International Journal of Teaching and Learning in Higher Education 2014, Volume 26, Number 3, 343-357
http://www.isetl.org/ijtlhe/ ISSN 1812-9129

"The Course Fit Us": Differentiated Instruction in the College Classroom

Mary Dosch
Minnesota State University Moorhead

Margaret Zidon
University of North Dakota

As diversity in higher education increases, the one-size-fits-all, teacher-centered, traditional model of lecture-style teaching sets students up for failure. In addition, the strategic rhetoric of blaming students for academic failures keeps the systemic power in place, justifying the current system. In contrast, differentiated instruction, a student-centered instructional model, has shown success in higher education through a limited number of mostly qualitative studies. The purpose of the current study was to explore implementing differentiated instruction in higher education to understand if quantitative improvements were noted in a differentiated (DI) classroom compared to a nondifferentiated (NDI) classroom in two different sections of the same Educational Psychology course taught by the same instructor. In addition, perceptions toward the use of differentiated instruction were attained. The DI and NDI sections had enrollments of 39 and 38 undergraduate students, respectively. The majority were preservice teachers attending a mid-sized Midwestern University. The DI group significantly outperformed the NDI group on the aggregates of the assignments and the exams. However, only two assignments and one exam showed significantly higher scores for the DI group when examined individually. The DI group perceived differentiated methods as beneficial to their learning as noted on the course evaluation and survey questions.

At the higher education level, students are perhaps even more diverse than K-12 students due to their varied educational and life experiences, yet less consideration for diversity in instructional planning occurs (Merriam, Caffarella, & Baumgartner, 2007). Planning instruction to meet the needs of the adult population, however, becomes no less imperative considering the changing demographics of this population and the increasing numbers of adult learners today (Aud et al., 2011; Merriam et al., 2007; Santangelo & Tomlinson, 2009; Wormeli, 2007). Pliner and Johnson (2004) elaborated, "higher education in the United States has been primarily available to a professional class that was white, able-bodied, heterosexual, Christian, and male" (p. 106). In recent years, higher education has become more inclusive; however, the curriculum and teaching methods have not been altered sufficiently in response to incorporating diverse students and meeting their unique educational aspirations. The one-size-fits-all, traditional model of lecture-style teaching and teacher-driven education continues to dominate in college

With increasingly diverse adult learners and few alterations to higher education teaching methods, undergraduate institutions have found that the number of students repeating college courses is disturbing. Aud et al. (2011), in a report on remediation, uncovered the following:

> In 2007-2008, approximately 36 percent of first-year undergraduate students reported that they had ever taken a remedial course, and 20 percent of first-year undergraduates reported that they had taken at least one remedial course in the 2007-08 academic year. (p. 70)

This academic failure is pervasive for students of all racial groups, genders and types of disabilities (Aud et al., 2011).

Failing Methods for Adult Learners

The high percentage of students repeating an academic course indicates a mismatch between college instruction and students' academic needs. In addition the current educational system works hard to keep the traditional ideals and "one-size-fits-all" methods in place rather than employing more learner-centered approaches. For example, Fassett and Warren (2004) found when interviewing teachers and students that both use strategic rhetoric and behaviors which keep systemic power in place so that the current educational system can be justified.

The three types of rhetoric that Fasset and Warren (2004) stated are most often used are individualism, victimization, and authenticity. Individualism is the notion that the student's success is based solely on one's efforts, but without consideration for the many contextual factors such as the unspoken educational expectations, culture, and socioeconomics. In other words, there is nothing wrong with the system or the current hegemonic ideal; if the student cannot make it in the current system, then it is his (gender will be alternated throughout) own fault. Blame can stem from the student himself or the teacher.

Victimization, in direct opposition to the individualism strategic rhetoric, holds that the student is a victim of the context, namely societal rules, teacher expectations or institutional rules Within the rhetoric of victimization, any form of control over success or failure is unavailable to the student. The student simply needs to survive the current system because there is no hope for change in the institution.

The strategy of authenticity falls under three forms of power: "(1) a failure to measure up to standards, (2) mythical other's success, and (3) popular culture as a

model" (Fassett & Warren, 2004, p. 33). Again, the student is blamed for not meeting deadlines or other societal norms of education. Second, the student is compared to others such as peers or the teacher herself; these superior (hegemonic) measures are then used to judge the student. Third, expectations of the classroom in the movies or other media are used as gauges for how teachers and the educational experience should be. Students are said to expect, for example, that all teachers should be like the inspirational ones seen in specific films, an unrealistic goal because movies are made for entertainment and fail to capture the day-to-day demands of a classroom.

Blaming the student for not learning connects to the traditional model, or teacher-centered model of education. In other words, the teacher decides what students learn as he is the keeper of the knowledge, which oftentimes is distributed in a lecture format. If students do not learn the material, it is their fault. In sharp contrast to these three rhetorical frames that admonish the student for learning failure, differentiated instruction is student-centered.

Differentiated Instruction

Differentiated instruction is a teacher mindset that all learners respond to instruction differently. Therefore, a one-size-fits- all mentality limits student opportunity to benefit from the instructional method applied. Teachers who utilize differentiated instruction take into consideration multiple aspects of learners to best meet their educational needs. Three diagnostic formative components are utilized to best understand personal characteristics of students and their academic skills: readiness, interest, and learning profile (Tomlinson, 2001).

Student readiness refers to a student's proximity to the desired educational outcome based on background foundational knowledge, past experiences, opportunities for learning, and skill level. Readiness means the student is always kept in his zone of proximal development, a position where, with guidance, the student can successfully learn new material (Vygotsky, 1997).

When students are interested, intrinsic motivation is awakened (Deci & Ryan, 1985; Vansteenkiste, Lens, & Deci, 2006). Thus, tapping into students' interests through differentiated instruction is significant. To maintain intrinsic motivation, Jensen (2005) suggested allowing students choices, activating their background knowledge, increasing feedback, and providing a safe environment for exploring.

