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Student Learning with Performance-Based, In-Class and Learner-Centered, Online Exams

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The purpose of this study was to explore the experience of students with performance-based, in-class and learner-centered, online assessment and the effects of these formats on comprehensive exam scores in an educational psychology course required of participants in a teacher education program. In our quantitative analysis, we investigated the effects of in-class and online exams on undergraduate students' performance on an in-class comprehensive final (n=141). Students were randomly assigned by course section to take one proctored exam in-class and two other unit exams online in a learner-centered format. At the end of the course, students in all sections took a proctored comprehensive final, consisting of a series of multiple choice questions closely aligned with questions from the unit exams. No significant differences were found between content items initially assessed utilizing the traditional, in-class format and the learner-centered online format. In our qualitative analysis, students in one of the six sections (n=22) were selected to participate in open-ended interviews. A phenomenological method was used to collect and analyze responses to the question: "When thinking about your experiences with both the in-class exam and Blackboard exams in [course name], what stands out for you?" Findings from our qualitative analysis resulted in separate yet balanced themes for participants' perceptions of in-class and online exams. For both categories of themes, the constructs of stress, control, and knowing stood out for participants. Implications of this research project are discussed in relation to the use of learner-centered assessment.

The growing popularity of using online resources to teach and to assess students in higher education has created a demand for improved teaching methods to maximize the effectiveness of online learning. A learner-centered theoretical framework provides one such method. According to Weimer (2002), a learner-centered approach to teaching and assessment involves five key changes to traditional, performance-centered teaching practice: (a) shifting the balance of power from teachers to students; (b) seeing the function of content as a means of facilitating changes in how students think and understand; (c) de-centralizing the role of the teacher; (d) helping students develop into responsible life-long, learners; and (e) providing evaluation and assessment that emphasizes process and promotes learning. It was this latter component, assessment, with which this study was concerned. More specifically, this study focused on how a learner-centered approach to assessment influences the performance of students within a higher education classroom, as well as how they experienced such a format.

Literature Review

In more traditional classrooms, exams have often been performance-centered, with a goal of evaluating student knowledge, rather than assessing student progress (Huba & Freed, 2000; Rocco, 2007; Weimer, 2002). The emphasis in a performance-centered classroom is on the final product, correct answers, final grades, and is often accompanied by a sense of individualism and competition (Huba & Freed, 2000). According to Weimer (2002), pressure to perform on exams often results in cheating, in students "playing games" in order to succeed, and in an overall lack of depth of understanding. Furthermore, the emphasis on grades in a performance-centered environment often has emotional consequences on students' overall sense of self, their health, and their motivation (Weimer, 2002).

In a learner-centered environment, assessment emphasizes student improvement, problem-solving, and a commitment to higher order thinking skills (Huba & Freed, 2000; McCombs & Vakili, 2005; Weimer, 2002). These environments are often associated with more supportive relationships with instructors, a sense of ownership in learning, and meaningful dialogue within a community of learners (McCombs & Vakili, 2005). In addition, learner-centered assessment may increase students' awareness of the learning process and take the focus off grades (Weimer, 2002). It should provide students with opportunities to exercise self-regulation and to gain additional control over the outcome of an exam. According to Benson (2003) and Ercikan (2006), learner-centered assessment utilizes a formative assessment process that includes multiple opportunities to take an exam, allows students to use course materials while taking the exam, and provides immediate feedback after the exam. This formative process also promotes classroom discussion. The same principles that contribute to learner-centered

assessments in the classroom may also be applied to online formats of assessment (Benson, 2003).

Since the advent of online learning, there has been extensive research on various approaches to online assessment (Lightfoot, 2005; Vonderwell, 2007), the implementation of assessment within online learning (Buchanan, 1998; McCombs & Vakili, 2005), and advantages and disadvantages associated with online assessment (Kerka & Wonacot, 2000). While some research has delineated potential disadvantages of online assessments—learner isolation, lack of instructor control over assessment conditions, and lack of security with regard to the exam itself (Benson, 2003; Kerka & Wonacot, 2000; McCombs & Vakili, 2005)—some of these researchers stress that such limitations can be addressed through a learner-centered approach to online assessment (Benson, 2003; Rocco, 2007; Vonderwell, 2007).

While we found scant literature demonstrating how to systematically apply learner-centered principles to online assessments, there were some exceptions. For example, Benson (2003) suggested that online assessments facilitate a learner-centered environment through individualized and immediate feedback. This finding is consistent with research conducted by Peat and Franklin (2002) with undergraduate biology students; in course evaluations, students expressed that the immediate feedback provided by online exams contributed to an increase in self-assessment and improved learning. We did not find, however, studies comparing student performance with online versus in-class assessment, nor studies providing an in-depth focus on students' perceptions of their experiences with learner-centered versus performance-centered assessment.

