Constructivism and Future Self-Efficacy: Student Teachers' Confidence in Applying Learning Theories to Computer Technology

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Abstract

This mixed-method study investigated how a course exploring the application of major learning theories to computer technology might impact student teachers' decision about employing principles of this knowledge base in their future practice. Eighty-two student teachers representing three semesters, explored and employed behaviorism, cognitivism, and constructivism to inform computer-technology-supported lessons. The data collected through an anonymous 10-item electronic exit survey completed by participants at the end of the "Applying Learning Theories to Computer Technology" unit, indicate that the majority developed strong confidence in applying the theories to computer technology. Themes generated from the findings also reveal strategic reasons constructivism is participants' preferred theory, and the value learning theories in general potentially hold for prospective teachers.

Keywords: Learning Theories; Teacher Self-efficacy; Teacher Preparation; Student Teachers; Computer Technology; Learner Empowerment; Pedagogical Empowerment

1. Introduction

The importance of educational theory in the teacher preparation process has been well established (Gagne, 1985; Gardner, 1999; Holmes Group, 1990; Merrill, 2002; Zeichner, 2010); but as one author noted, "While most teachers are skilled in providing opportunities for the progression of children's learning, it is often without fully understanding the theory behind it" (Pritchard, 2014, p.i). Grounding teachers in the leading theories undergirding the field, is necessary for them to understand their work and how to make informed decisions about improving practice. Learning theories for example, are leading ideas in the field that outline principles and practical applications that are particularly valuable to effective pedagogy. Notwithstanding the significance of this significant of this knowledge base, it has been observed that in recent times teacher preparation programs are deemphasizing theories of learning (Orchard & Winch, 2015; Pritchard, 2014). It is necessary therefore that prospective teachers not only develop an understanding of learning theories, but also a commitment to using this theoretical framework to inform their practice in the future. The application of learning theories in the teaching and learning process is probably most noticeably absent in decisions relating to the integration of technology in the classroom. Computer technology for example, is quite often used to support instruction but there is little evidence that teachers consciously employ principles of learning theories to inform those decisions (Bailey, 2017). In light of this observation, the author designed a course featuring a unit exploring the use of three major learning theories (behaviorism, cognitivism, & constructivism) to inform the utilization of computer technology in the classroom. For this study, the author was interested in the impact of this unit on student teachers' future self-efficacy and intentions to ground their practice in principles of learning theories. Because of the predictive power and application of self-efficacy for practically any behavioral task (Henson, 2001), it is a useful construct for examining student teachers' future pedagogical intentions.

2. Purpose of Study and Research Questions

The purpose of this study was to examine how a course exploring the application of three major learning theories to computer technology, might impact the future practice of 82 student teachers in employing principles of those theories in the classroom.

Although the ideas articulated in this study are related to self-efficacy, the study was not intended to gather information on self-efficacy measures per se, as already explored by numerous scholars (Armor et al., 1976; Ashton, Olejnik, Crocker, & McAuliffe, 1982; Coladarci & Fink, 1995; Gibson & Dembo, 1984; Guskey, 1981; Midgley, Feldlaufer, & Eccles, 1989; Rotter, 1966; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). The primary aim was to ascertain how students' thinking has moved after taking the course, as well as to gage their level of confidence to make theoretically-informed pedagogical decisions in the future. Therefore, the questions that guided this study are:

1. How knowledgeable were student teachers about learning theories before taking the course?
2. Did student teachers think about the application of learning theories to computer technology in the classroom before taking the course?
3. How confident are student teachers in employing the theories to inform their use of computer technology to instruction after taking the course?
4. Which learning theory do most students intend to use in their future practice, and why?
5. What value do student teachers think learning theories hold for them?