Finally, a student's learning profile is defined as "a preference for taking in, exploring, or expressing content" (Tomlinson & Imbeau, 2010, p. 17). A learning profile consists of a student's preferred contextual environment, intelligences, gender, and culture (Tomlinson & Imbeau, 2010). Each of these preferences contributes to how a student learns most proficiently and efficiently. Contextual environment pertains to ways of learning such as alone or in a group and to issues such as how information is presented. Intelligences refer to different ways students think such as practically, analytically or creatively (Sternberg & Spear-Swerling, 1996) or through multiple intelligences as suggested by Gardner (1993). One's gender also affects learning for a variety of reasons including social, cultural and physiological differences (Jensen, 2005). Finally, one's culture can distinguish what information is considered worth learning (Vygotsky, 1978).

After understanding how students best learn, the teacher can differentiate any or all of the following: content, process, product and affect. To differentiate content, one might use three texts about the Holocaust at three different reading levels that match the students' varying needs.

Process entails how the student makes sense of the information and learns. Tomlinson and Allan (2000) used "activity" as a synonym to define *process*. For example, when working with a student who enjoys critiquing movies, a teacher might encourage the student to learn about the Industrial Revolution through analyzing and evaluating film documentaries of that era.

Product refers to a medium through which the students show what they know, understand and are able to do, based on their investigation of a specific topic. An example of product differentiation would be a teacher allowing students to express their knowledge of a topic through a variety of choices such as writing a newspaper article, creating a skit or drawing a cartoon.

Finally, affect addresses students' emotions about school-related issues that influence their learning. "Student affect is the gateway to helping each student become more fully engaged and successful in learning" (Tomlinson, 2008). Affect is embedded within the content, process and product; therefore, many studies regarding differentiated instruction do not mention affect with the other three diagnostic components.

Differentiated Studies and Academic Performance

Differentiated instruction has been applied in grades K-12 with positive academic gains. At the elementary level, significant academic growth was noted among diverse students in language arts (Beecher & Sweeny, 2008; Cusumano & Muelier, 2007) and math (Beecher & Sweeny, 2008; Grimes & Stevens, 2009; Tomlinson, 2009). These gains were documented for students of all ability levels, across all racial groups, for English language learners, and for students of all socioeconomic levels. In addition, Avci, Yüksel, Soyer, and Balikçioğlu (2009) and Grimes and Stevens (2009)

also noted affective gains among students involved in their research.

At middle schools and high schools, differentiated instruction implementation occurs less frequently than in elementary schools. Consequently, few research studies focused on differentiated instruction at these levels have been documented. However, significant academic improvements were found for students when differentiated instructional methods were utilized compared to students where teachers used traditional methods of instruction in science (Mastropieri et al., 2006) and in biology and literature (Graham, 2009). Tomlinson (2009) stated that significant gains were found for standardized test scores in math, reading, and writing for Colchester High School in New York within 5 years of beginning a system-wide differentiation initiative. Tomlinson also noted a decrease in behavior referrals.

At the college level, even fewer studies exist regarding differentiation, possibly for several reasons including the following: (a) class sizes are typically quite large; (b) the number of contact hours with students is minimal; (c) designing several ways to assess students is time consuming and challenging for professors who, in addition to teaching, have research and service obligations; and, finally, (d) ethical issues such as fairness in grading can be controversial (Ernst & Ernst, 2005). Although scarce, the following few examples provide brief summaries of extant qualitative research studies on differentiation in higher education.

Ernst and Ernst (2005) conducted research in an undergraduate political science course where differentiated instruction was utilized. Their study employed a Likert-type survey regarding perceptions of differentiated instruction and their written perspectives acquired through open-ended questions. The majority of the 35 students in the course affirmed that the course helped them reach their learning potential, group work benefitted their learning, and they appreciated having choices and exploring topics based on their interests.

In another qualitative study, Livingston (2006) found success utilizing differentiated instruction in his undergraduate education course wherein 33 preservice teachers learned how to teach using constructivist methods. The students wrote reflections and responded to a variety of questions throughout the course that were collected by the instructor. Unanimously, the students stated that they appreciated being able to choose how to complete their assignments according to their own learning styles and felt that choice allowed them to better learn the information. The teacher as a facilitator, rather than a lecturer, was also highly approved by students.

Santangelo and Tomlinson (2009) conducted a qualitative investigation of 25 diverse graduate students enrolled in Santangelo's Education and Psychology of Exceptional Learners course. Santangelo and Tomlinson (2009) designed and administered a pre-assessment, rubrics for five key course assignments, and classroom activities to measure student mastery of the material. They stated that all students met the course objectives; however, they did not provide a clear picture of how mastery was measured. On the course evaluation, students indicated the following benefits: (a) using a variety of materials and activities, (b) participating in collaborative learning opportunities, (c) having options for expressing their knowledge, (d) learning strategies that were designed to support text comprehension, and (e) having the provision of choices (Santangelo & Tomlinson, 2009).

One study used a quasi-experimental design. Chamberlin and Powers (2010) had three instructors teach a first-year college math course for preservice teachers using similar differentiated instructional methods. Meanwhile, four different instructors, using traditional methods, taught the other five sections that constituted the control group. Homework, writing prompts, projects, quizzes and tests were used to assess understanding, with all students completing the same quizzes and tests. Chamberlin and Powers (2010) assessed student progress in reference to meeting course objectives and constructed a survey to measure elements of differentiated instruction, which was completed by students in both groups. They also conducted interviews to ascertain if there were any differences in perception between the two groups. The results indicated the experimental group made higher gains. On average, the treatment group participants scored 1.7 items higher on math scores from pretest to posttest compared to an average gain of .3 items scored higher for the control group. The results revealed that the students successfully met the course objectives and that the participants in the experimental sections perceived the course more positively due to the differentiated methods of instruction (Chamberlin & Powers, 2010).

Tulbure (2011) conducted an experimental investigation in her Educational Science classes using Kolb's learning styles categories to place pre-service teachers in small sub-groups and differentiated instruction accordingly. The control group was taught as a whole class without differentiation. Significant differences were found on pre and post-test achievement scores within subjects for the experimental group, but not for the control group; however, no significant differences were found between experimental and control groups on achievement scores (Tulbure, 2011). The experimental group did improve more in achievement scores than the control group, but not significantly (Tulbure, 2011).

With so little research on differentiated instruction at the higher educational level, further studies are

needed to gauge the impact of this educational approach on college students' academic success. The purpose of this study was to explore implementing differentiated methods in higher education to investigate whether quantitative improvements are noted in a differentiated (DI) classroom compared to a nondifferentiated (NDI) classroom in two different sections of the same course taught by the same instructor. In addition, we were curious as to whether the DI students would perceive differentiated methods as beneficial to their learning.

