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Faculty Beliefs on Active learning Strategies in Higher Education: Identification of Predictors for Use of Active Learning

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FACULTY BELIEFS ON ACTIVE LEARNING STRATEGIES IN HIGHER EDUCATION: IDENTIFICATION OF PREDICTORS FOR USE OF ACTIVE LEARNING

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There is no way to know what your journey will be like when you start a doctoral program, and that path is unlike anyone else's journey. When I started out in the program at the University of South Alabama, I had recently moved states, started a new job, and started a second graduate degree in a new field of study. After three years of pre-requisites needed, I was able to start my official journey on my PhD coursework. During my studies there was a global pandemic, marriage, travel, family illnesses, deaths of loved ones, changes in job positions, adjustments to my committee, and stepping down from my teaching job to work on my PhD full time. Anyone who has gone through the same situation knows that working full time and earning a doctorate degree is not for the faint of heart. The highs are high, and the lows can be challenging. Burnout is real, but so is will power and determination to move past that burnout. I was consistently supported and reminded that progress is progress and to keep working and not give up. I am beyond grateful for the support, patience, understanding, and guidance from my advisor, Dr. Van Heneghan. I am thankful for my committee for providing support, guidance, and encouragement as I have moved through the program.

I want to thank my mother and father who were with me each step of the way providing guidance, help, and support in my dream of earning my doctorate degree. They are and will continue to be one of my greatest sets of cheerleaders and supporters. Even when difficulties came about in life, they were the first to encourage me not to give up and

power through. I am thankful for my husband, who was my calm supporter, provider of consistent words of encouragement, and letting me know he was there for me and that “you’ve got this”. He always knew when I needed a break, a cup of coffee, or a funny moment. I also want to say a thank you to my friends, co-workers, and acquaintances who showed support, perhaps only in a single sentence. Small moments like that can make a huge difference!

I am thankful for my time in the program and for the skills and knowledge it has afforded me. I have grown personally and professionally over the years and have learned a great deal. I am fortunate to have had the opportunity to pursue this dream and I am excited for my next journey.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

Figure Page

ABSTRACT

Salter, Margaret, Marie, PhD, University of South Alabama. Faculty beliefs on active learning strategies in higher education: identification of predictors for use of active learning. Chair of Committee: Dr. James P. Van Heneghan.

Evaluating the perceptions of active learning strategies is often seen from the perspective of the learners at the primary and secondary education levels. Additional data on beliefs of active learning in higher education such as of faculty members is needed. Active learning strategies are on the front line in education as a method to enhance student learning and foster twenty-first century skills. Developing twenty-first century skills is essential as the environment of the workplace is dynamic and evolving requiring individuals to rely on critical thinking and diverse application of their knowledge. Universities should continue to evolve to best prepare graduates for their endeavors post-graduation. Gaining an understanding on beliefs of active learning in higher education is beneficial as it provides insight into the faculty beliefs and how to foster a culture promoting twenty-first century skills. This study sought to understand faculty beliefs on active learning strategies and use of active learning in higher education. Faculty from three southeast universities were surveyed and a total of 210 participants completed the survey. Data was collected and analyzed to determine variables that were predictors of the frequency of use of active learning strategies and overall use of active learning strategies. The study found an overall high frequency of use of active learning strategies (M = 3.82, SD = .81), confidence in using active learning strategies (M = 3.95, SD = .84), and job satisfaction (M = 3.99, SD = .73). Correlations for frequency of use of active

learning included beliefs on learning with a positive correlation of (.43), professional development with a positive correlation of (.34), and confidence in use of active learning strategies with a positive correlation of (.68). Correlations for overall use of active learning strategies included confidence in use with a positive correlation of (.38), beliefs with a positive correlation of (.36), and professional development with a positive correlation of (.26). Logistical barriers were found to be negatively correlated to both frequency of use (r =-.39) and overall use of active learning (r = -.34). The most prevalent barrier to the use of active learning was that faculty were not trained how to use these strategies. The most prevalent active learning strategy used was Socratic questioning. Regression analysis identified several predictor variables to the frequency of use of active learning strategies and for the overall use of presented active learning strategies. The predictor variables having a positive influence included beliefs on learning (a more constructivist viewpoint), professional development, and confidence in use of active learning. In addition, level of course undergraduate (lower-level courses indicating more active learning) positively predicted the frequency of use of active learning strategies.

This study provided insight into the belief set of faculty members as well as the barriers seen by the faculty. The results from this study can provide universities insight to develop programs and provide support and training to their faculty to aid in their teaching and fostering of student learning. Several avenues for future research were identified and presented in the study to continue gaining insight into the beliefs of faculty member on active learning, barriers to active learning, and potential solutions to barriers.

CHAPTER I
INTRODUCTION

The education field is encouraging the incorporation of teaching strategies promoting the development of twenty-first skills. These twenty-first century skills often include critical thinking, collaboration, communication, and creativity (Kivunja, 2015). The term "innovative" has often been used when referring to the use of these four twenty-first century skills. In this case, the term innovative is referring to developing an engaging classroom for learners providing a structural foundation that promotes the practice of twenty-first century skills. These skills are best used in the learning setting when they are integrated into course content. The rationale behind the incorporation of twenty-first skills into curriculum is the transferability of these skills to any field or career (Pellegrino & Hilton, 2012). This draws attention to the fact that education and teaching strategies chosen during instruction should allow students to practice the transfer of learned skills. To achieve this, students must engage in deeper learning. The National Research Council defines deeper learning as "the process through which an individual becomes capable of taking what is learned in one situation and applying it to new situations" (Pellegrino & Hilton, 2012). Students must reach a level of content proficiency and critical thought to transfer learned skills and knowledge. Deeper understanding and knowledge of content requires a higher level of cognitive processing compared to surface learning. The process of surface learning requires lower levels of cognitive processing for example, rote

memorization (Czerkawski, 2014). Deeper learning is witnessed during knowledge comprehension, higher order thinking, intrinsic motivation, active engagement, declarative learning, transfer of knowledge, reflection, collaboration, and communication. The Hewlett Foundation identified six main dimensions that are associated with deeper learning (Vander Ark & Schneider, 2014):

- Mastery of Content
- Critical thinking and problem-solving abilities
- Communication Skills
- Effective Collaboration
- Learning how to Learn
- Academic Mindset

To achieve dimensions of deeper learning there are specific learning environments and strategies that better promote deeper learning for students. A classroom incorporating twenty-first century skills using active learning strategies will help promote a student's ability to reach a state of deeper learning. This can be valuable to a student's current and future learning, career endeavors, and life situations.

The development of deeper learning and the ability to transfer learned skills is essential to individuals as they navigate their work experiences. Today the workplace has evolved from employment positions based on manual labor or human controlled tasks to more sophisticated positions where technology and innovation has become commonplace in the job description. This evolution of work environments has resulted in the creation of a dynamic workplace. It is more common today for people to hold several different jobs in their professional career whereas in the past individuals usually maintained one job

until retirement. For individuals to excel in a diverse and dynamic workplace they will need to develop twenty-first skills along with the skill sets specific to their employment skill set. Jobs today require people to be innovative, adapt to changes, and work in non-traditional work environments. Developing twenty-first century skills will be essential for the success of the employee. Reaching success as an employee can equate to success both economically and personally and for social well-being.

Developing a learning environment and instructors that foster the development and practice of twenty-first century skills is essential. Incorporation of active learning strategies can offer the student the opportunity to engage in their own learning, collaborate with their peers, and rely less on traditional lectures. Students engaging in active learning would be learning through a more innovative lesson design. Active learning has been shown to support the development of critical thinking and problem-solving skills. Active learning also helps in the transfer of learned information to various situations a person may encounter in life. Learning using active learning strategies will allow learners to practice drawing on prior knowledge and skills.

Active learning strategies and the desire to support the learning of twenty-first century skills can be seen in K-12 classrooms and in higher education. However, there may be room for improvement in the prevalence of active learning in higher education. Even with the benefits of active learning strategies for student learning, professors may or may not choose to develop courses or restructure current courses to include active learning strategies. There are a variety of potential factors as to why faculty may not choose to use active learning in their courses. Two of these potential factors includes the need for faculty members to balance teaching and research responsibilities and how their

own personal beliefs about learning determine teaching style (Sturtevant & Wheeler, 2019). Insufficiencies in infrastructure, lack of professional development, and stress regarding student performance have also been seen in faculty reviews on whether or not active learning strategies are used (Michael, 2007). There can be a multitude of influential factors for the resistance or lack of desire to incorporate active learning into higher education courses. Understanding these factors is an initial step in determining if and how universities can develop and encourage more faculty members to incorporate active learning strategies into their courses.

When students seek out universities to submit applications for potential admission many factors can influence their decision. Areas of study, tuition costs, admission requirements, scholarship opportunities, location, campus life, student support and graduation rates are just a few factors students will evaluate when choosing a university. Two important qualities a university could present to their prospective and current students include a quality academic reputation and data showing graduates acquire high quality jobs upon graduation. A third quality to mention would be that upon graduation students are prepared for jobs based on the education and experiences they received during their time at university. It is in the best interest of universities to understand the learning environment they will be offering to their students. These learning environments include the courses and degrees offered as well as the classrooms, campus facilities, and the teaching quality of their faculty. To understand the teaching characteristics of faculty members, a method of evaluating faculty beliefs on twenty-first century skills and active learning may be beneficial. Once the beliefs of the faculty are known, steps can be taken to provide support to the faculty. Assisting them and encouraging them to develop

courses for maximal student learning and performance. Taking this one step further, understanding predictors of use of active learning strategies of faculty members can help guide the university in their direction for student success.

Purpose of Study

The purpose of this study is to gain faculty beliefs regarding the use of active learning in higher education learning environments, to identify potential barriers to the use of active learning, and to establish what factors predict whether a person is likely to use active learning strategies in their course design. Determining the predictors of whether a faculty member will use active learning strategies in their teaching will help support the developed model of active learning predictors as well as provide meaningful information as to how to best support faculty. University support of faculty is important and it has been seen as a barrier to why faculty do not incorporate active learning strategies into their courses (Miller & Metz, 2014). By addressing areas where support is lacking, faculty could develop greater job satisfaction and be more willing to use active learning strategies. A total of six variables were included with the main research questions all of which are evaluated in this study. These include the impact of epistemological beliefs and the use of active learning, environmental and external variables, teaching and research ratio, courses taught, and number of courses taught, and years teaching. Insight into these components will help in developing the model of the use of active learning strategies in a higher education classroom.

This literature review covers three primary areas of interest. The first area defines active learning in higher education classrooms and what it entails. The second area discusses active learning strategies incorporated into the higher education learning

environment. Finally, the literature review contemplates factors that may affect the decision of a faculty member to incorporate active learning strategies into the courses they teach. The literature review aids in the evaluation of current and future methods to measure active learning incorporation into courses. The literature review allowed for the development of a method of measuring active learning use in higher education, beliefs of active learning and learning in general, as well as additional facets that helped develop potential predictors of the use of active learning in higher education courses.

Use of Active Learning in Higher Education Model

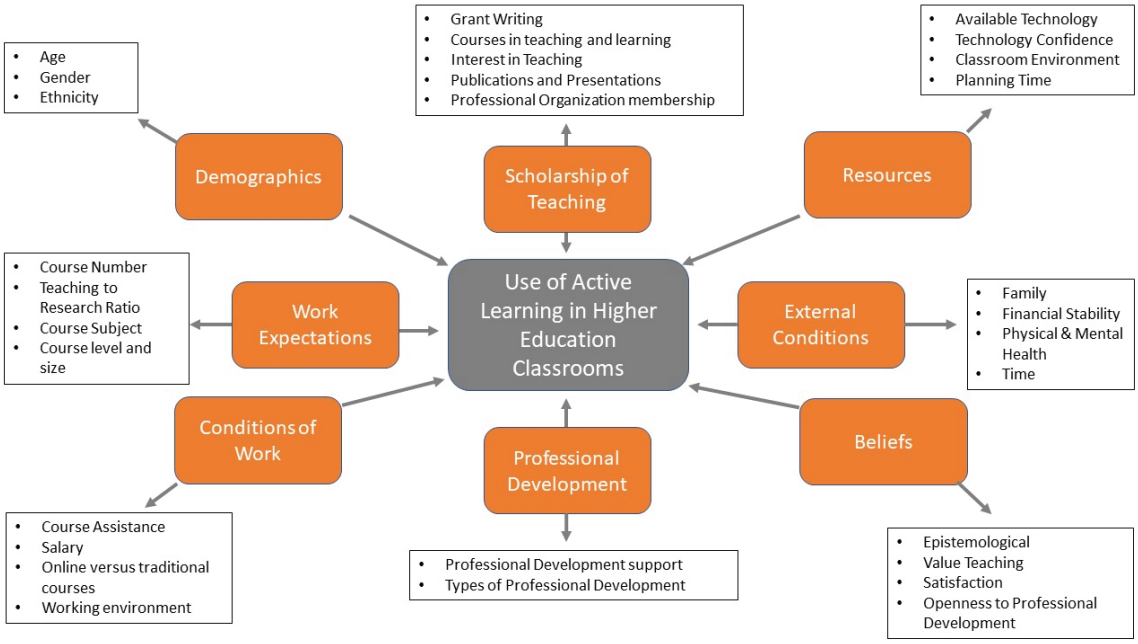
The decision of a faculty member to incorporate active learning strategies is often dependent on factors that influence the outcome of course design. For this study, a model of the use of active learning in higher education classrooms was developed to guide the evaluation of faculty beliefs regarding the use of active learning. This model helped gain insight to potential predictors of using active learning strategies. This model is shown in Figure 1. In the model there are eight main factors that influence the decision as to whether active learning is used as a strategy in the classroom. By using this model as a guide for the development of our instrument we worked to identify factors that are predictors to an individual incorporating active learning strategies into their teaching.

All eight factors have subcomponents that can influence the faculty members' decision to use active learning. Two of the factors include demographics and external conditions. Demographic information was collected in this study to establish any correlation with age, gender, and ethnicity and the use of active learning strategies. However, the factors labeled as external conditions including family, financial stability, physical and mental health, and time will were not addressed in this study. It is

acknowledged that these factors can affect a person's decision-making process and thus use of active learning, but these factors are usually outside of the professional work environment, and we felt it would be best suited to explore in a separate study.

As can be seen in Figure 1, beliefs include epistemological beliefs, value of teaching, satisfaction, and openness to professional development are factors that were expected to have a higher influence in the decision to use active learning strategies in the classroom. An individual's beliefs regarding how learning occurs can have a significant impact on the way they choose to provide instruction to their students (Turner, et al., 2009). Active learning is based on the theory of constructivism where learners are an active part in constructing their understanding of the world around them and the skills and knowledge they acquire as they move through the learning process. A faculty members belief about the value of teaching and job satisfaction in teaching may also have an influence on the decision to use active learning strategies.

Figure 1



Use of Active Learning in Higher Education Classrooms Model

Also seen in Figure 1 are three additional components of the model including resources, work expectations, and conditions of work criteria which are tied to university and faculty positions. Lack of resources could influence the use of active learning especially if active learning used requires technology. Work expectations includes type of courses taught, class sizes, teaching to research ratio, and level of courses taught are all influencing factors. In the conditions of work component, course assistance such as graduate assistants or co-teachers, salary, online versus traditional classroom settings, and the actual working environment could play a role as well in determining use of active learning. These aspects of a faculty members' job description could also influence the

decision to use or not to use active learning strategies. These factors all have the potential to be influential to and predators of the use of active learning.

Research Questions

This study addresses three research questions regarding active learning in higher education and faculty beliefs. The first question is what are faculty's beliefs of active learning in higher education courses? This question holds importance as an individual's perspective on a learning strategy will be a determining factor on if they choose to incorporate active learning strategies in their course plans. Understanding these beliefs will allow for higher education learning centers and faculty professional development centers help support faculty in their teaching endeavors and help them grow as educators. Beliefs of active learning strategies may also be correlated with the faculty members personal epistemological belief regarding how learning occurs. A faculty's personal beliefs about learning can be a large determining factor as to the learning environment they develop for their courses they teach. In addition to gaining insight to beliefs of active learning, it can allow us to establish the level of understanding faculty have about active learning strategies, the level of interest in learning more about the strategies, and to what extent active learning strategies are already being used at the university.

The second research question is what potential barriers exist that prevent the use of active learning in higher education learning environments. Understanding the presence and type of barriers can provide insight into the use of or lack of use of active learning strategies in higher education. Knowing what variables are present may also help

determine the influence of epistemological beliefs and the use of active learning and how the presence or absence of barriers influence decision making regarding active learning.

Understanding faculty beliefs and barriers helped guide the study into the third research question which is finding out what predicting factors exists for the use of active are learning in higher education classrooms. Understanding predicting factors, whether intrinsic or extrinsic, will help us to understand whether an individual will include active learning strategies in their classroom. This is important when developing an instructional culture at a university and developing professional development that can support faculty in their teaching and student learning. Establishing predicting factors may also bring light to information on whether certain colleges and programs are more likely to incorporate active learning strategies. This can help the university better meet the needs of the faculty in their teaching endeavors.

There are additional components to the three research questions evaluated in this study and incorporated into data collections. Determining the significance of epistemological beliefs of faculty and how it correlates to their teaching style helped provide insight to use of active learning. Understanding the ratio of time and teaching assignments of the faculty member can also play a role in whether an individual uses active learning strategy regardless of their belief of learning and effect of active learning strategies. It is important to address differences in the incorporation of active learning strategies between online or in person courses. The structure of the course has the potential to sway the faculty members decision in using active learning strategies in different course delivery platforms. Although technology is not a requirement to incorporate active learning strategies into lessons it is often seen as an essential tool for

active learning to take place. Understanding this required determining a faculty members level of technology literacy and availability of technological resources. Understanding this facet would allow for learning centers to develop professional develop opportunities to assist faculty and increase the availability of technology. Level of courses, undergraduate or graduate, could also have potential to affect the desire of faculty to use active learning strategies. In addition to the level of a course, course content can determine the use of active learning. Although active learning can be used at any level and type of course content, perceptions of faculty can sway the decision to include active learning strategies.

The methodology of the study was a quantitative dominant study with both quantitative and qualitative data collected in a non-sequential manner with beliefs of active learning in the classroom collected through semi-structured surveys. These surveys were sent through campus mass email systems with a link to the online survey platform Qualtrics. An in-depth literature review was conducted on methods to measure use of active learning and applied to the active learning classrooms at the university. All data was statistically analyzed to determine relationships between variables and identify trends, predictors, and moderator variables.

Limitations of the Present Study

There are recognized limitations to this study that should be addressed. This study is evaluating the beliefs of faculty on learning and active learning strategies rather than learners. This could present a view more of intended goals and outcomes rather than what the true outcomes are based on student views and performance. However, faculty perception is important as they are a variable in the whole picture of a successful twenty-

first century learning environment. The population for this study was a convenience sampling across three different universities in the southeast which will not be fully representative of the population being studied. Another limitation to this study is that it is a self-report study which runs the risk of responses that are considered the socially desirable responses rather than what is truly occurring in the faculty's courses and experience.

Definition of Terms

For the purposes of this study, this section provides a list of definitions specific to how these terms are being used in this study. Each term definition has been adapted from text and references are provided when possible.

Active Learning: is a type of learning and instructional approach where students are engaged in actively constructing understanding of content often using strategies and activities such as writing, collaboration, problem-solving, real-world application, and reflection on learning (Miller & Metz, 2014).

Barrier: something that prevents faculty members from learning about and/or implementing an active learning strategy in the courses they teac.

Cognitive: the process of gaining knowledge and understanding through various types of leaning situations and experiences (Ormrod, 2012).

Collaboration: interactions between individuals either with peers or teachers with the goal of the facilitation of learning and achieve a common goal (Ormrod, 2012).

Communication: an intrapersonal competency where information is transferred from one person to another in various forms. These forms could include written, visual, feel, or audio avenues to transfer information (Pellegrino & Hilton, 2012).

Conditions of Work: the conditions or requirements a faculty member will be encountering in their job such as course subject, course level, class size, salary, and course teaching assistance (Kamarulzaman et al., 2011).

Constructivism: a broad term emphasizing that the learner is a contributor to their own learning. Through activities on an individual scale as well as in social situations the learner is building their foundation of knowledge. Learners will take new information and construct new conclusions and understanding by incorporating their prior knowledge and the knowledge of others with the newly learned content (Council, N R, Education, 2000).

Creativity: the ability to develop new products, methods or interpretations relying on originality and imagination (Pellegrino & Hilton, 2012).

Critical Thinking: is the cognitive domain where individuals engage in analytical thinking and use logical thought processes (Pellegrino & Hilton, 2012).

Epistemological: term referring to the beliefs about how knowledge is developed and how learners learn (Richardson, 2013).

External Conditions: events or situations that are outside of your control that are affecting the actions or decisions of an individual (Kamarulzaman et al., 2011).

Higher Order Thinking: refers to learning that requires higher levels of cognitive processing of information compared to surface learning or rote memorization and leads to deeper learning and understanding of content (Bloom, 1956).

Innovative: is referring to developing a classroom using new or original ideas that is engaging for learners and provides structural foundation that will promote the practice of these skills alongside learning course content (Rook, et al., 2015).

Interpersonal Competence: refers to when individuals can interact with other individuals or community of individuals (Pellegrino & Hilton, 2012).

Intrapersonal Competence: refers to when an individual can interpret one's own thoughts and emotions (Pellegrino & Hilton, 2012).

Intrinsic Motivation: refers to actions and behaviors of an individual for internal reasons such as satisfaction and not because of reward or punishment (Ormrod, 2012).

Learning Environment: refers to a physical environment, cultural context, or learning approach in which learners will work through the process of learning skills or concepts (Rook, et al., 2015).

Learning Strategy: refers to any method that is incorporated in the educational design implemented by the instructor and/or used by the learning that facilitates learning (Ormrod, 2012).

Perspective: refers to the attitude or the way of feeling an individual holds regarding learning and educational design.

