A PHENOMENOLOGICAL STUDY OF PEDAGOGICAL CHANGES IN PRESERVICE TEACHERS THROUGH PARTICIPATION IN PROJECT-BASED LEARNING

Dr. Lory E. Haas
Sam Houston State University, Texas
loryhaas@shsu.edu

Dr. Elizabeth Lasley
Jefferson County Public School, Kentucky
Elizabeth.lasley2@jefferson.kyschools.us

ABSTRACT
There is extensive theoretical and practical research devoted to the purpose for implementing various pedagogies of engagement for student-centered learning. This article presents a phenomenological study of preservice teachers' cognitive and affective behavioral changes after participating in a semester-long project-based learning (PBL) experience. Forty-seven undergraduate education majors seeking certification in early childhood-6th-grade education who were enrolled in an early childhood education course participated in a PBL pedagogical approach to learning. Participants' shared their previous experiences with teaching and learning had been traditional approaches which were teacher-centered and teacher-directed. At the end of the semester and completion of their projects, students were asked to respond in writing to the following questions: Reflecting over the past semester, how do you think you have or have not changed from when you entered this course? Why do you think you have or have not changed? Responses to the questions revealed students were challenged by the student-centered approach to learning and preferred it versus traditional approaches. Findings of this phenomenological study illustrate the emergence of five themes based on students' perceptual changes after their semester-long experiences with PBL: autonomy, mastery, purpose, perspective taking, and evaluation. The themes align with the pedagogical principles of engagement identified in PBL and are consistent with skills needed for critical thinking and paradigm shifts in education to prepare individuals for advances in a global society.
Keywords: project-based learning, preservice teachers, autonomy, perspectives, pedagogy

INTRODUCTION

Twenty-first Century Pedagogy

"The last few decades have belonged to a certain kind of person with a certain kind of mind – computer programmers who could crank code, lawyers who could craft contracts, MBA's who could crunch numbers. But the keys to the kingdom are changing hands. The future belongs to a very different kind of person with a very different kind of mind – creators and empathizers, pattern recognizers, and meaning makers (Pink, p. 1, 2006)."

There is a paradigm shift within the field of education from students' merely gathering information to function in an industrial-age society to the twenty-first century set of skills necessary for functioning within a global society (Darling-Hammond et al., 2008; Silva, 2008). Advances in technology readily available to students and instructors, as well as increased research on the nature of creativity and how people learn, has shed light on the learning process and the way twenty-first-century educators need to facilitate student learning (Friedman, 2005; National Research Council, 2000; Wagner, 2012).

Feiman-Nemser (2001) indicates the ability to reform our education system depends on the quality of our teachers. The characteristics of teaching and learning require a constructivist lens which supports a collaborative process with emphasis on student-to-student and student-to-teacher discourse (Ginsburg-Block, Rohrbeck, & Fantuzzo, 2006; Wolters, 2003). Wiersema and Licklinder (2009) indicate the need for educators to "plan learning opportunities to provide students with experiences that will challenge their old ways of thinking and learning, giving them a reason to develop new habits of thinking deeply about all experiences" (p. 125).

The 21st century approach to teaching requires student-centered pedagogies for authentic learning, collaboration, communication, self-regulated learning, self-reflection, and reflective teaching (Giroux, 2011; Price, 2011). The new learning goals for students are creative thinking, problem solving reasoning, critical thinking metacognition, and higher-level thinking skills (Hursh, 2007; Moore & Stanley, 2010). The reasons for student-centered authentic learning are evident in Noddings (2003) statement that "Education, by its very nature, should help

people to develop their best selves—to become people with pleasing talents, useful and satisfying occupations, self-understanding, sound character, a host of appreciations, and a commitment to continuous learning" (p. 23).

Significant ways to support students twenty-first century skills occur through various pedagogies of engagement: problem-based learning, project-based learning, inquiry-based learning, service learning, and experiential or experimental-based learning (Colby, Ehrlich, Beaumont, & Stephens, 2003; Flecky, 2011; Furco & Root, 2010; Lee, Blackwell, Drake, & Moran, 2014). Such a paradigm shift requires a change in the instructional delivery model from traditional teacher-directed approaches to a constructivist student-directed learning format at the university level for future elementary school teachers. The educational objective for current and future teachers is to facilitate the development of student-directed intrinsically motivated twenty-first-century learners (Wagner, 2012).

The objective of our research is to determine the cognitive and affective behavioral changes of preservice teachers after experiencing a semester-long pedagogy of engagement format. The selected pedagogy of engagement approach is project-based learning that emphasizes 21st-century skill development and how people learn. Our goal is to challenge preservice teachers' beliefs and assumptions about teaching when faced with 21st century learning goals. "Programs that successfully change beginning teachers' understanding about teaching and learning use their students' initial beliefs about teaching as a springboard for surfacing and confronting misconceptions" (Darling-Hammond & Baratz-Snowden, 2007, p. 117). In addition, through understanding the benefits of project-based learning as an interactive approach, educators can design and implement learning opportunities to increase and sustain knowledge acquisition and develop critical thinking.

CONSTRUCTIVIST PEDAGOGIES OF ENGAGEMENT

The term pedagogy of engagement is used to describe an approach to education that promotes student-directed teaching practices that empower students and the professors'/instructors' commitment to the well-being of students (Palmer, 2010). The primary principles of learning within this framework is the promotion of active engagement, academic rigor in critical and divergent thinking curriculum, organization of knowledge, meaningful patterns of information, effort, interest, reflective thinking, differences, socialization, self-regulation, and the contextual transferability to the real world (Lee, Blackwell, Drake, & Moran, 2014; National Research Council, 2000). The various forms of active engagement accentuate learning opportunities for students to become involved with or within a selected community (Flecky, 2011).