Methods

The participants in the study were undergraduate students in a Midwestern university (enrollment 7,000 + students) who were registered in two sections of Educational Psychology; the lead author was the instructor for each section. The course was a liberal arts elective at the university but also a required course for early childhood-, elementary-, and secondary-level preservice teachers. The course includes psychological theory and research related to learning, motivation, cooperation, and instruction within diverse cultures and settings. The two sections of the course I taught were held back-to-back in the same classroom on Tuesday and Thursday afternoons with each session lasting 75 minutes. In preparing to teach the two sections of Educational Psychology differently, we chose the earlier (1:30 p.m.) section as the NDI group (nondifferentiated instructional group) and the latter (3:00 p.m.) section as the DI group (differentiated instructional group). The traditional lecture-style teaching for the NDI group made sense to do before attempting the differentiated teaching, as we wanted to avoid accidently carrying the differentiated methods into the NDI course. All students who registered for the 1:30 p.m. section became part of the control group whereas all students who registered for the 3:00 p.m. section became part of the experimental group.

Participants

Control group. The control or nondifferentiated instructional (NDI) group consisted of 38 undergraduate students. Of the 27 females and 11 males enrolled in the course, 37 were Caucasian and one was of Middle Eastern descent. Their ages ranged from 18 to 30 with the majority between 18 and 20 years of age. Most of the students (89%) were preservice teachers (early childhood education, elementary education, secondary education, and special education) while 11% were other majors (mortuary science, graphic design, psychology, and military science).

Experimental group. The experimental or DI group consisted of 39 undergraduate, Caucasian students. Among the 32 females and 7 males enrolled in the course, the age span of the students ranged from 18 to 49 years of age with the majority (69.2%) between 18 and 20 years. The majority of the students (85%) were preservice teachers while the other 15% majored in paralegal studies or psychology, with three students undeclared. Over half the DI students were in their first or second years of college; however, four students in the group had previous undergraduate degrees. For a comparison between the experimental group's and the control group's demographic information, see Table 1.

Course Design for Both Groups

All students were informed that their academic grades would be used as part of a study examining differentiated teaching methods; however, all identifying information would remain confidential. To ensure anonymity, notecards were distributed to the DI

Table 1
Demographics of Participants in the DI and NDI Groups

		DI (n = 38)		NDI (n = 39)	
		N	%	*N*	%
Students	Male	7	18	11	29
	Female	32	82	27	71
Ethnicity	White	39	100	37	97
	Mid. Eastern	0	0	1	3
Age in years	18-20	27	69.2	26	68.4
	21-25	6	15.4	9	23.7
	26-30	2	5.1	2	5.3
	31+	4	10.3	1	2.6
Major	Education	33	85	34	89
	Non-Education	6	15	4	11
Previous degrees		4	10	0	0

group and the NDI group on the first day of class. Students wrote their first and last names on one side of the card, drew a number between one and 85, and then wrote that number on the other side. The numbers allowed for scoring of assignments and exams with the intent of minimizing bias. Students were asked to turn in assignments and exams using a version of this format: their number, the course, and the assignment number (e.g., #34, Ed Psych 294, Assignment 4). Only after scoring assignments did I match numbers with names and enter their points into the gradebook. Although the choice of the assignment product may have differed, the requirements for the assignments remained the same for all students. For further assurance, one colleague not associated with the study scored a random sample (25%) of Assignment 4 and another colleague scored a random sample (25%) of the Exam 2 essay questions to establish inter-rater reliability of the rubrics.

Instructional Design

All students were held to the same course objectives and the same grading criteria in both sections. The NDI group was taught in a teacher-centered, traditional lecture format with students taking notes and did not have choices in how to complete assignments; all were written assignments.

The DI group was taught using a constructivist, student-centered format with many hands-on activities, choices for completing assignments, and instruction altered based on formative assessments. For example, after we covered a unit on Piaget's stages of cognitive development, a few students were still struggling with the concept of conservation (understanding that a quantity can remain the same even if its appearance changes, e.g. a ball of play dough versus a cube of play dough) according to the exit cards; thus, the instructor asked a colleague if her preschool-aged son could join us for class. We demonstrated a conservation task with the preschooler. Afterwards, the students all gave thumbs up that they understood the concept.

Assessments

Formative assessments. For both groups, the instructor taught a lesson on Gardner's Multiple Intelligence theory and Sternberg's Triarchic theories. Both groups participated in an application of these theories by completing an instructor-created learning profile inventory, Gardner's Multiple Intelligence Survey, and Sternberg's Survey. Although the learning profile inventory and the two intelligence surveys were given to both sections, these instruments are typically used as a differentiated instructional technique. Therefore, the data for the NDI group was not analyzed or utilized to plan for their instructional needs. The following examples pertain to formative assessments and how they were utilized for instruction only with regard to the DI group.

The learning profile contained questions and statements regarding (a) demographic information, (b) past school experience, (c) preferred ways of learning, (d) preferred contextual environments, and (d) interests. Through examining, studying, and frequent referencing of my students' learning profiles and the intelligence surveys, I discovered many interests and preferences of my DI students that I incorporated into my instruction. For example, one of my students was a baseball enthusiast, so when trying to explain intrinsic and extrinsic motivation, I began by asking the student whether he thought that professional baseball players played the sport because of intrinsic (love of the game) or extrinsic (big money) motivations.

Students completed Sternberg's survey and discovered their preferences for representing knowledge: creatively, practically or analytically. Using these results, the instructor divided the DI students into groups accordingly. Then, each group was given a choice board that included three activities to choose from within their preferred way to demonstrate their knowledge on the subject of "creating classroom rules."

Numerous other formative assessments were used on a daily basis to check for student understanding and to alter instruction, including (a) thumbs up/thumbs down, (b) question and answer sessions, (c) reviews, (d) cold calling, (e) quick writes, (f) exit cards, (g) review of notes, (h) observation of activities completed, and (i) small group performance tasks. The formative assessments were teacher-made for the DI group and were used to guide my instruction for the DI section. Also to assist with future instructional planning, the instructor kept a journal, though sometimes sporadically, throughout the course.