Purpose of the Study

This study was designed to explore students' experience with traditional, in-class exams and learner-centered online exams as well as the effects of the exam formats on comprehensive exam scores. The research was guided by two questions: (a) Is there a significant difference between the mean scores of items on a final exam initially assessed in-class and those initially assessed online? (b) What are the lived experiences of undergraduate students taking in-class and online exams?

Methods

The participants were 141 pre-service teachers enrolled in one of six sections of a required senior level educational psychology course at a large southeastern university in the United States. All of the participants had been admitted into a teacher education program. Each course section was taught by a graduate teaching assistant who, with a professor-coordinator, formed a collaborative instructional team. Each section covered the same materials and had the same class assignments. Data were collected as a regular part of course requirements on only the students who signed a consent form.

The Quantitative Study

We investigated the effects of three in-class and online unit exams (40 multiple-choice items and two short essay questions) on students' performance on an in-class comprehensive final (60 multiple-choice items). Six educational psychology course sections were randomly assigned to take one exam in a traditional, proctored format (i.e., performance-centered where students had 75 minutes to complete the exam and no access to course materials) and two exams online in a learner-centered format (i.e., multiple attempts over a one week period with access to course materials, along with immediate feedback provided by online software after each trial, with items randomly rearranged before every new attempt). At the end of the course, students in all sections (n=141) took a proctored, comprehensive final exam, consisting of a series of multiple choice questions closely aligned with questions from the unit exams.

We conducted a one-way analysis of variance and Tukey post hoc on exam scores to determine any significant differences between and within the six course sections. No differences were found in the results ($p < 0.05$). We also computed comprehensive exam mean scores for items aligned with in-class and online exams separately. T-tests for independent means revealed no significant differences ($p < 0.05$) for any of the three analyses (see Tables 1-3).

The Qualitative Study

The qualitative analysis of this study employed existential phenomenological methods to investigate the perceptions of participants enrolled in the course. Rather than focusing on causality and prediction (Polkinghorne, 1989), phenomenological research focuses on meaning and understanding, the "what" and not the "why" of an experience (Thomas & Pollio, 2002). We invited students from one randomly selected course section to participate ($n = 22$) in interviews after they had completed all four exams. These participants took the first unit exam in-class and the second and third unit exams online. They also took the comprehensive final in-class.

Five members of our research team conducted unstructured, open-ended interviews with individual students. The interviews lasted from 7 to 60 minutes.

Table 1
Comprehensive Final Exam Mean Scores on Unit One Test Items
Initially Assessed Utilizing an In-Class or Online Format

Exam Format	N	Mean	Std. Deviation	Std. Error Mean	t-value	df	Significance (2-tailed)
In-Class	51	90.69	9.64	1.35	1.17	139	0.24
Online	90	88.44	11.55	1.22			

p<0.05

Table 2
Comprehensive Final Exam Mean Scores on Unit Two Test Items
Initially Assessed Utilizing an In-Class or Online Format

Exam Format	N	Mean	Std. Deviation	Std. Error Mean	t-value	df	Significance (2-tailed)
In-Class	40	77.50	9.06	1.43	-1.25	139	0.21
Online	101	79.65	9.31	0.93			

P<0.05

Table 3
Comprehensive Final Exam Mean Scores on Unit Three Test Items
Initially Assessed Utilizing an In-Class or Online Format

Exam Format	N	Mean	Std. Deviation	Std. Error Mean	t-value	df	Significance (2-tailed)
In-Class	50	75.80	11.13	1.57	-1.54	139	0.13
Online	91	78.68	10.32	1.08			

p<0.05

We began each interview with one general question that allowed the participant to share whatever perceptions he/she wished to share for whatever length of time he/she desired: "When thinking about your experiences with both the in-class exams and online exams in [course name], what stands out for you?" Other follow-up questions were asked as needed for clarification.

To provide rigor during our analysis, all interview transcripts were analyzed by our research team members who were familiar with a particular hermeneutic method developed at The University of Tennessee (Thomas & Pollio, 2002). One member read aloud each participant's transcript while others noted what stood out. Together, we discussed these *meaning units* (Robbins, 2006) and challenged each other to justify ideas with quotes from the transcript. We looked for shared meanings across participants that would answer Churchill's (2006) question: "How is it that I am standing such that I see what [the participants] see?" This analysis resulted in themes, which we define as "patterns of description that repetitively recur as important aspects of a participant's description of his/her experience" (Thomas & Pollio, 2002, p. 37). We selected words of participants to represent the shared meaning of each theme. Finally, we derived the relational structure of themes.