The Association of American Colleges and Universities (AACU) (2007) encourages the use of active, hands-on, collaborative, and inquiry-based teaching that promotes the learning process. The premise is that when learners are actively engaged in the learning process, higher achievement occurs. Higher achievement requires seven principles of excellence (AACU, 2007):

1. Aim high and make connections between the essential learning outcomes and life.
2. Facilitate and assess student's plan of study for achieving mastery of essential learning outcomes.
3. Immerse learners in inquiry-based learning and innovation through opportunities to analysis, discovery, problem solve, and communication.
4. Engage students in big questions related to science and society, cultures and values, global interdependence with emphasis on changing economy, and human dignity and freedom.
5. Connect knowledge with choices and action for citizenship through engaged and guided learning on "real-world" problems.
6. Emphasize personal and social responsibility through civic engagement and ethical learning.
7. Assess students' ability to apply learning to complex problems and use the assessment to deepen student learning as well as continuous improvement.

The seven principles of excellence correlate with the major principles of learning. Learning requires active engagement, academic rigor in curriculum to promote critical and divergent thinking, organization of knowledge, meaningful patterns of information, effort, interest, reflective thinking, differences, socialization, self-regulation, and the contextual transferability to the real world (Flecky, 2011; Lee, Blackwell, Drake, & Moran, 2014; NRC, 2000).

Advocates of twenty-first-century skills favor student-centered methods, for example, problem-based learning and project-based learning that allows students to collaborate, work on authentic problems and engage with the community (Rotherham & Willingham, 2010, p. 19). The use of technology in the twenty-first century takes learning opportunities beyond the classroom to national and worldwide audiences (Buckingham & Domaille, 2004). Therefore, at all ages and stages of learning, the focus needs to be on ensuring learners gain the necessary

critical thinking, problem-solving, creativity, innovation, and twenty-first-century skills to be successful (Wagner, 2012).

UNDERGRADUATE STUDENTS IN TEACHER EDUCATION

The ultimate purpose of teacher education is to develop pedagogical skills of future educators to meet the learning needs of all students. Preparing preservice teachers for the classroom is critical to help them develop knowledge, problem solving skills, and critical thinking of the learners in their classroom. To do so, they must experience interactive learning and critical inquiry themselves. Researchers specify pre-existing beliefs from previous learning experiences and cultural backgrounds influence teaching practices and perceptions of teaching (Johnson, 2009; Ogilvie & Dunn, 2010; Pajares, 1992). In addition, they also identified that there are a variety of factors contributing to and limiting positive connections between beliefs and learned teaching practices (Johnson, 2009; Ogilvie & Dunn, 2010; Pajares, 1992).

Pajares (1992) indicated that students rely on past experiences when formulating personal instructional approach to teaching and learning. Researchers found future teachers resistant to change to an instructional learner-centered approach (Dees, 2006; Klien, 2001). Beliefs and behaviors are egocentrically based because of one's difficulty in perceiving the world from another's perspective (Deci, 1995; Epley, Van Boven, Keysar, & Gilovich, 2004). The ability to incorporate perspective taking instead of personal biases to learn becomes a challenge during the epistemological or learning process for adults (Epley, Van Boven, Keysar, & Gilovich, 2004).

COGNITIVE DISSONANCE

Confronting beliefs and assumptions include cognitive behaviors that activate and influence specific decisions and actions. Darling-Hammond (2006) specifies the need for "explicit strategies to help students to confront their own deep-seated beliefs and assumptions about learning and students and to learn about the experiences of people different from themselves" (pg. 6). This involves students learning how to learn, encouraging reflective thinking, and motivating their peers to learn through collaboration and inquiry-based research (Weimer, 2002).

Wagner (2012) stresses the need for innovation within the field of education that will influence future and current teachers' decisions and actions. He describes two forms of innovation that create change. One is incremental innovation and the other is disruptive innovation, cognitive dissonance. Cognitive dissonance stimulates a fundamental change and a sense of disequilibrium rather than improving what already exists. It is a state of mental discomfort because it challenges personal thoughts, beliefs, or attitudes due to new experiences. Cognitive dissonance requires students to reassess and evaluate their perspectives, attitudes, and values based on self-awareness and self-determination.

Therefore, future educators need to experience cognitive dissonance to engage in perspective taking, divergent and critical thinking. Dissonance occurs when individuals perform actions that contradict personal beliefs, principles, and values. Critical thinking requires analyzing and evaluating thinking with the objective to improve one's thinking (Facione, 2011; Paul & Elder, 2007). It requires students to reassess and evaluate their understanding of concepts, perspectives, attitudes and values through self-awareness, self-determination, and the development of social-emotional confidence.

PROJECT-BASED LEARNING

The theoretical constructivist premise for using project-based learning is the establishment of optimal learning opportunities where students have the freedom and autonomy to engage in purposeful and relevant learning with an emphasis on creativity while integrating new information and concepts with pre-existing perceptions (Hmelo-Silver, 2004; Pink, 2006; Wagner, 2012; Wolters, 2003). The objective for implementing project-based learning is two-fold. First, the structure of the project engages students to connect the interrelationship between textbook, content knowledge, and their role or purpose in the world (Bransford, Brown, & Cocking, 2001; Hammerness et al., 2005). Secondly, it encourages students to use their critical thinking and problem-solving abilities (Hmelo-Silver). Theoretically, students have the freedom and autonomy to engage in purposeful and relevant learning with an emphasis on creativity, while integrating new information and concepts with pre-existing perceptions (Hmelo-Silver, 2004; Pink, 2006; Wagner, 2012; Wolters, 2003). The goal is to advance students' critical thinking through the creation of a relevant problem or driving question that requires self-directed learning and mastery of course content knowledge.

Project-based learning correlates directly with AACU's (2007) seven principles of excellence and the major principles for how people learn. Students actively engage in projects that are associated with their community

and academic content. Students' interests and topics students care about to determine the projects. Table 1 identifies the correlation between PBL key elements, twenty-first-century skills, and AACU's seven principles.