Summative assessments. Summative assessments—seven assignments and three exams—were used to verify student learning and for grades. Rubrics for the assignments and for scoring essay questions on the exams were also teacher-made. The rubrics held the same requirements and scoring for all students. The assignments for the DI group allowed for choices that I surmised would be appealing to the students. The seven assignments were essentially the same for the DI group and the NDI group, with the exception of product choice. The exams consisted of multiple choice, true/false and short essay questions for all students. Each exam was worth 50 points. Students in both groups were required by forced choice to eliminate five multiple choice questions on each exam. As an instructor, I know that I do not create perfect tests and every test has error within it; the purpose was to give both groups choices to eliminate test items that created uncertainty and to ease test anxiety (differentiation according to affect).

Class Evaluation

Finally, an evaluation created by the instructor was used to solicit feedback regarding the course at the end of the semester. The evaluation consisted of a 10-item survey, which invited students to rate statements using a 6-point Likert-type scale. Participants rated statements from *strongly disagree* to *strongly agree*. In addition, students were asked to respond to four open-ended questions. Specifically, I wanted to see if the DI group found the instructional methods more beneficial than the NDI group.

Results

We utilized SPSS to conduct all analyses of quantitative data. To ensure that the DI group's internal variance of mean scores was not significantly different from the NDI group's internal variance of mean scores, a Levene's test for equality of variances (Levene, 1960) was conducted. Using a 95% confidence interval, no significant variance was found between the groups for the exams (p = .157) or the assignments (p = .935); therefore, equal variances were assumed.

An independent-samples t test was used to compare the two different sample populations (DI and NDI) that completed the same tasks (assignments and exams). The t test compared the difference in mean scores of the DI and NDI groups on six of the assignments and all three exams. Assignment 5 was not included in the analysis because the assignment erroneously was not differentiated for the DI group. As shown in Table 2, the aggregate mean score for the DI group (M = 18.96) was significantly higher than the mean score for the NDI group (M = 18.46) on the seven assignments, $t(75) = 2.128$, $p < .05$. Also, the aggregate mean score for the DI group (M = 39.77) was significantly higher than the mean score for the NDI group (M = 37.35) on the three exams, $t(75) = 1.995$, $p < .05$.

Table 3 shows the comparative mean scores for each of the seven assignments and for the three exam using an ANOVA. All assignments were worth 20 points and all exams were worth 50 points. Appendices A and B are the assignment instructions that were given to the DI and NDI groups explaining what each assignment entailed for each group.

Inter-rater reliability was calculated for the rubrics used to score student assignments and exam essay questions using Pearson's pairwise correlation. The inter-rater reliability coefficient between scorers on Assignment 4 was r = .95 and on Exam 2 was r = 1.00, which are both considered highly sufficient (Salvia, Ysseldyke, & Bolt, 2007). Inter-rater reliability was not conducted on the other assignments and exams.

In summary, using an independent-samples t test, significant differences were found between the aggregate mean group scores on the six assignments and the three exams (see Table 2). However, individually, only two of the assignments and one of the exams showed significant differences for the DI group (see Table 3).

End of Course Evaluation

The reliability of the current survey had a Cronbach's alpha of .885 across the nine items. Students rated each of the nine statements using a 6-point Likert-type scale from *strongly disagree* to *strongly agree*. In the NDI group, 32 of 38 (84.2%) students completed the optional survey while 34 of 39 (87.2%) students of the DI group did. No students from either group rated any of the items at the *strongly disagree* or *disagree* level. Ten students in the NDI group and only one in the DI group placed a rating at the *slightly disagree* level. Over 90% of the students in both groups rated each statement with some form of agreement (*slightly agree*, *agree*, and *strongly agree*); however, the ratings between the NDI and DI groups did differ in the intensity of ratings with the DI group giving stronger ratings on all of the statements. Table 4 represents the number of students who indicated disagreement or agreement for each statement.

The course evaluation also included five open-ended questions. Two of the questions were logistical regarding course suggestions and class attendance. The next three questions were particularly relevant to this study. The first question was, "What did you like MOST about this course? Explain." The second open-ended question was, "How was this course different from other courses you have taken? Explain." The third aspect asked for "Additional comments."

Table 2
Aggregated Mean Score Differences Between Groups on Assignments and Exams

Measure	Group	*N*	*M*	*SD*	*p*
Assignments	DI	39	18.96	.99	.037*
	NDI	38	18.46	1.07	
Exams	DI	39	39.77	4.76	.050*
	NDI	38	37.35	5.84	

Note. Assignment 5 was not included in the calculations due to failure on the part of the instructor to differentiate the task for the DI group. Because the calculation landed exactly on .050 for exams, the significance seems likely.
* $p < .05$.

Table 3
Between Group Score Differences for Each Assignment and Exam

Measure	Group	*N*	*M*	*SD*	*p*
Assignment 1	DI	37	18.95	1.68	.437
	NDI	35	18.60	2.06	
Assignment 2	DI	38	19.26	.98	.001*
	NDI	38	18.18	1.74	
Assignment 3	DI	37	19.16	1.28	.000*
	NDI	36	17.89	1.33	
Assignment 4	DI	39	18.38	2.20	.518
	NDI	35	18.69	1.73	
Assignment 5	DI	38	19.21	1.14	.001*
	NDI	38	19.87	.41	
Assignment 6	DI	37	18.95	1.58	.549
	NDI	36	18.72	1.60	
Assignment 7	DI	39	19.08	1.60	.779
	NDI	37	18.97	1.62	
Exam 1	DI	39	40.10	5.41	.141
	NDI	38	38.18	5.90	
Exam 2	DI	39	39.59	6.06	.022*
	NDI	38	35.89	7.77	
Exam 3	DI	39	39.62	5.29	.201
	NDI	38	37.97	5.87	

Note. Assignment 5 was the same for both groups; however, it was not included in the aggregate mean score calculation for assignments due to failure to differentiate for the DI group. Mean differences between groups are significant at $\alpha = .05$.
* $p < .05$.