Predictors: refers to a factor that may determine and individual's choice of influence the decision made regarding instructional design.

Problem Solving: refers to the process of evaluating various solutions to solve a presented problem or task to accomplish using learned knowledge or skills (Ormrod, 2012).

Professional Development: refers to the improvement of skills, learning of new skills, or maintaining understanding in the professional field of an individual (Weidenseld & Bashevis, 2013).

Resource: refers to any item that aids in effectively teaching using active learning and encouraging the use of twenty-first century skills. Examples of resources might be technology, space, hardware or software abilities, time, assistance, or support.

Scholarship of Teaching: refers to the research and inquiry for improving instruction and course design for the field in which a faculty member teaches (McKinney, 2004).

Student Performance: refers to the academic performance or mastery of skills by the learner after receiving instruction (Ormrod, 2012).

Transfer: refers to the ability of the leaner to take learned information and apply the concepts to new situations of contexts (Ormrod, 2012).

Twenty-First Century Skills: refers to the skills of critical thinking, communication, collaboration, and creativity which are competencies that are transferable and applicable in any field (Pellegrino & Hilton, 2012).

Chapter Summary

In this chapter an introduction presented information addressing the benefits of including twenty-first century skills into the learning environment. Learners can benefit in their educational endeavors and career ventures by mastering twenty first century skills. A successful method of incorporating twenty first century skills into classrooms is by having active learning strategies in the course design. When a successful learning situation is established, student and instructor satisfaction can increase. High student performance and satisfaction are important to university success and reputation. Establishing an active learning situation requires participation on both the learner and the instructor. When there is an active learning environment, higher student performance is seen. However, not all instructors incorporate active learning strategies into their course design. There are potential factors that may influence the decision of the instructor to incorporate or not to incorporate active learning strategies in their courses.

To address the identification and potential predicting factors of an instructor choosing to incorporate active learning strategies, this present study proposed a model of eight main factors influencing the decision as to whether active learning is included in an instructor's course design. This study developed an instrument that allows us to identify the predictors for an individual who will incorporate active learning strategies into the courses they teach. By using this model and the developed instrument this study sought to answer the following research questions:

- What are faculty perspective of active learning in higher education?
- What barriers to the use of active learning in higher education learning environments exist?

- What combinations of factors influence the use of active learning in higher education classrooms?

This study was a non-experimental prediction study with both quantitative and qualitative data analysis. This study added research and data to help to better understand faculty beliefs of active learning and identified potential predictors for the use of active learning strategies. By understanding the predictors for the use of active learning it can allow universities to address barriers to the use of active learning through resources or faculty training.

CHAPTER II

LITERATURE REVIEW

Chapter Overview

In this section a review of the literature surrounding active learning is presented. Twenty-first century skills including critical thinking, communication, collaboration, and creativity will be defined and explained. A more in-depth description of each skill and their potential benefits is discussed. The importance of twenty-first century skills and how the practice and mastery of these skills translate to a learner's academic and career success is also described. Following the discussion of twenty-first century skills, an overview of active learning is addressed. Understanding what active learning is and why it is beneficial in educational design allows a connection to be established between active learning classrooms and fostering twenty-first century skills. A more detailed review of active learning strategies that can be used in a classroom is presented as well as a classification of active learning strategies into four categories. These categories include active learning strategies for practice of content, application of content, evaluation of content, and creation using content.

The literature review continues by evaluating the research behind various elements of the present study's model that can be seen in Figure 1. The review initially covers beliefs about learning and how it impacts decisions about the use of active

learning strategies. Professional development is an element of the proposed model and is reviewed in connection to active learning. The literature review continues by reviewing academic scholarship and active learning and the association between faculty seeking academic scholarship in teaching connected to their field. The next element in the model shown in Figure 1 is conditions of work and active learning. External conditions such as family and life events as well as job satisfaction can affect a person's performance at work and the decisions, they make making these external conditions a factor in the model. A review of literature focusing on external factors and their effect on job performance and decisions is included in the literature review.

One of the factors included in the model are barriers to the incorporation of active learning strategies in course design. A review of this literature has been completed and aided in the further development of the model and the instrumentation for the present study. In addition to the previously identified barriers to active learning, a literature review was completed on how to measure the beliefs of active learning. This review was essential to the development of the instrument used in this study.

Definition of Twenty-First Century Skills

Reaching a conclusive definition to what constitutes as a twenty-first century skill has been the result of many years of research, investigation, and contribution of many individuals and collaborations. In 2005 The National Research Council embarked on an endeavor to evaluate and define twenty-first century skills. With this project the council set to define twenty-first century skills, describe the skills and their importance, and what is known about the skills and incorporation of these skills into education (Pellegrino & Hilton, 2012). There are four skills that stand out from research that are commonly

referred to as twenty-first century skills. These four skills include critical thinking, communication, collaboration, and creativity (Pellegrino & Hilton, 2012). These are not new skills making their appearance in education and the workforce but rather existing skills that have gained importance and support. With this renewed importance and support, these skills are being focused on in many education and workforce situations.

Critical thinking falls under the cognitive domain where individuals engage in analytical thinking and use logical thought processes. Using critical thinking skills allows a person to move from the lower-level taxonomy of remembering to the higher taxonomic levels of analyze, evaluate, and create. Bloom's cognitive domains has six main categories including knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956). All these categories of behaviors can be demonstrated when learners are engaged in critical thinking. The cognitive domain is essential for individuals to develop knowledge and intellectual skills. Critical thinking skills will allow students to take rote learning to the next level and be able to transfer their knowledge to various situations. Individuals will be able to compare and evaluate explanations and determine what alternatives exist as well as determine the quality of explanations. Critical thinking can be fostered in learners through teaching specific concepts and vocabulary associated with critical thinking, initiate planned classroom discussion encouraging higher-order thinking, direct instruction connected to critical thinking, and scaffolding and modeling critical thinking skills (Collins, 2014).

Communication is an intrapersonal competency where individuals must be able transfer information to others in one or more various forms. Communication can include written communication through pen and ink or through technological tools and resources

such as email, text, or virtual document. Communication can also be visual through art, drawings, graphical data, or video. Finally, communication can be in audio form such as spoken or sung word, music, beats, or other sounds equating to some understood meaning. Without communication information could never be transferred between individuals. Without communication, learning would not take place, the advancement of society would not move forward as effectively, and social interactions could be non-existent. Envisioning a world without communication is near impossible. Life led with poor communication skills may not be as successful as it could be without properly developed communication skills. Through active learning strategies, learners will have the opportunity to develop communication skills that will help them achieve their goals.

Collaboration among individuals can take place in three main areas of a person's life including personal, educational, and professional. The collaborative behaviors among living things are common; however, a unique quality of collaboration in humans is the ability to develop joint intentions in their collaboration (Duguid & Melis, 2020). Collaboration has potential to be beneficial as well as detrimental. Therefore, the skill of collaboration should be practiced reducing detrimental effects and increase beneficial outcomes. When done well, collaboration among learners can allow students to reflect on learned information with a greater depth. Working with other learners allows for insight and understanding of content and allows for the strengthening of learned content. Collaboration between learners allows these learners to gain respect for the perspectives of others. Employers often seek out potential employees that have quality collaborative skills. In many careers there is an inherent need for people to collaborate and work together to meet the objectives of work tasks. Individuals who have developed the ability

to successfully collaborate with others will find that their contribution to the collective effort beneficial. The ability for people to collaborate can drive development and advancement in society. Collaboration can create an environment where evolution can take place and lend to cultural learning (Gavrilets, 2015). In teams with strong collaborative efforts, individuals can focus on their own personal strengths they bring to the group. This often provides inspiration spurring critical thinking, creativity, and productivity.

Creativity is often seen as the ability to develop new products, methods, or interpretations of thoughts or products. Creativity is known for people relying on originality and imagination. Two central components of creativity are imagination by experience and filtering through interesting solutions (Duch, 2007). Sternberg discussed several theories of creativity including investment theory of creativity and propulsion theory of creative contributions (Sternberg, 2006). Investment theory states the creativity requires six interrelated items including intellectual abilities, knowledge, styles of thinking, personality, motivation, and environment. Creativity is a diverse topic and if often subjective in nature. Typically, people personally gauge and set their own parameters for what is deemed creative. However, regardless of how we determine creativity, the process of creativity is important to maintaining forward progress and innovation in society. The need for creative solutions to problems that currently face both current and future generations will rely on creativity to one extent or another. Creativity can be seen as a skill someone is born with but in fact, creativity is a teachable skill. Instructors can support learning endeavors and activities that work on creation rather than reproduction. This can be done by encouraging students asking questions, providing time

for reflection, and supporting contemplation. Critical thinking is often seen when learners are working with content to produce a product. Even though critical thinking takes place during times of creativity they are separate entities and skills to be developed (Wechsler et al., 2018). Developing creativity allows for individuals to better use their learned knowledge and apply knowledge to various scenarios.

Importance of Twenty-First Century Skills

Establishing the importance for twenty-first century skills derives from the desire and need for individuals to be successful in their careers. Developing skills to help an individual be prepared for their career traditionally occurs in the form of education from formal schooling, trade schools, or apprenticeships. As society has advanced in technology and companies have been able to expand through globalization. The need for highly skilled, educated, and versatile employees has risen. Many studies have shown that people who invest in their education have higher rates of return in terms of monetary gain in the workplace (Schultz, 1961). In addition to higher earning abilities, individuals who have more years spent on their education demonstrate higher job satisfaction when compared to people who have comparatively less years spent on their education (Barrow and Rouse, 2005). With this said, the number of years an individual spends earning their education does not account for the overall success of that individual in their career. There are additional personal qualities that can contribute to a person's success in their career. Cognitive as well as intrapersonal and interpersonal competencies have been shown to be predictors of success in the workplace (Pellegrino & Hilton, 2012). With intrapersonal and interpersonal competencies, the characteristics that showed most promise in

predicting workplace success was conscientiousness. This fact makes logical sense in that the attributes that go along with conscientiousness lend to being productive in work.

A person's time spent in school, their cognitive ability, and their interpersonal and interpersonal qualities do play a role in the level of success and job satisfaction they will have in their careers. However, there is increasing attention on twenty-first century skills and the importance of incorporating meaningful practice of these skills in a person's education. We now have a need for people to engage in complex communication tasks, expert thinking, and problem solving rather than completing manual labor. People must be adaptable and be able to evaluate and alter their course of action when needed to accomplish a goal. This allows people to meet the dynamic state of a technologically advanced society and workplace. People must have skills that are transferable. People require skills allowing them to excel in multi-disciplinary situations as many employment positions require collaboration and team-based efforts to develop and run business endeavors. This is where twenty-first century skills will help an individual flourish.

Active Learning: What is it and Why is it Helpful

The concept of active learning is not a modern development in the field of education but rather it is a pedagogy that has evolved over decades and has been said to have roots back to Maria Montessori (Vanhorn et al., 2019). Over the years there have been many theorists and educators that have contributed to the development of active learning practices such as Dewey who presented learning as being an active process rather than a passive process (Slaughter, 2009). Active learning processes also pulls from Vygotsky and his suggestion that learning takes place when students engage in solving problems in a learning environment (Vygotsky, 1978). Theorist Jean Piaget moved away

from the traditional lecture-based style of learning and believed that learning should be based on activity and experiences (Piaget, 1953). Active learning is based in the theory of constructivism where learners actively construct their knowledge, building connections with their prior knowledge and new experiences (Bransford et al., 1999). Active learning taps into our innate behaviors of observing, doing, trying, and reflecting. In active learning, the learning environment is developed to allow the learner to be involved in the process of gaining knowledge through meaningful activities and strategies. It is understood that learning itself is an active process and approaches, strategies, activities, and coursework should have students involved and engaged with the material to be learned and with other learners (Vanhorn et. al., 2019). When students are engaged in learning they are building mental connections between their prior knowledge and the new information they are being presented. Learning by doing is a powerful and effective teaching method that promotes comprehension and retention (Mekonnen, 2020).

As far as we can look back at our history people have engaged in activities that could be seen to fall under the umbrella term of active learning. Individuals learning to survive, build, craft, and communicate were all originally learned through active processes. The term active learning and strategies specifically deemed as active learning can be considered more a modern term. The emphasis and attention drawn to active learning in the twentieth century caused the terminology specific to active learning to be more prominent. As referenced previously, a prominent theorist promoting active learning was John Dewey (Vanhorn et al., 2019). His theories followed the ideas that learning by interaction between people and the environment is superior and that learning is best through problem solving, inquiry, reflection, and learning by doing (Grabinger &

Dunlap, 1995). Another theorist that contributed to active learning was Jean Piaget. Piaget presented concepts such as student-centered learning, an emphasis on critical thinking, a constructivist approach to developing knowledge, and again the connection of the learning and the environment (Piaget, 1953). Jerome Bruner has also contributed to the concept of active learning through his discovery-based learning pedagogy. He has provided emphasis on collaborative work, problem solving, learning construction, as well as social relevance and real-world problems (Bruner, 1961). These theorist and educators have helped to propel active learning to a mainstream concept.

In addition to the theorists who contribute to learning pedagogies, active learning has been incorporated and promoted from various fields. Two of the most notably fields that have used and helped advance active learning are medical schools and law schools. In the field of medical education, the prevalence of active based learning strategies in teaching has been growing for decades and presents a long history of problem-based learning in the field (Barrows, 1996). Survey data has shown that faculty at United States based colleges of pharmacy who spend a large percentage of their time teaching students are more likely to use active learning strategies (Stewart et al., 2011). The prevalence of active learning strategies in medical fields can be greater than seventy percent in some medical school programs (McCoy, et al., 2018). Numerous medical schools acknowledge the value of active learning strategies for education in the medical field and have incorporated these strategies into their programs. Given the nature of the medical field and the skills medical professionals will need to learn, active learning strategies are suited perfectly to medical school programs. Medical schools implement review and analysis of case studies as well as clinical rotations. Typically, students will complete two years of

clinical rotations where they are shadowing physicians and gaining real world experiences for their education and career as doctors. Clinical rotations have been a staple in medication education for years and is an excellent demonstration of the benefit and incorporation of active learning into and educational program. What is changing is the classroom experience in medical school to incorporate more active learning strategies prior to the start of clinical rotations. One University that received notice was The University of Vermont, Larner College or Medicine. The college made a bold pledge to move toward lecture free classrooms embracing a complete active learning educational format (Bookless, 2018).

In law schools active learning has been incorporated into education prior to the active learning strategies being mainstream. A key component of law school is the Socratic method. The Socratic method, named after the Greek philosopher Socrates, is an ancient pedagogical tool that has been used in education and debate. The Socratic method is a series of dialogues encouraging participates to think critically, and seek deeper understanding of concepts being questioned (Delić & Bećirović, 2016). For generations lawyers have used Socratic method. Christopher Columbus Langdell, first dean of Harvard Law School, believed law is a science and promoted the case method study and Socratic questioning for students in law school (Hlinak, 2014). Reviewing the movement of active learning strategies in medical and law schools illustrates that active learning has been present in education before active learning became the new buzz word. The practice of active learning has been taking place naturally as humans grow and evolve over individual lives and generations. Through active learning humans have developed a deeper understand of the world around us and consistently develop questions and seek

answers. The more formal inclusion of active learning has emerged and examples such as the fields of medicine and law provides evidence that active learning strategies can be incorporated across various fields.

There are many ways to incorporate active learning into classroom lessons. In the following tables commonly used instructional strategies identified as active learning strategies are discussed. These strategies are categorized into four different groupings of practice, application, evaluation, and creation while using the learned content. The strategies are further categorized into strategies used for formative evaluation or summative evaluation. When categorizing these strategies many of the strategies, depending on how they are used in a classroom setting may fall under more than one classification. In this study the classification of active learning strategies is meant to aid in the definition of active learning and to gain insight on how these strategies can be used. This clarification can then be used when instrument items are developed and presented to faculty members.

Table 1 outlines active learning strategies that could be used for students to practice learned content. As students engage in these learning strategies, they will be able to repeatedly retrieve the information they are learning from their long-term memory. This will enhance retention of content and allow for information retrieval to be swift and accurate building a foundation for future learning. These strategies will also allow students time to work with the content and understand the concepts they are learning. The strategies listed include a variety of student groupings from individual work to group work depending on the strategy and the outcome the instructor is seeking.

Table 1

Active Learning Strategies for Practice of Content

Active Learning Strategies for Practice of Content	
Formative Assessment	Summative Assessment
Categorizing Grids	Concept Mapping
Classroom Assessment Techniques	Digital Simulators
Interactive Lectures	Direct Paraphrasing
Group Teaching	Demonstrations
Notes Exchange	Game Based Learning
Partial Outlines and Notes	One Sentence Summary
Think Pair Share	Polling Devices and Response Systems
Turn and Talk	
Work at the Whiteboard	
Visual Based Learning	

The second grouping of active learning strategies are presented in Table 2 and are concerned with students applying the content and information they have learned in some manner. During these activities' students may use the learned content to a related activity or in some cases students can work to apply the learned content to a different scenario. This allows students to understand content relevance and understand how to apply concepts to different situations. These strategies will continue to help students reach mastery of the content. The strategies in Table 2 can be arranged in various manners such as individual assignments and tasks as well as group work and projects.

Table 2

Active Learning Strategies for Application of Content

Active Learning Strategies for Application of Content	
Formative Assessment	Summative Assessment
Community Based Learning	Breakouts
Cooperative learning	Community Based Learning
Creative Activities	Debates
Field Trips	Experiential Learning
Flipgrid	Gallery Walks
Online Supplementation	Prop and Con Grid
Role Play	Scavenger Hunts
WebQuests	Service Learning

Active learning strategies presented in Table 3 can be used for students to practice evaluating content. Benefits can be found when students can take information and based on the content, they have learned evaluate the information based on criteria. Once the information is evaluated the students can then reach a determination of what to do based on the overall goal of the activity. Many of these strategies work best when designed to be carried out in a group setting; however, but several can also be conducted as individual activities with benefits to student learning.

Table 3

Active Learning Strategies for Evaluation of Content

Active Learning Strategies for Evaluation of Content	
Formative Assessment	Summative Assessment
Cooperative Learning	Breakouts
Fishbowl	Case Study Analysis
Jigsaw	Journal Writing
Muddiest Points	Portfolio Development
Questioning	Sorting
Summary of Another Students' Work	Structured Controversy

The last of the learning strategies for active learning are presented in Table 4 and include strategies that call upon content students have learned and practiced using. In these learning activities students will create a product using the learned content. Upon evaluation of the table, many of these strategies are beneficial to use as a summative assessment. This determination is based on the fact that students will be required to create a content-based product at the end of a unit. Most of these strategies are appliable to be used in groups or for individual students.

Table 4:

Active Learning Strategies for Creation Using Content

Active Learning Strategies for Creation Using Content	
Formative Assessment	Summative Assessment
Application Cards	Case Studies
Minute Writes	Memory Matrix
Socrative Questioning	Problem Based Learning
	Research Based Learning
	Student Presentations

Active learning promotes higher order learning skills including twenty-first century skills. Learners will develop deeper understanding of the content which will allow students to retain and apply the information to various situations. Active learning strategies increase student satisfaction allowing learners to be more positive regarding learning environments and processes (Hyun et al., 2017). Active learning encourages student interaction which will allow them to better maintain attention to learning rather than being distracted which equates to better comprehension and retention. Active learning promotes a more student-centered learning approach to classroom design allowing instructors more time to evaluate student learning and provide more frequent feedback. This is a holistic view of how active learning promotes opportunities for learners to develop strong foundational knowledge they can then use to ascertain more complex understandings of content.

Learning Environments Promoting Twenty-First Century Skills

Identifying a learning environment as one that promotes the practice of twenty-first century skills can begin with the understanding what a learning environment structured to support twenty-first century skills will look like. A learning space that is identified as being innovative has been described as open and accessible, high-tech, comfortable and aesthetically appealing, fluid and effective in use (Rook, et al., 2015). As students learn and prepare to be productive members of society and successful in their professional careers, they should be engaging in authentic learning practices allowing them to develop twenty-first century skills. Learning spaces are important to learning as they are a mediator of learning itself. The design of the learning environment can be an influencing factor of the learning and quality of learning that takes place. This idea of how learning spaces affect learning and how they should be designed has been gaining interest in the field of education research. The idea that the learning space determines learning type and ability can be associated with the term of New Generation Learning spaces from the research of Radcliffe et al. (2008) and Jamieson (2007). An interesting note to be made from their work is that they evaluated the connection between pedagogy and learning spaces that support a more student-centered learning environment (Byers et al., 2014). This student-centered approach to learning environments will support the use of active learning strategies and develop the space into an innovative learning classroom. When a New Generation Learning space is used, student perceptions of their learning and learning outcomes are improved (Byers et al., 2014).

Use of Active Learning in Higher Education and Resources Needed for Active Learning

Incorporating active learning in higher education classrooms is feasible. The range of strategies and methods to create an active learning classroom are broad. As previously reviewed, there are an extensive collection of strategies that can be included during the development a course. Many universities across the country are striving to develop and foster an active learning culture among their faculty and in the offered courses. The transition of higher education classrooms to be more active learning and student centered has been gaining attention and support over the years. Over seventy percent of universities are investigating the implementation of and support of active learning classrooms (Brown et. al., 2020). The trend for inclusion of active learning strategies stepped into the spotlight as incoming students are familiar with and accustomed to learning through innovative lessons and active learning strategies from their K-12 education. This is a student need that universities are encouraged to meet. If students are accustomed to a certain way of learning and the method is beneficial, then universities may benefit from continuing a that method to meet student's needs. Universities not only want students to attend, but they also desire for their students to complete their degree. Retention and graduation rates are essential components of a prosperous university and providing innovative learning environments will engage the students and enhance their learning. Innovative learning environments will also provide them with a support network to help them complete their studies and graduate. In the following sections several methods of how universities are promoting active and innovative learning on their campuses is addressed.

