Engaging Pre-service Teachers in Experiencing Universal Design for Learning Principles in a College Classroom

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Abstract

The Universal Design for Learning (UDL) framework strives to ensure access to learning for all students (Rose, 2001). The purpose of this project was to model the principles of UDL to pre-service teachers. The rationale behind this project was to engage all students in learning the course content, as well as to experience first-hand the benefits of having multiple means of expression, representation, and engagement. Twenty-nine pre-service teachers enrolled in a Universal Design for Learning and Assistive Technology course participated in this project. The results focus on artifact data depicting students' responses to multiple means of expression options. The discussion includes recommendations for future research and practice.

Keywords

UDL, UDL principles, UDL assessment, curricular approach in college, multiple means of expression

INTRODUCTION

Universal Design (UD) started as an architectural concept to provide access and to accommodate the physical needs of all potential users (Center for Universal Design, 2007). Although UD is well established in architecture and related fields, and is becoming visible in K-12 education, it is still relatively underrepresented in higher education (Rose, Harbour, Johnston, Daley, & Abarbanell, 2006).

Universal Design for Learning (UDL; Rose, 2001; Rose & Meyer, 2000), Universal Design for Instruction (UDI; Scott, McGuire, & Shaw, 2001), and Universal Instructional Design (UID; Silver, Bourke, & Strehorn, 1998), all focus on providing access to education for all learners. In recent studies, attention has been paid to include UDL or UID principles in the college classroom to strengthen the learning outcomes for a diverse body of students (Davies, Schelly, & Spooner, 2013; Higbee, 2003; Higbee & Goff, 2008; Rose et al., 2006; Scott, McGuire, & Shaw, 2003; Scott, McGuire, & Foley, 2003; Silver, et al, 1998). Scott, McGuire, and Shaw (2003) postulated that:

"Making individual accommodations may have seemed manageable when students with learning disabilities were a small, and almost invisible, cohort of the college population. Today, growing numbers of students with apparent and hidden disabilities combined with students at risk for academic failure require new approaches to provide accessible and effective instruction for this diverse cohort of college learners (p. 370)."

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UDL in Higher Education

Embracing UDL principles in instructional strategies is increasingly more essential in higher education (Davies et al., 2013; Rose et al., 2006). Greenfield (2009) suggested that the use of various technologies by today's youth increases their parallel processing and multitasking skills (Davies et al., 2013). Thus, college instructional strategies need to be responsive to these changes in the receptive and expressive learning styles of current students. Rose et al., (2006) explained that students differ in how they are motivated and to what degree their motivation is extrinsic or intrinsic, thus should be provided with multiple means of engaging in learning.

Many college professors already implement, or have a strong belief in, the principle of multiple means of engagement, so they provide students with active learning strategies, a team approach, contextual learning, and other strategies (Silver et al., 1998). Similarly, more and more faculty members strive to provide students with multiple means of representation of the content they are teaching by scaffolding, preparing guided notes, using both visual and auditory presentations, and providing materials in class and online (Silver et al., 1998). Rose and colleagues (2006) argued that the principle of multiple means of representation is based on the assumption that there is not just one way of presenting information. Similarly, Rose et al. (2006) explained that the principle of multiple means of expression stems from the belief that there is no one way of expression that will be universal for all students, so students should be provided with multiple means to express what they are learning.

In contrast to the principles of engagement and representation, the principle of multiple means of expression appears to be less represented in higher education curricular strategies. Most faculty appear to prefer one type of testing, or one way of submitting an assignment. Silver and colleagues (1998) identified some potential barriers to implementing the principles of the UID in the college classroom. These barriers included increased time commitment from the faculty, insufficient faculty preparation to teach, difficulty with changing the status quo of college education, as well as some faculty beliefs that a college class is a good place to eliminate the weakest students who do not belong in college (Silver, et al., 1998). While these data were collected well over a decade ago and referred to the UID principles, similar barriers seem to be apparent in implementation of the UDL principles in a contemporary college environment.

This research study sought to demonstrate how the UDL principles, especially multiple means of expression, can be provided to college students and how such implementation might change their attitudes towards learning and their overall learning experience. Although the principles of UDL are taught to future general and special education teachers in many college teacher preparation programs, rarely are they modeled in college curricular strategies. The purpose of this project was not only to teach about the principles of UDL, but also to allow students to experience how the principles can guide instruction, how these principles look in practice, and their potential for improving student outcomes and attitudes toward the class. The underpinning of this project was to ensure that pre-service teachers would not treat the UDL principles as yet another instructional strategy or approach they needed to learn about, but a pedagogical framework that would guide them in their future practice as teachers in K-12 settings.