The qualitative data analysis resulted in two categories, representing the two exam formats, in-class and online. Within the context of these two experiences, the research team identified three themes for each category as shown in Figure 1.

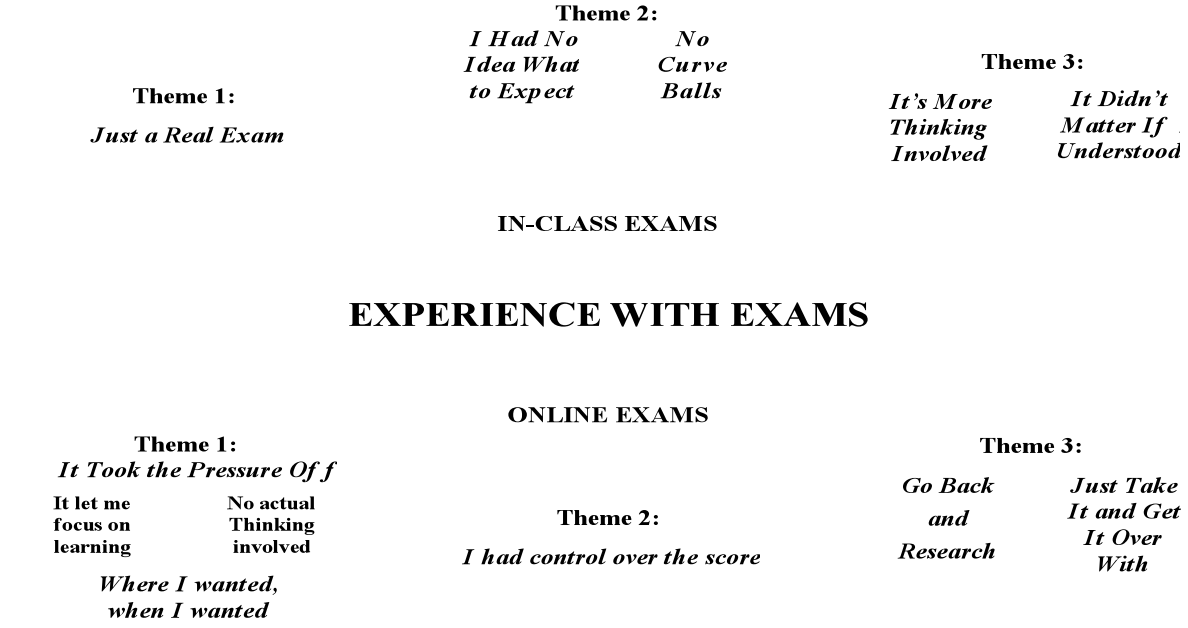
Category One: In-Class Examinations

Theme 1: *Just a Real Exam*

The first theme, "*just a real exam,"* is about the participants' perception of the in-class exam as being "similar to other in-class exams I've had in other

Figure 1

Structure of Themes for Students' Experience with Online and In-class Exam Formats



courses." For some of the participants, the idea of a "normal test" was often associated with the feeling of "I'm not going to get a second chance so I mean, kind of a 'do or die' there." One participant described a traditional, in-class exam:

> I have grown up taking the same exam, same format all through my school. I didn't have much alternate assessments. Just a real exam – studying the material covered in class and in the book and then coming in and taking it with a pencil in a classroom, silent, I guess the traditional classroom exam.

Although at least one student indicated the in-class exam was "*just* a real exam," (emphasis added) others noted it created a sense of stress:

> It's stressful to study for a test. It's stressful to be in the environment where everybody is silent and filling in the bubbles.

Sarros and Densten (1989) conducted a study asking undergraduate students to rate 34 potential stressors within their college experience. Nine out of the top 10 noted stressors were related to assessment activities, such as classroom exams and grades. The participants in our study expressed similar feelings of anxiety related to in-class exams:

> Tests make me nervous [laughs quietly] and in a classroom setting where you've had to study for several chapters and in these chapters there's so many different theories and so many concepts to grasp onto so you're studying an overall, a lot of material. So that can get stressful because you don't know exactly what's on the test.

This anxiety was expressed in the context of not knowing what to expect on the first exam.