Universities have been taking steps to incorporate more active learning strategies as well as active learning-based classroom designs. The increase in the use of active learning classrooms spaces can be tied to Robert Beichner and his development of the SCALE-UP (Student Centered Active Learning Environment with Upside-down Pedagogies) in the 1990s (Beichner & Saul, 2003). Beichner's model has guided the transition of hundreds of universities in multiple different content areas. These active learning classrooms are designed to promote student interactions and collaborations during activities completed in class. The upside-down pedagogies are tied to using a flipped classroom model. In this model instruction will take place out of the classroom prior to the students attending class where they will then complete activities used to enhance understanding of the content. All this is done through active learning course design. This re-design and re-evaluation of a learning environment has helped faculty and students transform their teaching and learning to embrace the use of active learning strategies with more consistency and success.

Another concept that came onto the scene of active and innovative learning in higher education is the concept of Makerspaces. These makerspaces are helping to guide not only development of education but also monetary investment into educational programs. A makerspace is an area provided to learners that is equipped with the resources and materials needed for individuals to explore their own interests, collaborate with peers, and learn through active processes. Makerspaces are seen in both K-12 education and universities and allows schools to incorporate active learning environments for the students. Makerspaces have become more prevalent since the initial makerspace-based design introduction to higher education at MIT in 2001 (Slatter & Howard, 2013).

The number of makerspaces in universities has risen to at least forty makerspaces at thirty-five universities (Hynes & Hynes, 2018). These spaces are outfitted with high tech equipment, room and tools for collaboration and brainstorming, and materials to create products. These maker spaces encourage students to practice and hone their critical thinking, communication, collaboration, and creativity skills. They encourage students to push their boundaries of knowledge in a versatile learning space that supports their endeavors. The benefits of students being able to use makerspaces has been seen in building of connections and relevance between learned content and real-world problems. This allows students to engage in interdisciplinary active learning endeavors that will allow them to practice skills they may use in their future careers. Such skills that are developed include as design and development of a product, prototype development and testing, and use of sophisticated software. This is beneficial for the learner as they will have hands on experience when entering the workforce. The use of a makerspace and the active and innovative learning these spaces foster, may benefit the learner and the workforce. Encouraging the use of makerspaces in higher education may be a worthwhile endeavor to continue and expand.

The increase in accessible and mobile technology has also allowed for the incorporation of active learning strategies in the classroom. It has been shown that technology enhanced classrooms using active learning produce students that perform better when compared to control groups with traditional learning classrooms (Brooks, 2011). Innovative and active learning classrooms often require the use of technology. Clicker devices for question and response sessions or computers labs, and computer on wheels (COW), are all examples of technology resources that has opened doors for

innovative teaching. Technology based active learning has been shown to be beneficial in improving learning processes and allows for quality collaboration and teamwork (Ghilay & Ghilay, 2015). With the increase in availability of technology, learners have been able to take advantage of resources promoting active learning. The use of cloud storage capabilities has allowed for students to collaborate more effectively on group assignments and collaborate and work on a single document simultaneously. This has enhanced the ability and effectiveness of group work. The tools embedded in cloud sites like Google Docs have allowed for more sophisticated documents and projects to be developed.

Active learning is not synonymous with advanced technology or significant budget lines. The incorporation of active learning into classrooms can be enhanced by the physical attributes of the classroom (Rands & Gansemer-Topf, 2017). By arranging the furniture in a way that allows students to engage in meaningful communication results in the learning environment becoming more students centered. Active learning classrooms remove the classically arranged chairs and desks in front facing rows and any unmovable piece of furniture. This style of classroom furniture can limit the interaction among students needed for active learning strategies. Active learning classrooms are outfitted with modular desks or tables with rolling chairs that allows for various configurations of seating and groupings. This flexibility in furniture arrangement is an essential component of active learning classrooms. Flexible classroom designs with mobile chairs and trapezoid, movable desks showed higher student preference over traditional fixed furniture configurations (Harvey & Kenyon, 2013). This flexible seating and desk arrangements remove the front of the classroom where the instructor would

traditionally be located. Having a traditional seating arrangement with the instructor in the front of the room is a visual implication that the learning environment is instructor centered. By removing the instructor from the front of the room and placing them either at the back of the room, or rather have no specific set place they set up their desk, allows for students to have a more student-centered learning environment (Krych, 2015). In a higher education classroom, having a lack of a front of the room arrangement allows for the instructor to move around and address the learning of students as they engage in active learning lessons.

Active learning environments are even branching out from the traditional classroom design and classrooms can end up not resembling the traditional layout. One study showed that developing a classroom more in line with the feel of a coffee shop allowed students and faculty the ability and motivation to collaborate more effectively and increased their comfort level in the environment (Dee Fink, 2009). In this same study the size of the room and the arrangement or style of the furniture was positive but there were some mixed reviews due to personal preferences. Active learning is also conducted outside of the classroom through field trips, study abroad programs, technology, field work, service learning, and experiential learning (Claiborne et. al., 2020). University classrooms can provide onsite learning for different courses through field trips or through real-life locations that would be associated with their field of study. In addition to field trips there is also place-based learning. Placed-based learning is a learning practice that uses geography to develop engaging as well as meaningful learning for students (Schneider et al., 2017). Place-based learning provides field experience and connects the learners to the area and regions in which they live and build a connection to the world

(Smith, 1999). A classic out of the classroom learning experiences is through study abroad programs. Study abroad programs usually occur through the enrollment and completion of courses at foreign universities. Study abroad programs immerse students in learning and cultural experiences and provide benefits including cross-cultural skills and transformational worldviews while developing twenty-first century skills (Tilley, 2008). Service learning engages students through connecting them with organizations in their community to provide a service. Service learning is considered to be founded by John Dewey as he promoted students learning through experience (Currie-Mueller & Littlefield, 2018). Service learning promotes the honing of communication skills, personal growth, social insights and civic engagement (Gleason & Violette, 2012), and multi-cultural awareness (Blithe, 2016). Learning is a dynamic event and in the case of active learning instructors and universities can benefit from the understanding that classrooms in the traditional sense are not the only option for holding courses. Thinking outside of the box in how and where students can learn can enhance learner and instructor satisfaction.

Use of active learning strategies are becoming more common in higher education courses. As the benefits and feasibility of active learning incorporation into courses becomes more known, the prevalence of active learning strategies in higher education courses will increase. It is important to note that in some cases, the use of active learning is incorporated into the course design to supplement a lecture-based format. Incorporating activities such as case studies or workshops allow students to gain information from lectures and then use information in a more an application-based learning activity. It has been seen that incorporating these types of learning strategies has proved to increase

comprehension (Miller & Metz, 2014). Understanding that active learning strategies can be incorporated into teaching alongside other teaching strategies rather than completely replacing other strategies is essential. This makes the point that learning, and teaching is diverse and flexible.

Active Learning in Online Course Environments

Online courses have established themselves in the world of education. It is now known that the percentage of students enrolled in distance learning courses is 33.1 percent (exclusively distance learning 15.4%, distance learning institutions 2.0%, distance learning non-exclusive institutions 13.4%, enrolled in some distance learning courses 17.6%) (Ginder et. al., 2018). With more than a third of the postsecondary student population involved in distance learning courses to some degree it is beneficial to understand how active learning functions in online learning environments. In addition to individuals learning through digital platforms by choice it can be a necessity. We have seen a world-wide shift with online learning in a short amount of time due to the COVID-19 pandemic. This shift can be a catalyst for many teachers and students seeking an online version of active learning they may have already been using with traditional teaching environments. Understanding how active learning can take place in online formats could be an essential component of an instructor's toolbox. As we see what education will look like in a time of a pandemic such as COVID-19 as well as post pandemic society, it will be interesting to see what will happen with distance learning opportunities. Students who will be in brick-and-mortar schools in k-12 education are working to move all teachers into a blended learning model for all classrooms in the preparation for if a second shut down is needed during situations like COVID-19

pandemic or any future situation that could arise. Recognizing that teachers will need support as we transition into a new norm of teaching will need to be addressed for the success of the teachers and students. This is also a prime situation to encourage, support, and implement more active learning strategies in all levels of education.

Active learning on distance learning platforms can look similar to active learning in a traditional classroom setting. Many of the learning strategies used for in person classes can be implemented in virtual learning scenarios. One challenging aspect of online teaching can be to maintain student engagement in the course. If students are to participate in active learning they need to be actively engaged in the course. In online learning as with in person learning students can engage with the instructor, the content, and with their fellow classmates. In online learning these interactions may differ. Students can interact with the instructor and fellow classmates through email, web-conferencing, phone conversations, and online learning communication tools. Although the in-person option is removed from online learning the advancement in web-conferencing tools and programs have allowed for distance communication to take place and connecting a real-time image of the individuals. How students interact with the content in an online learning platform has some differences. Online learning can be done asynchronous or synchronous. When an online course is asynchronous active learning can still take place but may often look a bit different compared to in a face-to-face learning environment (Riggs & Linder, 2016). Active learning is often connected to collaborative learning which requires interaction with others. This can be problematic with asynchronous online learning. If students are not working at the same time, it can be difficult to accomplish the collaborative aspect of active learning. Group projects,

problem-based learning, interactive digital experiments and modules, case studies, and interactive lessons have all found a place in online learning. When structured and planned out active learning can take place in online learning with examples such as problem-based learning, portfolios, and discussions. The difference may be seen when looking at interactions such as live lessons or collaborative project-based learning where the line between asynchronous and synchronous will blur and can often fluctuate back and forth between both situations.

Epistemological Beliefs and How it Impacts the Acceptance of Active Learning Strategies

Instructors must make decisions about how to best provide instruction to meet the objective of the course, the platform of the course, and the students who are receiving the content. They must evaluate their audience as well as themselves to determine the best course of action for the course design. An aspect that influences the outcome of the course design and the instructional strategies an educator will choose is the educators own personal beliefs of learning. In teaching it has been seen that both attitudes and beliefs help drive the decisions an instructor makes about the actions they take in the courses they teach and design (Sikula, 1996). An identified barrier to having instructors choose to include active learning strategies in a course is their own personal beliefs about how students' abilities affect their learning and their beliefs of their own personal responsibilities about teaching (Aragón et al., 2018). Another aspect of whether an instructor will choose to use active learning strategies in their teaching is their exposure to these strategies and how they are implemented into the courses. However, even with professional development and resources are made available, instructors may not use

active learning. This can be the result of having a growth mindset versus having a fixed mindset. An individual with a growth mindset is more likely to hold the belief that learning in malleable and that it can be constructed and cultivated whereas a person with a fixed mindset would more likely believe that intellect is finite and has a set limit (Dweck, 1986). When a person is presented with an alternative way of teaching content the person will filter the information and determine if they want to act and implement the new strategies or tools in their course. As this concept of active learning is being mulled over in the individuals' mind, the information is passing through the person's set of beliefs and will end up determining if the new information is accepted and incorporated into the person's own beliefs and subsequent actions. People who have a fixed mindset are more likely to hold on to their current beliefs as they may feel that changing teaching strategies will not change the learning outcomes. People, once they have established a belief, in this case about learning, they will filter new information so that they maintain that belie, (Lewis, 2004). Individuals with a growth mindset are more likely to adopt and implement active learning strategies as they believe that with various teaching strategies student performance can be improved.

Another aspect of beliefs of learning, is an individual's epistemological foundations. Epistemology relates to the study of human knowledge and beliefs of the theory of knowledge. A person's epistemological beliefs has been seen to influence their comprehension, meta-cognition, and interpretation of information (Schommer, 1998). As an instructor develops their teaching style, resources, and strategies used, what they choose will often be influenced largely by their beliefs of how people learn and how information should be taught (Er, 2012). Understanding the epistemological beliefs of an

instructor could help provide information on which teaching styles and strategies they are likely to adopt. Another facet of understanding the connection of the instructor's belief of learning and the learning environment they will develop in their courses is which learning theory they subscribe to. Active learning follows most closely in line with the paradigm of constructivism. The paradigm of constructivism learning is an active process where knowledge is constructed as new information in integrated with prior understandings. Individuals who align themselves with the constructivist paradigm would be expected to embrace active learning strategies or already be implementing learning strategies in their teaching.

Professional Development and Active Learning

The term professional development, (PD) can be found in variety of fields of work and is often seen as a method of maintaining competency in skills and knowledge for both personal and professional development. In areas of education, professional development is often a requirement to maintain certification as well as meeting requirements to obtain certain rankings in employee evaluations. Professional development can be presented in many forms depending on type of career. Evaluation of what characteristics professional development should have to be most effective has been the topic of research as well as reflections of faculty forums and articles. Bates and Morgan suggested seven elements that would provide effective professional development for educators (Bates & Morgan, 2018). These elements include having PD focus on content, be presented in an active learning format, support collaboration, models the practices, coaching and expert support, provide reflection and feedback, and have a sustained duration. When looking at professional development in the field of education it

is often seen more readily and consistently with K-12 educators. Often in higher education faculty members may consider professional development connected to research rather than connected to the enhancement of their quality of teaching. It is important to note that when faculty take part in and are presented with quality professional development targeted at enhancing their teaching methods and strategies, those faculty will often show a change in their teaching (Condon et. al., 2016). Academic focused professional development is seen in universities to support and foster the learning and development of their faculty. It is also used to support and aid the fulfillment of Quality Enhancement Programs or QEPs. These Quality Enhancement Plans (QEPs) consist of a report developed by the university addressing five main areas that will be submitted to their association of accreditation. The five areas to be addressed in the QEP would be key issues of the university, learning outcomes as well as the environment that will support student learning, demonstration of the universities ability to successfully complete the QEP, involvement of constituencies of the university to develop the QEP, and identification of the goals to assess achievement (SACSCOC, 2020). In addition to these five items addressed in the QEP, these endeavors will allow the universities to develop and provide professional development support for their faculty. Professional development opportunities provided for faculty can be based on the needs that are identified in the development of the QEP and from communication of needs from the faculty themselves. Once professional development is implemented and offered to faculty the value of the training and the quality of training implementation will help determine the benefit to the faculty member and in turn the students themselves. Key reflection questions of professional development include the efficacy of the professional development, the

applicability of the training, and if the instructor will take the learned content and retain and ultimately implement what they learned into their classroom. These questions lead into the evaluation of how professional development can influence an instructor to learn, retain, and implement active learning strategies.

Academic Scholarship and Use of Active Learning

University professors are often classified in different categories by peers, institutions, and themselves. Professors not only instruct students they serve on committees, conduct research, serve as graduate and undergraduate advisors, are responsible for completing professional development, and focus on the advancement of their own academic scholarship. Academic scholarship serves to meet the requirements for faculty to earn tenure status and satisfy the needs of becoming a scholar which is usually an inherent desire of professors. A third component to academic scholarship is the development of research endeavors and seeking grant monies and securing publications. Developing academic scholarship can be influenced by both internal and external factors. As individuals develop themselves as an intellectual, they are developing a sense of self and this development of self can influence our decisions and vice versa, (Desimone, 2001). In the field of higher education faculty can have various levels of percentages of teaching to research requirements.

One factor to be considered is scholarship of teaching and learning. Scholarship of teaching and learning encompasses a "systemic, literature-based study of processes and outcomes involved in teaching and learning intended for peer-reviewed publication and dissemination, (McKinney, 2004). Scholarship of teaching and learning if often seen as valuable but not as valuable as research specific to the discipline in which the faculty

member teaches. It has been acknowledge that placing more emphasis on scholarship of teaching is needed in higher academia for the benefit of the educators and the learners (Peterson & Sandholtz, 2005). How people perceive the value of scholarship of teaching and learning research may influence their participation in such research that would hold potential in enhancing their teaching and incorporation of active learning strategies in their course designs.

Influence of Work Conditions on Active Learning

The general term of work conditions can encompass a wide range of factors. Generally speaking, and according to the International Labour Organization, a work condition can include topics and issues, work environment, hours worked, schedules, allotted time off, compensation, benefits, physical conditions of the workplace, and mental demands the worker feels (International Labour Organization, 2023). How an individual feels in their workspace can influence their overall productivity in their job as well as potentially affecting their feeling of job satisfaction. The physical environmental conditions of the employees work place can affect not only that employees productivity but their attitudes and behaviors as well (Kamarulzaman et al., 2011). If knowing that the physical conditions of the workplace influence productivity and attitudes, it is a natural thought progression that an employee's decisions and decision-making abilities would be affected by their working conditions. Decision making is often a multifaceted cognitive function, however; work conditions can influence the decision making ability of an individual which in turn can affect their job performance (Ceschi et al., 2017). Understanding that work environments influence performance can help lead

conversations into how the environment will affect instructors and the decisions they will make regarding their teaching strategies.

External Factors Affecting the Use of Active Learning

External factors are commonly referred to as items that are outside of the organization but items that can affect the organization or the people who work in the organization. This can affect the overall performance of the person in the organization. In the proposed model of this study external factors are listed as a potential influencing facet of whether or not a faculty member will choose to incorporate active learning strategies in their teaching methods. Areas of external factors proposed included family, physical and mental health, and time. In an ideal situation people may try to have a division between their personal lives and their work lives. Simply put as employees will leave personal issues at the doorstep so they can do their job more effectively. Even though this is an honorable goal it can be a lofty goal for many. Stressors in one's personal life can play an underlying role in the performance and attitudes that a person has towards their job and their overall job performance (Ragins et al., 2014). Life stressors can influence the decisions you make when experiencing stressors over a long period. Chronic stress can cause structural brain changes that in turn results in behavior changes and can alter decision making thought processes (Dias-Ferreira et al., 2009). Stressors can often affect not only mental but physical health as well which can have a negative impact on the person's outlook and open mindedness at their work. Couple this with a person's beliefs of learning there could be a connection to physical and mental wellbeing and the decisions made to incorporate active learning strategies.

People who have satisfaction in their job will have a higher level of job performance (Wright et al., 2007). However, various life events have a varying degree to which people have an increase or decrease in their job satisfaction and job performance based in event and time passed since the event (Georgellis et al., 2012). These life situations could impact the decisions faculty make about the teaching strategies such as active learning they incorporate into their lessons. Using active learning or switching to active learning strategies can be viewed as requiring more time or learning a new method which can be either a negative or an appealing opportunity based on the life events a person is going through. Often people will choose the known versus the unknown when dealing with life stressors and choose the path of least resistance where they can.

Time can be a limiting factor in whether a person will choose to use active learning strategies in their teaching. In fact, time restraints are often seen as identified barriers for the incorporation of active learning strategies in the classroom, (Miller & Metz, 2014). Time can be viewed as time needed during class and during work hours; however, time constraints can also be viewed as time that may be used from a person's time off the clock. This can be affected by situations that are happening in their personal life and with family responsibilities.

Although external barriers have briefly been addressed and have potential to be influential in the decision of a faculty member to use active learning, these components of the model being presented in this study are not going to be directly addressed in the research at the time of this study. It is recognized it would be neglectful to not mention and discuss the role external factors play on the decision and perceptions of faculty, but it is also acknowledged that the scope of the study would grow too large with the

incorporation of these model variables. This is an area that would be suggested for future research questions and studies going forward.

Identified Barriers to the Adoption of Active Learning Methods

Barriers faculty perceive and experience when determining if they are going to adopt active learning strategies in their courses have been studied (Patrick et al., 2016). The identification of barriers is a crucial step in providing support when working to enhance teaching methods. There are many barriers that have been identified by faculty considering using active learning. A study looking at the faculty perceptions of active learning identified twenty-two significant barriers (Michael, 2007). This study categorized these barriers into three general categories including student characteristics, issues impacting faculty, and pedagogical issues. Other common barriers that stand out when evaluating the literature include lack of time, lack of teacher recognition, and lack of resources such as space and technology (Kim et al., 2019). Another common barrier is the need for effective training. Instructors have varying levels of training on different learning strategies such as active learning. Even though some instructors express some understanding and have experience using active learning strategies there is still a population of instructors that have little education in or experience using active learning strategies (Niemi, 2002). This is an important fact to address as many faculty members enter teaching at the university level without having educational courses. Providing professional development and ongoing resources to help faculty will be beneficial in promoting and sustaining the use of active learning teaching strategies in higher education courses.

Another barrier connected to time is the balance of teaching to research appointment for the faculty members. With some institutions there is a research-first mentality (Kim et al., 2019). If importance is placed on the development and conduction of research rather than classroom teaching faculty will often see less value in re-developing their courses and using active learning strategies. If faculty efforts are placed on carrying out high quality research their mental capacity and efforts will be focused on research rather than teaching. Often more recognition can be achieved through quality research than quality teaching. This fact does not support the efforts to engage faculty in professional development on learning teaching strategies and even less so, implementing those learned strategies in their classrooms on regular and consistent basis.

Access to technology as well as the physical classroom set up are other barriers faculty face when working to adopt active learning strategies. Designing classrooms that allow more freedom of movement and classroom arrangement can help increase use of active learning. Providing the hardware and software for courses can address and reduce hesitation for the implementation of active learning methods in higher education. It is important to note that access to technology is not essential for the use of active learning strategies and this is one misconception that can be corrected through professional development.

How to Measure Beliefs of Active Learning

Perception is defined as the way of understanding or interpreting something (Matlin & Foley, 1992). People have individuals' differences which contributes to why people will perceive things differently. A person's belief regarding a subject has the potential to influence their perception of the subject. A person's belief and perception of

a topic, in this case the use of active learning, has the potential to influence why or why not an instructor would choose to use active learning strategies. This internal motivation and belief system often drive decisions. Research on gathering the perceptions of active learning is easily found when trying to gain the insight from the learner's perspective. It is also easier to locate studies conducted within secondary education settings rather than in higher academia. Gathering data from faculty on their beliefs or perceptions of different topics regarding education and teaching strategies is often conducted through structured and semi-structured surveys and interviews. Often these surveys include Likert scale formatting as they are reliable in collecting an individuals' opinions and perceptions.