3. Theoretical Framework

The theoretical frame of the study comprises *constructivism* (Bruner, 1986; Dewey, 1966; Montessori, 1964; Piaget, 1955; Vygotsky, 1994), and *self-efficacy* (Bandura, 1977, 1986). The central principle or premise of constructivism, is that learners construct meanings for themselves, and are not passive recipients of knowledge. This principle is predicated on the idea that as a species, we are constantly constructing knowledge based on our personal experiences and hypotheses about our environment. Therefore, learning should focus on providing learners opportunities and support to (re)construct or co-construct knowledge. Thus, the constructivist approach to education is potentially empowering to students because of its learner-centered emphasis. Learning experiences can be quite disengaging and disempowering if teacher's voice overwhelms the students'. The position of the teacher is inherently one of power, and that voice might represent a single dominant background or culture, which students might be inclined to interpret as the correct and only way of understanding the world. Constructivist pedagogy provides opportunities and support for learners to actively engage in exploring and collecting knowledge for themselves, instead of being passive recipients (Freire, 1970) of information. This conception of learning strongly supports a pedagogical model that decenters power in the classroom and engenders learner self-confidence and self-efficacy.

Self-efficacy is a branch of social cognitive theory grounded in the assumption that people have agency and control over their actions to influence changes. Teacher self-efficacy therefore has to do with teachers' confidence in their knowledge and ability to influence student learning (Allinder, 1994; Armor et al., 1976; Bandura, 1977; Guskey, 1988; Stein & Wang, 1988). Or framed another way, "A teacher's efficacy belief is a judgment of his or her capabilities to bring about desired outcomes of student engagement and learning" (Tschannem-Moran & Woolfolk Hoy, 2001, p.783). An impressive number of studies have demonstrated that self-beliefs play an important role in the teaching and learning process (Skaalvik & Skaalvik, 2010; Tschannem-Moran & Woolfolk Hoy, 2001), both from the teacher's as well as learner's perspectives. It is also established that teacher self-efficacy is a strong predictor of productive teaching practices (Abu-Tineh, Khasawneh, & Khalaileh, 2011).

This author is of the view that the amalgamation of the two pedagogical lenses – constructivism and self-efficacy – seamlessly complement each other as they operate from a similar epistemological position. The constructivist theory promotes learner agency and life-long learning skills, and is thus appropriate to develop self-efficacy in prospective teachers, which can in turn be transmitted to their students. It is therefore fitting to explore this hybrid theoretical frame to ascertain the predictive impact on both teaching and learning outcomes.

4. Related Literature

4.1 The Role of Learning Theories in Informing Computer Technology in the Classroom

Since this study focuses on the effects of grounding Computers in Education course in learning theories, it is useful here to foreground the value of that pedagogical decision. First, a logical reason for employing learning theories to inform the application of technology in the classroom is their compatibility (i.e. compatibility between learning theories and computer technology). For example, principles of the major learning theories logically connect with the technical applications of computer software.

For instance, one principle of the cognitive theory is that learning involves the component processes of *attention*, *encoding*, *storage* and *retrieval* (Atkinson & Shiffrin, 1968). Computer applications engage the human brain using these four components, and is sometimes presented as analogous to how the brain functions (Davis & Palladino, 1997).

Second, the learning theory-computer application synergy has a strong potential to enhance fundamental principles of teaching and learning. In particular, this synergy provides instructional direction and potentially, learner motivation. An essential consideration for the teacher when planning and implementing lessons is to formulate, and be guided by clear instructional objectives, which articulate intended learning outcomes (Darling-Hammond & Bransford, 2005; McCown, Driscoll & Roop, 1996; Ormrod, 2011; Saphier & Gower, 1997; Wiggins & McTighe, 2005). The instructional objectives in turn inform the methods and materials that will accomplish the goals of the lesson. Methods and materials will therefore involve the learning-theory-informed-technology the teacher selects for supporting the lesson. In terms of learner motivation, because students are so captivated by computer technology, it is reasonable to assume that such fascination will positively influence their engagement with the lesson.

Third, instruction informed by learning theories is also likely to reduce the romanticism of computer in the classroom. The romanticized view (Bransford, Brown, & Cocking, 1999) or fantasy effect of the technology may drive teachers to believe that heeding the call of integrating computers in their classrooms will be a panacea for teaching and learning challenges. Indiscriminate or uninformed use of computers will be no more effective than not using the technology at all. Applying principles of learning theories requires teachers to be more intentional in the use of the technology. In so doing, the application of computer technology is likely to produce more meaningful and potentially effective learning experiences and outcomes.