Table 4
Number of Students Indicating Disagreement and Agreement for Instructor End of Course Evaluations

		Slightly disagree	Slightly agree	Agree	Strongly agree
The instructor was knowledgeable regarding the course material.	NDI	--	--	10	22
	DI	--	--	4	30
The instructor demonstrated respect for individual differences.	NDI	--	--	6	26
	DI	--	--	5	29
The instructor stimulated my interest in the course.	NDI	--	4	10	18
	DI	--	1	2	31
The instructor taught me information in ways that allowed me to understand the material.	NDI	3	6	12	11
	DI	--	2	5	27
I would recommend this instructor to my friends.	NDI	1	2	6	23
	DI	--	1	2	31
The general climate in this course was good for learning.	NDI	1	3	8	20
	DI	--	--	6	28
The course respected diverse ways of learning.	NDI	2	2	6	22
	DI	--	--	4	30
The assignments engaged me in learning.	NDI	2	5	10	15
	DI	--	1	9	24
Overall, I learned a great deal from this course.	NDI	1	2	10	19
	DI	--	1	4	29

Note. NDI $n = 32$; DI $n = 34$.

A great variety of answers were given for these questions with several similarities between the two groups. Four overarching themes surfaced from the two groups: Environment, Instruction, Curriculum, and Teacher Qualities. We categorized comments under Environment if students' statements described or related to the feel of the room or the actual physical set up. Instruction included comments about instructional delivery or the process of learning. Curriculum included comments pertaining to the text, supplemental materials, assignments, and exams. Teacher Qualities included direct comments about personal qualities of the teacher. The categories are not perfectly isolated from one another. For example, classroom activities could be categorized under Instruction as a way of learning or under Curriculum as an activity model. Similar and dissimilar comments from each group are listed in Table 5.

The open-ended questions on the evaluation showed that both groups had similar comments regarding the course's Environment and the Teacher Qualities; however, differences were shown regarding Instruction and Curriculum. Particularly, students in the DI group appreciated choice, more freedoms and consideration of their learning styles.

Findings Regarding Research Questions

The answer to the first research question is that differentiated instructional methods for the DI group showed some significant achievement in students' academic learning compared to the NDI group. Assignments 2 and 3 were significantly higher for the DI group. On Assignments 1, 6, and 7, the DI group scored slightly higher than the NDI group, but not significantly. On Assignment 4, the NDI group actually scored slightly higher than the DI group, but not to a significant level. The inconsistency of the score differences on the assignments may have been due to the fact that the assignments were created before the class commenced. At that time we had no reference for knowing the DI students' interests. Maybe the assignments that showed significantly higher scores for the DI students contained options that better fit their learning profile.

Interestingly, the NDI group scored significantly higher than the DI group on Assignment 5. When creating this assignment, the instructor made an error by not providing choices for Assignment 5 for the DI group. Both groups received the identical instructions stating only one way for the students to demonstrate their learning. The autonomy and feeling of self-control that choice provided was nonexistent and may be why the DI group performed significantly lower on this assignment. If choice truly does have this strong of an impact (Jang, Reeve, & Deci, 2010; Santangelo & Tomlinson, 2010; Vansteenkiste et al., 2006), then the philosophy of differentiated instruction becomes even more imperative to meet the needs of college students.

The overall exam score composite which included three exams was also significantly higher for the DI group than for the NDI group. Not only on the overall composite but also on each of the three exams, the mean for the DI group was higher than the mean for the NDI group. However, only on Exam 2 were the scores for the DI group significantly higher than the NDI group. The content of the exams was identical for both groups.

Regarding the second research question of whether the DI students would perceive differentiated methods as beneficial to their learning, the answer is yes. The instructor-authored course evaluation conveyed that the majority—over 90% of the students—rated the items with some form of agreement, but the highest ratings came from the DI group. On the open-ended questions ("What do you like most about this course?"; "How was this course different from other courses you have taken?"; and the "Additional comments" section), students gave very similar comments about the Instructor. This made sense, as the instructor was the same in both classrooms. The comments on the Environment were also similar, as the same physical classroom was utilized and the feel of the environment was similar. As noted by the comments from both sections, the students felt comfortable to share, relaxed, and liked that the teacher knew them by name. Where differences occurred between the groups was with Instruction and Curriculum. The majority of the NDI students made typical comments about liking or disliking (a) the curriculum, (b) the assignments, (c) in-class activities, (d) discussions, and (e) video clips. However, the DI students made comments about (a) freedom of choice, (b) their strong sense of engagement and interest, (c) the fact that their learning styles were considered, (d) doing self-evaluations, (e) learning to a deeper level, (f) instruction that helped them understand, and (g) the course being "fit" to them. The DI students referenced the components of differentiated instruction: learning profiles, readiness, and interest. The DI students did perceive differentiated methods to be beneficial to their overall learning; the ratings were stronger for the DI group than those of the NDI group on all nine evaluation statements.

The students in the DI group, again, showed support for choice. At the college level, this also held true in the findings of Ernst and Ernst (2005), Livingston (2006), and Santangelo and Tomlinson (2010). The students in each of these studies shared that they appreciated having choices and they felt it improved their learning of the material.

Discussion and Recommendations

Choice in product appears to have had a strong impact on aggregate score differences between DI an NDI groups. However, pinpointing one component of

Table 5
Similar and Dissimilar Comments Between the NDI and DI Groups on the Two End of Course Evaluation Questions and Additional Comments Section

Questions	Comments
Similar	
Considering the Environment, both groups indicated the following:	1. Students liked the classroom dynamics. 2. Students felt safe to share in a nonjudgmental classroom. 3. Students felt that their opinions mattered. 4. Students liked that the course was laid back, relaxing, and stress-free. 5. Students enjoyed/didn't mind coming to class.
With regard to the Instruction, both groups conveyed these ideas:	1. Students stated that the instruction was exciting, engaging, fun, and interesting. 2. Students found that the topics were related to real life making content more understandable. 3. Students liked the discussions and group work. 4. Students appreciated that the instructor provided many examples. 5. Students liked the varied ways of teaching the instructor used—not just lecture. 6. Students liked applying the things they learned. 7. Students felt that they learned a lot.
Concerning the Curriculum, both groups highlighted the following:	1. Students liked learning the material in this course. 2. Students liked the assignments and the options on the tests. 3. Students liked the study guide outlines for exams. 4. Students liked the in-class activities. 5. Students liked the video clips used in class.
Pertaining to Teacher Qualities:	1. Students felt that teacher was caring and understanding. 2. Students appreciated the passion that the teacher displayed about the topics. 3. Students felt that the teacher was helpful. 4. Students stated that the teacher was knowledgeable about the subject matter.
Dissimilar	
Unique to the NDI group:	
Environment:	1. One student stated that he liked the chairs in the room because they allowed him to move around a bit (the chairs were on wheels and could recline slightly).
Teacher:	1. Another student commented the teacher was fair in her practices.
Unique to the DI group:	
Instruction:	1. Students stated that they learned material to a deeper level. 2. Students stated that the course was well-organized. 3. Students felt that the course was "a fit" for them. 4. Students noticed that the teacher taught for different learning styles.
Curriculum:	1. Students appreciated the meaningful assignments. 2. Students liked that the assignments were differentiated. 3. Student valued having choices when completing their assignments. 4. Student liked doing self-reviews.