Theme 2: *I Had No Idea What to Expect/No Curve Balls*

Many of the participants expressed uncertainty about the in-class exam, while others felt there were no surprises. This second theme is shown as a continuum with *"I had no idea what to expect"* on one end, and *"no curve balls"* on the other end. The majority of the participants felt that they did not know what to expect specifically related to the first in-class exam. On the other hand, the comprehensive in-class exam was viewed as throwing "no curve balls."

Participants described the first exam as stressful:

> I was very stressed out about the in-class exam because my class took it first, and I had no idea what to expect.
>
> Well, you never know what to expect when you take the first test in a class. So my first one [in-class exam] was just kind of like, "Oh man, this is bad."

Some participants expressed that the comprehensive in-class exam threw "no curve balls," compared to their experience with the first in-class exam:

> Like you walk in with just like a timidness because you're like "What's this? What's this [in-class exam] gonna be like?" So … But with the comprehensive final, that was in class too, and I didn't have that at all. I mean I studied for it and I was like, "Yeah, it's comprehensive, but I studied over the previous test. I studied my notes that I had taken in class."
>
> If you knew the material that was tested [on the final exam], then you would be fine on this test. It wasn't throwing any curve balls like, "Oh, you should have studied page 43." Or you know, that second paragraph – there wasn't any surprises. Yeah, and I guess since I was so prepared, the second one [comprehensive in-class exam] wasn't bad at all. With the first one I guess I didn't know what to expect and maybe if I had taken the in-class exam as a second or third one instead of the first one I might have…so I think everyone was a little bit – well you never know what to expect when you take the first test in a class.

Theme 3: *It's More Thinking Involved/It Didn't Matter If I Understood*

While most of the participants referred to some knowing of the course content, there was an implicit difference in how they defined this "knowing," ranging from critically thinking to the simple regurgitation of information. A continuum of knowing emerged with *"it's more thinking involved"* on one end and *"didn't matter if I understood"* on the other end. A participant at one end of the continuum compared in-class to online exams:

> Being in-class [exams] where it is more critical thinking because you have a, you get, it's like separating your mind in two different places. You have the test and then you have your database of information that you have studied and it's the process of associating that information that you have studied to the test, as opposed to a blackboard [online] – it's more of a – look at the question and find the answer. There is no actual thinking involved so I feel like, when I'm in the in-class [exam] I – because I've done that critical thinking, it's more thinking involved. That means I feel I have more retention of the process as opposed to just regurgitating facts on blackboard [online].

Some participants, representing perspectives nearer the other end of the continuum talked about the difference between memorizing and understanding:

> Really didn't matter to me at that point [with the in-class exam] if I really, I would say understood exactly – I have really good memorization so to me, if I can just memorize it word for word – maybe not even understand what it meant but just get it down I would have a pretty good shot I would think at being able to answer the questions.
>
> Well, when I memorize I just, I know all the information and I see it long enough to write it down for the test and then when I'm done with the test I don't really care anymore [laughs]. And it goes away. I mean it will come back if I have to take a test again but it's not something that pops up in my mind all the time or I can – it's not useful to me and in like a year or two I won't remember it or in a week or two sometimes.

Another participant shared the perspective about knowing that she learned from a former teacher:

> I had a history teacher; she was always like, "Understand… don't memorize." 'Cause if you understand something you will remember it mostly, but if you just try to memorize facts or memorize answers, it's not gonna stick, because it's just this whole list and stuff that's gonna get lost.

In the preceding quote, knowing is perceived as more than merely memorizing information; it is inherently connected to an in-depth understanding. While this quote referred to traditional in-class exams, the same underlying belief guided our design of online exams with our emphasis on the process and promotion of learning.

Category Two: Online Examinations

Three themes emerged in category two just as they did in category one. What stood out about the participants' experience of the in-class exams was quite different from that of the online exams; nevertheless,

they continued to focus on the constructs of stress, control, and knowing.

Theme 1: It Took the Pressure Off

The first theme was prominent for all participants. They agreed that online exams reduced the amount of pressure, at least to some extent. Within the context of the first theme, *"it took the pressure off,"* emerged two sub-themes*: "let me focus on learning/no actual thinking involved"* and *"when I wanted to, where I wanted to."*

Sub-theme a: Let me focus on learning/no actual thinking involved. Within the first sub-theme, a continuum emerged with one side representing the participants who felt the online exams "let me focus on learning." The other end of the continuum represented those who experienced the online exams as having "no actual thinking involved." Many participants fell somewhere between the two ends of the continuum, contingent upon "how they looked at it," as one participant stated.