4.2 Three Major Learning Theories: Behaviorism, Cognitivism, and Constructivism

Behaviorism is based on the thinking that the process and outcome of learning is best understood through observable behaviors or actions (Pavlov, 1957; Skinner, 1977; Thorndike, 1911; & Watson, 1966). According to this theory, behavior can be *manipulated*, *measured* and *changed*. In the field of education, behavior broadly refers to students exhibiting pro- or anti-social behaviors, being on or off task with assigned work, and students' performance on assessments. We manipulate behavior in the classroom by establishing rules for acceptable conduct, instructional approaches, and presenting incentives or disincentives. We measure behavior when we assign a grade or rating to academic performance or classroom conduct. And we change behavior through incentives or disincentives. Essentially, the theory purports that our behavior after an experience indicates whether we have learned or not. Furthermore, behaviorists hold the view that learning is dependent on the negative or positive consequences resulting from a behavior.

The cognitive theory of learning is somewhat of a counter-theory to behaviorism, and largely grounded in the ideas and work of scholars such as Asubel (1968), Bruner (1966), Piaget (1936), and Vygotsky (1968). It is these scholars' view that the study of learning should be based on the workings of the mind, and therefore the focus should be on mental processes instead of observable behaviors. In addition to the seminal work of these luminaries, we also owe much of our understanding of the process of human memory or mental processes, to research done by other scholars (see Akinson & Shiffrin, 1968; Anderson, 1995; Ericcson & Kintsch, 1994; Massaro & Cowan, 1993). The cognitive theory is therefore explicated through the Information Processing Model (Atkinson & Shiffrin, 1971), an analogy comparing the human brain to how the computer functions. The Information Processing Model constitutes three major serial components or stages: the *sensory*, *working*, and *long-term* memories. In simple terms, the sensory memory collects information from the environment through our senses; the working memory receives the information that was not lost during that process; and the long-term memory stores the information that was preserved in the previous stage. Later we are able to retrieve the information stored (or saved).

While the behaviorist and cognitivist theories focus on the learner as a passive recipient of knowledge, constructivism considers the learner a more active or interactive participant in the process. The constructivist theory of learning is rooted in the work of education theorists such as Bruner (1960) (learning as an active process); Dewey (1916) (democracy, hands-on learning); Montessori (1912) (learner-centered classroom); Piaget (1966) (experiential learning); and Vygotsky (1968) (social learning). Essentially, constructivism advances the perspective that people (re)construct knowledge for themselves as they attempt to understand their environment.

From the constructivists' perspective, learning should focus on providing learners opportunities and support to (re)construct or co-construct knowledge. As Slavin (2000) posits, "Teachers can give students ladders that lead to higher understanding, [but] the students themselves must climb these ladders" (p.256). The key principles of constructivism are: (1) Learners construct meanings for themselves, (2) new learning builds on prior knowledge, (3) learning is enhanced by social interaction, and (4) meaningful learning develops through "authentic" tasks (Cooperstein & Kocevar-Weidinger, 2003).

4.3 Self-Efficacy and Teacher Preparation

Self-efficacy is perhaps one of the most under-estimated concepts in teacher preparation but among the best predictors of learning outcomes (Pajares & Miller, 1994; Zimmerman & Bandura, 1994) and effective classroom practices. Based on Bandura's (1997) definition of perceived self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations" (p.3), this theory bears much import for teachers and their students. As Ormrod (2011) argues, not only should beginning teachers foster self-efficacy in their students, they themselves should believe that they can make a difference in students' lives. And as Tschannen-Moran and Woolfolk Hoy (2001) state, "Teacher efficacy is a simple idea with significant implications" (p.783) for teaching and learning outcomes.