TABLE 1: Correlation between Project-based Learning, 21st Century Skills, and AACU Principles

Project-based Learning Elements	**Twenty-first Century Skills Wagner, 2012)**	**AACU's Seven Principles (2007)**
• Challenging problem or question • In-depth Inquiry • Authentic real-world content • Learner -driven • Community involvement • Multiple forms of assessment • Self-regulation • Choice • Responsibility • Self-direction • Autonomy • Group and self-evaluations	• Critical thinking – problem solving • Collaboration – leading by influence • Agility and adaptability • Initiative and entrepreneurship • Communicating effectively • Assess and analyze information • Curiosity, innovation and imagination	• Connections between learning and life • Mastery of learning outcomes • Inquiry-based learning: analysis, discovery, problem solving, & communication • Real world content: culture, values, society, science, human dignity & freedom • Real world problems • Civic engagement and ethics • Assessment to deepen student learning

RESEARCH

PEDAGOGICAL STRUCTURE-PROJECT-BASED LEARNING

The structure of the study is a project-based learning model. To begin the project, discussions about early childhood cognition and the course content was initiated during the first week of class. Students discussed their perception of teaching and what information they would like to know regarding the differences between the course content they need to understand and what is happening in the real world of teaching. The course focuses on five key components for teaching – development, and learning, assessment, classroom environment, planning and instruction, and reciprocal relationships with students and parents.

Students established small collaborative groups and a driving question they wished to research. Examples of driving questions were: *What is the role of play in the classroom setting? What aspects and principles of child development are used throughout the school day? Why and when are developmental factors (cognition, language, social, emotional, and physical) considered when teaching? What is play and why is it necessary for cognitive development? What is the role of a teacher in the developmental-learning process?* After determining each group's driving questions, research questionnaires were developed by each group and sent via email to current pre-school to third-grade teachers throughout the state of Texas.

Students were responsible for accessing, documenting, analyzing, evaluating and managing all the research necessary to find the solution to their driving question. Group planning, implementation, review, and revisions throughout the research process was requires. Students regularly reflected on their work and personal progress - metacognition. Current teachers responded via email and direct interviews. Interviews were analyzed and evaluated as the responses related to the collaborative groups' driving question.

The final phase of the project was the development of a digital documentary video produced by each group regarding their research as the culminating project. The documentary video was evaluated by members of the education community – practicing pre-school through 3rd-grade teachers, instructional coordinators or administrators for feedback. Via the videos, students had an opportunity to share their research findings with others in and outside the field of education. The project requires students to compare and analyze course content concepts with the teaching community to generate new generalities demonstrated within a video documentary. Figure 1 is a diagram that presents the flow of concept development through project-based learning artifacts to the final product a video.

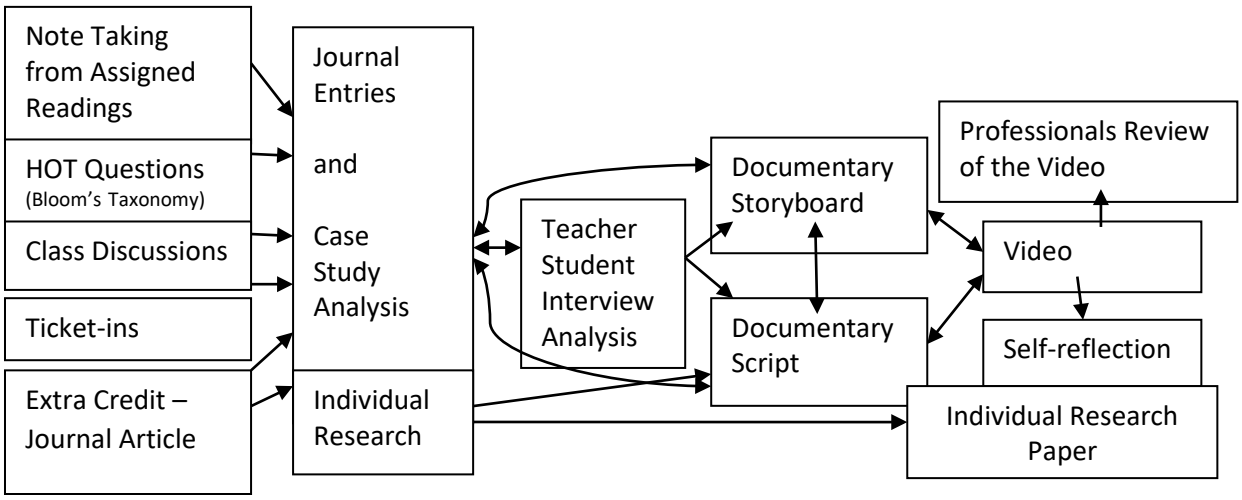

FIGURE 1: Project-based Learning Artifact/Product Development Based on Learning Outcomes

The analytical process provides a self-awareness/understanding of what it will take to complete the project as well as the complexity of the field of teaching. The goal is for the development and internalization of key concepts through internal mental constructs because of the interaction or dialogue with the course material, social environment, and the current world of teaching instead of direct instruction on the part of the professor. Value is therefore placed on the learning process and becomes the necessary engagement of the students for sustainable learning.

METHODOLOGY

PHENOMENOLOGICAL RESEARCH

According to Creswell (1998), "qualitative research is multi-method in focus, involving an interpretive, naturalistic approach in which the researcher attempts to make sense of or interpret phenomena in terms of the meanings people bring to them." (p. 15). Phenomenology follows the collection of information from participants to uncover individuals' perception of their lived experiences. The purpose is to analyze and interpret the data as potentially relevant concepts based on the set of responses. Concepts related to the same phenomenon are grouped into themes-categories.