differentiated instruction that enabled this to occur for the students' comprehensive learning as measured by the exams, which were identical must refer to something more specific for just the DI group.

The overall content was the same for both sections but the difference was that the instructor knew the DI students more holistically. The assessments and continuous reflection on her teaching allowed for this difference. As Wormeli (2007) explained,

"Differentiation is foremost a professional and responsive mind-set" (p. 7). We agree. Through ongoing formative and summative assessments plus continuous reflection, the instructor came to know the DI students on many fronts.

Philosophically, differentiated instruction is a student-centered and holistic approach. Students in both sections commented on the relaxed environment, engaging instruction, interesting material, and a caring teacher as beneficial to their learning. However, the DI class went further. For example, several students stated, "She considered how we learned and took time out to make the course fit us [*sic*]"; "She included different activities and learning styles for all students"; and, "We actually got self reviews every once in a while to see how we were doing."

The exam scores, as well as the qualitative comments, supported that students learned at a deeper level. Logically, this makes sense in that their mastery of the material was ensured through the use of continuous assessment of their learning, which guided further instruction.

This differentiated philosophy—or mindset—of teaching, the cycle of purposefully using ongoing assessments to guide the next steps in instruction that ensure learning, is what we believe accounts for the significant difference on the overall exam scores between the DI group and the NDI group.

Implications

Differentiation could be the difference between academic success and failure for many students. A professional mindset of differentiation includes a learner-centered, constructivist model that will meet the needs of all learners at every level. Differentiated instruction may significantly alter the current remedial issues for college students and hopefully will lessen the impact of strategic rhetoric (Fassett & Warren, 2004).

It is imperative that educators recognize our responsibility to ensure that all of our students have the opportunity to learn the course material and can access the curriculum via instruction that matches their learning needs. Educators and students alike share this responsibility of students' learning. Both have an obligation to eliminate the rhetorical framework or blaming game that does not benefit the student or the educator.

As an instructor of preservice teachers, another implication is that differentiated instruction must be incorporated in training programs for our future teachers. Within the INTASC standards for teacher education, preservice teachers must know about and be able to implement differentiation. Therefore, preservice teachers need to observe differentiation in action during their teacher training and then practice differentiated instruction during their practica and student teaching (Darling-Hammond, Hammerness, Grossman, Rust, & Shulman, 2005; Goodnough, 2009). Preservice teachers must be knowledgeable and experienced in conducting formative and summative assessments as these are the driving force behind differentiated instruction. Without assessment, it is virtually impossible to differentiate effectively.

Differentiation is challenging at all levels, but perhaps more so at the college level. Initially, more planning time and reflection are needed to differentiate to meet the diverse needs of students. Regardless of the discipline, small steps are preferable over trying to adopt a full-scale DI approach. It is critical to understand that DI does not mean that "anything goes." A higher education course should be guided and shaped by common goals, objectives, and evaluation criteria. With these established, the instructor has the foundation to plan for differentiation. Some examples, not in any particularly rank order, include (a) pre-assessment of background knowledge (entrance slips), (b) learning profiles, (c) awareness of expert blind spots (Wiggins & McTighe, 2006), (d) exit slips to ensure understanding, and (e) bound choices based on identical expectations as delineated in a rubric (see Appendix B).

In addition, educators in higher education can audit reoccurring stumbling blocks within courses allowing for preplanning of how to approach difficult material. Over the years, we have realized that college students tend to stumble on the same concepts or understandings as the students in previous semesters and differentiated materials used in previous semesters can again be utilized to help clarify. Tomlinson (2008) stated that it takes several years to differentiate well and our journey with differentiation has only just begun. A differentiated mind-set occurs gradually as does the development of methods and materials to support this philosophy. The key is to start small and build on one's repertoire of materials and methods for differentiation. Recognizing that this is a short list of possibilities, some excellent references for further strategies include Cross and Angelo (1993), Tomlinson and Imbeau (2010), and Huba and Freed (2000).

Just as students are whole people, we posit that differentiation must occur as a whole package. As the comments of these students confirmed, differentiation must consider (a) readiness levels, (b) interests, (c) learning profiles, (d) the affect regarding the teacher, (e) the course material, and (f) the environment. Each component is integral.

Limitations

The lead author has been using differentiated instruction for years, but more extensively in this study than in previous courses taught. However, reflection

surfaces missed opportunities to differentiate that may have allowed for even stronger connections to the material and even deeper learning for the students. The score differences may seem minimal but with a teacher who has more experience with differentiation, we believe that an even larger difference would be obtained.

Another limitation to this study was that inter-rater reliability was only conducted on one assignment and one exam. Reliability measures on all of the assignments and exams would be preferable.

The possibility that students from the DI section of the course interacted with students from the NDI section could also have potentially skewed the assessment data. For example, had the students come together from the DI and NDI classes to study, the DI student could have shared more depth of information about a topic. The responses on the end of course evaluation may also have been influenced based on possible interaction of the two groups.

Future Research Recommendations

Further quantitative research needs to be conducted at the college level to better understand the impact of differentiated instruction for diverse learners. Tulbure's (2011) study ending in mixed results confirms that more studies in this area need to be conducted. This study refers to an undergraduate Educational Psychology course that only and needs to be replicated to confirm the findings.

Another research issue is whether differentiated instruction can be implemented across all disciplines or only for certain lower level courses. In other words, would differentiated instruction be beneficial for courses in more specialized courses, such as in the medical field? For example, when learning how to perform a specific medical procedure, choice in content, process, and product may not be acceptable and may have severe consequences.