The participants who felt that the online exams helped them focus on learning expressed the following:

> It gives you the ability to do as well as you want … it took the pressure of the grade away a little more and let you focus on learning.

> I think with having to find it on my own and having the resource in front of me, I felt like it stuck better in my mind when I went back through it to know. To have it in front of me and to have it on the test to go through, it stuck in my mind for me.

> The good thing is that I did learn it because I went over it and over it, and over it again; and it wasn't just something I was memorizing, because I didn't have to memorize it because it was right there in front of me and I was actually reading what it said rather than memorizing the words.

Interestingly, 4 of the 22 participants explicitly disagreed with this end of the continuum, seeming to approach the task of completing the online exams from more of a performance-oriented mindset. Performance-oriented perspectives tend to focus on "high grades, public displays of ability, and performance compared to others" as compared to the emphasis of learning-focused approaches on "effort, continuous improvement, and understanding" (Eggen & Kauchak, 2007, p. 337). The participants who did not feel that "it [online exam] let me focus on learning," indicated that they approached the task of online exams by simply looking at the question and finding an answer as opposed to focusing on learning the content.

> A blackboard [online test] – it's more of a – look at the question and find the answer. There is no actual thinking involved.

> I think I maybe didn't learn as much through the blackboard [online] tests because I would just look it up in the book as I did it instead of reading it.

Regardless of their approach to taking the online exams, all of the participants agreed that one of the benefits of online exams was the flexibility of where and when the exam was completed.

Sub-theme b: Where I wanted, when I wanted. The participants explicitly expressed that one of the elements that lessened their sense of pressure was the way that the exams were structured. For example, the participants were able to complete the exams at a convenient time and in a comfortable location. This was expressed by the following:

> Obviously it gives you a window to be able to take the test; I don't have to study it and know all the information by Tuesday or Thursday at 9:40. I can have it between Friday night at whatever o'clock until Sunday, you know what I'm saying? It kind of gives you that window to kind of you know, when you have time.

> But the other one was nicer [online exam] because I was just sitting on my couch and you could do it when you wanted to and when you had the time . . . in the comfort of my own home.

Not only did the participants express that their sense of pressure was lessened by the flexible exam structure and the opportunity to focus on learning, they also valued their control over the final grade.

Theme 2: I had control over the score

The second theme, *"I had control over the score,"* brought forth the idea of how a sense of influence or control of a grade influences achievement. Perry, as cited in Weimer (2002), suggested that a student's sense of control, or lack thereof, strongly influenced academic achievement. In one study, Perry and Magnusson (1987) reported that a student's sense of control or perceived measure of influence upon academic outcomes had a more powerful effect than an instructor who was perceived by students as highly effective. Thus, it was intriguing to discover that the participants' perceived control over the score with

online exams was often referenced in relation to their willingness to persist with the material.

> I guess, the second test I took was online and I kept getting a seventy-six out of eighty and there were two questions that um I was getting wrong over

> and over. But since they switched out and it wasn't in order, it took me a long time and I kept thinking, "Seventy-six [out of eighty] is not so bad." And then I was, "No way. I'm going to get an eighty."… I wasn't settling for the seventy-six. So I did it all the way and it took me a long, long time.
>
> I guess my motivation was stronger on the blackboard test to do better because I knew that I had control over it. Even after I had taken it the first time I was able to go back and fix what I had missed. Whereas in the classroom tests, I was not given the opportunity, so what I got wrong was what I got wrong, so it was sad. It, I guess, decreased my motivation to go back and find out the answers 'cause I had already gotten the final grade.

Many of the participants spoke about this control over the score in relation to their level of motivation. Attribution theory further explicates this idea, suggesting how a learner's explanation of their success and failure deeply influences motivation and behavior (Eggen & Kauchak, 2007). This theory states that a student's belief that an academic outcome is attributable to "internal, stable, and controllable causes" impacts their willingness to persist within a given task (Schunk & Zimmerman, 2006).

> It [online exam] gives you the ability to do as well as you want, also. Obviously, you're taking it multiple times so you don't take away that sense of control. I didn't do as well as I wanted to on the first test [in-class], I didn't feel that I prepared myself enough to take the test in class, but there was a little bit of relief knowing that I could do as well as I was willing to do on the next [online] test and having some control over that. Like, I could make a hundred on the next two tests, if that's my goal. And I don't know why you wouldn't—take it as many times as you could [laughs]. I don't know if people did or not, but it was nice to have that control. It took the pressure of the grade away.