Often, the prime objective for gaining active learning perceptions is to have insight to the actual use of active learning in classrooms, the benefit of active learning, and the barriers to use active learning strategies. A Likert-scale style survey was used with open-response questions in a study to gain perceptions of both faculty and students of active learning targeting the topics of use, effectiveness, and barriers (Miller & Metz, 2014). This same instrument, with some modifications, was used in a study used to evaluate the difference in perceptions of active learning between faculty and students (Patrick et al., 2016). Both studies found that faculty had used active learning and see it as beneficial to student learning, but most often stated that a lack of planning and classroom time to implement active learning on a more regular basis was a barrier. In a study evaluating the perceptions of instructors implementing differentiated instruction, researchers developed an instrument and set of criteria (Coubergs et al., 2017). They developed a Differentiated Instruction Questionnaire and through factor analysis four

different factors were deemed predictors of the adoption of differentiated instruction. These four factors were teachers' mindset, ethical compass, flexible grouping, and the output input as dependent variable. Considering these identified perceptions as potential predictors, especially teachers' mindset, helped in the development of the instrument for the present study.

Given that the focus of perceptions of active learning are often focused on the learner, there is potential in gleaning from instruments from these studies to develop an instrument to measure faculty perceptions of active learning. Action research has been used to gain the perception of college students about active learning in their classes. Writing assignments and small group discussions allowed researchers to gain insight and find that students valued active learning strategies and that is had a positive impact on their learning (Lumpkin et al., 2015). Action research could work well for evaluating the perceptions of faculty regarding active learning but seems to be most feasible and beneficial to a smaller grouping of individuals such as gaining insight within a certain college.

To gain insight to the barriers seen in implementing active learning strategies it could be beneficial to have open-ended questions or in person communication. In one study, a workshop was carried out to ascertain the perception of barriers to active learning (Michael, 2007). This study advertised for a workshop where faculty could attend and from this workshop, they developed a list of twenty-two significant barriers that where then placed in one of three categories. A summary of the results is seen in Table 5. These previously identified barriers for both students and faculty provided insight on what faculty and student perceive about active learning and what we could

predict to see with the results from this study. Thus, the Michael 2007 study aided in the development of the items for the questionnaire in this research study.

Table 5

Summary of Identified Active Learning Barriers and Developed Barrier Categories from the Research of Michael 2007

Category	Barriers
Student Characteristics or Attributes	• Students do not know how to do active learning • Compromised active learning due to unprepared students • Unwilling students to engage in active learning • Student heterogeneity problematic for active learning to take place • Student maturity is lacking for active learning • Student learning expectations produce a barrier
Teacher Characteristics or Problems directly affecting Teachers	• Active learning requires too much time to prepare • Less teacher control in an active learning classroom • Colleague perceptions inhibit active learning • Risk of poor student evaluations when active learning is used • Lack of teacher maturity • Faculty reward structure leads active learning to be unattractive • Teachers do not know how to do active learning
Pedagogical Issues that Affect Student Learning	• Classrooms not suited for active learning • Active learning takes too much class time • Student assessment is difficult in active learning classrooms • Class size prevents active learning • It is difficult to predict learning outcomes when using active learning strategies • Difficult to ensure quality control with multiple sections • Lack of resources to do active learning • Classroom periods are a barrier

Chapter Summary

This literature review encompassed a discussion of twenty-first century skills and the identified importance of developing these skills in learners. Active learning strategies can be an essential tool to aid in learning for students and the development and practice of twenty-first century skills. The literature review also provides a picture of a learning environment and the resources needed to support an active learning classroom environment. With the evidence supporting the benefit of the use of active learning strategies there is a lack of sufficient research regarding the perceptions of faculty on the use of active learning and the ability to predict if active learning will be used in learning environments.

In the present study, the literature review helped guide the study and develop the procedure for instrument development, data collection, and analysis to answer the following research questions:

- What are faculty beliefs of active learning in higher education?
- What barriers to the use of active learning in higher education learning environments exist?
- What are the predicting factors for the use of active are learning in higher education classrooms?

Semi-structured surveys were sent through the online survey platform Qaultrics to faculty members at three universities in the southeast. All data was statistical analyzed to determine relationships between variables and identify trends, predictors, and moderator variables.

Faculty beliefs of learning may influence their use of active learning strategies and is an area that would benefit from more research. Whether or not a faculty member is using active learning strategies based on their epistemological beliefs can also be affected by other variables. Finding answers to the research questions in this study can help support faculty in professional development and support to help faculty meet the needs of their learners in their educational and future career endeavors. Data from this study may also provide insight into the dynamics of the predictors and underlying decisions as to whether an individual will incorporate and use active learning strategies in their courses they teach.

CHAPTER III
METHODS

In this study faculty beliefs and use of active learning and the barriers to active learning were explored and evaluated. Active learning, for the purposes of this study is defined as the learner being involved in the process of gaining knowledge through meaningful activities and strategies. The study provided a survey with question items targeted in gaining insight to the beliefs on learning and the self- reported use of active learning strategies to better discern a standard of faculty beliefs and use of active learning in higher education.

Participants

The participants for this study were a convenience sampling of (N = 210) faculty members at three universities in the southeast. Faculty members who participated in this study included individuals who instruct lower-level and upper-level undergraduate courses as well as individuals who teach graduate and professional level courses. Full-time and part-time professors at all levels (assistant, associate, full) were provided the opportunity to participate in the study. Adjunct faculty, lecturers, and instructors were also presented the opportunity to complete the survey. Faculty within all colleges and disciplines at each university were reached with the survey invitation.

Two of the three universities have a basic Carnegie Classification of Doctoral Universities, one classified as High Research Activity and one with Very High Research

Activity. The third university is classified as Master's Colleges and Universities: Larger Programs. All three universities are public universities. Table 6 provides and overview on the university faculty demographics of the population that was reached with the survey instrument.

Table 6

University Faculty Demographics

	University 1	University 2	University 3
Number	568	339	1,428
Faculty Rank			
No Rank	-	-	1%
Instructor	21%	19%	5%
Lecturer	-	9%	12%
Assistant Professor	38%	31%	26%
Associate Professor	23%	20%	27%
Professor	18%	24%	28%
Gender			
Male Faculty	46%	53%	59%
Female Faculty	54%	47%	41%

The participants were contacted via email invitation with a description of the research study and the survey and presented with a link to the survey. The research study and survey went through an Institutional Review Board process based on each university's specific requirements and was approved by each IRB. After IRB approval, the survey invitation was then approved for mass email distribution at each university. The survey invitation was sent out via mass email to faculty a total of two times with a range of one to four weeks apart. Table 7 outlines the demographics of the participants who selected to participate in the study.

Table 7

Participant Demographics for Survey of Faculty Beliefs on Active Learning in Higher Education

	Respondents
University	
University 1	21.4% (45)
University 2	12.4% (26)
University 3	52.9% (111)
No Response	13.3% (28)
Gender Identification	
Male	27.6% (58)
Female	56.2% (118)
Prefer not to answer	2.4% (5)
Age	
25-34	15.2% (32)
35-44	25.7% (54)
45-54	23.3% (49)
55-64	14.8% (31)
65 or older	7.6% (16)
No Response	13.3% (28)
Ethnicity	
Caucasian	72.9% (153)
African American or Black	4.3% (9)
Asian	1.9% (4)
Hispanic or Latino	3.3% (7)
Other	2.9% (6)
No Response	14.8% (31)
Faculty Level	
Adjunct Professor	6.7% (14)
Visiting Professor	1.0% (2)
Assistant Professor	28.1% (59)
Associate Professor	17.1% (36)
Full Professor	14.3% (30)
Endowed Professor	1.9% (4)
Instructor	10.5% (22)
Teaching Professor	6.2% (13)
No Response	14.3% (30)

Two of the three universities approved for an incentive to be allowed in the survey invitation. Participates were given the option to enter a drawing for one of thirty $10.00 Starbucks gift cards. Twenty-six percent of participants (56 of 212) chose to be included in the drawing. The participants to receive gift cards were selected at random from a random name selector. Participants received an email informing them they were selected for a gift card and the physical gift card was delivered via campus mail. There was no significant difference between survey participation between the universities offering an incentive and the university that was not provided with an incentive.

Student enrollment and student demographics were not a central focus of the research study, however; information on the student population was gathered to better understand the structure and environment of the universities. Table 8 outlines a summary of the student population at all three universities. The top three degrees awarded to undergraduates at each university, according to Data USA as of 2020, are as follows. University one included registered nursing, general biology, and interdisciplinary studies. University two: awarded the most degrees to undergraduates in the field of registered nursing, followed by general health sciences and general psychology. The top three degrees awarded to undergraduates at university three include general business administration, general biomedical sciences, and general finance.

Power analysis was completed using the GPower software to determine the sample size needed for this study (G*Power, 2019). Preliminary power analysis data showed we needed 111 participants to find a correlation of 0.3 but in order to find partial correlations a larger sample size of 320 participants was desired. Parameters used in the power analysis included a two-tail analysis with an alpha value of 0.05 with a 0.3 effect

size. The questionnaire was evaluated and developed to be efficient to improve faculty participation and completion of the survey. The final sample size of survey participants was $N = 250$. After evaluating the submissions and removal of incomplete survey submissions a total of $N = 210$ participant surveys were able to be used in the analysis. Given that the number of participants secured was a hundred and ten submissions fewer than hoped for, the statistical power of this study was affected and can be seen as a limitation to the study.

Table 8

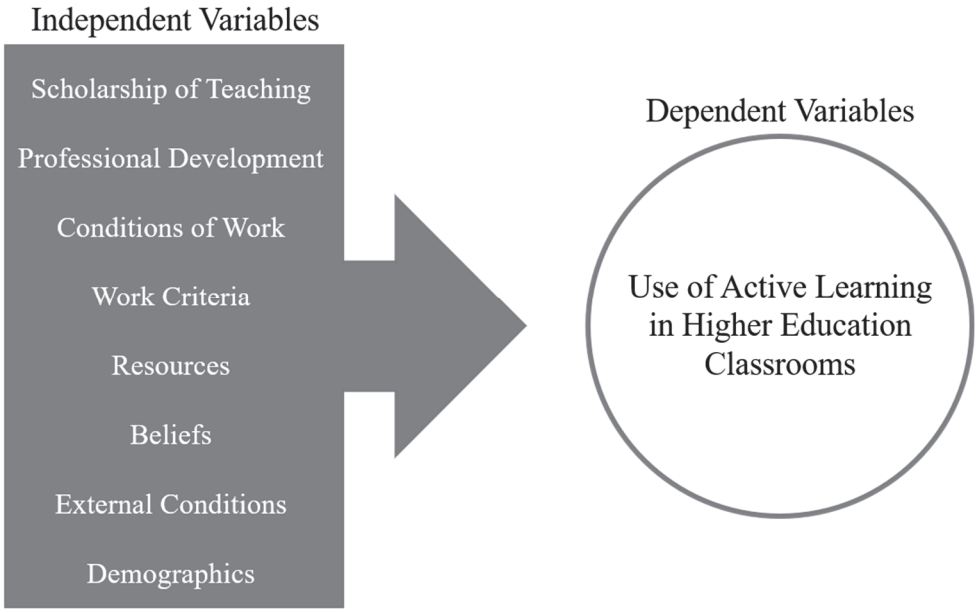
University Student Demographics

	University 1		University 2		University 3	
Enrollment						
Student Enrollment	14,224		13,061		30,737	
Full Time Enrollment	83.0%		53.8%		87.1%	
Graduation Rate	44.7%		48.2%		78.7%	
Student Ethnicity						
White	62.60%		64.30%		77.30%	
Black or African American	20.60%		11.60%		5.95%	
Hispanic or Latino	4.09%		10.50%		3.20%	
Asian	3.66%		3.67%		2.61%	
Two or More Races	3.54%		4.96%		1.63%	
American Indian or Alaskan Native	0.79%		0.41%		0.39%	
Native Hawaiian or Pacific Islander	0.12%		0.29%		0.12%	
Degrees Awarded	Male	Female	Male	Female	Male	Female
	32.5%	67.5%	36.4%	63.6%	49.5%	50.5%

Research Design and Instrumentation

The design of this study was a non-experimental cross-sectional prediction analysis that is a quantitatively driven non-sequential design. This study is evaluating the impact of factors identified in the model shown in Figure 1 on the use of active learning strategies in higher education courses and to determine if any of the factors are predictors of the use of active learning strategies. The variables identified in this study can be seen in Figure 2.

Figure 2



Independent and Dependent Variables Identified in the Study of Faculty Beliefs on Active Learning in Higher Education

The dependent variable in the study is the use of active learning strategies used by faculty in higher education courses. These are seen by the self-reporting use of active

learning strategies collected from responses on the survey. The independent variables are the factors identified in the model seen in Figure 1 as potential influential factor for the use of active learning strategies. These variables include scholarship of teaching, professional development, conditions of work, work criteria, resources, beliefs, external conditions, and demographics.

Although active learning strategies can be directly observed through classroom observations, this study sought to look beyond the use of active learning strategies or lack of active learning strategies. Evaluation of the epistemological beliefs of the faculty teaching courses as well as faculty perceptions of active learning will allow the identification of predictors for the use of active learning strategies. Given that these items cannot be directly observed they were determined through questioning. Faculty were asked to voluntarily complete a questionnaire. The answers provided in the questionnaire provided data needed to determine the relationships between the variables in the study.

The survey platform available for student use through the University of South Alabama is Qualtircs. This platform was used for the development and delivery of the questionnaire. There was a combination of point-scale items and open-ended items included in the survey for participants to complete. The questionnaire consists of conditions of work, work criteria, use of active learning, barriers to active learning, access to resources, and epistemological beliefs. In addition to these study specific question items, participants were also asked to answer basic demographic information. The complete questionnaire can be found in Appendix B.

The questionnaire used in this study was developed using question items from published studies as well as items developed from the proposed model of the predictors

for the use of active learning in higher education. The questionnaire was reviewed for clarity as well as evaluated for validity and reliability. Cronbach's alpha analysis was conducted to evaluate internal consistency of the instrument and the different scales constructed from the instrument. The acceptable reliability value for Cronbach's alpha was set at .70 as a minimum and perfect consistency considered to be a value of 1.0 with the items. This study sought to determine the perceptions faculty have regarding active learning, their use of active learning strategies, and barriers to active learning. Results from questions regarding these topics and basic demographical information were used to determine any correlations among the variables. Correlations found were used to aid in the identification and confirmation of the proposed predictor variables and mediating variable in the model.

Questionnaire

The questionnaire items will be presented in this section based on their categories as they are found in the survey to be distributed to the participants. The categories include questions related to the participants conditions of work, work criteria, epistemological beliefs, use of active learning strategies, barriers to the use of active learning, available resources, scholarship in teaching, professional development, and demographic information. The complete and detailed questionnaire is shown in Appendix B.

Items on the questionnaire were developed from literature research, consultation with experts, and personal experience with active learning strategies. The active learning strategies included in the survey is a compilation of active learning strategies often seen in course development and professional development. Additionally, active learning strategies were included that have been seen at university innovation centers to provide

resources to their faculty. The university innovation centers used to help develop the active learning strategy list and questions included the Berkeley center for Teaching and Learning, the University of Minnesota Center for Innovation, and the Iowa State University Center for Excellence in Learning and Teaching. Development of the questions for the portion of the survey regarding active learning barriers was adapted from surveys in two previously published studies. These referenced studies are Michael covering the "Faculty Perceptions About Barriers to Active Learning" (Michael, 2007) and "The STEM Faculty Instructional Barriers and Identity Survey (FIBIS) (Sturtevant & Wheeler, 2019). The section of the survey on beliefs of learning was adapted from the literature review of the "How People Learn" resource from the National Research Council and from Schommer's Epistemological Beliefs instrument (N R Council, Education, Board on Behavioral, & Practice, 2000; Schommer, 1990). Once the literature review was completed survey questions were developed to help gain data and insight that would align with the model developed in this study seen in Figure 1. The items developed and included in this questionnaire were selected and generated to meet specific research questions of the developed model thus psychometric properties of the questionnaire were evaluated. The items were vetted by the dissertation committee who have expertise in the development of survey questions to provide validity for the initiation of the study. The determination of the validity and calculation of Cronbach's Alpha were conducted.

Demographics

Demographic information was gathered from the questionnaire participants including items such as age, race gender, spoken language, employment status, number of years teaching, and contract year. Information gathered in the demographics section of

the questionnaire could present predicting factors for the use of active learning. However, sample size was a limiting factor in gaining enough demographic information to draw significant correlations. Questions asked in the demographic section of the survey include some of the following:

- What is your age, gender, race, and native language?
- What is your employment status (professor, assistant professor, etc.)?
- How many years have you taught at the university level?
- How many years have you taught at the k-12 level?
- What is your contract year schedule (10 or 12 month)?

Conditions of Work

The conditions of work category of the questionnaire included multiple choice and drop-down selection items. The items regarding conditions of work provided insight to the university and department or college the participant is currently working with. The conditions of work section also asked which courses the participants teach. Other conditions of work included if the courses taught have a laboratory component that goes along with the main course. Average class size and level of the courses was a component of their work conditions. Another aspect was if the courses they teach includes a graduate student's assistance and if so what the primary role of that assistant has for the course. These items allowed data to provide insight to course type and class size as it applies to the use of active learning strategies. Any differences between the use of active learning and the level of courses were determined from these questionnaire items. Having graduate assistances may or may not indicate a correlation to the use of active learning

strategies; however, the role of the graduate student could show a tendency for use of active learning strategies. This is hypothesized to be the case as the faculty member has more assistance and could accomplish more in each time frame. The questionnaire items found in this category are as follows:

- Select the university where you work.
- Select the college that best fits within your university in which you work.
- List of courses taught.
- What level of courses do you teach?
- Do the courses you teach have a laboratory component to the course requirement?
- What is the best match for your average course size?
- Do you have any graduate assistants and if yes what is their primary role?

Work Criteria

The conditions of work criteria of the questionnaire include multiple choice and drop-down selection items. In addition to the multiple choice and drop-down items there is a job satisfaction component using a scale of 1 (*Strongly disagree)* to 5 (*Strongly agree)* with a summative scale developed and Cronbach's alpha used to test for internal consistency. Job satisfaction has the lowest possible score of a 10 which equates to low job satisfaction and the maximum score being 50 which equates to high job satisfaction. For job satisfaction Cronbach's alpha showed an internal reliability score of .86. Higher job satisfaction has the potential to impact the use of active learning strategies. Work criteria questionnaire items include courses taught per semester and the platform in which

the classes are taught such as face to face, distance learning online, or a blended format. This aspect of teaching can impact the decision as to whether an instructor will incorporate active learning strategies into their course design. Another aspect of work criteria that is addressed in this section of the questionnaire is work focus. The questionnaire asks about the participants primary work focus and what percent of their position is focused on teaching versus research. There is the potential to see participants who have a higher percentage focused on research to have less active learning strategies used in the courses they teach. It is hypothesized that faculty members who have a higher percentage of their assignment to teaching versus research will be more likely to use active learning strategies. Work location, time of classes taught, and location of where the participant work are also items in this category of the questionnaire. The questionnaire items in this section include the following:

- How many courses taught per semester?
- What percent of your position is focused on teaching courses?
- What it the best description of your primary work focus?
- What is the primary mode of the courses you teach?
- What best describe your primary work location?
- How many days are you engaged in on campus or online synchronous teaching?
- What is the primary timeframe during the day of the courses you teach?

Beliefs of Learning

Faculty beliefs regarding learning is an essential component of this questionnaire. The method a person believes students best learn will often influence the methods in

which they teach those students. This portion of the questionnaire contains items using a scale of 1 (*Strongly disagree)* to 5 (*Strongly agree)* to determine beliefs of learning. A summative scale was developed, and Cronbach's alpha used to test for internal consistency. There are two sub-scales in this questionnaire category. The first sub-scale included questions relating to student centered or teacher centered learning environment. The second sub-scale is regarding student's innate ability to learn information. When evaluating the first sub-scale, the higher the number score the more likely the participant develops their course to be more student-centered and based on active learning methodology. A lower score would indicate a classroom environment that is more instructor centered with less student engagement in constructing their understanding of the content. The lowest possible score would be 14 with the highest being a score of 70. Regarding the second sub-scale a higher number score would indicate that students are able to construct knowledge. A lower score would indicate that individuals have a set learning ability that cannot be affected by education and learning strategies. The lowest possible score would be 14 with the highest being a score of 70. It is hypothesized that a faculty member who believes that learners construct their own understanding, believes in a more students centered learning environment, and believes in active learning will be more likely to use active learning strategies. Both scales were combined into a single summative scale to be used in the analysis. Any items that needed to be reversed were addressed. The summative scale showed a Cronbach's alpha of .73 which met the requirements for internal consistency. A selection of items in the first sub-scale in this category of the questionnaire includes the following:

- Faculty should operate as the facilitator of learning.

- Students should be active in the development of their learning.
- Students actively gain knowledge from their teachers.
- Active learning is an effective way to learn and retain content.
- Students have experiences they can offer to the class.
- Students need strict classroom structure to learn.

A selection of items in the second sub-scale in this category of the questionnaire include the following:

- People's intellect is set of birth.
- Some people are born with certain gifts and talents.
- Knowledge is constructed from previously understood content.
- Students should reflect on their learning.
- Learning is best when students are actively engaged.
- Students learn best through listening to lectures.
- Students learn best with real-world applications.