If we were to repeat this study, we would keep the topics of the assignments but not create differentiated product options for the DI group until we had collected learning profiles and the instructor had spent time getting to know the students. Through using information from the learning profiles, the instructor would cater the product options of the assignments to the interests of the students.

Last Thoughts

Tomlinson (2008) and Wormeli (2007) both suggested that differentiation is an ethical issue. During the implementation of this study, we experienced many points of ethical dilemma as we reflected on the two sections. Many times the instructor questioned and struggled with the fairness of not differentiating for the NDI group. After witnessing the academic improvements attained by the DI group, we question this decision even more now than before conducting the study. However, with the academic improvements witnessed in the students' learning and the overwhelmingly positive response that the lead author has received from students, the lead author cannot, in good conscience, nor would she want to, revert back to her former philosophy or mindset as a teacher. Even though she has just begun efforts to utilize differentiated instructional methods, with minimal extra effort, significant differences in the depth of her students' learning was noted.

References

Aud, S., Hussar, W., Kena, G., Bianco, K., Grohlich, L., Kemp, J., & Tahan, K. (2011). *The condition of education 2011* (NCES Report 2011-033). Retrieved from Department of Education, National Center for Education Statistics website: http://nces.ed.gov/pubs2011/2011033.pdf

Avci, S., Yüksel, A., Soyer, M., & Balikçioğlu, S. (2009). The cognitive and affective changes caused by the differentiated classroom environment designed for the subject of poetry. *Educational Sciences: Theory & Practice, 9*(3), 1069-1084.

Beecher, M., & Sweeny, S. M. (2008). Closing the achievement gap with curriculum enrichment and differentiation: One school's story. *Journal of Advanced Academics, 19*(3), 502-530.

Chamberlin, M., & Powers, R. (2010). The promise of differentiated instruction for enhancing the mathematical understandings of college students. *Teaching Mathematics and Its Applications, 29*, 113-139. doi:10.1093/teamat/hrq006

Cross, T. A., & Angelo, K. P. (1993). *Classroom assessment techniques: A handbook for college teachers* (2nd ed.). San Francisco, CA: Jossey-Bass.

Cusumano, C., & Muelier, J. (2007). How differentiated instruction helps struggling students. *Leadership, 36*(4), 8-10.

Darling-Hammond, L., Hammerness, K., Grossman, P., Rust, F., & Shulman, L. (2005). The design of teacher education programs. In L. Darling-Hammond & J. Bransford (Eds.), *Preparing teachers for a changing world: What teachers should learn and be able to do* (pp. 390-441). San Francisco, CA: Jossey-Bass.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum Press.

Ernst, H. R., & Ernst, T. L. (2005). The promise and pitfalls of differentiated instruction for undergraduate political science courses: Student and instructor

impressions of an unconventional teaching strategy. *Journal of Political Science Education, 1*(1), 39-59. doi:10.1080/15512160590907513

Fassett, D. L., & Warren, J. T. (2004). "You get pushed back": The strategic rhetoric of educational success and failure in higher education. *Communication Education, 53*(1), 21-39. doi:10.10/0363452032000135751

Gardner, H. (1993). *Frames of mind: The theory of multiple intelligences.* New York, NY: Basic Books.

Goodnough, K. (2009). Investigating pre-service science teachers' developing professional knowledge through the lens of differentiated instruction. *Research in Science Education, 40*, 239-265. doi:10.1007/s11165-009-9120-6

Graham, K. J. (2009). *Mandated implementation of differentiated instruction effectiveness examined* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3366972)

Grimes, K. J., & Stevens, D. D. (2009). Glass, bug, mud: A self-assessment system enables teachers to differentiate elementary mathematics instruction, which boosts both student learning and students' sense of themselves as mathematicians. *Phi Delta Kappan, 90*(9), 677-680. doi:10.1177/003172170909000914

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

Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*(3), 588-600. doi:10.1037/a0019682

Jensen, E. (2005). *Teaching with the brain in mind* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

Levene, H. (1960). Robust testes for equality of variances. In I. Olkin (Ed.), *Contributions to probability and statistics* (pp. 278-292). Palo Alto, CA: Stanford University Press.

Livingston, D. (2006). Differentiated instruction and assessment in the college classroom. *Reaching Through Teaching: A Journal of the Practice, Philosophy and Scholarship of College Teaching, 16*(2), 17-31. Retrieved from http://www.kennesaw.edu/cetl/publications/rtt/RTT16,2.pdf

Mastropieri, M. A., Scruggs, T. E., Norland, J. J., Berkeley, S., McDuffie, K., Halloran Tornquist, E., & Connors, N. (2006). Differentiated curriculum enhancement in inclusive middle school science: Effects on classroom and high-stakes tests. *Journal of Special Education, 40*(3), 130-137. doi:10.1177/00224669060400030101

Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). San Francisco, CA: Wiley & Sons.

Pliner, S. M., & Johnson, J. R. (2004). Historical, theoretical, and foundational principles of universal instructional design in higher education. *Equity & Excellence in Education, 37,* 105-113. doi:10.1080/10665680490453913

Salvia, J., Ysseldyke, J. E., & Bolt, S. (2007). *Assessment in special and inclusive education* (10th ed.). Boston, MA: Houghton-Mifflin.

Santangelo, T., & Tomlinson, C. A. (2009). The application of differentiated instruction in postsecondary environments: Benefits, challenges, and future directions. *International Journal of Teaching and Learning in Higher Education 20*(3), 307-323. Retrieved from http://www.isetl.org/ijtlhe/pdf/IJTLHE366.pdf

Sternberg, R. J., & Spear-Swerling, L. (1996). *Teaching for thinking.* Washington, DC: American Psychological Association.

Tomlinson, C. A. (2001). *How to differentiate instruction in mixed ability classrooms* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. A. (2008, November). *A baker's dozen indicators of quality interventions*. Symposium for the MSUM Visiting Scholar Grant at Minnesota State University, Moorhead, MN.