Many of the participants expressed a willingness to persist in completing the online exams by "going back and re-searching." However, for some participants, depending on how they looked at it, the online exams were seen as an opportunity to "just take it and get it over with."

Theme 3: Go Back and Research/Just Take It and Get It Over With

The third theme emerged as a continuum where one end was expressed as *"go back and re-search,"* and the other as *"just take it and get it over with."* One end of the continuum,"go back and re-search," speaks to the very nature of our online exams, whereby the participants were provided an opportunity to take the exam an unlimited number of times during the one week timeframe, enabling them to continually revisit the course content. Many of the participants spoke about how the immediate feedback often led them not only to improve their performance, but to enhance their understanding as well. As with category one, participants seemed more drawn to making comparisons between the two categories when focused on some aspect of knowing, as these examples indicate:

> For the online exams, I took that one question, the one area it was asking and studied that in-depth in the book, like everything about it, you know and so I had more understanding of the concepts like an individual concept in-depth in the whole chapter… because for the first exam [in-class] I knew a little bit about everything but for the second two [online] I knew a lot about a few things.
>
> With the test online, I felt like I could re-search the answers more carefully. I would take the test to see what I knew up front, and then the ones that I got incorrect, I would go back through and really look in the book and really research what the question was asking and go through all the answers. So I feel like I learned more that way.
>
> I understand the material in those [online exams] a lot better than the material I took in class, because I looked at it once and then didn't look at it again until the final. But the ones I did online, because I was able to do them over and over and over until I got the grade I wanted, I think I got the material a lot more.

The idea of "going back and re-searching" seems to hint at the idea of self-regulated learning, with one feature of such being characterized by Zimmerman (1989) as occurring when "students monitor the effectiveness of their learning methods or strategies and respond to this feedback in a variety of ways" (p. 4). The following participants provide examples:

> I guess that the way to remember it is to go back over it when you've gotten something wrong. It's not just, Ok, I got the question wrong. It's to go back over it and either the teacher re-teach it or you re-teach yourself the concept.
>
> For me, it was "Well, if I got it wrong, I will go back over the notes and the book in that particular section and think about why could this answer be

> wrong?" So think about what I'm reading and try and analyze it in a different way and figure out what the answer was.

On the other end of this continuum, a minority of participants described online exams as being something to "just take and get it over with." This end of the continuum highlighted the experience of those who approached the online exams as something to simply "check off my list" of things to complete. It was interesting to note that only 4 out of the 22 participants articulated a disposition toward this end of the continuum and tended to approach the task of online exams from a more performance-oriented mindset, as voiced by the following participants:

> I studied more of the information to memorize it and like learn it and understand it more [for in-class exam] than just to answer the test – the questions on the [in-class] test because I had to remember it for a longer period of time to take the in-class than just to take it online and get it over with.

> It's because, on the in-class tests, we are preparing for something and you don't have that relaxed feel where, you know, "I don't really have to study for this, this blackboard test, because I could just look up the answer really quickly.

Some of these participants spoke about simply using a process of elimination when completing the online exams.

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> … .if they are given multiple chances to get the correct answer, well then eventually they are going to keep up with what's right and what's wrong and they just go back and click through it.

This idea of just getting it over with emerged predominately when discussing the practice of not inquiring further about test questions that were difficult to understand or that the participant disagreed with.

> I still probably should have asked about that [online test question], but I didn't because I just checked it off my list, "Ok, I took the test" I ended up getting it right and doing well.

The vast majority of the participants, however, explicitly disagreed with this end of the continuum "just take it and get it over with," often referring to the extensive amount of time they needed to complete the online exam, as expressed by the following participant's words:

> I thought I could just look at the question, find it in the book and that would be it, it would take like 30 minutes. But finding it in the book was more, more of a task than I thought it would be and it did take more time because I went through the first time just trying to see what I knew and then trying to find that in the book and then I would miss it and have to take it again or something like that so it, it was more time consuming than I, you know, what I previously anticipated.