Use of Active Learning Strategies

Determining the faculty's use of active learning is a key factor in this survey. It will determine if the faculty is using these strategies and will then allow correlations to be made with other characteristics to then identify predictors of the use of active learning. This section of the questionnaire contains the summative scale of 1 (*never*) to 5 *(always*) as to the frequency to which an active learning strategy is used in their teaching with Cronbach's alpha used to test for internal consistency. To provide clarification in this section of the survey, the active learning strategy listed will also include a summary of

that strategy. The higher the score the higher the frequency the participants use active learning in their course design. It is important to note that it would be unrealistic for each participant to select *always* for each strategy. With this known, the higher the score in this section provides insight to the frequency of use for active learning strategies. The learning strategies are broken down into four different categories. The first category includes learning strategies that are often seen to help students practice the content they are learning and has a range of 7 to 35 for the summative scale. The second category contains strategies that are seen when having students apply the content they are learning and has a range of 8 to 40 for the summative scale. The third category includes strategies that allow students to practice evaluation connected to the content they are learning and has a range of 5 to 25 for the summative scale. The fourth category includes strategies that allow students to create a product using learned content and has a range of 5 to 25 for the summative scale. The participants are also asked to rate their confidence level using active learning strategies using a scale of 1 (*not confident*) to 5 (*highly confident*). A summative scale was created for the overall use of active learning with an evaluated Cronbach's alpha of .83. One open-ended question was asked allowing participants to provide information on active learning strategy used in their courses that were not addressed in the questionnaire. A selection of the learning strategies and questions from this section include the following:

- How often do you use active learning strategies in your courses?
- What is your confidence level using active learning strategies?
- Please select the frequency you use the following active learning strategies for practicing learned content.

- Please select the frequency you use the following active learning strategies for applying learned content.
- Please select the frequency you use the following active learning strategies for evaluating learned content.
- Please select the frequency you use the following active learning strategies for creating products using learned content.

Active Learning Barriers

Often the reason active learning strategies are not used more frequently in higher education courses is based on various barriers that a faculty member may encounter. In this section of the questionnaire scale items were used to assess level of agreement of potential barriers to the use of active learning strategies. The questionnaire used a summative scale of 1 (*Strongly disagree)* to 5 (*Strongly agree)* to determine level of agreement. Again, Cronbach's alpha used to test for internal consistency. The higher the score the more strongly the participant finds a certain statement as a barrier to the use of active learning. There is a 17 to 85 summative scale range for active learning barriers. The test for internal reliability showed a Cronbach's alpha of .88 for this scale. A selection of the items used are as follows:

- Active learning requires too much preparation time.
- Provided classroom spaces do not allow for active learning.
- Students will not participate in active learning.
- There is a lack of institution support for active learning.
- Faculty reward structure does not encourage use of active learning strategies.

- There is a lack of resources to use active learning strategies.

Evaluation of the barriers to use of active learning question items presented the potential for sub-scales or factor sets. A factor and parallel analysis showed two distinct components large enough to meet the 95th percentile requirement out of random factors. The cutoff point was 1.4 in 1000 sets. Evaluation through parallel analysis of principal components with varimax rotation, two components were retained. The two components that emerged were categorized by the theme of attitude and institutional barriers and logistical barriers. The barrier survey items are separated by factor and their respective loadings shown in Table 9.

Table 9

Barriers to Active Learning Factors

Logistical Barriers	Component Loadings	Attitude Barriers	Component Loadings
• There is a lack of institution support for active learning	.800	• Active learning does not allow for learning to take place	.810
• Class size does not allow for active learning	.613	• Active Learning requires too much preparation time	.556
• Faculty reward structure does not encourage use of active learning strategies	.763	• Active learning requires too much class time	.708
• Class schedule does not allow for active learning	.662	• Active learning reduced teacher control	.592
• Faculty are not trained on how to use active learning strategies	.681	• Active learning is ineffective	.809
• There is a lack of resources to support active learning	.706	• Students will not participate in active learning strategies	.681
• Provided classroom spaces do not allow for active learning	.651	• Students lack maturity to engage in active learning strategies	.612
• Students do not understand active learning	.425	• Assessing student learning with active learning strategies is too difficult	.612

Resources

Another possible predicting factor for using active learning strategies is having adequate resources. This section of the questionnaire asked participants their level of agreement to statements regarding resources. The items were set using a scale of 1 (*Strongly disagree)* to 5 (*Strongly agree)* summative scale to determine beliefs of learning with a 20 to 100 summative scale score range. The higher the score, the more prepared the teacher feels to meet the needs of the students while using active learning strategies. Cronbach's alpha was determined at .91 for this scale. A selection of items used are as follows:

- I have the technology I need.
- The classrooms I teach allow for flexible seating.
- I have access to reliable and efficient internet networks.
- I have the hardware and software needed to teach.
- I have sufficient time to develop lessons.
- I have a fluent understanding of how to use the resources available to me.

Scholarship of Teaching

When considering the use of active learning in higher education, a predicting factor that may show a correlation is whether an instructor pursues research, committee membership publications in enhancing their pedagogical understanding in their field. In this section of the questionnaire the items are either yes or no answers are short answers describing their number of publications. Included in the survey is a percentage slider to determine a faculty's percentage of publications that are focused on scholarship in

teaching. Feedback from the participants that demonstrate a high level of participation in the areas of improving academics and scholarship of teaching would have an anticipated higher probability of using active learning strategies in their teaching. A higher level would be considered higher number of publications and level of participation in committees focusing on scholarship of teaching. However, on the other side of would be a faculty member focused highly on publications not focused on scholarship of teaching which could be an indicator of not using active learning strategies. Questionnaire items are as follows:

- How many publications have you completed in your career?
- What percentage of your publications have focused on scholarship in teaching in your field?
- How many presentations have you completed in your careers?
- Have you written books or book chapters in your career?
- Do you serve or have you served on any committees focusing on improving academics. and scholarship of teaching in your field? If yes, please describe your position and contribution?
- Have you participated in any research specifically addressing improving teaching. strategies in your field or in teaching in higher education in general?

Professional Development

Professional development is an inherent part of being an instructor and in some cases maintaining certifications. The type of professional development that is offered as well as completed can indicate the level of desire and confidence in implementing active

learning strategies. Participation in professional development could be align with the tendency to have a growth mindset which would indicate a higher probability of implementing active learning strategies. This section of the questionnaire consists of scale items that will be used to assess level of agreement of professional development opportunities to help with teaching improvements. The questionnaire used the summative scale of 1 (*Strongly disagree)* to 5 (*Strongly agree)* to determine level of agreement with Cronbach's alpha used to test for internal consistency. The higher the score the more strongly the participant feels that statement is accurate with regards to professional development. Internal reliability analysis produced a Cronbach's alpha of .70. A selection of the items used are as follows:

- My university provides professional development to improve my teaching.
- I participate in professional development to improve my teaching.
- Professional development is important to faculty to meet the needs of the students.
- My university provides a learning center to help faculty to develop and teach courses.

Additional Scales

Additional scales were developed for this study as upon analysis of the data set, sub-scales were seen to be significant. A summary of the development of these scales is addressed in this section.

A scale that had to be developed was the sections of the questionnaire dealing with short answer responses from participants. These short answer items included topics

concerning scholarship and work conditions. Scholarship in teaching included number of publications, presentations, and books completed. Participants were asked to state the number of each item they had completed to date in their career. To develop the scale each item was assessed to establish the range of answers and an appropriate scale developed. Regarding work conditions, the short answer was regarding the number of students in courses they teach. Table 10 provides the scales developed for these items.

Table 10

Scales Developed for Items Related to Scholarship in Teaching

	Range	Scale	Frequency
Number of Publications	0 to 250	0	17
		1-50	121
		51-100	15
		101-150	6
		151-200	2
		201-250	3
Number of Presentations	0 to 300	0	6
		1-50	118
		51-100	34
		101-150	8
		151-200	4
		201-250	3
		251-300	5
Number of Book Chapters	0 to 200	0	82
		1-50	96
		51-100	-
		101-150	-
		151-200	1
Number of Books	0 to 194	0	136
		1-20	43
		194	1
Class Size	0 to 300	1-60	158
		61-120	18
		121-180	11
		181-240	2
		241-300	2
		No Response	82

Open-ended Questions

The survey provided participants with several open-ended questions to provide additional information on topics covered in the survey. Open-ended questions were assessed for common themes. Open-ended questions in the study included:

- If there are any active learning strategies you use in your classroom that were not previously listed, please list the strategy and provide details as to the frequency of use and method of implementation.
- Do you serve or have you served on any committees focusing on improving academics and scholarship of teaching in your field?
- Have you participated in any research specifically addressing the improvement of teaching strategies in your field or in teaching in higher education in general?
- Are you a member of professional organizations within your field and if yes, indicate if they provide assistance in scholarship of teaching in your field.
- Please list the primary course subjects you teach.
- If you have graduate assistants, please state their primary role in helping you.
- How has navigating teaching during the COVID-19 Pandemic altered your teaching strategies?
- Please provide any additional comments you would like to share regarding active learning in higher education.

Procedures

The questionnaire developed and created in Qualtrics was reviewed by a panel of experts to determine the content validity of the questionnaire. Upon committee approval

the study was submitted for approval to the University of South Alabama IRB. The Approval letter is included in Appendix D. Once approved the survey was emailed out though the faculty mass email system with a limit of two requests for participation in the survey. Additional participants were sought for the study and collaborations were established with two additional universities in the southeast. Additional IRB approval was needed with one of the universities. Required documentation was submitted and approval was given by the IRB committee. The approval letter can be found in Appendix E. The other university did not require additional IRB approval through their board as no key personnel from the university were engaged in the study. Upon liaison sponsor approval and IRB approval, mass email to their faculty population was approved. A total of two requests were sent out for both the universities.

Upon data collection, results gathered went through quantitative analysis using SPSS software. The objective of this study was to identify predicting variables of the use of active learning by assessing the perceptions towards active learning of faculty members. A suitable analysis to use in this data set to seek out predictor variables would be a correlation and regression analysis to establish any relationships between the variables. In this study the dependent variable is the use of active learning strategies in higher education with the independent variables being, conditions of work, work criteria, epistemological beliefs, resources, and active learning barriers. In addition to the variables connected to active learning and teaching specifically, demographic data was analyzed to determine if correlations existed between the dependent variable and demographics.

Research Questions

Research question one. What are the faculty perceptions regarding the use of active learning in higher education learning environment? This research question was evaluated through a multiple regression analysis using the data collected from a quantitative questionnaire. The further evaluate and gain insight to answering this question the following question was asked.

- Do epistemological beliefs-based variables such as how students learn, faculty's role in the learning environment, level of student, and effectiveness of active learning strategies predict whether a faculty member will implement active learning strategies in their courses.

Research question two. What are the potential barriers to the use of active learning in higher education learning environments? This question was answered statistically by evaluating the quantitative data collected from the questionnaire but determining the frequency at which the barriers score high scores on the Likert Scale. To further evaluate and gain insight to answering this question the following question was asked which regards to research question two.

- Does access to resources such as professional development, flexible classroom spaces, software and hardware technology, course materials, and student resources influence the ability of a faculty member to implement active learning strategies in their courses.

Research question three, are there predicting variables to whether a person is more likely to use active learning strategies in their course design and teaching?

Correlation and regression analysis was used with the data from the questionnaire provided insight as to which variables could be predictors of using active learning strategies in higher education. To further evaluate and gain insight to answering this question the following questions was asked to help identify and determine if predicting factors exists.

- Do conditions of work such as course subject, course level, class size, teaching assistants, and job satisfaction predict the use of active learning strategies in higher education courses?
- Does work criteria such as courses taught, percent teaching status, course presentation method, and work location predict the use of active learning strategies in higher education course?
- Do epistemological beliefs predict the use of active learning strategies in higher education courses?
- Do barriers to the implementation of active learning strategies and access to resources predict their use in higher education courses?
- Does scholarship in teaching, professional development, or demographic characteristics predict the use of active learning strategies in higher education course?

The question items included in the survey which have been discussed in this chapter will provide data to answer the research questions. Each question item found on the survey will be used to answer certain research questions. A breakdown of which survey items were used to answer evaluate each research question can be found in Appendix C.

Data Analysis

To answer the research questions, the independent variables and the dependent variable were run through a correlation analysis. Variable combinations that are found to be highly correlated with one another were further evaluated. Regression analyses were used to evaluate the potential for relationships between the independent variables and the dependent variable and the independent variables' potential for being a predictor for the use of active learning strategies. In addition to the structured survey items, the open-ended questions were run through qualitative analysis to identify any themes, item selection clarification, and expanding data to help better gain understanding of the data and implications of results collected from the participants.

Chapter Summary

In this chapter the process that was used for collecting and evaluating date was discussed. The survey instrument included both structured as well as two open-ended questions for additional feedback and information from participants. The items included in the questionnaire were developed and selected to be included through literature of similar peer-reviewed studies and review of the questions from a panel of experts. The questionnaire was distributed to faculty members at tree universities in the southeast through electronic dispersal with an active link to the questionnaire on the Qaultrics software platform. Data collected was analyzed using the SPSS software to determine the relationship between the variables and if predicting variables can be identified.

CHAPTER IV
RESULTS

This study had the purpose of identifying faculty beliefs on active learning, identifying barriers to use active learning, and identifying predictors for the use of active learning in higher education learning environments. This study was a non-experimental cross-sectional prediction analysis that was a quantitatively driven sequential design. Presented in this chapter are the results from the survey developed to gain insight on active learning in higher education and faculty beliefs. The survey was sent to faculty at three different universities. The Carnegie Classification of the universities are as follows: One with a Doctoral Universities with High Research Activity and one Doctoral University with Very High Research Activity. The third university classified as Master's Colleges and Universities: Larger Programs. The results are presented and organized in the following categorical sections – participant and university demographics, developed scales used in the analysis, use of active learning, barriers to use of active learning, epistemological beliefs of active learning in higher education, results pertaining to each research question, analysis of open-ended items on the survey, and an interpretation of results following in chapter five.

Data Collection and Cleaning

All data was exported from the Qualtrics software platform in an SPSS file format. Once data files were exported, survey submissions were evaluated and assessed for incomplete submissions. Use of active learning was the central component and focus for this study. It was determined that any survey submissions lacking answers for the active learning items on the survey were removed from the data set before analysis was completed. In addition to removal of incomplete survey submissions there were several survey questions that were reverse coded for optimal internal consistency. These items consisted of faculty beliefs on how people learn and included the following survey item topics:

- Learning depends on quality of the teacher
- Faculty should be at the center of learning
- Learners depend on their teachers for knowledge
- Students actively receive knowledge from their teachers
- The only resource needed is a teacher
- Learning should not use technology
- Students need strict structure in the classroom to learn
- People's intellectual potential is fixed at birth
- Some people are born with certain gifts
- Smart people are born that way
- Learning most concepts are easy
- Students learn best by listening

Data was assessed and scales created to develop summative variables based on survey item categories. Survey scaled variables include questions items in the following categories: use of active learning, barriers to active learning, beliefs on learning, resources, and job satisfaction. As previously addressed, all Cronbach alphas for internal consistency were calculated and verified for all scales meeting the minimum score of at least .70 or higher.

Descriptive Analysis

Descriptive statistics were run on all items and scales used in the study. The means and standard deviations for all scales are shown in Table 11.

Table 11

Descriptive Statistics on Scales

	Mean	*SD*
Frequency Using Active Learning	3.82	.81
Confidence in Using Active Learning Strategies	3.95	.84
Use of Presented Strategies	2.56	.55
Barriers to Use of Active Learning Strategies	2.41	.73
Attitude Barriers	2.77	.92
Logistical Barriers	2.04	.74
Available Resources	3.80	.64
Beliefs on Learning	3.87	.29
Job Satisfaction	3.99	.73

The means and standard deviations of the scales and survey items are expressed in mean Likert scale and standard deviation with all items having a range of 1 to 5. As seen in Table 11, there are high scores for mean frequency of using active learning and mean confidence in using active learning strategies. This indicates that in general participants use active learning strategies often or highly often and are generally confident in using those strategies. A lower score would have indicated that the participants rarely or almost never used active learning strategies in their classrooms and had a lower confidence level in implementing active learning strategies in their courses. Use of presented strategies represented the mean number of different types of active learning strategies participates indicated they used in their courses. The higher the number indicated a greater diversity in the number of active learning strategies used in the participants courses. The lower average for the use of presented strategies indicated that the participants do not use a diverse range of type of active learning strategies but does not indicate that they do not use active learning strategies. The higher mean score of frequency of use of active learning strategies along with the lower mean score for use of presented active learning strategies could indicate that participants are using strategies not specifically listed in the survey or use only a few active learning strategies on a regular basis. More in depth analysis on the different types of active learning strategies presented in the survey and level of use will be addressed further later in this chapter.

The higher the mean of barriers to active learning indicates that a higher number of barriers were present hindering the individuals from using active learning strategies in the classroom. As seen in table 11 the mean of active learning barriers present is lower indicating that survey participants did not feel that there were high levels of barriers to

the use of active learning. Barriers A higher score with available resources indicated that the individuals felt that the resources needed to use active learning and to meet their needs as an instructor were met. Connecting barriers and resources indicated that access to resources is not a barrier to the use of active learning.

The beliefs on learning were based on higher scores indicating a constructivist mindset on learning. Having a constructivist mindset can be connected to faculty being more inclined to use active learning strategies. Table 11 shows a higher mean score for beliefs on learning. This higher score is interpreted that the participants of the survey on average have a more constructivist view on learning. This aligns with the higher frequency of use of active learning strategies also seen in the results of the survey. The last scale in Table 11 was job satisfaction. The mean score for job satisfaction was seen to be a higher score indicating that the participants overall had a positive view on their job satisfaction.

Correlations

Pearson correlations were calculated to assess linear relationships between the dependent variables and frequency of use of active learning strategies and use of presented strategies. Correlations are shown in Table 12 for non-dichotomous variables of the major categories of the model developed in this study. Correlation analysis was run before conducting further analyses for all non-statistical items to be identified and not included. The number of participants (*n*) listed for each correlation indicated all participants that responded to those sets of survey questions. The correlations were completed using pairwise deletions. No significant difference between results were seen when comparing pairwise to listwise deletions. Table 12 is organized with the

independent variables in the first column and two separate dependent variables in the second and third columns. As stated previously the two dependent variables are evaluating two different aspects of active learning including the self-reporting of frequency of use of active learning and the overall different number of active learning strategies used.

Table 12

Correlations for Belief Scale Variables from Major Model Categories

	Frequency Using Active Learning			Use of Presented Strategies		
	n	*r*	Sig.	*n*	*r*	Sig.
Confidence in Using Active Learning Strategies	209	.68	<.001*	209	.38	<.001*
Barriers to Use of Active Learning Strategies	197	-.30	<.001*	198	-.24	<.001*
Attitude Barriers	196	-.17	.016	197	-12	.096
Logistical Barriers	196	-.39	<.001*	197	-.34	<.001*
Available Resources	194	.10	.16	195	-.01	.90
Beliefs on Learning	194	.43	<.001*	195	.36	<.001*
Job Satisfaction	184	.01	.94	184	-.001	.99
Professional Development	188	.34	<.001*	189	.26	<.001*

* Correlation is significant at the 0.05 level

There was a strong positive correlation between confidence in using active learning strategies and frequency of use of active learning strategies, r(207) = .68, (*p* <.001). There was a moderate positive correlation between use of presented strategies and

confidence, r(207) = .38, (p <.001). For each increase in a standard deviation in confidence in using active learning strategies there is an increase in the frequency of using active learning strategies and overall use of active learning strategies in courses being taught. These results indicated that if faculty are confident in using active learning strategies, they are more likely to implement active learning strategies in their courses.

There was a moderate negative correlation between total barriers to the frequency of active learning strategies, r(195) = -.30, (p <.001) and a moderate negative correlation between total barriers and the use of presented active learning strategies, r(196) = -.24, (p <.001). Indicating that for every increase in standard deviation in barriers there is a decrease in the frequency of use of active learning strategies and decrease in the overall use of active leaning strategies. When evaluating the two individuals factors regarding barriers, attitude based barriers and logistical based barriers, there was a weak negative correlation between attitude barriers and frequency of use of active learning barriers, r(194) = -.17, (p = .02). There was a weak negative correlation between attitude barriers and use of presented strategies but this correlation was not statistically significant, r(195) = -.12, (p = .10). A moderate negative correlation was found between logistical barriers and the frequency of use of active learning strategies, r(194) = -.39, (p <.001). There was also a moderate negative correlation between logistical barriers and use or presented strategies, r(195) = -.34, (p <.001). Available resources was not found to be statistically significant and had weak correlations. Resources and frequency of use of active learning strategies was found to have a weak positive correlation, r(192) = .10, (p = .16).

Resources and use of presented strategies was found to have a weak negative correlation, r(193) = -.01, (p = .90).

Beliefs on learning and frequency of use of active learning strategies was statistically significant with a moderate positive correlation, r(192) = .43, (p <.001). For every increase in standard deviation there is a positive increase in the frequency in use of active learning strategies and overall use of those strategies. Beliefs on learning was also statistically significant with use of presented strategies with a moderate positive correlation, r(193) = .36, (p <.001). Job satisfaction was not found to be statistically significant and was weakly correlated. Job satisfaction had a weak positive correlation with frequency of use of active learning strategies. r(182) = .01, (p = .94). Job satisfaction and use of presented strategies was found to have a weak negative correlation, r(182) = -.001, (p = .99). Professional development was found to be statistically significant with both frequency of use of active learning strategies and use of presented strategies. A moderate positive correlation was found between professional development and frequency of use of active learning strategies, r(186) = .34, (p <.001). A weak to moderate positive correlation was found between professional development and use of presented strategies, r(187) = .26, (p <.001).

Table 13 shows the correlations for the non-dichotomous variables for subcategories in the model of the present study. The Pearson's Correlation was conducted with pairwise deletion. All participant numbers (n) are listed for each variable which is based on the number of participants who chose to answer those specific questions.

Table 13

Correlations for Variables for Demographics and Work Characteristics

	Frequency Using Active Learning			Use of Presented Strategies		
	n	*r*	Sig.	*n*	*r*	Sig.
Years Teaching	182	-.03	.74	182	-.01	.94
Faculty Status	180	.06	.40	180	-.01	.85
Gender Identification	181	.07	.39	181	.13	.07
Age	182	-.003	.97	182	.10	.20
Teaching to Research Ratio	188	.16	.03*	188	.15	.05*
Courses Taught Per Semester	188	.22	.003*	188	.18	.01*
Primary Work Focus	187	.003	.97	187	.10	.16

* Correlation is significant at the 0.05 level

As seen in Table 13, the only correlations that were statistically significant included teaching to research ratio, courses taught per semester, and level of course taught. Based on the analysis there is no correlation between frequency of use or use of presented strategies with discipline, years teaching, faculty status, gender identification, age, or primary work focus.