Tomlinson, C. A. (2009). Two schools pursuing learning profiles. *School Administrator, 66*(2), 32. Retrieved from http://vnweb.hwwilsonweb.com/hww/results/results_single_ftPES.jhtml

Tomlinson, C. A., & Allan, S. D. (2000). *Leadership for differentiated schools and classrooms.* Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. A., & Imbeau, M. B. (2010). *Leading and managing a differentiated classroom.* Alexandria, VA: Association for Supervision and Curriculum Development.

Tulbure, C. (2011). Differentiate instruction for pre-service teachers: An experimental investigation. *Procedia—Social and Behavioral Sciences, 30*, 448-452. doi:10.1016/j.sbspro.2011.10.088

Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist, 41*(1), 19-31. doi:10.1207/s15326985ep4101_4

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1997). *Educational psychology*. (R. Silverman Trans.). Boca Raton, FL: St. Lucie Press. (Original work published 1926)

Wiggins, G. P., & McTighe, J. (2006). *Understanding by design* (2nd ed.). Alexandria, VA: Association for the Supervision and Curriculum Development.

Wormeli, R. (2007). *Differentiation: From planning to practice grades 6-12*. Portland, ME: Stenhouse.

MARY DOSCH is an assistant professor in the School of Teaching and Learning at Minnesota State University Moorhead. Her research interests include differentiated instruction, strategic rhetoric used in education, early literacy, and response to intervention.

MARGARET ZIDON is an associate professor in the Department of Teaching and Learning at the University of North Dakota. Her research interests include the learner's experience of curriculum, cross-cultural experiences, and use of literary text in teacher education.

Appendix A
Assignments for NDI Section

General Instructions: Please put your number on the top of your paper. All written portions must be typed and double-spaced, with 1-inch margins and 10-12 point font. At least one full page is required for any writing assignment/reflection.

Assignment 1: After class lecture and discussion about the value of research, each student will write a reflection about one math intervention on either www.whatworks.ed.gov or Google intervention central and then explain why research is important to guide instruction. Include pros and cons about the intervention. Be sure to include one source that teacher's could use to guide them.

Assignment 2: After the class lecture and discussion on diversity in schools, each student will watch 15 commercials on TV observing whether the commercials starred a male or female, what ethnic group the individual belonged to, what the individual was selling, and what perceived class (lower, middle, upper) the individual was a member of? Create a table or graph displaying what you found, then write a reflection on how diversity in media can affect a child's self-efficacy in education.

Assignment 3: Through the use of a classical conditioning define a behavior that someone does and make three attempts to alter that person's behavior. In a written reflection, document what occurred and then create your own scenario of how a teacher could use classical conditioning to alter a child's behavior in school.

Assignment 4: Students will view a video from the PBIS (Positive Behavioral Supports in Schools) website showing system-wide models of Positive Behavioral Supports in school settings using a three-tiered model of intervention. Students will watch the video on their own time. Students will write a reflection explaining PBIS, explain how a PBIS school compared to your own school, and give your own opinion on PBIS.

Assignment 5: Students will work within collaborative groups. Each individual will be assigned a learning strategy to research and directly teach to the other members of the group. Afterwards, the student will write a reflection about the teaching experience and explain how the learning strategy could be used in a teaching experience. Also give your opinion of the strategy.

Assignment 6: Students will work to differentiate a lesson in reading. The student will create a written plan as to how to differentiate a lesson using Sternberg's Triarchic theory. For each intelligence, one must explain what the students should know, understand, and be able to do. Each of these learners must be taught at their zone of proximal development.

Assignment 7: After the class lecture on learning environments, students will draw the perfect learning environment for K-12 students; then, write a reflection of why this would be a good learning environment.

Appendix B
Assignments for DI Section

General Instructions: Please put your number on the top of your paper. All written portions must be typed and double-spaced, with 1-inch margins and 10-12 point font. At least one full page is required for any writing assignment/reflection.

Assignment 1: After the class lecture and discussion about the value of research, and sharing some of the interventions found with peers. Each student will read one research study from the National Undergraduate Research Clearinghouse, What Works Clearing House, or Intervention Central websites and write about any intervention of one's choice, include pros and cons of the intervention, and then write about the importance of research in guiding instructional decisions. Be sure to include one source that teacher's could use to guide them.

Assignment 2: After the class lecture and discussion on diversity in schools, each student will watch 15 commercials on TV observing whether the commercials starred a male or female, what ethnic group the individual belonged to, what the individual was selling, and what perceived class (lower, middle, upper) the individual was a member of? Create a table or graph displaying what you found then choose from the following:

- Write a reflection on how diversity in media can affect a child's self-efficacy in education
  OR
- Create a cartoon demonstrating how media can affect a child's self-efficacy in education
  OR
- Write a letter to the TV station about your concerns regarding a child's self-efficacy in education according to what you witnessed when watching the commercials.
  OR
- A creation of your choice that addresses how media affects a child's self-efficacy in education (okay your idea with the instructor).

Assignment 3: Through the use of a classical conditioning, or operant conditioning, or observational learning, define a specific behavior that someone currently does and make three attempts to alter that person's behavior. In a written reflection, document what occurred and then create your own scenario of how a teacher could use whichever conditioning you did to alter a child's behavior in school.

Assignment 4: Students will view a video from the PBIS (Positive Behavioral Supports in Schools) website showing system-wide models of Positive Behavioral Supports in school settings using a three-tiered model of intervention. Students will watch the video on their own time and (1) create a brochure on PBIS, (2) write a reflection on PBIS, or (3) create a 60 second video promoting PBIS. You must include an explanation of PBIS, explain how a PBIS school compared to your own school, and give your own opinion on PBIS.

Assignment 5: Students will work within collaborative groups. Each individual will choose a learning strategy that he/she would like to research and directly teach to the other members of the group. Then the student will write a reflection about the teaching experience and explain how this strategy could be used in a teaching experience. Also give your opinion of the strategy.

Assignment 6: Students will work to differentiate a lesson on one topic of one's choice. The student will create a written plan as to how one would differentiate a lesson using Sternberg's Triarchic theory or differentiate for three levels of learners: struggling learners, average learners, and above average learners. You must explain what the students should know, understand, and be able to do. Each of these learners must be taught at their zone of proximal development.

Assignment 7: After the class lecture on learning environments, students will design the perfect learning environment for K-12 students—for example, the student could create a diorama of the environment, a drawing of the environment, a computer layout of the environment—then write a reflection of why this would be a good learning environment.