Structure of Themes Across Categories One and Two

Participants saw in-class and online exams through the constructs of control, stress and knowing but from different perspectives. A sense of "I had no idea what to expect/No curve balls" reflected the degree of lack of control they felt regarding the first unit exam and their improved sense of control regarding the comprehensive final. This was in contrast to the clear perception of "I had control over the score" when they took online exams. The participants also focused on the degree of stress in relation to the exams. "Just a real exam" reflects the pressure and nervousness they felt during in-class exams as well as the lack of stress due to familiarity with this format of test taking. In relation to online exams, "It took the pressure off" revealed a lack of stress due to the ability to take the test at a time and place of choice, and depending upon the approach taken, allowed one to focus on learning in-depth—or to not have to think much at all. Knowing was the focus of theme three, which participants perceived as either requiring thinking and searching for understanding or as a regurgitation of facts where understanding was unnecessary. The interesting aspect of this structure was that "it depended upon how you looked at it." The participants did not all agree on whether in-class or online exams required a higher order of understanding or lack of it, although most viewed online exams as providing more opportunity to "focus on learning," with learning more equivalent to understanding. The shared thematic structure of the in-class and the online exams required us as researchers to consider more deeply both the limitations and the implications of the findings.

Limitations

Limitations of the study included the schedule of course topics for each of the unit exams, the varying course formats, and that the unit exams covered three to six chapters. Most notably, the perspectives from students in sections taking their in-class exams for a later unit were not obtained. Thus, in that these students' perspectives may have differed from the students who were interviewed, this aspect of our study's design may have limited our understanding.

Despite these noted limitations, the findings provided a wealth of understanding related to exam formats.

Implications

One of the strengths of this study was that it involved both quantitative and qualitative analyses, thereby providing a richer understanding of learner-centered assessments. The overarching aim of the quantitative portion of the study was to examine the effects of exams administered in an in-class and online format. Our quantitative analysis resulted in no significant differences between the mean scores of the content items on the comprehensive final that were initially assessed with an in-class exam and those initially assessed with an online exam. This was an important finding because it suggested that traditionally administered exams did not necessarily result in better performance on a traditionally administered comprehensive final—and the same degree of usefulness in terms of performance on final exams for online exams. Because all of our participants were required to take standardized, national licensure exams in order to become licensed teachers, it was important for us to consider how the in-class or the online format affected their performance on comprehensive exams, given under conditions similar to those of standardized exams. If we had ended our study at this point, we could have reasoned that the literature claiming the merits of learner-centered assessment is questionable. Our qualitative study provided important information that forced us to think more deeply.

The overarching aim of the qualitative portion of this study, to provide a rich description of our participants' experience with the two exam formats, allowed us to discover a number of implications for online, learner-centered exams that we could well have overlooked without it. Our findings strongly indicated that our efforts to facilitate student appreciation and use of a learner-centered assessment approach were perceived differently by some students. These findings led us to reflect deeply on various aspects of control, stress, and knowing that stood out for our participants. We realized the need to help students question what it means to know, and how control over time, place and scores, as well as stress, can lead to more or less meaningful learning, depending upon one's perspective.

We also gained insight into factors influencing the students' level and source of motivation. Many students made comments related to a feeling of being over-extended; some were taking more than 18 semester hours and balancing projects and exams required by this course with exams or deadlines in others. Students' comments also shifted from a process to a performance orientation as they described feeling stressed by these constraints. One participant described approaching the online exam as "another thing to check off my list."

One of the considerations for future research that evolved from this study related to the instructors' observations concerning their own teaching. Even though the instructors had considerable experience administering in-class assessments to students in other educational contexts, they anecdotally expressed an uncomfortable awareness of a disjunction between their philosophy and what they were doing in the classroom. When the instructors claimed to be learner-centered and then interjected performance-centered assessment in their teaching practice, they agreed with students' written comments that they should "practice what you preach." This is an area worthy of future exploration.

Some studies have suggested that it is not necessarily the use of computer technologies that enhances student learning, but rather the epistemological orientation of the instructor using such tools (Taylor & Maor, 2000). This idea emphasizes the need for compatibility between epistemological orientations and pedagogical practices, such as assessment design.

Conclusion

Our findings uncovered learners' perceptions and orientation towards test-taking and revealed our need to more explicitly teach students to value and use learner-centered approaches. This study further suggests that traditionally administered exams do not inevitably lead to higher performance on traditionally administered comprehensive finals, encouraging the use of learner-centered approaches to assessment. Technology affords the opportunity to enhance methods of learner-centered assessment (Benson, 2003; Rocco, 2007; Vonderwell, 2007), to encourage students to become more deeply involved in learning experiences (Huba & Freed, 2000; Rocco, 2007; Weimer, 2002), and to become more self-regulated (Weimer, 2002) and persistent learners within the realities of a system where grades still count. As Chickering and Gamson (1987) asserted, "Learning is not a spectator sport" (p. 4); offering assessments with which students can actively engage, gain feedback, ask questions about, and feel genuine competence toward, can help students move out of the stands and onto the playing field.