The research focus of this project was to document college students' preferences for expressing their preparation and knowledge of course content. We acknowledge that this particular course example is a work-in-progress and does not strive to be a model for UDL implementation in higher education. We offer our observations and findings to encourage other faculty to explore the UDL principles in their own teaching.

METHOD

Participants and Setting

The participants in this project were 29 undergraduate students enrolled in a Universal Design for Learning and Assistive Technology course. Six of the students were males, constituting 20.7% of the class. Three students in class had documented disabilities, varying from a specific learning disability to a significant visual impairment. The class met once a week for two and a half hours in a spring semester.

Procedures

The course's instructional strategies and curriculum planning reflected the three principles of UDL. Examples included presenting the course content visually and orally, allowing students to engage in various learning strategies and activities that included large and small groups, and independent and partnered work, to name a few. Especially critical to students' engagement and representation of the content was a connection between this and a fieldembedded course in instructional methods that students were taking concurrently. The connection between the activities in both classes allowed students to apply the knowledge they gained in the college classroom to their field placement experience, thereby making learning relevant.

Since the focus of this project was to concentrate on multiple means of expression, the procedures specific to this principle of UDL that were practiced in this project will be described in detail. Students had informal opportunities to express their knowledge and skills by participating in class discussions, partnered reflections, and in-class, hands-on activities. However, two formal and monitored ways for students to express their knowledge were examined in this study and are described below.

First, the students were expected to submit weekly reading notes that would reflect their level of preparation for the class. At the beginning of the semester, the instructor explained how the students could use various modalities to submit the reading notes to reflect their personal reading and class preparation styles. The instructor provided students with examples, including scanned hand-written notes, typed notes, or photos of notes, and allowed for additional modalities to be explored by the students.

Second, the students were given a choice of how they could take their final exam. They were required to write a rationale in which they proposed a chosen final exam modality and explained their justification for such a choice. The students were asked to reflect on their preferred method of expressing their knowledge and propose an exam modality based on that preference. Based on the rationales articulated by the students, the various exam modalities were designed by the instructor.

Data Collection and Analysis

The data collected in this project was comprised of the students weekly reading notes submission styles, final exam choices, and the corresponding rationale for that choice. The reading notes and the final exam choices were analyzed using descriptive statistics to obtain the mean and mode of the choices (Pearson, 2010). The final exam rationales were analyzed using an inductive analysis process (Hatch, 2002) to determine themes students' attributed to their rationales.

RESULTS

Weekly Reading Notes

The weekly reading notes students submitted represented five different categories: typed notes, photos of highlighted sections of text from the book, photos of hand written notes, photos of underlined text in the book, and photos of hand-written note cards. On average, the most popular method of taking reading notes each week was highlighting sections of text from the book and submitting photos of these highlights, with the exception of the first week. Specifically, 59% of students chose to submit photos of highlighted text more than twice in the semester. Photos of highlighted text constituted 52% of all reading notes submissions across the semester, while typed notes were 24%, photos of hand written notes 20%, photos of underlined text 3%, and photos of note cards less than 1%. Figure 1 presents these results visually.

Interestingly, during the first week of classes, reading notes submissions were either typed or hand written text. Only after additional encouragement from the instructor did the students began to explore other means of reading notes submission. In the weeks that followed, 65% of students chose to utilize only one method of reading note submission, while the other 35% explored multiple options before settling on a single type.



Figure 1. Visual representation of the percentage of the types of weekly reading notes submitted by students.

It is interesting to consider the similarities between some of the modalities students submitted for creating weekly reading notes. Photos of highlighted text and photos of underlined text represent methods that students used to prepare for class that involved working from the textbook alone. Typed notes, photos of hand-written notes, and photos of note cards represent methods that students employed that required additional work and interaction with the text to enhance their preparation for class beyond simply reading the text. When weekly reading notes are grouped according to these similarities, 55% of the weekly reading notes submissions reflected interaction with the textbook alone, while 45% of submissions reflect preparations beyond simply reading and highlighting text. There is no way to know how students prepared for class beyond what they submitted. It is not known whether students who highlighted and underlined text engaged in additional study activities to prepare for class or simply highlighted or underlined sections of text.