Methodologically, we adopted the qualitative phenomenological approach because very little has been written about undergraduate education majors' affective and cognitive perception of their transition from teacher-directed teaching to student-directed learning. The attempt is to uncover what phenomenon participants have in common based on their experience (Creswell, 2009). Interpretation of the responses describes the perceptions conveyed by the participants.

Phenomenology focuses on individuals' constructing meaning from an experience. Patton (1990) explains that the aim of the phenomenological research is on the concept that "there is an essence or essences to shared experience" (p. 70). The assumption or essence, like the ethnographer's assumption that culture exists and is important, becomes the defining characteristic of a purely phenomenological study (Patton, 1990, p. 70).

Phenomenological research is concerned with understanding an individual's account of an experience or phenomenon to advance future practices (Finlay & Ballinger, 2006). In this case, the concern is a pedagogical approach for teaching in the twenty-first century that challenges students' cultural perception of learning as well as receiving and delivering instruction; therefore, resulting in students' perceptual changes in cognitive and affective behaviors.

> "Perception is original awareness of the appearance of phenomena in experience. It is defined as access to truth, the foundation of all knowledge. Perception gives one access to experience of the world as it is given prior to any analysis of it. Phenomenology recognizes that meanings are given in perception and modified in analysis..." (Oiler-Boyd, 2001, pp. 96-97).

In general, "a phenomenological research is well suited for studying affective, emotional, and often intense human experiences" (Merriam, 2009, p. 26). According to Creswell (1998), "qualitative research is multi-method in focus, involving an interpretive, naturalistic approach in which the researcher attempts to make sense of or

interpret phenomena in terms of the meanings people bring to them." (p. 15). Using the phenomenology research approach requires an understanding of social experiences shared by a similar group (Creswell, 1998).

Phenomenology research involves examining the meaning of a lived experience. The objective of our research was to determine cognitive and affective behavioral changes of preservice teachers after experiencing a semester-long pedagogy of engagement format. The research hypothesis was the cognitive and affective components of critical thinking would evolve as students emerged from the PBL experience, which included meaningful course content and various opportunities for students to demonstrate self-awareness, self-regulation, self-management, self-motivation, and self-determination.

As addressed previously, an individual's cognitive and affective behaviors (beliefs, values, attitudes, and practices) are perceptions formulated from experiences. Perception affects one's motivation to learn. Cognitive dissonance generates divergent and critical thinking, which leads to changes in an individual's perception. Cognitive dissonance also requires the reassessment and evaluation of perspectives, attitudes, and values based on self-awareness and self-determination. This includes students' ability to listen, respond, interact with others, self-reflection, self-awareness and willingness to revise previous concepts or opinions when presented with new information, i.e. perspective-taking.

Research indicates a correlation between cognitive and affective behaviors that motivate learners' desire to change their conceptual understanding and perceptions. Motivating student learning involves accessing and evaluating intangible factors in cognitive and affective behaviors such as relevance, interests, and actions driven by internal, intrinsic rewards. McKeachie and Svinicki (2006) suggest educators focus on student self-determination, autonomy, and opportunities for choice and control for motivating learning.

PARTICIPANTS

The participants in this study were 47 preservice teachers seeking teacher certification in an EC-6 (early childhood through grade 6) elementary education program or EC-6 bilingual education program. The preservice teachers were enrolled in the fall term in a required early childhood cognition course at a university in southeast Texas. The 47 preservice teachers were in three separate early childhood cognition courses during the semester with the same professor. The following demographic data were obtained. Participants were between the ages of 20-26. Thirty-one of the 47 participants are 20-21 years of age; nine participants are between the ages of 18-19, five participants are ages 22-23 and two 24-26 years of age. Academic status indicated that 30.5% of the participants were sophomores, 57.8% were juniors, and 12.2 % seniors. Gender status revealed 93.9% were female and 6.1% male. Ethnicity status was identified as 72% White; 8.5% Black; 12.2% Latino; 2.4% Multiracial; 1.2% Middle Eastern; and, 3.7% declined to disclose their ethnicity. Of note, the demographic makeup of the courses are reflective of the teaching demographics in the United States in which the majority of teachers are white and female.

RESEARCH QUESTIONS

The research questions were constructed to narrow the scope within the study to the description of cognitive and affective changes within participants using their own words. Participants were asked to describe any changes they could identify because of their experiences. The research questions narrow the scope of the study to identify participants' perception of any cognitive or affective behavior changes they recognized because of their experience. Forty-seven preservice teachers responded to the following questions at the end of their semester-long experience: (a) Reflecting over the past semester, how do you think you have or have not changed from when you entered this course? and (b) Why do you think you have or have not changed?

Written responses also provided students with an opportunity to contemplate and reflect on their semester-long experience. The purpose was to determine and understand the meaning of the experiences and the impact the experiences had on individuals. Such an approach parallels Heidegger's (1927/1962) phenomenological approach in the search for a coherent understanding of the phenomena of teaching and learning. Inductively, patterns became evident with implications toward various self-determination characteristics such as autonomy, motivation, attitude and ability in setting achievable goals, mastery, solving problems, making decisions, advocating for themselves, evaluating decisions, and adjusting to achieve their goals.

DATA ANALYSIS AND TRIANGULATION

Theoretical rigor requires in-depth planning, reasoning, choice of methods and consideration for the phenomenon when analyzing and coding information (Higgs, 2001; Rice, & Ezzy, 1999). Triangulation of data was incorporated to establish comprehensive validity and reliability for the evaluation of data (Teddlie & Tashakkori, 2009). Three faculty members from the College of Education at a southeast Texas university

analyzed the student transcripts: the instructor of the early childhood course, a colleague from another education program and a faculty member from another department in the same college. Additionally, a graduate student participated in the final discussions of themes and codings as an added verification measure. Each researcher independently reviewed 47 student reflections for analysis and coding purposes.