References

Benson, A. (2003). Assessing participant learning in online environments. *New Directions for Adult and Continuing Education, 100*, 69-78.

Buchanan, T. (1998). Using the World Wide Web for formative assessment. *Journal of Educational Technology System 27*(1), 21-79.

Chickering, A. A., & Gamson, Z. F. (1987, March). Seven principles for good practice. *AAHE Bulletin*, 3-7.

Churchill, S. (2006). Phenomenological analysis: Impression formation during a clinical assessment interview. In C. Fischer (Ed.), *Qualitative research methods for psychologists: Introduction through empirical studies.* (pp. 79 – 110). Boston: Academic Press.

Clarianna, R., & Wallace, P. (2002). Paper-based versus computer-based assessment: Key factors associated with the test mode effect. *British Journal of Educational Technology 33*, 593-602.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions.* Thousand Oaks, CA: Sage.

DeRoma, V., & Nida, S. (2004). A focus on "hands-on," learner-centered technology at The Citadel. *TechTrends: Linking Research and Practice to Improve Learning 48*(5), 39-43.

Eggen, P., & Kauchak, D. (2007). *Educational psychology: Windows on classrooms* (7th ed.). Upper Saddle River, NJ: Pearson-Prentice Hall.

Ercikan, K. (2006). Developments in assessment of student learning. In P. Alexander & P. Winne (Eds.), *Handbook of educational psychology*. (2nd ed., pp. 929-952). Mahwah, NJ: Lawrence Erlhaum Associates.

Huba, M., & Freed, J. (2000). *Learner-centered assessment on college campuses: Shifting the focus from teaching to learning*. Boston: Allyn and Bacon.

Lightfoot, J. M. (2005). Integrating emerging technologies into traditional classrooms: A pedagogic approach. *International Journal of Instructional Media 32*(3), 209-224.

Kerka, S., & Wonacot, M. (2000). *Practitioner file: Assessing learners online*. Columbus, OH: Clearinghouse for Adult, Career, and Vocational Education. Accessed May 16, 2007 from: http://ericacve.org/fulltext.asp

McCombs, B., & Vakili, D. (2005). A learner-centered framework for e-learning. *Teachers College Record. 107*(8), 1582-1600.

Northcote, M. (2002). Online assessment: Friend, foe or fix? *British Journal of Educational Technology 33*(5), 623-625.

Peat, M., & Franklin, S. (2002). Supporting student learning: The use of computer-based formative assessment modules. *British Journal of Educational Technology 33*(5), 515-523.

Perry, R. P. (1997). Perceived control in college students: Implications for instruction in higher education. In R. P. Perry & J. C. Smart (Eds.), *Effective teaching in higher education: Research and practice* (pp. 171-204). New York: Agathon Press.

Perry, R. P., & Magnusson, J. L. (1987). Effective instruction and students' perceptions of control in the college classroom: Multiple-lectures effects. *Journal of Educational Psychology 79*(4), 453-460.

Polkinghorne, D. E. (1989). Phenomenological research methods. In R. S. Valle & S. Halling (Eds.), *Existential phenomenological perspectives in psychology* (pp. 41-60). New York: Plenum Publishers.

Rocco, S. (2007). Online assessment and evaluation. *New Directions for Adult and Continuing Education 113,* 75-86.

Sarros, J. C. & Densten, I. L. (1989). Understanding student stress and coping strategies.*Higher Education Research and Development 8*(1), 1-13.

Schunk, D. H., & Zimmerman, B. J. (2006). Competence and control beliefs: Distinguishing the means and ends. In P. Alexander & P. Winne (Eds.), *Handbook of educational psychology*. (2nd ed., pp. 349-368). Mahwah, NJ: Lawrence Erlhaum Associates.

Taylor, P., & Maor, D. (2000, February). Assess the efficacy of online teaching with the constructivist online learning environment survey. Paper presented at the Flexible Futures in Tertiary Learning, Teaching Learning Forum, Perth Western, Australia.

Thomas, S. P., & Pollio, H. R. (Eds.) (2002). *Listening to patients: A phenomenological approach to nursing research and practice.* New York: Springer Publishing.

Vonderwell, S., Liang, X., &Alderman, K. (2007). Asynchronous discussions and assessment in online learning. *Journal of Research on Technology in Education 39*(3), 309-328.

Weimer, M. (2002). *Learner-centered teaching: Five keys to changing practice*. San Francisco: Jossey-Bass.

Zimmerman, B. J. (1989). Models of self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theory, research, and practice*. (pp. 1-25). New York: Springer-Verlag.

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