There was a weak positive correlation with frequency of using active learning strategies and teaching to research ratio, r(186) = .16, (p = .03), indicating that for every increase in standard deviation of percent teaching courses there is an increase in frequency of use of active learning strategies. There was also a weak positive correlation between teaching to research ratio and the use of presented strategies, r(186) = .155, (p

=.05), indicating that for every increase in standard deviation of teaching to research ratio there is an increase in the diversity and number of use of the presented strategies.

Further evaluation of Table 13 indicates a weak positive correlation between number of courses taught per semester and the frequency of use of active learning strategies, r(186) = .22, (p =.003) and use of presented strategies, r(186) = .18, (p = .01). This indicates that for every increase in standard deviation there is an increase in the frequency of use of active learning strategies and use of presented strategies.

Level of courses taught was only statistically significant with frequency of use of active learning strategies. The calculated Pearson's correlation indicated a weak negative correlation, r(181) = -.15, (p = .04). Indicating with each standard deviation decrease in the level of course taught there is an increase in the frequency of use of active learning strategies. There was also a weak positive correlation between course delivery and use of presented strategies, r(185) = .23, (p = .002).

Correlations were run between frequency of use of active learning strategies and the overall active learning strategies used are positively correlated. The analysis results can be seen in Table 14.

Table 14

Correlation Between Active Learning Variables

	Frequency Using Active Learning n =209	
	r	Sig.
Use of Active Learning Strategies. n =209	.45	<.001*

Research Questions

Research question one. What are the faculty perceptions regarding the use of active learning in higher education learning environment?

A. Do epistemological beliefs on how students learn predict whether a faculty member implements active learning strategies in their courses?

Based on the correlation analysis previously discussed the two variables demonstrating statistical significance was beliefs and confidence in active learning strategies. A multiple regression was conducted on both variables and frequency of active learning strategies. A separate multiple regression was conducted with use of active learning. The predictor variable (IV) was beliefs on learning and confidence in active learning strategies. The dependent variable (DV) was frequency of use of active learning strategies in the first regression analysis and overall use of active learning in the second regression analysis. The multiple regression was run to predict frequency of active learning strategies from beliefs on learning and confidence in use of active learning strategies. The multiple regression was statistically significant, $R^2 = .49$. $F(2, 191) = 91.93$, $p < .001$. It was determined that the beliefs on learning significantly predicted frequency of use of active learning strategies ($\beta = .41$, $p = .01$). It was also determined that confidence in active learning strategies significantly predicted frequency of use of active learning strategies ($\beta = .58$, $p = < .001$). Table 15 presents the coefficients determined from the multiple regression analysis.

Table 15

Coefficients Frequency of Use of Active Learning Strategies from Beliefs and Confidence

Model	Unstandardized Coefficients		Standardized Coefficients			Part Correlation Squared
	B	Std. Error	Beta	*t*	Sig.	
Constant	-.065	.553		-.12	.91	
Confidence in Use	.584	.054	.621	10.75	< .001	.31
Beliefs	.409	.159	.149	2.58	.011	.02

The multiple regression was run to predict overall use of presented strategies from beliefs on learning and confidence in use of active learning strategies. The multiple linear regression was statistically significantly in predicting use of presented strategies, R^2 = .19. $F(2, 191) = 22.56$, $p < .001$. It was determined that the beliefs on learning significantly predicted use of presented active learning strategies ($\beta = .41$, $p = .002$) and confidence also significantly predicted use of presented active learning strategies, (β = .18, p = < .001). Table 16 shows the model for beliefs and confidences on use of presented strategies. Table 16 demonstrates the overall variance explained with the regression models. The linear regression model explained 49% of the variance with beliefs and confidences on frequency of use of active learning strategies. The linear regression model explained 19% of the variance for beliefs and confidence on the use of presented strategies.

Table 16

Coefficients Overall Use of Presented Active Learning Strategies from Beliefs and Confidence

Model	Unstandardized Coefficients		Standardized Coefficients			Part Correlation Squared
	B	Std. Error	Beta	*t*	Sig.	
Constant	.261	.464		.56	.57	
Confidence in Use	.179	.046	.286	3.93	< .001	.07
Beliefs	.414	.133	.227	3.12	.002	.04

B. Does level of student influence the use of active learning strategies?

Based on the correlation analysis presented in Table 12 the level of students was statistically significant with frequency of use of active learning but not statistically significant with overall use of active learning strategies. This indicates that level of student could be a predictor of the frequency of use of active learning strategies but does not predict the use of presented strategies. Further analysis between these variables to evaluate their relationship was conducted using a one-way ANOVA comparing student level on frequency of use of active learning strategies and use of presented strategies.

A one-way ANOVA was conducted with level of student on frequency of use of active learning strategies. Level of student was defined as either lower division or upper division. Lower division was comprised of undergraduate level courses of freshman and sophomore levels whereas upper division was comprised junior and senior levels students

and a third level consisting of graduate (masters and doctorate) courses. The one-way ANOVA to determine the difference between the means where the dependent variable was overall reported frequency of use of active learning strategies. Analysis of the difference between upper and lower-level courses was the only comparison of level of student and use of active learning strategies. Analysis revealed that there was statistically significance difference between lower division and upper division with frequency of use of active learning strategies $F(2, 183) = 3.76$, $p = .025$, $\eta^2 = .04$. Faculty were more likely to use active learning strategies when teaching lower division courses (4.15 ± .74) when compared to upper-level courses (3.75 ± .70). Contrast assuming equal variances showed significance with lower-level courses ($p = .013$), upper-level courses ($p = .015$), and not significant for the third group consisting of graduate level courses ($p = .842$). Cohen's d point estimate values were .476, .561, and .034 respectively.

A one-way ANOVA was also conducted on level of student on overall use of presented strategies. This analysis did not produce statistically significant results $F(2, 183) = .905$, $p = .41$, $\eta^2 = .01$. This indicated that of the presented active learning strategies in the survey there was no difference in the overall number of active learning strategies between lower-level (2.56 ± .44) and upper-level students (2.65 ± .47). While there was significant impact on frequency of use of active learning strategies between level of course, overall use of presented active learning strategies was not related to level of course. Contrast assuming equal variances showed no significance between lower-level courses ($p = .708$), upper-level courses ($p = .445$), and the graduate level group ($p = .181$). Cohen's d point estimate values were .072, -.159, and -.231 respectively.

C. What was the frequency of active learning strategies used based on reported of presented active learning strategies?

To answer this component of research question one, a frequency of active learning strategies was determined, and the frequencies and percentages were calculated based on the participants who reported a use of sometimes (3), very often (4), or always (5) on the Likert scale option choice. There was no difference between the top three most frequently used strategies when comparing using levels 3-5 versus 4-5 on the Likert Scale. It was determined that the three levels of sometimes, very often and always would be the most appropriate to use in this evaluation. These frequencies and percentages were then ranked from least frequently used to most frequently used. Results are found in Table 18 showing both the frequency of use out of 210 total participants and the percentage of people that chose that strategy. The classification of each learning strategy is listed as well including P for practice learned content. for application of learned content, E for evaluation of learned content, and C for creation using learned content.

Based on the results seen in table 17 the most frequently used active learning strategy was Socrative questioning with 75.7 percent of participants indicating the use the strategy. Problem-based learning was the second most frequently used active learning at 74.3 percent of participants indicating they used the strategy. The third most frequently used was application activities at 67.1 percent of participants using this strategy. Case studies was fourth most frequent at 66.7 percent and peer teaching was fifth most frequent at 65.2 percent of participants using these active learning strategies. Quizzing

students came in at sixth most frequent with 64.9 percent of participants using this strategy.

Research based strategies came in at seventh most frequent with 63.3 percent of participants using this strategy. Think-pair-share (62.4%), cooperative learning (61%), small group presentations (58.6%), polling and response systems (50.5%) and Simulations or role playing (49.5%) complete the selections that included at least 50 percent of the participants stating they use the strategies at least sometimes. Of the strategies in the top 50 percent used by participants, there is an almost even distribution of activities from the four categories of classification. The presented learning strategies in the survey were broken down into four different categories including practice of learned content, application of learned content, evaluation of learned content, and creation using learned content. Each learning strategy is identified in Table 17.

Table 17

Frequency and Percentages of Active Learning Strategies Used in Higher Education

	Classification	Frequency	Percent
Jigsaw	E	46	21.9
Structured Controversy	C	54	25.7
Muddiest Point	E	55	26.2
Brain Dump	P	59	28.1
Portfolio	C	66	31.4
One Minute Paper	P	69	32.9
Pro con list	A	72	34.3
Concept Mapping	P	78	37.1
Computer Based Learning	P	90	42.9
Debates	A	96	45.7
Fieldwork	A	96	45.7
Student Generated Questions	A	101	48.1
Self and Peer assessment	E	103	49.0
Role Playing and Simulation	A	104	49.5
Polling and Response Systems	P	106	50.5
Small Group Presentations	E	123	58.6
Cooperative learning	A	128	61.0
Think-Pair-Share	P	131	62.4
Research Based Learning	C	133	63.3
Quizzes	A	136	64.8
Peer Teaching	P	137	65.2
Case Studies	E	140	66.7
Application Activities	A	141	67.1
PBL	C	156	74.3
Socrative	C	159	75.7

Strategy Classification: P = Practice, A = Application, E = Evaluation, C = Creation

Evaluating the bottom 50 percent of strategies used by participants, it is seen that there is again an almost even distribution based on classification; however, less strategies are seen for creation using learned content is seen. The bottom 50 percent of strategies are also more specific strategies with little room for tailoring the strategy to the course and students. One surprising, yes understandable finding was that computer-based learning was in the bottom 50 percent at 42.9%. This could indicate a lack of consistent

access to computers or that computer-based learning is used in more specific courses. More than likely, it is not related to access to computer but perhaps a global definition issue. The definition of computer-based learning presented in the survey and known to the participants prior to taking the survey could lack clarity and specificity in order to gain clear understanding from participant answers.

A final note regarding the frequency of use of presented strategies is that the top four learning strategies, Socrative, PBL, application, and case studies, all require students to use twenty first century skills to complete these learning strategies with effectiveness.

Research Question Two. What are the potential barriers to the use of active learning in higher education learning environments?

A. What are the potential predicting barriers seen for the use of active learning in higher education.

As shown in table 12, evaluation of the survey items regarding potential barriers to the frequency and overall use of active learning there was a negative correlation found between the variables. Principal components analysis was completed and determined there are two distinct groups within the grouping of survey items regarding barriers. These two groups included attitude barriers and logistically barriers. Of the two groups of barriers, only the logistical barriers were found to have a statistically significant correlation. Correlations for the attitude $r(195) = -.12$, ($p = .10$) and logistical groups $r(194) = -.39$, ($p < .001$) of barriers can be found in Table 12.

Given the correlations found, a multiple regression was performed on frequency of use of active learning strategies and overall barriers and logistical barriers. The predictor variables overall mean barriers and logistical barriers, and the dependent

variable was frequency of use of active learning strategies. The model was found to be statistically significant (p <.001) with 15% of the variance explained by the predictor variables. The model is shown as $F(2, 192) = 16.89$, $p = < .001$, $R^2 = .15$.

The correlations found that overall use of presented active learning strategies was only statistically significant with logistical barriers and thus a simple regression was performed in this scenario. The predictor variable was logistical barriers to active learning strategies and the dependent variable was overall use of presented active learning strategies. The regression was found to be statistically significant ($p < .001$) with a model of $F(1, 195) = 25.97$, $p = < .001$, $R^2 = .12$. The model explains 12% of the variance.

B. What are the most common reported barriers to use of active learning?

The survey presented sixteen different potential barriers to the use of active learning. Table 18 shows the frequency of barriers that were selected as either somewhat agree or strongly agree from least to most frequent. Percentages are listed for each barrier as well as their classification indicated. The barrier classification is based on the parallel factorial analysis to determine two distinct groups of barriers. The two groups, as discussed previously, are attitude barriers and logistical barriers.

As seen in Table 18 there is a trend that the attitude barriers are not seen as important of a concern when compared to logistical barriers. The most important barrier that is seen at 50.5% is that faculty lack the training or skill set to use active learning strategies in their courses. This is an encouraging finding as training is a feasible barrier to address. The second most seen barrier at 39% is that the faculty reward system does not encourage use of active learning. This is an institutional logistical barrier and more

insight would be beneficial. The third most seen barrier identified is that classroom spaces do not allow for active learning at 35.7%. Fourth most seen barrier is that students do not understand active learning at 31.9%. This is an interesting observation as it can be connected to faculty lacking the training to provide active learning strategies in courses. If faculty lack understanding it is guaranteed that students could lack understanding of the learning strategies as well. Both barriers can be addressed with training be enhance confidence and use of active learning strategies.

Table 18

Frequency and Percentages of Barriers to Use of Active Learning

	Classification	Frequency	Percent
Does not allow for learning	A	4	1.9
Is ineffective	A	8	3.8
Students lack maturity	A	21	10.0
Students do not participate	A	25	11.9
Assessing active learning is too difficult	A	29	13.8
Reduces teacher control	A	31	14.8
Lack of Institutional support	L	37	17.6
Class schedule does not allow for active learning	L	47	22.4
Requires too much classroom time	A	51	24.3
Lack of resources	L	61	29.0
Class size does not allow for active learning	L	65	31.0
Active Learning Requires too much Prep Time	A	66	31.4
Students do not understand active learning	L	67	31.9
Classroom Spaces do not allow for active learning	L	75	35.7
Faculty Reward system does not encourage active learning	L	82	39.0
Faculty lack training	L	106	50.5

Classification A = attitude barrier L = logistical barrier

The barrier of active learning requires too much prep time is fifth most frequently seen at 31.4%. Faculty manage many different roles in their job and having a lack of prep time to incorporate active learning strategies was an expected barrier to find. Another interesting finding is that the seventh most identified barriers is that class size does not allow for active learning (31.0%). This aspect could be tied to training as well since active learning may need to look different in large lecture classrooms. The eighth most seen barrier is a lack of resources (29.0%). This is an expected barrier to see as often active learning will require resources either from the faculty or the students. The eighth most seen barrier is that active learning requires too much class time (24.3%). This is an attitude barrier and one of two that fall in the top half of the presented barriers. The second attitude barrier was that active learning requires too much prep time (31.4%). It is important to note that the two attitude barriers that were found to be in the top half of the identified barriers are both connected with time as a theme.

The bottom half of the identified barriers included only two logistical barriers, class schedule not allowing for active learning (22.4%) and lack of institutional support (17.6%). The remaining six barriers are all attitude barriers, reduces teacher control (14.8%), assessing active learning is difficult (13.8%), students do not participate in active learning (11.9%), students lack maturity (10.0%), active learning is not affective (3.8%), and active learning does not allow for learning (1.9%). The lowest scoring barriers are attitude based on learning and student ability and are all under 15% of the total responses.

C. Do faculty have resources they require to meet the needs of using active learning in the classroom?

As seen in Table 12 there was no correlation between frequency of use of active learning and the overall use of presented active learning strategies and resources. Since there was no correlation between available resources and the use of active learning strategies no further analysis was conducted. Based on the data it is thought that resources are available to the faculty and that recourses are not a determining factor in the use of active learning strategies in higher education courses.

D. Does professional development influence the use of active learning strategies in higher education?

As seen in Table 12, correlations between professional development and frequency of use of active learning strategies and overall use of active learning strategies showed a statistically significant positive correlation $r(186) = .34$, ($p < .001$). This is interpreted as that professional development does predict the use of active learning strategies. For every standard deviation increase in professional development there is an increase in the frequency of use of active learning strategies and the overall use of presented strategies in the survey.

Research Question Three. What are the predicting variables to whether a person is more likely to use active learning strategies in their course design and teaching?

A. Do conditions of work such as number of courses taught and percent teaching status, predict the use of active learning strategies?

Based on the correlations discussed in Table 12, number of courses taught and teaching to research ratio and frequency of use of active learning and overall use of active learning were statistically significant. Teaching to research ratio and number of courses

taught had a moderate positive correlation $r(188) = .58$, ($p < .001$). This indicated that number of courses taught and teaching to research ratio are related and will provide similar information regarding predicting use of active learning strategies. Given that the correlation between frequency of use and active learning strategies and number of courses taught $r(188) = .22$, ($p = .003$) was greater that frequency of use of active learning strategies and teaching to research ratio, $r(188) = .16$, ($p = .03$), number of courses taught was used in the analysis.

A simple regression was conducted on frequency of active learning strategies and number of courses taught per semester. The regression was found to be statistically significant ($p = .003$) with a model of $F(1, 187) = 9.21$, $p = .003$, $R^2 = .05$. Number of courses taught significantly predicted frequency of use of active learning strategies ($\beta = .22$, $p = .003$). Table 19 shows the model for number of courses taught on frequency of use of active learning strategies.

Table 19

Coefficients Frequency of Use of Active Learning Strategies from Courses Taught

Model	Unstandardized Coefficients		Standardized Coefficients			Part Correlation Squared
	B	Std. Error	Beta	*t*	Sig.	
Constant	3.40	.144		23.96	< .001	
Number of courses	.163	.054	.217	3.04	.003	.217

A regression analysis was run between the overall use of presented learning strategies with number of courses taught. The result was found to have a statistically significant model, $F(1, 186) = 6.30$, $p = .013$, $R^2 = .03$. Number of courses taught was a statistically significant predictor of overall all use of presented strategies, ($\beta = .18$, $p = .013$). Table 20 shows the model for number of courses taught on the use of presented active learning strategies.

Table 20

Coefficients Use of Presented Active Learning Strategies from Courses Taught

Model	Unstandardized Coefficients		Standardized Coefficients			Part Correlation Squared
	B	Std. Error	Beta	*t*	Sig.	
Constant	2.35	.098		24.03	< .001	
Number of courses	.092	.037	.18	2.51	.013	.18

B. Does job satisfaction influence the use of active learning strategies in higher education?

Based on the correlations found and reported in Table 12, job satisfaction was not statistically significant with either frequency of use of active learning strategies of overall use of active learning strategies and thus no regression analysis was conducted on these variables. Since these variables are unrelated to one another no further analysis is needed

and it can be determined that job satisfaction is not a predictor of using active learning strategies.

C. What demographical information are predictors of the use of active learning strategies in higher education?

Demographic information collection included age, gender identification faculty status, and years teaching. Of these variables the only statistically significant correlations found were with gender identification with the overall use of active learning strategies. A one-way ANOVA was also conducted on gender identification on frequency of use of active learning strategies. This analysis did produce statistically significant results $F(2, 180) = 3.41$, $p = ..04$, $\eta^2 = .04$. This indicated that of three different levels (male, female, prefer not to answer) of gender identification there was a significant difference between groups in frequency of use of active learning strategies. While there was significance indicated in the ANOVA analysis, the multiple comparisons did not show any statistical difference between the groups. This could be the results of a small population size resulting in low statistical power. The other contributing factor to this is that the significance level was .04 which is close to the .05 cutoff point for significance and indicates a weak global effect. Although the one-way ANOVA did indicate there was a difference between groups, it is inconclusive to which groups have the higher mean.

A one-way ANOVA was conducted on gender identification on overall use of presented active learning strategies. This analysis did produce statistically significant results $F(2, 180) = 3.32$, $p = .04$, $\eta^2 = .04$. This indicated that of three different levels of gender identification (male, female, prefer not to answer) there was a significant difference between groups in overall use of presented active learning strategies. Analysis

of post-hoc analysis indicated a statistically significant difference ($p = .04$) between females (2.63 ± .51) and males (2.43 ± .55). This indicates that females are more likely to use a more diverse set of active learning strategies in their courses when compared to males.

Research Study Regression Model

A multiple regression was conducted on the frequency of use of active learning or the overall use of presented active learning strategies on the variables that were found to be statistically significant. This analysis was done to examine the combined predictive power of the variables included in the study model. The predictor variables used included: confidence in use of active learning strategies, beliefs on learning, professional development, number of courses taught, and level of course. Two new variables were set for level of course to use the data in the regression model. A variable comparing lower-level undergraduate students with the grand mean and one variable for the upper-level undergraduate courses compared to the grand mean. This allowed an accurate evaluation in the regression model. The multiple linear regression of the independent variables on frequency of use of active learning strategies was statistically significantly in frequency of use of active learning strategies on statistically significant predictor variables identified in the study, $R^2 = .51$, $F(7, 185) = 26.84$, $p < .001$.

Table 21

Study Regression Model Coefficients on Frequency of Use of Active Learning Strategies

Model	Unstandardized Coefficients		Standardized Coefficients			Part Correlation Squared
	B	Std. Error	Beta	*t*	Sig.	
Constant	-.913	.814		-1.06	.29	
Lower-Level Course	.123	.119	.063	1.03	.30	.003
Upper-Level Course	.019	.097	.012	.20	.85	<.001
Logistical Barriers	.030	.071	.028	.42	.67	<.001
Professional Development	.243	.081	.169	3.00	.003*	.025
Confidence	.541	.060	.570	9.08	<.001*	.225
Number of Courses	.066	.040	.088	1.64	.103	.007
Beliefs	.347	.173	.127	2.00	.05*	.011

The results from the overall regression model seen in Table 21 indicated that the only statistically significant variables included professional development (β = .17, p = .003), confidence (β = .57, p = <.001), and beliefs (β = .13, p = .05) in predicting the frequency of use of active learning strategies. Other observations from this analysis indicated a correlation between barriers and beliefs and are inversely related. As there is an increase in a belief set based on constructivism there is a decrease seen barriers. There is also a correlation between professional development and barriers, again an inverse relationship. As faculty have an increase in the amount of professional development participation, there is a decrease in seen barriers.