Following Moustakas' (1994) phenomenological research methods, each participant's reflective responses to the two questions were preliminarily grouped. Unrelated information was eliminated when considering the significance of the statements, such as phrases that contained broad, general aspects of the overall experience or presented repetitive and vague terminology. Consistent patterns, as well as clusters of core themes were identified, established and labeled by each of the three researchers. Then, the researchers met as a group to share their findings and determine the final codes and themes. This led to a combined transcript of themes and concepts based on discussions and researcher interpretations. Composite descriptions of the *Individual Textural Descriptions* (Moustakas, 1994, p. 121) were created based on the implications and essence of the experience.

Researcher interpretations were presented and discussed with a fourth party, a graduate assistant, to confirm interpretations and to provide clarification when necessary. When agreement of themes or codings of a few participant responses was not reached, dialogue between researchers and the graduate assistant continued until a consensus was reached. The purpose was to add rigor, credibility, trustworthiness, integrity, and competence within the study's analysis (Crabtree & Miller, 1999).

FINDINGS

Research indicates a correlation between cognitive and affective behaviors that motivate learners' desire to change and conceptual understanding developed during the active engagement in the learning process, project-based learning. Motivating student learning involves accessing and evaluating intangible factors in cognitive and affective behaviors such as relevance, interests, and actions driven by internal, intrinsic rewards. McKeachie and Svinicki (2006) suggest educators focus on student self-determination, autonomy, and opportunities for choice and control for motivating learning.

Five core themes emerged within the phenomenology theoretical framework: autonomy, mastery, purpose, perspective taking, and evaluation. For each theme, students' cognitive and affective perceptual changes because of such an experience are described. The themes align with the pedagogical principles of engagement identified in PBL aligns and AACU's (2007) premise to immerse learners in inquiry-based learning. The following describes the five core themes and the alignment with PBL's and AACU's basic principles. Student written responses validate each identified theme.

AUTONOMY

Autonomy is the ability to take control of one's own learning. The term autonomy equates with AACU's (2007) recommendation to emphasize personal and social responsibility through civic engagement and ethical learning. Autonomy also aligns with the theoretical framework for independent, interdependent and self-directed learning. This allows for critical thinking when making independent and group decisions as well as controlling one's own actions. Autonomy includes collaboration, interdependent decision-making, self-direction, self-regulation, planning, control of one's thinking and interdependence when thinking critically.

Cognitive dissonance emerged because of students' beliefs regarding the role of a teacher. The opportunity for learner autonomy instead of the teacher assuming responsibility for every aspect of student learning originally created frustration and self-doubt. Initially, there was a continuous concern for providing the professor with "what the professor wanted" instead of what the assessment instrument stated needed to be present within the final product/artifact. Fear of failure and the concept of doing something wrong permeated comments. Participants were not accustomed to the role of a teacher as a facilitator and collaborator rather than direct instruction. The purpose of the facilitator and collaborator in a PBL is to support students' sense of autonomy – independent and interdependent decision-making, control of one's own learning.

Student statements represent an acknowledgment of independent and interdependent actions for controlling and driving their own learning:

Independent and interdependent decision-making:

> *She had provided a caring community of learners; in which we were learning to be self-sufficient! To be honest, this was a completely foreign concept to me up to this point.*

I was unprepared for the amount of voice and choice that came with the documentary. I did not know how to handle that much freedom because I never experienced it before.

It was an amazing experience to watch an entire group grow from six classmates into six friends and teachers. I hope that we are all able to carry over the skills to lit block, student teaching and then eventually actual teaching.

In particular, Morgan, Kevin and I really worked well together and were able to get things done quickly and efficiently and had a very good understanding of each other's' ways of communication and could bounce off ideas extremely well.

Control of one's own learning:

When you handed out the syllabus and the assignments that are due, it was more of a shock to everyone because we actually get to think on our own and I think this stressed everyone out - thinking on their own. Because up until this point in time, everyone is used to what the teacher gives you and this is what the teacher specifically wants. There was no outside thinking. And, being in your class we are allowed to think outside the box, think critically, and it is more stressful and overwhelming at first when you're actually allowed to do that.

Everyone just got stressed, we stopped thinking clearly, and we started to lose track of what we were doing. This was the point where we needed to support and collaborate with each other the most, like we had done all semester.

I will continue to think interdependently and remain open to continuous learning in my next education courses. I know that not many other instructors or classes are set up this way so I will always think of this course and how I could use the lessons I am taught in the future to apply to a classroom that I plan to operate just like this one. I guess you can say I had one giant "A-ha moment" that I will never forget!

MASTERY

Mastery promotes deep understanding of constructs or concepts. It requires critical thinking when reassessing and evaluating the understanding of concepts, perspectives, attitudes, and values through self-awareness and self-determination. Gaining deep understanding includes confronting failures, making mistakes, and creating multiple revisions. Once again, students questioned their beliefs and perception about learning and how to learn. Students began to understand that making mistakes is how they learn. They grasp the knowledge that mistakes, and reflective thinking are necessary for learning. Such understanding increased the desire and motivation to complete the project.

Mastery refers to the repetition of an act or exercise to improve and use a new concept. Students sought a right answer at the beginning of their project. There was a paradigm shift in student understanding as to what it takes to reason through their problems rather than having a right answer. The desire for improvement correlates with AACU's (2007) principle for facilitating and assessing student mastery of essential learning outcomes. Theoretically, always improving and striving for accuracy requires critical thinking for revising and rethinking a concept or final solution.

The following quotes exemplify the changes in students' perception that mastery includes making mistakes and multiple answers rather than one right answer:

Critical thinking:

However, this class made me think critically, I had to analysis EVERYTHING!

So, it gets frustrating because when you are doing it, you start thinking outside the box, using your critical thinking skills, and you just naturally feel like you're doing something wrong. You need to reel yourself back in, you know, you're not on task, you are not thinking the way you are supposed to because you don't have a clear guideline and set to address. So now I think it has made it easier for us to realize that it is okay and there isn't a wrong answer. And, we are supposed to think outside the box.