There is strong evidence that teacher self-efficacy correlates positively with a number of consequential classroom factors. These include: classroom management (Abu-Tineh, Khasawneh, & Khalaileh, 2011; Silva, Iaochitte, & Azzi, 2010), democratic values (Topkaya & Yavuz, 2011), teacher-student relationship (Kim & Kim, 2010), motivation (Midgley et al., 1989; Mojavezi & Tamiz, 2012), autonomy (Skaalvik & Skaalvik, 2010), learners' own self-efficacy (Anderson, Greene, & Loewen, 1988), and academic performance (Ashton & Webb, 1986; Corkett, Hatt, & Benevides, 2011; Ross, 1992). The factors outlined above can definitely be fostered in the constructivist classroom environment; hence this approach should be quite beneficial in the preparation of teacher candidates for the development of their own self-efficacy as well as confidence to support their future students likewise.

Self-efficacy is promoted through constructivism as teachers are provided with a framework on how to promote agency and belief in one's abilities. The constructivist theory of learning represents a counter to hegemonic instructional practices as it democratizes power in the classroom; hence students are not conditioned to believe that the teacher holds all the knowledge and they are empty vessels. Constructivism also respects students' agency as it provides learners the opportunity to (re)construct knowledge and make meanings for themselves, which will likely cultivate confidence in their personal abilities or self-efficacy. Constructivism is also likely to promote collective self-efficacy (Bandura, 1997) as it privileges multiple perspectives as students collaborate on undertaking challenging tasks. When students support each one another in the learning process, they provide scaffolding for each other's effort and thus tend to have higher self-efficacy for accomplishing challenging tasks (Good, McCaslin, & Reys, 1992; Webb & Palincsar, 1996; Wiley & Bailey, 2006). Grounding prospective teachers in these pedagogical models and insights, prepares them to be more confident and effective practitioners in the future.

5. Methodology

5.1 Participants

The data for this study were gathered over 3 semesters from eighty-two student teachers, the vast majority females (98%), who took a Computers in Education course taught by the researcher. Participants were pursuing teacher licensure in early childhood (24.4%), elementary (57.3%), and special education (18.3%). The majority were juniors (49.4%), followed by sophomores (40.4%), and seniors (10.2%). Consistent with the general instructional approach governing the course, the unit was facilitated through the constructivist theory of learning.

5.2 Instrumentation

The data for this study were based on the participants' responses to a 10-item electronic exit survey they were required to complete anonymously at the end of the "*Applying Learning Theories to Computer Technology*" unit.

To fulfill the course assignments for this unit, participants worked in Collaborative Learning Teams (CLTs)[1] of 4 (and sometimes 3 depending on class size) to design three computer technology-supported lessons informed by principles of behaviorism, cognitivism, and constructivism, respectively. Each assignment followed a lecture presentation by the author on the learning theory under consideration, and a class discussion for clarification and learner contribution. Assignments were divided into two sections: (A) Lesson plan completed by using a lesson plan template provided by the author; and (B) Analysis of the lesson plan requiring students to respond to two major questions in relation to the learning theory applied[2]: (1) How are the principles of the theory reflected in the lesson? And (2) How are the principles of theory reflected in or supported by the technology? These questions were intended to engender students' self-awareness and intentionality about developing computer-technology-supported lessons that are grounded in learning theories.

After the completion of the three assignments which concluded the unit, the author sent a link to the electronic exit survey instrument which was designed in, and delivered through Google Forms[3]. The items on the instrument required learners to report on their (i) previous knowledge about learning theories, (ii) current thinking about the theories, and (iii) intentions regarding the integration of the theories and computer application in their work as prospective teachers.

5.3 Data Analysis

The data gathered for this study were both quantitative and qualitative. Data for research questions (RQ) 1, 2, 3 and part "a" of 4 were quantitative, while data for part "b" of research question 4, and for question 5 were qualitative. Percentages were used to summarize the number of students knowledgeable about the learning theories before taking the course (RQ.1), who thought about applying the theories before taking the course (RQ.2), confident in applying the theories after the course (Q.3), and the learning theory most students intended to use in the future (RQ.4a). Themes were generated for students' reasons for the theory they intended to use in the future (RQ.4b), and the value they think learning theories hold for them as prospective teachers (RQ.5). In order to protect their anonymity, participants (i.e. student teachers) were assigned pseudonyms according to the semester they took the course. For example, a student teacher taking the course in spring 2016 was labeled "ST S16"; the other labels are "ST F16 and ST S17.