The multiple linear regression of the independent variables on the overall use of presented active learning strategies was statistically significantly in frequency of use of

active learning strategies on statistically significant predictor variables identified in the study, $R^2 = .22$, $F(7, 185) = 10.21$, $p < .001$.

The results from the overall regression model seen in Table 22 on the independent variables and the overall use of presented active learning strategies indicated that the only statistically significant variables included confidence ($\beta = .21$, $p = .008$) and beliefs ($\beta = .16$, $p = .04$) in predicting the frequency of use of active learning strategies. To make note, level of course was dropped from the regression with overall mean use of active learning strategies due to the fact that the ANOVA for level of course was nonsignificant for this variable. There was a positive relationship found with confidence indicating that with an increase in confidence there was an increase in active learning strategies used. There was a positive relationship between beliefs indicating that with an increase in score for beliefs this indicated a more constructivist view on learning which connects to and increase in use of active learning strategies.

Table 22

Study Regression Model Coefficients on Overall Use of Presented Active Learning Strategies

Model	Unstandardized Coefficients		Standardized Coefficients			Part Correlation Squared
	B	Std. Error	Beta	*t*	Sig.	
Constant	.389	.681		.571	.568	
Logistical Barriers	-.075	.061	-.103	-1.23	.219	.007
Professional Development	.122	.068	.125	1.78	.077	.012
Confidence	.136	.050	.211	2.69	.008*	.012
Number of Courses	.059	.034	.115	1.72	.09	.013
Beliefs	.299	.146	.162	2.05	.04*	.018

Open-ended Questions

The following section presents the major themes that were identified from evaluation of the open-ended questions from the survey. The themes addressed in the open-ended questions could provide greater insight and understanding of the use of active learning strategies in higher education. Table 23 shows the major themes addressed in the first short answer question: If there are any active learning strategies you use in your classroom that were not previously listed, please list the strategy, and provide details on the frequency of use and method of implementation.

Table 23

Additional Active Learning Strategies Used in Your Teaching

Theme	Example(s)
None (*n* = 12)	None or N/A
Gallery Walk or Walk About (*n* = 2)	"Placing multiple questions on board, students walk around the room responding to each, we then review responses and discuss differing interpretations and perspectives."
Case-based studies (*n* = 3	"Students in small groups work with a real-world client to solve a particular challenge"
Remediation/Review (*n* = 4)	"Redoing assignment after providing feedback from faculty." "Remediation - complete a hands-on lab or problem; fix what you messed up" "Peer review: empowering students to give constructive feedback to others on performance" "Gots or nots - a variation on muddiest point"
Project Based Group Learning (*n* = 4)	"Write a business plan (group project) and present to class" "Team-based learning" "Project-based learning, design projects, drawing exercises,"
Flipped Classroom (*n* = 1)	"Fully flipped classroom"
Hands-on learning/creation (*n* = 2)	"Hands-on Learning in the Building Construction department. In this strategy students learn a concept and apply that on a prototype to test its applicability and design. These types of projects are twice a semester." "live coding for statistics/methods classes'
Editing/Content Dissection/Critique (*n* = 5)	'Frankenpaper" "Students are given visual problems to solve, then we critique the work collectively." "Students work in groups to critique articles in the literature on 13 different points, then that is used as a basis for class discussion where I force groups to defend their ratings."

Table 23 cont.

Problem Solving/Experimental Learning (*n* = 4)	"use problem solving mostly" "Experiential activities such that the students produce the data to illustrate a concept." "Learn it, try it, share it' pattern to class activities where students hear content, try it usually through a problem-based or research-based active learning strategy"
Quizzes (*n* = 2)	"Group quizzes" "Quiz-Quiz-Trade"
Game or simulation based learning (*n* = 2)	"Storytelling within simulation" "Interacting with a resource or game/activity that is used in the specific field of work"
Group Writing/Reading (*n* = 2)	"Group writing." "transforming sections of novels into dramatic play-style readings; having two groups of students perform part of play in different ways"
Real World Connections (*n* = 1)	"Start every class with current events that relate to the topic at hand."

In the survey, gaining insight as to if faculty have graduate students under their guidance and if so, what roles they play in the courses they teach. Faculty that are able to have graduate assistants might have additional time and ability to implement active learning strategies. A total of 75 (35.7%) participants indicated that they had graduate assistants. Of those who answered yes, 63 (84%) provided details on what the role of their graduate assistants. In Table 24 the major themes found in the role of graduate students are presented.

Table 24

Role of Graduate Students for Faculty Members

Role	Frequency
Lab Assistant	10 (16%)
Grading	20 (32%)
Teaching	10 (16%)
Research Assistant	17 (27%)
Material Preparation/Record Keeping	5 (7.8%)
Simulation	1 (1.6%)
Training	1 (1.6%)
Tutor	1 (1.6%)

Another aspect of using active learning strategies that was addressed in a short answer response in the survey was how covid impacted teaching strategies. Although evaluation of the impact of COVID-19 on teaching strategies was not a focus in the study, it was prudent to ask this question in that the survey based on ongoing management of the COVID-19 pandemic in higher education. Table 25 addresses the major themes found when asking the following question: How did navigating teaching during the COVID-19 Pandemic alter your teaching strategies?

Table 25

How COVID-19 Altered Teaching Strategies

Theme	Example(s)
Online Courses/Remote Access (n = 37)	"All classes were held online"
	"Emphasis on remote access to students"
	"teaching online for the first time"
	"I am now friendly to and competent in delivering online learning."

Table 25 cont.

Instructional Technologies/Zoom (*n* = 29)	"I value the opportunity to have zoom class meetings and office hours" "More familiarity with technology" "Utilizing new technology to make course materials and activities more accessible." "I'm now an expert Zoomer."
Increased Flexibility/more student awareness/scaled down (*n* = 22)	"flexible modalities, more compassion" "More mindful of student connections"
New Instructional Skills and assignments developed (*n* = 20)	"Different active learning needed." "Motivated me to figure out how to adapt the active learning strategies I use face-to-face in online synchronous/asynchronous classes" "I've started employing more self-paced and -directed assignments and fully inverted my classroom."
Did not change (*n* = 14)	"It hasn't", "No change" "No. I was well equipped and acquainted with distance learning"
Adjustments to Beliefs of learning and students (*n* = 6)	"I have learned a lot about teaching because of it. The challenge brought new learning opportunities." "We learned new ways to accomplish our teaching goals using technology that we can continue to use going forward." "I did an A/B hybrid format where half the class came each week and the other half had asynchronous work to complete. I have continued to use this format through this semester because students enjoyed it"
Difficulties and adjustments to career (*n* = 3)	"very time consuming. Hybrid is not preferable." "A huge problem is the amount of academic dishonesty." "I chose to leave my full-time administrative position in higher ed as a result of the pandemic and other things. I chose to change my role so that I could focus more on teaching and learning."

Chapter Summary

This chapter presents the results found from data collected through the questionnaire on faculty beliefs on active learning in higher education. An overview of demographics was addressed with demographic frequencies listed. The next section provided an in-depth overview of data cleaning needed prior to the analysis conducted. Once data cleaning was completed, correlations were conducted for all belief scale variables from the major categories in the study (Table 12). Variables that were found to be statistically significant were then further assessed through regression analysis with the dependent variables being frequency of use of active learning and overall use of presented active learning strategies. Correlations for demographics and work characteristics were evaluated as well to identify correlations with frequency of use of active learning strategies and overall use of presented active learning strategies (Table 13).

Each research question was addressed with any further analysis needed to answer each question fully based on seen correlations or additional analyses. Ranking from low to high of the sixteen presented active learning strategies was evaluated and discussed. Ranking from low to high regarding most identified barriers to use of active learning was also evaluated and discussed.

Lastly open-ended questions were evaluated and reported in the next section of the results chapter. Each open-ended question was reported and evaluated for themes. The major themes were identified and the number of times the theme appeared was notated. Open-ended questions included additional active learning strategies not

addressed in the survey, role of graduate students, and how COVID-19 impacted teaching.

The data analysis indicated that overall people are using active learning strategies and are confident in using active learning strategies. Beliefs on learning, particularly having a constructivist mindset, are an indicator of using active learning strategies. Logistical barriers are a negative predictor of use of frequency of use of active learning strategies. Professional development and active learning are positively correlated and involvement in professional development can be a predictor of the use of active learning strategies. The main barrier seen to the use of active learning strategies, based on results, is that faculty are not trained on how to use active learning strategies. The most seen active learning strategy was Socratic questioning and active learning strategies are more often seen with undergraduate lower-level courses compared to upper-level undergraduate courses. The next chapter will discuss the results seen in chapter four and possible conclusions reached and limitations to take into consideration. Implications from the study and future suggested directions with the research topic will conclude the following chapter.

CHAPTER V
DISCUSSION

Introduction

This study explored faculty beliefs on active learning strategies in higher education. Beliefs were gained through a questionnaire sent through email invitation for participants to opt into participation in the study. The questionnaire was primarily Likert scaled questions with a few open-ended questions or short response answers. Participants were from three universities in the southeast. The survey link was distributed through university faculty mass email systems with two emails total inviting individuals to participate. After data cleaning, a total of 210 participant surveys were included in data analysis. The data gained from this survey will aid in understanding the beliefs of active learning in higher education, which has less research conducted compared to students' perceptions of active learning strategies. Understanding faculty beliefs and identifying potential predictor variables of use of active learning can assist instructional designers in providing training and support at universities.

This chapter will continue with a discussion of the results addressing each research question in the study followed with acknowledging study limitations. A

discussion of further research avenues regarding the topic of the study will complete the chapter.

Discussion and Findings

Descriptive Statistics. The study was able to use a total of 210 participants in the data analysis. Gaining participants for survey-based studies in notoriously difficult and provides uncertainty as it is unknown going into the study what type of response will be seen. Overall, it would have been beneficial to have obtained more survey participants, but the data that was collected was sufficient. The decision to broaden our potential sample population to include three universities did extend the time needed for data collection but provided the benefit of additional responses. There was no difference between the universities regarding number of responses. All three universities had two faculty mass email invitations with one to four weeks between emails. All three universities had an 8% response rate based on submitted surveys per total faculty number reached. Participants were primarily female, in the age range of 35-44 years of age, Caucasian, and held an assistant professorship title. This was expected based on the potential population based on university faculty demographics, (Table 6). Overall, participation and participant demographics was as expected. At two of the universities, incentives in the form of gift cards to Starbucks was offered by the participant choosing to be entered into a drawing. This offer did not influence the overall percent participation in the study based on percent participation calculation from participants and total potential participants reached at each university. Gaining additional participants is optimal and potential ways to do this is to include additional universities or move to surveying individuals who are attending training or conferences. This could increase

number of participants but introduces the potential for skewed results based on the topic of professional development or conference.

Regarding the contemplation of improvements and limitations, one aspect to consider is survey length. The time the survey required for participants to reach completion was on average 26 minutes. This was based on the time needed to read through descriptions to accurately answer the questions. Most of the participants completed the survey, but there was a noticeable amount of incomplete survey responses. This attrition during the survey could possibly be due to the length of time to complete the survey. In the future, there is the possibility the survey could be streamlined based on data gained in this study to shorten the length of the survey and still obtain beneficial data for analysis.

Descriptive statistics conducted on study scales indicated that participants generally felt they had a high frequency of use of active learning strategies in their courses and felt confident in the use of active learning strategies. Frequency of use was a self-reported Likert scale response. The scale of use for presented active learning strategies was lower than expected when comparing to the self-reported frequency of use of active learning strategies. However, it was understandable as the survey presented a selection of learning strategies for participants to select their level of frequency of use. The low mean could indicate that there is a low diversity in the type of learning strategies that faculty are using in their courses. It can be hypothesized that upon further

investigation that faculty may use strategies frequently but use the same strategies on repeat.

In general, the barriers to active learning did not present a high mean score from the Likert scale indicating that the participants did not see barriers to the use of active learning. This is logical in that barriers are lower and frequency of use of active learning strategies is higher. Participants indicated that they had the resources needed for active learning strategies and teaching and they also indicated having a high level of job satisfaction. The belief on learning scale demonstrated a higher mean. This aspect corresponds to the higher level of frequency of use of active learning as the higher the mean on beliefs on learning indicates the participants are more likely to have a constructivist viewpoint on learning and would be more likely to use active learning strategies in their teaching methods. The findings on initial evaluation of descriptive statistics aligns with many of the assumptions of beliefs of learning and active learning strategies when beginning this study.

Correlations. Analysis for correlations on the scales and variables was completed to determine statistical significance of the variables and scales to gain insight on which variables could be predictors of use of active learning strategies. In the study there were two specific dependent variables that were being assessed. The first was frequency of use of active learning strategies where participants stated their level of use of active learning strategies. The second was a scale score determined from the mean of overall use of a set of presented active learning strategies. Correlations that had statistically significant positive correlations with frequency of use of active learning strategies and overall use of presented strategies included confidence in using active learning strategies, beliefs on

learning, and professional development. Correlations that had statistically significant negative correlations with frequency of use of active learning strategies and overall use of presented strategies was mean barriers and logistical barriers. These results indicate that a high frequency of use of active learning strategies is predicted by confidence in using active learning, beliefs on learning specifically having a constructivist mindset, and participation professional development. The results also indicate that an increase in seen barriers does decrease the frequency of use of active learning strategies as well as the overall use of presented strategies. Additional variables such as attitude barriers, resources, and job satisfaction were not correlated, and it was determined that the use of active learning is not directly influenced by these variables.

Correlations were conducted on demographic and work characteristics. The only variables seen to be statistically significant were courses taught per semester and teaching research ratio. This indicated that participants that taught more courses per semester and had a higher percent teaching to research ratio were more likely to implement active learning strategies in their courses. This is a logical finding in that faculty that are more focused on teaching would be more likely to use a variety of teaching strategies. Whereas a faculty member focused more on research may not have the time or inclination to use a variety of active learning strategies in the courses they teach. Number of years teaching, faculty status, age, work focus, and gender identification were not correlated indicating that these factors do not influence or predict a faculty members use of active learning strategies in their courses.

Research Question One. What are the faculty perceptions regarding the use of active learning in higher education learning environment?

A. Do epistemological beliefs on how students learn predict whether a faculty member will implement active learning strategies in their courses?

Based on the correlation results confidence in use of active learning and beliefs on learning were positively correlated. Moderate positive correlations were determined between use of active learning, confidence in use, and beliefs on learning. Two multiple regressions were conducted for each of the IVs on each of the DVs. Results indicated that participants who had confidence in using active learning strategies and held epistemological beliefs aligned with constructivist viewpoints had increased frequency of use of active learning strategies. These results aligned with our expectations in that having confidence in a method often results in higher use of the method.

From the literature review, it is known that attitudes and beliefs influence the decisions an instructor makes regarding their course design and teaching methods, (Sikula, 1996). Based on the results regarding beliefs the inference can be made that on average the participants in the study held a constructivist viewpoint. This is supported in the fact that it was expected that people who hold a more constructivist viewpoint on learning would lean more towards using active learning strategies. Teaching methods aligning with constructivist viewpoints, in this case align with active learning strategies. From the survey data, the positive correlation of beliefs and active learning strategies confirmed our expectation that with a tendency towards a constructivist viewpoint the higher frequency and likelihood for the use of active learning strategies. Since we know that a person's belief set will influence the instructional decisions they make, belief set of a person can be a barrier to the use of active learning strategies (Aragón et al., 2018). Developing an awareness of the belief sets of the faculty can aid in addressing barriers.

This is important in that it can be inferred that the participants have a growth mindset regarding learning and implementation of learning strategies benefit the learners.

Overall, the data presented little that was deemed problematic outside of the overall number of participants as this would have added additional statistical power. As discussed in the literature review, fostering twenty-first century skills helps prepare students for their careers. The need for people to engage in communicative tasks, critical thinking and problem solving in their careers is evident with the advancement of technologies in all fields of careers. Students who are better equipped with twenty-first century skills will be better able to excel. Engagement in courses that use active learning teaching strategies and under the direction of faculty that support these teaching methods is a key factor in aiding the next generation of students. Results from the analysis of the data from this study of beliefs on use of active learning strategies met expectations, confirmed previous findings in literature, and established faculty beliefs at three southeast universities. There is a population of faculty in higher education that have a set of beliefs on learning that promote the incorporation and implementation of active learning strategies. This use of active learning strategies by the participants in this study allows for the inference to be made that the faculty support the development of twenty-first century skills.

Confidence in use of active learning was found to be positively correlated and thus a predictor of participants using active learning strategies. It was expected that participants who have confidence in using active learning strategies will be more likely to use active learning strategies. Recognizing that confidence is a predictor to the use of active learning strategies is a key a factor to evaluate. Building confidence in the use of

active learning can be addressed by professional development geared towards training faculty how to use active learning strategies. From the literature review on previously identified barriers, lack of training is often found to be a significant barrier to the use of active learning strategies (Niemi, 2002). By continuing to foster faculty confidence in active learning strategies through professional development and training, it is likely to see a continuation or increase in use of active learning strategies. Addressing confidence in use of active learning is potentially easier than adjusting an individual's personal beliefs on learning which makes it an appealing barrier to address.

B. Does level of student influence the use of active learning strategies?

Correlation analysis indicated a statistically significant interaction with frequency of use of active learning and student level indicating that level of student could be a predictor. To further evaluate these variables a one-way ANOVA was conducted with level of student on frequency of use of active learning and overall use of presented active learning strategies. Lower-level students included lower-level undergraduate courses and upper-level students included upper-level undergraduate student with a third groups comprised of graduate and professional courses. Results indicated that faculty members were more likely to use active learning strategies with lower-level undergraduate students when compared to upper-level students and graduate level students.

The data and conclusions are logical in that lower-level students may need more structure and guidance in their learning. Active learning aids in the development of skill sets they will need in their college education and beyond. Upper-level students have often reached a level of motivation and knowledge that their course structure leans less towards using active learning strategies. However, in the literature review it was found that

several professional studies such as medical schools (Bookless, 2018) and law schools (Hlinak, 2014), frequently use active learning strategies to enhance student learning. In this case the data from our population does not fully align with the findings in previously published literature. It has been seen that instructors are more likely to use higher order thinking and active learning strategies such as problem solving in graduate level courses compared to undergraduate level courses (Faust & Paulson, 1998). Given the small sample size and the fact that more participants in the study were more likely to be teaching undergraduate courses the data is potentially skewed. Further evaluation of the available literature does lean in the direction of needing additional research comparing use of active learning strategies compared between lower and upper-level course. This is a potential area to investigate in future studies. Understanding how level of student and course influences the use of active learning strategies can further help in the evaluation of what learning strategies will best aid student learning at different course levels. This will be beneficial in providing faculty support based on what level of courses they teach. An aspect that was not fully addressed in this specific study but would be beneficial to investigate, is how course level and student level in different fields of study differ in the use of active learning strategies. This would provide and more holistic understanding of course and level and the use of active learning strategies.

C. What was the frequency of active learning strategies used based on reported of presented active learning strategies?

Based on the results the most frequently used active learning strategy was Socratic questioning closely followed by problem-based learning. Socratic questioning and problem-based learning are related and similar in structure for active learning

strategies. As previously discussed, Socratic questioning requires learners examine ideas or problems and determine validity and solutions (Delić & Bećirović, 2016). Socratic questioning is often used and can be applied to various disciplines and class sizes and makes it a versatile active learning strategy to use. The least used strategies included Jigsaw and structured controversy. These are more specific and less mainstream of the active learning strategies. The higher scoring strategies were using learned content and application of learned content based; however, ranking of the strategies did not seem based on type of active learning classification. Application activities, case studies, peer teaching, quizzes, and research-based learning were all top selections with 60% of participant stating they used the strategies at least somewhat often. These results indicate that faculty are aware of active learning strategies and are implementing them in their classroom. There is a connection between the top two learning strategies in that they both require students to use their learned knowledge to evaluate a situation and them provide solutions and evaluations.

There are some limitations in this study in the evaluation of the overall use of and most used active learning strategies. The selection of active learning strategies was based on strategies seen in articles covering active learning in higher education (Faust & Paulson, 1998) and (Vanhorn et al., 2019). The list provided was not exhaustive and was not able to provide options for all active learning strategies faculty may use in their courses. Another issue is the name of each active learning strategy. Some strategies may be the same but titled differently depending on instructor and how the instruction learned about the strategy. It is important to note that a definition of each learning strategy was provided in the survey for participants to reference. Active learning strategies are also

dynamic in that a strategy may fall under the umbrella of a broad definition, but the instructor can tailor the strategy based on the needs of their courses. Potential methods to enhance the data collection is to provide a survey of only learning strategies for participants to complete. This would allow for a wider range of strategies to be presented as an option. Overall, it is apparent that Socratic questioning is the most frequently used active learning strategy and that even if the faculty are not using a diverse number of strategies the strategies, they choose to use they implement them frequently.

Research Question Two. What are the potential barriers to the use of active learning in higher education learning environments?

A. What are the potential predicting barriers seen for the use of active learning in higher education.

To achieve a desired result, identifying barriers is essential to the process. If active learning is not being used or used as effectively as desired, finding the barriers and proposing solutions to those barriers is required. As seen in the literature review, barriers to use of active learning have been identified (Patrick et al., 2016). Previously identified barriers aided in the development of the survey instrument in this study. Evaluating the results from this study, it was determined through principal components analysis that of the barrier scale there were two distinct groups of barriers, attitude barriers and logistical barriers. Logistical barriers were statistically significant and negatively correlated with frequency of use of active learning strategies and overall use of presented strategies. These results indicate that the more barriers that are present the less likely participants would use active learning strategies. Specifically logistical barriers include barriers such as lack of institutional support, lack of training in active learning strategies, and faculty

reward system does not support the use of active learning strategies. These results align with previous studies where barriers were categorized in three groups including student characteristics, issues impacting faculty, and pedagogical issues (Michael, 2007). The findings of distinct groups in the data are like the groupings found in the Michael study and points out that identified barriers to active learning can often be placed into specific categories. Being able to confirm that there are often categories of barriers will aid in the ability the effectively address these barriers and provide solutions.

