study lays groundwork for future quasi-experimental research comparing CBE with traditional methodology. In this framework, carefully selected pre- and post-test outcome measures could show differences in learning gains between the two formats of the same course. Standardized measures such as the ETS Major Field Tests (2016) for areas of study could be used in disciplines where content knowledge is of primary focus. In disciplines that place priority on process skills, projects from a CBE course could be compared with research papers from a traditional course using a rubric that employs common learning goals.

Other topics for future study might include student perceptions of the learning process, faculty attitudes toward CBE, and transfer of process learning to future academic and professional work. A particular area of focus could be on instructor preparation experiences, as we found the process to be arduous. Research could inform best practices in this area to create more efficient course preparation and evaluation. Similarly, student adjustment to the CBE model was equally challenging, and so research could be done on ways to facilitate student acclimation to the model.

Ultimately, we found that Competency-Based Education is an effective pedagogical tool for student learning. For instructors, beginning with learning goals is a best practice that is the center of CBE and stays in the forefront of course design, instruction, evaluation of student work, and assessment of the course. Students gained more ownership over their learning and found that learning can transfer to other settings and can be highly relevant in the form of projects based on realistic application with clearly-outlined end results. With improvements based on the recommendations above, CBE can provide an active and engaged basis for enhanced student learning in a traditionally-scheduled and graded semester system.



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## Appendix A

### *Letter to students registered in CBE Sections of Introduction to Psychology - 1 Month Prior to the Start of the Semester*

Hello, Students,

I am writing to tell you about two of the Introduction to Psychology sections this fall that will use a form of learning called Competency-Based Education (CBE). You are receiving this email because you are registered for one of these sections.

In CBE, students demonstrate learning through projects and the work is evaluated using a list of skills, abilities, and knowledge. Professors design the learning experiences that help students apply course content to real-world situations. A way to think of this is that you primarily learn through doing.

In the CBE Psychology courses, students will have choices about project types and will be presented with clear guidelines for demonstrating the type of learning needed for each one. While there is choice, there are also examples of typical assignments that are provided as well. This approach empowers students to make choices about the way they show what they have learned, presents some flexibility in the way learning is approached, and provides support and coaching from faculty member and course assistants.

Students who would likely enjoy and be successful in this style of learning like to:

- Take ownership over their learning
- Apply what they learn to real-life situations
- Be active and engaged throughout the learning process
- Use individualized feedback and guidance to learn more than any student might have thought possible.

Of course, these elements are present to some degree in other sections of Intro Psych; they are more prominent and more constant in the CBE sections.

If you have any questions for either or both of the instructors of these sections, please email [instructor names and email addresses] If you need help re-arranging your schedule or getting permission to register for a class, please contact [name and email of the psychology department chair]

## Appendix B

### Competency/Project Grid

Color Guide: Gold Silver Bronze							
Badges	PAKS	Competencies	Projects Where Competencies are Earned				
Achievement Areas that are comprised of competency areas	Groups of competencies	These competencies were selected from the American Psychological Association Guidelines for Undergraduate Psychology Major, Version 2.0.	Think/Read Like Psych Sci	Myth Blog	Obs Res	Advocacy	Curation
Scientific Inquiry	Psychology = Science	1.1b Explain why psychology is a science, with the primary objectives of describing, understanding, predicting, and controlling behavior and mental processes					
	Scientific Reasoning						
		2.1a Identify basic biological, psychological, and social components of psychological explanations (e.g., inferences, observations, operational definitions, interpretations)					
		2.1b Use psychology concepts to explain personal experiences and recognize the potential for flaws in behavioral explanations based on simplistic, personal theories					
		2.1B Develop plausible behavioral explanations that rely on scientific reasoning and evidence rather than anecdotes or pseudoscience					
		2.5a Relate examples of how a researcher's value system, sociocultural characteristics, and historical context influence the development of scientific inquiry on psychological questions					
	Research Principles	2.4g Describe the fundamental principles of research design					
		2.2e. Interpret simple graphs and statistical findings					
		3.1a Describe key regulations in the APA Ethics Code for protection of human or nonhuman research participants					

<b>Information Literacy</b>	<b>Question Driven</b>	2.1d Ask relevant questions to gather more information about behavioral claims				
	<b>Database Strategies</b>	2.2c Identify and navigate psychology databases and other legitimate sources of psychology information				
	<b>Quality Sources</b>	2.2b Describe what kinds of additional information beyond personal experience are acceptable in developing behavioral explanations (i.e., popular press reports vs. scientific findings)				
	<b>Academic Articles</b>	2.2a Read and summarize general ideas and conclusions from psychological sources accurately				
<b>Social &amp; Ethical Responsibility</b>	<b>Diversity</b>	3.2c Explain how individual differences, social identity, and worldview may influence beliefs, values, and interaction with others and vice versa				
	<b>Challenges</b>	3.3a Identify aspects of individual and cultural diversity and the interpersonal challenges that often result from diversity and context				
	<b>Recognition</b>	3.3b Recognize potential for prejudice and discrimination in oneself and others				
	<b>Advocacy</b>	3.3c Explain how psychology can promote civic, social, and global outcomes that benefit others				
<b>Communication</b>	<b>Citing</b>	4.1d Write using APA style				
	<b>Writing</b>	4.1a Express ideas in written formats that reflect basic psychological concepts and principles				
		4.1b Recognize writing content and format differ based on purpose (e.g., blogs, memos, journal articles) and audience				
		4.1c Use standard English, including generally accepted grammar				
	<b>Presenting</b>	4.2a Construct plausible oral argument based on a psychological study				

		4.2b Deliver brief presentations within appropriate constraints (e.g., time limit, appropriate to audience)				
	Relating	4.3e #1 Respond appropriately to electronic communications - Reflections I & II and Final Reflection.				
		4.3e #2 - Reply appropriately to electronic communications - Post and reply to online discussions				
Academic Best Practices	Academic Integrity	3.2d Maintain high standards for academic integrity, including honor code requirements				
	Curiosity	4.3d Ask questions to capture additional detail				
	Professionalism	3.2b Treat others with civility				
		5.3a Follow instructions, including timely delivery, in response to project criteria				
	Self-Assessment	5.2b Accurately self-assess performance quality by adhering to external standards (e.g., rubric criteria, teacher expectations)				
	Feedback	5.2c Incorporate feedback from educators and mentors to change performance				
	Engagement	Login Frequency or Class Attendance & Participation				
Applied Content	Principles and Terms	1.2a Identify key characteristics of major content domains in psychology				
		1.1a Use basic psychological terminology, concepts, and theories in psychology to explain behavior and mental processes				
	Questions and Methods	1.2b Identify principal methods and types of questions that emerge in specific content domains				
		4.2e Pose questions about psychological content (Completed in reflection papers)				

	Applications	1.2d Provide examples of unique contributions of content domain to the understanding of complex behavioral issues				
		1.3a Describe examples of relevant and practical applications of psychological principles to everyday life				
		5.1d Describe how psychology's content applies to business, health care, educational, and other workplace settings				