6.Results

As stated earlier, the purpose of this study was to examine how exposure to the three major learning theories might impact student teachers' future decisions in employing the principles to informing the application of computer technology in the classroom. The findings are presented and discussed below according to the research questions.

6.1 Research question 1: How Knowledgeable Were Student Teachers About Learning Theories Before Taking the Course?

Fig. 1: Knowledge of learning theories before taking the course (%)

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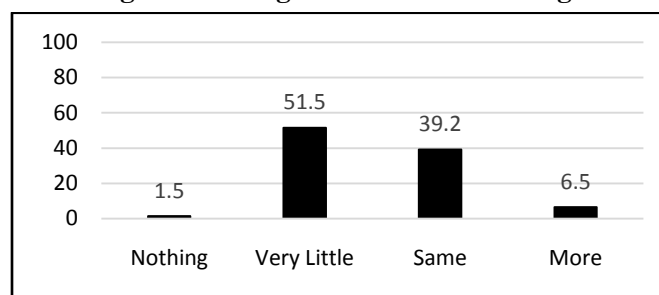
[1] Consistent with the author's constructivist teaching approach, students work in Collaborative Learning Teams (CLT's), a term he coined for the groups of 3 – 4 members organized according to area of teaching certification (i.e. early childhood, elementary, and special education).

[2] Although the participants were required to focus on, and explore the principles of one learning theory per lesson, the author established clearly in the course, that there is more value in designing instruction from multiple perspectives.

[3] *Google Forms* is a web-based app used to create forms for data collection purposes. The form is web-based and can be shared with respondents by sending a link, emailing a message, or embedding it into a web page or blog post. Data gathered using the form is typically stored in a spreadsheet and made available for analysis.

In order to establish a "base line" understanding about what relevant knowledge students brought to the course, the researcher was interested in what they knew about learning theories before taking the course. As displayed in Fig. 1, a small majority (51.5%) of student teachers reported having very little previous knowledge about learning theories. On the other hand, approximately 46% indicated that they had the same or more knowledge before taking the course. These participants are likely to have gathered this knowledge through other education or psychology courses taken, or information former students of this course may have shared with them. In any case, a significant proportion of students came to the course with some knowledge about the learning theories covered.

6.2 Research Question 2: Did Student Teachers Think About the Application of Learning Theories to Computer Technology in the Classroom Before Taking the Course?

Fig. 2: Thought about applying learning theory to computer technology before taking course (%)
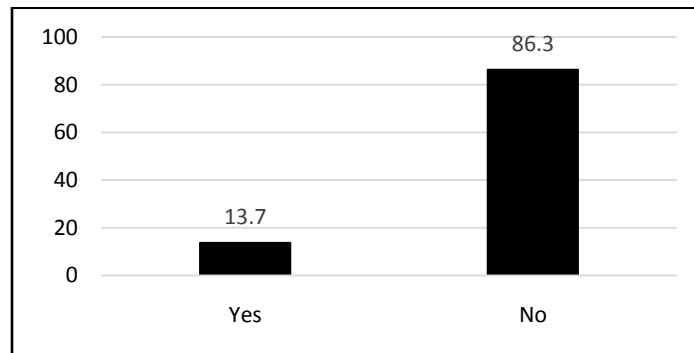
The researcher was also keenly interested in whether students previously thought about using learning theories to inform the use of computer technology in the classroom. This question was (and is) important to the researcher in order to gage the justification for focusing on a key goal in the course: exploring learning theories to inform computer application in the classroom. As shown in Fig. 2, only a small percentage (13.7%) thought of how learning theories could inform computer technology for instruction. Since the vast majority (86.3%) of student teachers have not contemplated applying the learning theories in this manner, there is strong justification for pursuing this key course goal. Although only a small percentage of students indicated that they have thought about applying learning theories to computers in the classroom, it is commendable since this thinking does not appear to be common among teachers – especially student teachers. This study did not investigate the source of students' thinking, but for those who considered applying the theory prior to the course, their thinking might be partly attributable to knowledge they have gathered from others who have taken the course in previous semesters.