I can now see that from the start of this class you wanted us to start thinking about our thinking and understand what it takes to be an early education teacher. Every assignment was a chance to develop our skills not just busy work like many teachers give and that some of us

thought that just completing an assignment was all we needed to do when we first started this class…

You challenged our ideas, not making us feel wrong but making us re-think them. I could tell that that was especially hard for our group, since we were basically raised to look for the right answer and determine our self-worth based on a grade. It's hard to just switch that way of thinking and form questions and come up with our own answers. But I felt like by the end of the PBL we were able to do that.

I believe I became better at learning because I collected data from the book, internet, and my group members. It might of have been tough but it made me more capable of finding sources and as a teacher once must be able to find different sources each day. My critical thinking and problem solving increased through these projects as well.

Making mistakes:

I feel like, I don't know, I feel like I don't know if it's right. I want to know that I am doing it right. And if I feel like I am not doing it right then I feel lost. I don't know if my point of view is the same point of view as others in the group. I have never really had to think on my own. I was always given the information that I needed to learn to get the right answer. Now, I see my mistakes and many different answers.

I learned to look back and reflect on past experiences, mistakes and use those to apply to new knowledge and learn.

A lot of teachers are perfectionists too so that is probably where a lot of the issues come in, they want to be in control of everything but I mean, how are students going to learn if they can't make their own mistakes?

Self-determination:

Planning takes a lot of time, brainstorming, re-writing and patience with yourself.

All throughout grade school I only wanted A's and I did what I could to get the highest grade possible…While taking this class and creating a documentary. I feel like I am proud of my work for once.

I was learning concepts I had never heard about and developing skills I had never been forced to improve before.

The documentary made me effectively have oral and written communication with others because I had to openly and purposefully talk to my group my members to accomplish and complete tasks.

PURPOSE

Establishing a purpose is a necessary component for learning in the theoretical framework of Deci (1995), Pink (2006), Wagner, (2012) Glasser (1998), and Jung (1957-1958). According to AAUC (2007), purpose requires connecting knowledge with choices and action for citizenship through engaged and guided learning on "real-world" problems. The PBL allowed students to address the real world of teaching.

The PBL pedagogical approach includes student choice, civic engagement with the community and connections to the real world when entering the field of teaching. Purpose connects to the interests, reason, and motivation for learning, pedagogical usefulness, and application of new information based on thoughtfully questioning and reflective thinking. The PBL and pedagogical practices transformed students' understanding of the purpose for teaching and learning. This is evident in their response to survey questions.

Students describe their awareness and understanding of purpose in the following statements:

Future as a teacher:

This class has opened my eyes. I feel that I now have an essential tool needed to be an intentional and effective teacher. More than likely it will take some practice to get used this to but I can do it.

In this course, I made mental connections or frameworks because it relates to me personally and all the assignments tied into the main concepts.

The research we found on what it takes to become an intentional teacher is extremely valuable and I will use what I have learned in all areas of my life, especially when I become an Elementary teacher.

In learning about PBL I've realized this approach can make a huge difference in the way parents and students look at education. Its basis is to create strong problem solvers and innovators.

Being in this class has showed me that when I am a teacher I will have to collaborate with my team; I need to know how to do that. One teacher may think her idea is the best and the other teacher may disagree with that. I have to learn how to handle certain situations.

Personal connection to learning:

The factor that I really enjoyed about this class is that I knew the purpose of every assignment. We were not given "busy work" or "work for grades only" our assignments had a purpose and a meaning to it.

Literally everything ties together in this class. At the time I did not realize that but now I see why we did the assignments every day.

Everything I did had a purpose and a meaning.

PERSPECTIVE TAKING

Perspective taking involves changes in cognitive and affective behaviors from egocentric thinking to accepting different points of view including the interrelationships of concepts and ideas presented by others and empathy. Empathy occurs when someone understands and shares others' experiences and emotions. Perspective taking includes the self-awareness of one's biases, beliefs, and values. The movement from egocentric to perspective taking thinking creates cognitive dissonance. Cognitive dissonance exists as students journeyed through their projects. Statements within the perspective-taking category describe perceptual changes, self-awareness and a paradigm shift including their connection to community, cultures, and values.

Perceptual change:

You are going to have to collaborate on all sorts of stuff ... you are all going to have your different opinions and the way that you do things. But you are still going to have to collaborate. Fortunately, you don't have to all agree on the exact same way of looking at things.

.... this is one of the good things because everybody can have a different opinion so everybody's ideas come together, they make one whole idea.

I have noticed that over this short period of time in this semester my perception of what happens around me has changed. I am much more open to learning thought different ways other than visually and "hands on", which are the way I have always seemed to learn best.

The more engaged and involved an individual is with their group, the better they perform because they are excited to help, more ideas are sparked when they hear someone else's ideas, and tasks and assignments get completed in a timely manner when everyone works together.

Self-awareness:

Every week I had to think about what I was doing and what was going on around me. I had to be able to think and communicate it clearly and not be bias and only think about myself and my opinions.
I had to realize I can't always be a control freak looking for perfection because sometimes the imperfection is what's perfect. We all learned something new and learned to respect each other and pull our strengths and weaknesses together.

Just because I am a kinesthetic learner does not mean that all of my students will benefit most from hands on learning, like I would. This class really helped me, in many different aspects, to

alter my view on how I will want to teach the curriculum for my future classroom. I believe that I will use a project-based learning course curriculum in my classroom."

Now that I am connecting the dots and seeing where I am supposed to be going and actually give my own personal opinion and backing it up I feel a lot better and more comfortable.

I value my thinking a lot more because it is not just my opinion, it is still my opinion, but I have facts that back up why I feel the way I do. My upbringing is my reason for some of the ways I feel.