Final exam choices

The students were not given any directions regarding the final exam choices, other than that the exam was going to be offered in the classroom only and there would be a time limit of an hour and a half. One student with a documented disability decided to take the test in the testing center on campus to have extended time. The students proposed six methods for taking the final exam: a visual/graphic project, an essay, multiple-choice test, short response test, oral narrative, and a computer-based project. 69% of students de-

cided to take a multiple-choice test. Final exam choices are summarized in Table 1.

Exam Type	Number of Students	Percentage of Students
Multiple-choice	20	69%
Essay	3	10%
Oral narrative	3	10%
Short response	1	3%
Computer-based project	1	3%
Visual/graphic project	1	3%

Table 1. Number and percentage of students who chose each type of exam

Final Exam Rationales

Multiple Choice Test

The majority of students who chose to take a multiplechoice test argued that this was a traditional method of testing and they were most comfortable with such a method. Students indicated that the multiple-choice format was how they have been tested for their entire educational career. Students argued that multiple-choice tests allow them to eliminate incorrect answers and pinpoint the only correct one. A few students reflected that this method was the most organized and structured. One student pointed out that the Praxis exam, which they are required to take and pass before getting a teaching license, is also a multiple-choice test. Therefore a final exam of this type would be good practice for the Praxis. Another student reflected that a multiple-choice test was the most objective, as there was only one correct answer, and that factors such as hand writing or ability to formulate complex thoughts were not counted. Some of the common threads found in students' rationales for taking multiple-choice tests included statements that the student was "used to that format on tests and quizzes;" had taken "these kinds of tests for my entire career;" she/he was "able to eliminate the answers that I know are wrong;" was able to identify "having questions that have a definitive answer;" and felt "less stressed," "more comfortable," or "more confident" taking multiple-choice tests.

Essay Test

The three students who chose to write an essay referred to their excellent writing skills and ability to express themselves in writing. One student stated, "I chose essay response because I feel more confident with my answers when I have a chance to explain my thoughts. During the writing process, I find that I think of more information about the subject matter as I continue to write because I have the opportunity to transfer my thoughts to paper."

Oral Narrative

Verbal expression skills appeared to be the strongest rationale among students who chose to present their knowledge via an oral narrative. One student reflected, "I am looking to strengthen my interview skills and become more comfortable/confident talking under pressure. An oral narrative interview will give me valuable experience for when I start applying and interviewing for jobs."

Visual/graphic or Computer-based Project

One student decided to present her knowledge via a visual/graphic project, and referred to her visual skills and her interest in hands-on activities, like scrapbooking. Similarly, the student who chose a computer-based project reflected on his technology skills and ability to search the Internet for relevant materials.

Short Response Test

Lastly, one student chose to take the exam as a short response type of exam. She argued:

"This type of test works the best for me because multiple choice tests can sometimes be tricky and mess students up by using words like 'always' or 'the most...These kinds of tests usually cause me to overthink answers and second guess myself, while short responses allow me to say what I think the answer is and explain reasoning."

DISCUSSION

The purpose of this project was to model the implementation of the UDL framework for pre-service teachers as a way for them to experience UDL for themselves, as opposed to simply learning about it as an instructional strategy in their teacher preparation program. The research component of this project sought to document college students' experiences with multiple means of expression as they exercised their preferences for how they prepared for class each week and demonstrated their knowledge and skills on the final exam in a course on UDL. Students were offered options for the modalities they would use to submit weekly reading notes and the format of their final exam.

As described above, a little more than half of the weekly reading notes submissions were photos of highlighted or underlined text, while a little less than half of the submissions were modalities that required students to write notes related to the text. Overall, students submitted five different types of weekly reading notes and did not always submit the same type of notes each week, as illustrated by the fact that students explored other modalities after encouragement from the instructor. The fact that students submitted five different types of weekly reading notes and did not always submit the same type of notes each week illustrate that students took advantage of the multiple means of expression offered by their instructor.

The general findings related to the types of final exams that students chose to take also illustrate that students took advantage of the multiple means of expression offered by their instructor. Even though the number and percentage of students across the different types of exams taken were not as evenly distributed as for the types of reading notes submitted, students chose from a variety of options to demonstrate their knowledge.

The most interesting outcome of this study is reflected in the rationales students provided for their final exam choices. Remember that 69% of the students chose a multiplechoice format for their final exam. This is over twice as many as all the other formats combined.