6.3 Research Question 3: How Confident are Student Teachers in Employing the Theories to Inform the use of Computer Technology to Instruction After Taking the Course?

Fig. 3: Confidence in applying learning theory to inform instruction (%)
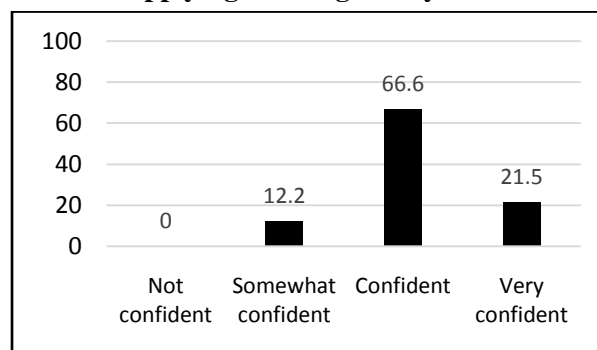
A key question in this investigation, was the participants' confidence in applying the theories to instruction after taking the course. This question is significant in terms of predicting student teachers' self-efficacy in applying principles of the theories in the future. Participants expressed very strong confidence in applying the theories to computer technology. As summarized in Fig. 3, over 80% of respondents reported being "confident" or "very confident". This finding strongly suggests that these prospective teachers have developed confidence in their ability to apply this knowledge in their future classrooms, hence demonstrating potential self-efficacy.

6.4 Research Question 4: Which Learning Theory do Most Students Intend to use in Their Future Practice, and Why?

Fig. 4: Preference of learning theory for future use (%)
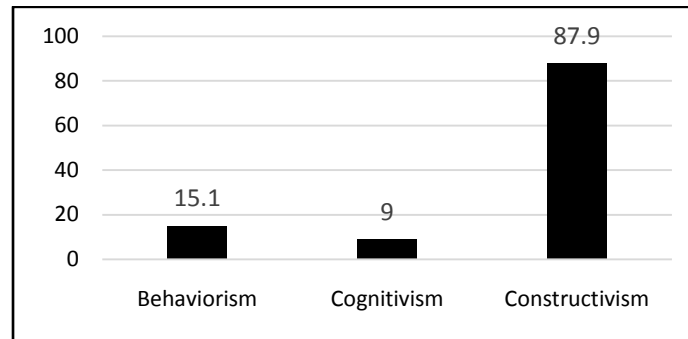
After exposing student teachers to the three major learning theories, the researcher was also curious to know (a) which theory they were most interested in employing in the future, and (b) the reason for their choice. The vast majority (87.9%) intend to use the constructivist theory of learning in the future, with behaviorism and cognitivism following at a distant second and third, respectively. This overwhelming preference might be prejudiced by the fact that the overall course was governed by constructivist pedagogy. However, participants offered the following reasons for their choice, which can be categorized into four major themes: (1) Pedagogical affinity, (2) student agency and empowerment, (3) active learner engagement, and (4) real-world application.

6.4.1 Theme 1: Pedagogical Affinity

A prominent reason participants offered for their intention to employ constructivism as future teachers is that the theory resonates with their thinking about teaching and learning. As one student stated "I would choose constructivism because it fits best with how I see myself as a teacher. My goal is to present, guide, and allow students to work together and answer the question or ideas presented" (ST F16). While some respondents focused primarily on the instructional dimension of affinity with the theory, others focused on the perspective of the learner – themselves included. Here is how one student teacher responded: "I have found that I enjoy the constructivist theory of learning and intend on using it in both my practicum and classroom. I am a supporter of student-centered learning" (ST S16). And as another expressed, "I intend to use constructivism because I feel the best way of learning for myself is through authentic tasks and social interaction. I also feel as though learning through social interaction can help students appreciate different perspectives" (ST S17).