EVALUATION

The evaluation theme identifies students' awareness of changes in their learning. One of AACU's (2007) principles is to assess students' ability to apply learning and to deepen student learning as well as continuous improvement. Student evaluating and assessing their own learning connects to changes in their affective behaviors – judgment, values, and beliefs. Students reference changes from their initial need for approval at the beginning of the course to satisfying one's own needs. Students evaluated their PBL experience to changes in the divergent and cognitive thinking. The following student statements describe the assessment of their personal improvement, learning, the learning process and sustainable learning because of the PBL pedagogical approach:

Personal improvement:

I don't want my students to learn the way I did. I want to be an intentional teacher that helps my students achieve success and inspire them for greatness….. through Project Based Learning each student has the ability to reflect on their work and explore new things to find answers.

I am not really sure how to describe the way I feel now. It is almost like a lightbulb has gone off in my head but at the same time I feel like a kid. Able to use my imagination to set up a pretend classroom of students and be creative with developing a lesson plan.

Reflecting on the PBL now, I see how much I have changed, not only in my ways of thinking but also in my attitude towards school. I have learned that everyone learns differently, and how I learn is my way and I can change it anytime and any way I want to (which is really cool to me)

I plan to continue to get better about the skills I need to become the best teacher possible, and also to remember all the concepts that I experienced as a student in this course to spread the word at how effective a classroom that operates this way is, and also to instill this type of learning in my future classrooms.

One of the biggest things I've learned was that teaching is so much more than I expected and even though I'm a little scared, I'm more excited to impact children in a positive way. I will remember to reflect daily on my actions, responses and attitudes, I will manage my time appropriately to ensure that each student feels that they are important and that changes/ adaptions to the curriculum or lessons are done appropriately for individual students. I will continue to use both habits of mind and 21st century skills to help me and I will always collaborate with my colleagues and others.

Learning and the learning process:

I had friends that took other professors for this course and do not know have of the stuff that I have learned in this course. It was a rough semester but I would do it all over again if I had to. This course was seriously one of my most eye-opening courses I have taken in my entire college career. I learned more in this course than I have in any other.

Remaining open to continuous learning was a struggle for me because once I have something on my mind I do not like to change it. I had to learn to listen with my ears open not closed and understand what the teacher was actually telling me.

…. through Project Based Learning each student has the ability to reflect on their work and explore new things to find answers. And for myself, the free range this course has, given me through Project Based Learning has, been very gratifying and has helped me come to realize that students are capable of anything, including myself.

It helped to grasp how all that we learn in a class somehow connects back to something else that we have previously learned.

….. I was so frustrated the whole time. I thought there was so much work, there was so much to do and it was more than I can handle. I honestly didn't understand why we did things like journal entries every single week and had to be so thorough, so developed, and you know I didn't understand the point of driving my own learning. You know because I never learned that way in my life….Now that I kind of reflect back on it, I am so far ahead in my other classes than absolutely anyone else…

After this semester and realizing the difference in PBL and standardized testing, in my opinion the way we were being taught did not promote any higher-level thinking, didn't prepare us for the real world, and we grew up lacking how to question.

LIMITATIONS

Potential limitations in coding may have occurred as it was completed without confirmation by the students who provided the narrative reflections. Each researcher did provide a coding method that allowed for consistency in the coding process through multiple perspectives. Of the 70 students who participated in the course, only 47 chose to respond to the questions: *Reflecting over the past semester, how do you think you have or have not changed from when you entered this course and not? Why do you think you have or have not changed?* Therefore, a larger sampling is needed to determine changes in motivation to generalize findings to a broader population. It would be beneficial to conduct follow up research to determine whether students transfer their learning and experiences in the project-based approach to their future teaching pedagogy. Further, research on the diverse learning experiences of various demographic groups would be of interest.

DISCUSSION AND CONCLUSIONS

Preservice teachers in these learner-centered teaching methods courses which implemented project-based learning, initially struggled with a learning approach that was different than their previous learning experiences. This is consistent with Dees (2006) findings in which preservice resisted interactive learning approaches in the college where he taught. Similarly, Lortie (1975) and Pajares (1992) postulated that preservice teachers rely heavily on their past experiences as students to form their personal beliefs of teaching and learning. However, despite the initial disturbance in views of teaching and learning expressed by preservice teachers' frustrations, this study revealed the phenomenological changes in perceptions of preservice teachers when encouraged to challenge their pedagogies and cognitive learning behaviors as teacher educators.

Current research indicates the need for instructional practices that vary from students' past educational experiences. Future teachers need to provide curriculum and assessments that promote higher-order skills (Darling-Hammond, 2006). Such a focus presents a challenge for preservice teachers. They need to learn how to reassess and evaluate their perceptions, adjust their attitudes and values through self-awareness, self-determination, and the development of social-emotional confidence. This process of self-evaluation stimulates cognitive dissonance and challenges current beliefs. Therefore, our research question addresses how our preservice teachers responded to a teacher-training framework, PBL pedagogy, which mirrors twenty-first-century curricular changes.

Our phenomenology study identifies undergraduate education majors' cognitive and affective perception of behavioral changes after a semester-long PBL pedagogical approach to learning. There were multiple reasons for implementing the PBL in a foundation education course. First is the need to grasp the connection between academic course content and current teaching practices. Secondly, what students are learning in beginning education coursework may or may not replicate what is happening in current classroom settings or teaching practices. Students' PBL driving questions expose students to what is happening inside and outside the academic setting of higher education. Third, challenging personal values and beliefs, which are based on their experiences; therefore, requiring a re-evaluation of priorities when entering the teaching profession. Lastly, students have the opportunity to evaluate the relevance of what they are learning inside and outside the academic setting i.e. higher-order thinking skills, collaboration, clear communication, habits of mind, twenty-first-century skills, self-awareness, and self-determination.