In K-12 public education, many students begin taking highstakes multiple-choice tests beginning in elementary school and continue taking these assessments through high school. They are taught numerous test-taking strategies so that they can be successful taking these assessments. When students prepare to attend college, they take the College Board SAT or ACT exam, both of which are multiple-choice assessments. Therefore, it is not surprising that college students would feel more comfortable with or be accustomed to demonstrating their knowledge in a multiple-choice format.

Implications

Once students graduate from college, they are likely to encounter the need to pass multiple-choice exams as they seek certification, licensure, or accreditation to practice their craft in their chosen field. However, it seems unlikely they will encounter the need to demonstrate their knowledge and skills on a multiple-choice test once they are on the job. In other words, most people in the workforce demonstrate their knowledge and skills in their area of expertise by performing their jobs, not taking a multiplechoice test. This is important because college students need to be prepared to be successful in workplace skills of expression once they graduate, not simply to pass multiplechoice tests so they can make good grades. While it is important for students to make good grades in college, it is a disservice to college students not to provide them with multiple means of expressing their knowledge and skills.

Embedded in the UDL principle of multiple means of expression is the assertion that students will be better able to demonstrate their knowledge when provided with options that align with their strengths (Rose et al. 2006). Allowing college students to demonstrate their knowledge in ways other than a multiple-choice test can be a powerful tool for promoting their success once they leave the college classroom. Whether or not average college students are comfortable demonstrating what they have learned using modalities besides multiple-choice tests is another matter. However, if they are not given the opportunity to show what they know in multiple ways, they are not likely to become comfortable doing so.

There is little research to document the level of knowledge, acceptance, or preparation of educators to implement UDL in the college classroom. Information relating to UDL is readily available from the Center for Applied Special Technology (n.d.), including resources specifically targeted at college instructors. Research efforts of the type presented here can be instrumental in helping college instructors become aware of UDL and how it can be implemented in their classrooms.

Modeling UDL in the college classroom is especially important in teacher education programs since "there are many concepts embedded throughout the Common Core Standards that are aligned with the UDL framework" (National Center on Universal Design for Learning, n.d.). Therefore, it is important for pre-service teachers to experience and see the UDL framework modeled in their college coursework so they understand that UDL is not just a strategy they may choose to implement in their future practice, but a framework that should inform their approach to successfully supporting the success of all students.

Future Research

As mentioned earlier, this study was exploratory in nature. While it offers some preliminary findings that are relevant to the body of knowledge about implementing the UDL framework in the college classroom, there is more research to be done. Students in this study had the opportunity to make choices about how they would submit their weekly reading notes and the format of their final exam, and they provided a rationale for their final exam choice. However, follow-up data with these students are not available.

The findings presented here should be extended by replicating the final exam choices and rationales components of this study and adding student perceptions about being offered multiple means of expression on their final exam. It would also be interesting to pair these data with the students' grades on the final exam modalities they chose, to see if the chosen exam method truly provided the best option for students to express their knowledge. This type of study would not need to be replicated in courses about UDL, but could be replicated in any college course by an instructor willing to implement the UDL framework.

An avenue to investigate related specifically to pre-service teachers would be to replicate the final exam choices and rationales components of this study and seek their perceptions about how their experience with multiple means of expression might inform or influence their future practice. It would be interesting to know how pre-service teachers view UDL after having personal experience with it as a student. Would pre-service teachers be more likely to embrace and use UDL in their future practice after having experienced it as a student, as opposed to pre-service teachers who were simply taught about the UDL framework using a more traditional instructional approach?

Beyond the experiences of college students who are offered multiple means of expression, it would be important to learn more about this phenomenon from the college instructor's point of view. What are the time constraints of offering multiple means of expression to students? How long would it take to create the different types of assessments? How long to grade all of the different assessments? Was it worth the effort? Did students demonstrate deeper or richer understandings of the course content by being offered the opportunity to show their knowledge in a way they felt best for them? These are questions that need to be answered and issues that need to be addressed before UDL will be embraced by college instructors.

Limitations

The limitations of this study are related to the small scope of the project. The small number of participants (n=29) and the inclusion of a single course and instructor mean that the findings cannot be generalized beyond this study. Since the findings from both components of this study are descriptive in nature, the intention of the researchers is not to make inferences about the efficacy of utilizing the UDL principle of multiple means of expression in the college classroom. It is important to recognize the exploratory nature of this study and that there is much more research to be done on implementing UDL in the college classroom.

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