6.4.2 Theme 2: Learner Agency and Empowerment

Another popular reason student teachers offered for making constructivism their choice is the empowerment and agency they believe the theory can provide learners. As one respondent expressed, "I like the idea of students constructing meanings for themselves instead of me, the teacher, telling them the answers. I will want to guide them in their learning and investigating, but not just flat out tell them the answers" (ST F16). Another participant noted that "giving [students] the opportunity to collaborate, bounce ideas off one another, and just learn from one another and not just me the teacher, is something I think is very important" (ST S16). The following comments represent student teachers' appreciation for the value of the collaborative learning component of constructivism: "I like the idea of having students working together or learning things on their own" (ST S17), and "I choose constructivism because of the social collaboration and the fact that students are learning concepts in their own way without the teacher providing them all the answers" (ST F16).

6.4.3 Theme 3: Active Learner Engagement

Student teachers also appreciated the constructivist theory of learning because it affords learners the opportunity to be actively engaged in the learning process. This sentiment is captured in the statement: "I prefer the constructivist theory because it incorporates a lot of hands-on learning and inquiry based discovery" (ST F16). As one participant stated, "I believe that this theory is the most hands-on approach to learning and really allows students to create a more personal understanding of what they are learning" (ST S17). And as two other participants declared: "I could use different resources and hands-on experiments and exploration in order to expand my students' knowledge" (ST S16), and "Another thing I enjoy about this theory is you can be very hands-on with it which can be extremely helpful with connecting ideas for young students" (ST F16).

6.4.4 Theme 4: Real-World Application

An important principle of the constructivist theory is that meaningful learning is developed through authentic tasks, a value that the findings indicate as influencing student teachers' preference for the theory. According to one respondent, "This theory also discusses the importance of real life scenarios and what is happening in the outside world and I think it is very important to teach children about that" (ST S16). One participant connected the real-life application to collaboration in the real-world context: "I liked the constructivist theory best because I am a huge fan of collaboration in the classroom, which I think is a powerful experience to prepare your for the real world" (ST S17).

6.5 Research Question 5: What Value do Student Teachers Think Learning Theories Hold for Them?

Finally, the researcher sought to ascertain what value student teachers think that learning theories in general hold for them. The significance of this question was for the researcher to gain additional evidence as to the importance of focusing on learning theories in the course. Student teachers provided compelling commentaries validating the value this topic holds for them. What participants value about learning theories are summed up under the following categories: (1) Sensitivity to different learning preferences; (2) pedagogical empowerment; and (3) personal learning.

6.5.1 Sensitivity to Diverse Learning Preferences

The overall aim of the learning theory unit in the course, is to develop a deep and informed awareness in student teachers about the importance of identifying and accommodating students' learning preferences. The responses offered by the majority of participants strongly suggest that they have grasped that understanding. As capsuled in the words of one participant: "What I have learned about learning theories will not only help me to identify my students' preference of learning but how to accommodate for them" (ST F16).

The following comment elucidates the idea of not only identifying learning preferences, but proceeds to the next step – accommodating the learner: "When you learn about different learning theories, you are allowing yourself to understand different ways to teach your students. Each student learns differently, and it will be my job to understand that and find different ways of teaching. This would allow each student the chance to learn to their highest capability." (ST S17). The last sentence in the above comment also highlights a common thread in the responses – the impact of the teachers' knowledge of the theories on student learning. The following excerpt reinforces the point: "Knowledge of learning theories will allow me to incorporate different teaching techniques into my lessons overall making them more accessible to the entire class, therefore increasing student learning" (ST S16).

6.5.2 Pedagogical Empowerment

Student teachers in this study highlighted valuing what can be characterized as pedagogical empowerment. Some participants point to the notion that the theories help them to adjust to practice: "These theories will help me adapt to the students in front of me and be able to make sure each student understands the materials" (ST S16). Participants also felt that the theories would empower them in terms of identifying not only their instructional strengths, but also weaknesses. As one participant argues, "It is also important to be aware of the different learning theories because one might work better for you than another, so as a teacher you become aware of your strengths as well as your weaknesses" (ST S16). And as another participant contends: "I believe that knowledge of these theories assists in boosting your confidence which [in turn] makes you a more effective teacher" (ST S17).