The findings in this study demonstrate how a PBL pedagogical approach can change students' cognitive and affective behaviors. Twenty-first-century skills accentuated by Wagner (2012) became apparent to the students themselves. Although apprehensive at first, students revealed how challenging it was to alter their mindset for gaining information from direct instruction to directing their own learning, mastery. Most noted that they had always been in a teacher-directed learning environment and had little choice and voice, so for many, this was an

affective awakening of sorts when able to direct their own learning, perspective taking. The students also demonstrated mastery when they were able to transfer what they had learned to what they will do as future teachers. Students came to rely on one another and welcomed the collaboration, autonomy. Now, this was not the case for a few groups, but students also learned to voice their concerns when a group member was not taking care of their part of the project. Additionally, the evaluation of their own learning recognized changes in their cognitive and affective behaviors.

REFERENCES

Altan, M. Z. (2006). Beliefs about language learning of foreign language major university students. *Australian Journal of Teacher Education*, *31*, 45-52.

American Association of Colleges and Universities (2007). *College learning for the new global century.* Washington, DC: AACU.

Bransford, J. D., Brown, A. L, & Cocking, R. R. (2000). *How people learn: Brain, mind, experience, and school* (Expanded edition). Washington, DC: National Academy Press.

Crabtree, B., & Miller, W. (1999). A template approach to text analysis: Developing and using codebooks. In B. Crabtree & W. Miller (Eds.), *Doing qualitative research* (pp. 163-177) Newbury Park, CA: Sage.

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

Creswell, J. W. (2009). *Research design: Qualitative, quantitative and mixed approaches*. Thousand Oaks, CA: Sage.

Darling-Hammond, L. (2000). Authentic assessment of teaching in context. *Teaching and Teacher Education, 16*, 523-545.

Darling-Hammond, L. (2006). Constructing 21st-centruy teacher education. *Journal of Teacher Education,* 57(10) 1-15.

Darling-Hammond, L., & Baratz-Snowden, J. (Eds.). (2007, Winter). A good teacher in every classroom: Preparing the highly qualified teachers our children deserve. Educational Horizons, pp. 111–132.

Deci, E. L. (1995). *Why we do what we do; Understanding self-motivation*. London, UK: Penguin.

Dees, D.M. (2006). "How do I deal with these new ideas?" The psychological acculturation attitudes of rural student. *Journal of Research in Rural Education,* 21(6) 1-11

Epley, N., Van Boven, L., Keysar, B., & Gilovich, T. (2004). Perspective taking as egocentric anchoring and adjustment, *Journal of Personality and Social Psychology*, 87 (3) 327-339

Facione, P. (2011). *Think critically*. New York, NY: Pearson

Finlay, L., & Ballinger, C. (2006). *Qualitative research for allied health professionals: challenging choices*. West Sussex, UK: Wiley.

Flecky, K. (2011). Foundation of service-learning. In K. Flecky & & L. Gilow (Ed.) *Service-learning in occupational therapy education: Philosophy and practice* (pp. 1-18). Boston, MA: John & Barlett.

Ginsburg-Block, M. D., Rohrbeck, C. A., & Fantuzzo, J. W. (2006). A meta-analytic review of social, self-concept, and behavioral outcomes of peer-assisted learning. *Journal of Educational Psychology, 98*, 732–749.

Giroux, H. (2011). On critical pedagogy. New York, NY: Continuum.

Hmelo-Silver, C.E. (2004). Problem-based learning: What and how students learn. *Educational Psychology Review, 16* (3), p. 235-266.

Hursh, D. (2007). Exacerbating inequality: The failed promise of the No Child Left Behind Act. Race, Ethnicity and Education, 10(3), 295-308.

Johnson, K. E. (2009). *Second language teacher education: A sociocultural perspective.* New York: Routledge.

Lee, J. S., Blackwell, S., Drake, J., & Moran, K. A. (2014). Taking a Leap of Faith: Redefining Teaching and Learning in Higher Education through Project-Based Learning. *Interdisciplinary Journal of Problem-Based Learning*, *8*(2) 19-34.

Lortie, D. (1975). School teacher: A sociological study. Chicago: The University of Chicago Press.

Maclellan, E. (2008). The significance of motivation in student-centered learning: A reflective case study. *Teaching in Higher Education, 13*(4) 411-421.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Moore, B., & Stanley, T. (2010). Critical thinking and formative assessments: Increasing the rigor in your classroom. Larchmont, NY: Eye on Education.

National Research Council (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academies Press.

Noddings, N. (2003). Happiness and education. New York, NY: Cambridge University.

Oiler-Boyd. C. (2001). Phenomenology: The method. In P.L. Munhall (Ed.). *Nursing research: A qualitative perspective* (3rd ed.) (pp. 93-122). Sudbury, MA: Jones & Bartlett.

Pajares, M.F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332.

Patton, M. Q. (1990). *Qualitative evaluation methods* (2nd ed.). Thousand Oaks, CA: Sage.

Paul, R., & Elder, L. (2007). *The miniature guide to critical thinking concepts and tools*. Dillon Beach, CA: The Foundation for Critical Thinking.

Pink, D. (2006). *A Whole New Mind, Why Right Brainers Will Rule the Future*, New York, NY: Penguin Group.

Price, D. (2011). Learning Futures: rebuilding curriculum and pedagogy around student engagement, FORUM, 53 (2) 273-284.

Rotherham, A. J., & Willingham, D. T., (Spring, 2010). "21st-century" skills not new, but a worthy challenge, *American Educator*, 17-20.

Wagner, T. (2012). *Creating innovators – The making of young people who will change the world*. New York, NY: Scribner.

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

Wolters, C. A. (2003). Regulation of motivation: Evaluating an underemphasized aspect of self-regulated learning. *Education Psychologist*, *38*(4), 189-205.