6.5.3 Personal Learning

In addition to the value of learning theories in helping student teachers develop sensitivity to learning preferences of their future students, and to their own empowerment as teachers, they also highlight the utility of the theories to themselves as students and learners. As one participant shared, "These theories will help me in other classes by being able to see what strategies I am good at when learning" (ST S17). And as another declared, "It already does! A few days ago, I had a test in my other education class and I used the knowledge of the constructivist theory which I acquired in this course" (ST F16). The following excerpt provides further explanation regarding the value of the theories to student teachers' personal learning: What I have learned about learning theories will help me out with my other classes because it can open different doors for me. I myself know the way I learn best. But, what if that isn't working for something brought up in class? I can attempt to attack the problem with a different learning theory and who knows maybe I will benefit more from that, than the theory that normally works for me. (ST S16).

7. Discussion and Conclusion

The purpose of this study was to examine how a course exploring the major theories of learning might impact student teachers' future practice in employing principles of learning theories to inform the application of computer technology in the classroom. In particular, this investigation focused on participants' (1) knowledge about learning theories before taking the course; (2) thinking about the application of learning theories to the use of computer technology in classroom before taking the course; (3) confidence in using learning theories to inform the use of computer technology to instruction after taking the course; (4) preferred learning theory for future practice; and (5) understanding of the value that learning theories hold for them.

The findings indicate that most students possessed very little previous knowledge about learning theories. In addition, although many had some knowledge about the theories, the vast majority of student teachers did not consider the idea of how learning theories could inform computer technology for instruction. After taking the course however, student teachers reported that they have become highly confident in their ability to apply the theories to computer technology, with most students intending to employ the constructivist theory of learning in the future. This confidence strongly suggests the teacher self-efficacy that other scholars (Anderson, Greene, & Loewen, 1988; Ormrod, 2011; Skaalvik & Skaalvik, 2010) have highlighted before. The main reasons for this preference for student teachers are: (a) their pedagogical affinity to the theory, (b) the agency and empowerment it provides learners, (c) the element of active engagement it affords learners, and (d) its potential for developing skills applicable to real life.

The exploration of the three learning theories also developed meaningful insights among student teachers about the value these pedagogical frameworks hold for them. First, student teachers reported that the knowledge gained about the theories will increase their sensitivity to different learning preferences. This is a critical learning outcome as prospective teachers prepare to enter more diverse classroom environments. Secondly, student teachers believe that knowledge of the theories increases their capacity to adjust to practice, identify their own strengths and weaknesses, and heightens their confidence as practitioners. These findings resonate with the idea that teachers with high self-efficacy are more receptive to new ideas and more willing to experiment with new methods to better address the needs of their students (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977; Guskey, 1988; Stein & Wang, 1988). This empowerment is critical to supporting self-efficacy as discussed earlier, where teachers believe that they can make a difference in students' lives (Allinder, 1994; Anderson, Greene, & Loewen, 1988; Armor et al., 1976; Bandura, 1977; Guskey, 1988; Ormrod, 2011; Stein & Wang, 1988; Tschannem-Moran & Hoy, 2001). And thirdly, student teachers value the potential of the theories to enhance their own learning.

The ideas gathered on this topic are not only valuable in their application in the short term to other courses, but could be potentially useful for the advancement of teachers as life-long learners, as other scholars (Bligh, 1982; Garipagaoglu, 2013; Knapper & Cropley, 2000) have noted before about efficacious learners. In general, the findings in this study strongly suggest that providing the opportunity for students to strategically connect the principles of learning theories, particularly constructivism, has the potential to greatly impact their intention and confidence in grounding their practice in theory. Future (longitudinal) research would be warranted to determine the extent to which this promise actually comes to fruition.

8. References

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