Finding that there are significant logistical barriers is encouraging as these barriers can often be addressed through training. Lack of training has clearly been seen as a barrier is studies addressing use of active learning (Niemi, 2002). Although providing training is a feasible solution to a barrier, training does not always equate to the implementation of active learning strategies. Further investigation to the before and after use of active learning after participation in professional development specific to learning strategies would be important to add to this area of research and understanding. In addition to logistical barriers such as training, some of the barriers such as institutional support will need to be addressed through re-evaluating initiatives at the institutional level to help support their faculty. Although this aspect is more complex than offering training to faculty it is still easier to address then an overall attitude towards active learning strategies. Lack of institutional support is another commonly seen barrier to the use of active learning strategies (Kim, et al., 2019). The present study population indicated that lack of university support was of greater concern when compared to the

study population for Michael (2007). Ensuring that universities are aware of these barriers and encouraged to address them will overall help faculty and students.

One limitation of the present study regarding barriers is a lack of input from participants. There was short answer or open-ended responses in survey that lacked significant insight into perceived barriers of the faculty. Further research regarding barriers would be beneficial which could be achieved through focus groups. This would hopefully allow for more detailed understanding of the barriers to address potential solutions.

B. What are the most common reported barriers to use of active learning?

From evaluating and ranking from low to high the top four barriers seen to the use of active learning strategies are all logistical barriers. Whereas most of the barriers seen as low potential for being barriers were attitude barriers. The top barrier to use of active learning was the logistical barrier of faculty lacking training. As already mentioned, lack of training has been seen as a barrier in multiple studies (Michael, 2007 & Niemi, 2002). Lack of training is to be expected as professional development is often geared toward content and research specific endeavors. Seminars at conferences are most often research specific. Thus, a barrier of lack of training in active learning correlates to less use of active learning strategies in courses. This lack of training also connects to the positive correlation seen between confidence and use of active learning strategies. Training in an area can increase confidence and use of the strategy. Based on the data from this study and supporting literature universities should evaluate their professional development courses and include training on use of active learning strategies to support their faculty. It has been previously shown faculty participating in professional development focused on

improving their teaching most often results in a change in faculty teaching strategies (Condon et. al., 2016). It is important to note that even if training is offered and faculty participate in the training there are additional barriers that could hinder or prevent faculty from using active learning strategies.

The next three barriers identified are faculty reward system does not encourage active learning, classroom spaces do not allow for active learning, and students do not understand active learning. Again, these barriers have been previously identified and discussed in the literature review (Michael, 2007). Based on the literature review, these previously identified barriers were included in the survey and were also identified as barriers by the sample population in the present study.

The faculty reward system at universities is traditionally seen as being focused on research. Faculty conducting research equates to more research-based funding entering the overall financials of the university. The higher the level and amount of research being done increases the classification of the university. There is traditionally a research first mentality rather than emphasis placed teaching focused faculty members (Kim et al., 2019). A faculty member whose value as an employee is based more on research will often not be teaching as many classes or be able to spend time developing a course program that incorporates active learning strategies. One way that this is being addressed is through universities adding more instructor-based faculty members improving the balance for the faculty. Faculty reward structure is not a barrier that can be quickly addressed but can be minimized as universities embrace the need to reevaluate faculty

reward structure and faculty appointments. By improving the reward system both the students' needs and be met while maintaining higher research standards.

Regarding classroom spaces, as addressed in the literature review many universities are now building or remodeling spaces that encourage and support active learning strategies (Beichner & Saul, 2003). Many spaces now allow for flexible seating, space for collaboration, and alternative classroom design. The identification of classroom spaces being a barrier was expected as classroom spaces has been already identified as a barrier (Michael, 2007). Universities would benefit from gaining faculty feedback on what spaces at the universities are in need or renovation that would enhance the use of active learning strategies. A limitation in this study regarding classroom spaces being a barrier is that the reason the spaces are not conducive to active learning is not specified. To address this barrier, more detail would be needed to address specific needs. This adds a deal of complexity to solving the barrier of classroom spaces as each classroom could need modifications specifically tailored to the course being taught in that area. As discussed in the literature review, developing a more innovative learning space that is open, high-tech, and comfortable promotes active learning (Rook et al., 2015). Modifications, new development, or simple adjustments such as classroom furniture can aid in the improvement of classroom spaces that are deemed innovative and thus promoting active learning. Once an active learning space is developed more student centered learning can take place and often results in improved student learning outcomes (Byers et al., 2014).

Students lacking the understanding of active learning strategies can be addressed through training of the learners. Potential avenues to address this barrier would be to train

the students in active learning strategies. This could be accomplished through the faculty members providing scaffolding and instruction in the course prior to the activity. Another method that could be beneficial is through a freshmen course or new student orientation that addresses learning strategies, study habits, and best practices. This could be conducted outside of class or through a credit-based college success course. This would help to minimize this barrier and allow for students to be one step ahead when taking core and field of study courses. Addressing students lack of understanding of active learning strategies is important as it has been seen that using active learning strategies increases student satisfaction (Hyun et al., 2017). One note to make is that not all students learn in the same way and there will be variability in students embracing active learning strategies. Students and learning have many variables, not all that can be addressed through training or the instructor. This is an important fact as eliminating this barrier would be unrealistic and minimizing students lack understanding of active learning strategies would be the goal.

The bottom half of the barriers were primarily attitude based. These types of barriers are more difficult to minimize as they are rooted in a person's set of beliefs. We know that an individual's personal belief set will influence how they provide instruction (Aragón et al., 2018). Although not addressed in this study, a student's belief on learning will also impact the use of active learning strategies. In general a person's beliefs will affect how they learn (Lewis, 2004). How students learn and the attitudes they express about learning could influence teacher methods. Students lacking interest or maturity is not necessarily something that a faculty member or the university can address. Students lacking maturity has been addressed in previous research (Michael, 2007), but this barrier

was not seen as highly important to our present study. This is possibly due to the sample population of both the faculty and the students. Given the smaller sample size of this study it is worth noting and something for future research. Assessing active learning and thus student learning being seen as too difficult is another barrier that was addressed but not seen as of high importance compared to other barriers. Of the barriers assessing student learning often appears and is identified as a barrier along with use of classroom time (Michael, 2007). As seen in the Michael study as well as this present study, assessing student learning seems to be a mid-level barrier based on ranking. Lack of necessary class time was seen as a moderate barrier but not the top identified barrier in this data set. Previous studies have found that the top barrier to use of active learning strategies was in fact a lack of class time needed (Miller & Metz, 2014). Another aspect of time is the time needed to prep materials for active learning. This barrier can stem from multiple factors based on teaching to research ratio or additional requirements of a faculty members responsibility. This again has been seen as a high priority barrier in other studies (Miller & Metz, 2014). In the present study preparation time was addressed but not found to be the top priority barrier. These differences between the present study and prior research could come from the fact that participant populations differ and differences in structure at the different universities. Analysis of identified barriers in this study and previous research points out that there are similarities in identified barriers but there is a degree of specificity based on the population of faculty, students, and university structure.

It is important to understand what barriers are present, which are of most concern, and which ones can be easily addressed. It is important to be aware of population

demographics and dynamics when developing a plan for reducing the effect of barriers to active learning and understand that one single solution cannot be applied to barriers even though they are defined as the same barrier. Eliminating all barriers is unrealistic, but taking the steps to minimize, in the case of this study, through training can provide momentum to increase the use of active learning strategies in higher education.

C. Do faculty have resources they require to meet the needs of using active learning in the classroom?

There was no correlation seen between access to resources and frequency of use of active learning strategies and the overall use of presented active learning strategies. These results indicate that the faculty participants have the resources they need and that the lack of or presence of resources did not influence the participants decision to use or not to use active learning strategies in their courses. One thing to consider is that not all active learning strategies are resource dependent. Many only require students and cognitive processing. It is true that access to resources aids in learning and diversity in what can be offered to faculty and students, but it does not negate learning and active learning strategies. The other thought process is that even if sufficient technology and resources are available, it does not influence a faculty member's decision to use active learning in their courses.

Interestingly, resources were positively correlated with job satisfaction and professional development. If faculty have more access to the resources, their satisfaction in their job will increase. If faculty have their needs met in their job it is logical that their overall job satisfaction will be high. This fact is seen in the data obtained for this study. Overall access to resources was positively correlated with professional development.

Access and participation in professional development indicates that faculty feel they are being provided with the resources needed to succeed.

Research Question Three. What are the predicting variables to whether a person is more likely to use active learning strategies in their course design and teaching?

A. Do conditions of work such as number of courses taught and percent teaching status, predict the use of active learning strategies?

Positive correlations were found between number of courses taught and research to teaching ratio. Teaching to research ratio and number of courses taught were found to be related and confirmed through correlation analysis. This being the case it was determined to continue forward using number of courses taught for analysis for ability to predict use of active learning. Number of courses taught and teaching to research ratio being positively correlated is a conclusion that is sensible given that faculty who have a higher teaching percentage in their assignment will have more courses assigned to versus faculty who have a higher research assignment. Faculty with a higher research assignment will need more time to dedicate to research endeavors rather than teaching courses. It is often seen that universities hold a research first mentality (Kim et al., 2019). This fact helps support that faculty members that have a lower percentage teaching appointment would use active learning strategies less often. Fewer courses taught indicates a lower chance of opportunity to work with students and implement active learning strategies. Evaluating the number of courses taught by faculty was a predictor of frequency of use of active learning and overall use of presented active learning strategies. This is understandable in that the higher number of courses taught the more likely active learning will be used. The more courses a faculty member teaches typically indicates a

teaching appointment for that faculty member. This fact could indicate that more active learning strategies may be used. Determining a better understanding as to why lower-level courses use more active learning is also needed. Further assessment taking into consideration and controlling for teaching to research ratio and determining the difference between active learning strategies used in courses taught by research heavy faculty versus teaching heavy faculty would be beneficial.

B. Does job satisfaction influence the use of active learning strategies in higher education?

Based on the results there was no correlation between job satisfaction and use of active learning strategies. These results indicate that a person does not need to have job satisfaction to use active learning strategies in their courses. As previously discussed, job satisfaction is related to professional development as well as available resources. With job satisfaction not related to use of active learning strategies this indicates that regardless of the faculty's feelings about their job satisfaction they will still engage in teaching strategies that match their beliefs on learning and their overall goal in teaching students. This is a positive finding in that job satisfaction can be affected by various factors (Ragins et al., 2014), and yet in the sample population of this study faculty provide quality teaching regardless of job satisfaction.

C. What demographical information is a predictor of the use of active learning strategies in higher education?

Of the demographic information collected and evaluated there was no correlation between age, faculty status, or years teaching in the use of active learning strategies. Use

of active learning does not change or differ based on your age, status as a professor of change based on the years spent teaching. Given that there were no correlations seen no further analysis was conducted on these variables.

One-way ANOVA evaluating gender identification and overall use of active learning strategies indicated that overall females were more likely to use a wider set of active learning strategies presented in the survey. Although the results were statistically significant it is important to take into consideration that a higher percentage of females participated in this survey and that these results could be skewed. There is also the aspect of having a wider selection of gender identifications based on the diversity of society. This finding does align with previous research in that it was found that male faculty were more likely to use lecture-based teaching compared to females; however both genders specified that lecture was their primary teaching method (Lammers & Murphy, 2002). A larger sample population as well as a more inclusive set of gender identifications could lead to a more conclusive set of results on the influence of gender in predicting the use of active learning strategies in higher education.

Overall Regression Model. After analysis a conclusive regression was run on all statistically significant variables on frequency of use of active learning strategies and overall use of presented active learning strategies and accounted for substantial variance in the use of active learning strategies. The predictor variables identified for frequency of use of active learning strategies included professional development, confidence, and beliefs. Predictor variables found for the overall use of presented active learning strategies included lower-level course, confidence, and beliefs. These results met our general expectations upon beginning the study. Knowing that epistemological beliefs and

shown to influence teaching strategies finding that beliefs seem to be a reliable predictor for use of active learning strategies add research and evidence to support this conclusion. Confidence in using active learning strategies again was an anticipated predictor in that when people are confidence in a skill or strategy, they are more likely to use that skill or strategy. Confidence was found to be a reliably statistically significant predictor for both frequency of use of active learning strategies and overall use of presented active learning strategies. Professional development was found to be a predictor of frequency of use of active learning strategies but not overall use of presented strategies. This difference could be in the fact that the professional development is more general use of active learning strategies rather than connected to the selected strategies presented in this study. Evaluating a wider more conclusive sample of active learning strategies to professional development may be beneficial in the future.

Overall, it is concluded that there were three statistically significant variables, (professional development, confidence, and beliefs) identified for frequency of use of active learning strategies and three predictors, (lower-level, confidence, and beliefs) identified for overall use of presented active learning strategies.

Open-ended Questions

Open ended questions addressed in this study included three major questions. These questions included: additional active learning strategies not listed in the survey, role of graduate students, and how COVID-19 impacted teaching strategies. The final

question asked participants to provide any additional comments they feel they needed to make regarding the study.

The first question asked participants to provide information on active learnings strategies they use that were not covered in the survey. The question stated, “If there are any active learning strategies you use in your classroom that were not previously listed, please list the strategy and provide details as to the frequency and use and method of implementation?” Of the 210 participants 44 participants chose to answer the question. The majority stated none or not applicable in their response. Major themes were identified and presented in Table 23. The theme with the highest number of participants was the theme of editing content or dissection and critique. One response that clearly described this active learning strategy as follows:

> “Students work in groups to critique articles in the literature on 13 different points, then that is used as a basis for class discussion where I force groups to defend their ratings.”

This participant answer clearly demonstrates that learners are actively critiquing and then building from the article they critiqued for discussion that would fit in with Socratic questioning. This is a key observation that falls in line with the data showing that Socratic questioning is the most used active learning strategies of the study population. This finding supports additional results from this study in that Socratic questioning was the most frequently used learning strategy. The ability of Socratic questioning to promote critical thinking aids in student learning and the support of twenty first century skills (Delić and Bećirović, 2016).

The second highest theme was remediation and review. Although remediation itself is not generally considered active learning, it depends on how the original work was

completed and what will need to take place for the learner to complete the review and remediation. Most of the participants indicated that the remediation included “hands-on lab”, “variation of muddiest point”, and “feedback from faculty”. These statements align with definitions and descriptions of what active learning is and how it is conducted as seen in literature regarding active learning (Grabinger & Dunlap, 1995). One participant’s response again can be connected to Socratic questions and problem-based learning as the remediation is based on constructive criticism. The participant’s response is as follows:

> “Peer review: empowering students to give constructive feedback to others on performance”

The statement of “empowering students”, and “constructive feedback to others”, allows the classroom environment to be student centered and encourages the use of critical thinking skills both of which are seen as important characteristics of active learning (Pardjono, 2002).

The third most prominent theme seen was project-based learning and problem-based learning. These are active learning strategy and is like problem-based learning. One participant provided the following statement regarding their project-based learning:

> “Write a business plan (group project) and present to class”

As seen in the literature, collaboration, problem solving and working on real-world problems is a key component of active learning pedagogy (Hood Cattaneo, 2017). The above statement from one of the participants is a great example of connecting real

world situations and working to solve a presented task. Project-based learning helps prepare students for life in their future careers and helps them to develop the twenty-first century skill sets shown to aid in success. Problem-based and experimental learning was discussed as well, and the following is from one participant providing their example of experimental learning:

> "Experiential activities such that the students produce the data to illustrate a concept."

There were some themes such as quizzing, games/simulation, and group work that were seen that do fit in with some of the presented strategies in the survey, but participants provided more details in the short answer question. The results from this open-ended question demonstrated that faculty are aware of a variety of active learning strategies and work to incorporate the strategies into their courses. Many of the strategies require learners to engage in problem-based learning with real-world connections followed by evaluation, critique, and remediation of their work. Overall, participants were descriptive in their responses but there is a limitation in that most of the survey participants did not choose the answer this question which will limit power to these themes.

The second open-ended question was regarding the role of graduate students. This was an interesting question as information on how much a graduate student was involved in teaching or course preparation could be insightful in using active learning strategies. Roles graduate students held are shown in Table 24 and include eight main roles. From highest to lowest frequency these roles included: grading, research assistant, lab assistant, teaching, record keeping, simulation, training, and tutoring. Although there was a group of participants that use their graduate students to aid in teaching other than

knowing they are teaching little was discovered to how this role and active learning were connected. Many participants did not have graduate students and the majority of those who did have students worked as a research assistant or on grading. Neither of these roles is directly connected to teaching and thus use of active learning strategies. There was also a difference in that one of the universities included in the study had a lower percentage of graduate degrees which would lessen the opportunity for faculty to have graduate students assigned to them. An alternative method of data collection of a different set of survey question could be beneficial in gaining better insight as to if graduate students influence the use of active learning strategies. For this purpose of this study this question mainly aids in gaining insight to the faculty population of the three universities.

The third open-ended question evaluated was based on how the COVID-19 pandemic altered teaching strategies. Given the timeline of this study it was prudent to ask this question. As seen from Table 25 the major theme identified from participants who chose to answer the question was that there was more use of online learning and remote teaching, and many used this teaching method for the first time. This was expected in based on the transition from face-to-face courses to online courses throughout the early parts of the pandemic. One aspect that was interesting is that several participants commented on the increase in confidence in using online learning. See one participant's remarks below:

> "I am now friendly to and competent in delivering online learning."

Acknowledging this theme is important in that active learning can still take place through online learning platforms. It has been seen in other studies that the pandemic allowed for the opportunity to introduce new digital delivery methods for instruction (Pokhrel and

Chhetri, 2021). Use of alternative instructional deliver methods can be easily addressed through professional development. It has been made clear that enhancing teaching methods and delivery methods will be important as we move into a post-pandemic environment (Alhammadi, 2021). Universities have and will continue to provide diverse online learning opportunities for their students and supporting faculty through training will be necessary.

Another theme that was identified was the increased familiarity of instructional technology. See the following response:

> "More familiarity with technology"

This is an important theme to capitalize on in that many learners are arriving to college from an age where technology is woven into every aspect of their lives. Having faculty be able to connect with learners though technology could be beneficial in promoting student learning.

There was also notation made on new instructional strategies being developed:

> "Motivated me to figure out how to adapt the active learning strategies I use face-to- face in online synchronous/asynchronous classes"

This is encouraging in that faculty seem steadfast on continuing to use active learning strategies even when faced with having to adjust. This promotes the finding the participants had beliefs set that aligned with constructivism and a growth mindset.

Another theme was increased flexibility. This was also an expected finding as we know that during the early parts of the pandemic flexibility and understanding was essential. One participant made the following comment:

> "flexible modalities, more compassion"

There were several participants that indicated no change to their use of active learning during the pandemic. There were a few participants that indicated career changes due to the pandemic as well as other reasons and made the following comment:

> "I chose to leave my full-time administrative position in higher ed as a result of the pandemic and other things. I chose to change my role so that I could focus more on teaching and learning."

This comment could indicate a connection between institutional support and structure and how it may or may not support use of active learning and scholarship in teaching.

The findings from the short answer question regarding the COVID-19 pandemic indicate the need to always provide education support and scholarship in teaching support to faculty. The main theme was connected with the mode of classroom lesson delivery in that is changed to a distance learning and online learning format. Many universities already provide online learning courses, but improving faculty preparation to move to fully online and methods of effective teaching online would be beneficial. Flexibility and understanding were also an important aspect of the data from the open-ended questions

regarding COVID-19. This demonstrates the need for connection and communication between faculty, students, and universities. Overall, the insight that was gained from the study is helpful in developing and plan to prepare for any situation where fully online learning is the main options for faculty and students.

Limitations of Study

The most significant limitation is the sample size for this study based was lower than desired. This limited the statistical power of the findings. Increasing the sample population could lead to more significance to identified predictors or identify additional predictor variables. In the study there were three different universities included and each of the three universities were different in their emphasis. With this being the case, the results might be less representative of the population whole. In future studies in would be beneficial to increase the sample population and work to have better matched universities in the study. Surveying additional universities could increase population size and would be suggested for future research and use of the survey.

Another limitation of the study is that the survey is a self-report survey which comes with inherent bias. Participants could respond more positively which could skew the results. The study was also on a volunteer basis. This could introduce bias in that people who use active learning would be more likely to complete the survey compared to faculty who are not interested in active learning. This could be addressed by distributing the survey to a sample population that could be participating in a training or conference. Taking into consideration the training and the conference topic would be essential as to limit any additional bias and skewed results. Generalization to a larger population is significantly limited in that only 210 participants were used from three universities.

However, the data and conclusions from this study allow for guidance in future research regarding the study topic.

The length of the survey is also a limitation in that attrition is a risk and that people will either not complete the survey or not take the survey to begin with based on time. This can be addressed by streamlining the survey or targeting more specific topics now that there is an overview of results and allows for a clearer direction to take future research regarding beliefs of active learning in higher education.

Limitations are difficult to eliminate in any study but the limitations in this study were anticipated and taken into consideration. Addressing these limitations and making improvements prior to future research studies will be expected.

Future Research and Implications

The current research study provided a great deal of data that provides guidance for future research. Potential areas for future research include addressing some of the variables in the developed model in more detail. There are additional aspects of model provided in Figure 1 of factors that could influence use of active learning that were not addressed in this present study.

Given that attitudes and beliefs significantly influence the decisions an instructor will make (Sikula, 1996), it would be beneficial to take a further look at epistemological beliefs. One aspect is taking a further look at more specific and in depth look at beliefs of learning and the connection to use of active learning in higher education. Expanding on the survey to address specifically active learning and beliefs would provide greater insight to beliefs being a predictor of active learning strategies. If the survey focused solely on beliefs with a more targeted and detailed set of questions it could provide

clarity on the correlation between beliefs and teaching methods. Questions to ask could include if there is a connection between subject matter and beliefs as this is an area that was not covered in this survey.

Professional development was found to be a predictor, but one aspect of the model that was not addressed in detail was the type and frequency of professional development. We know that when faculty participate in professional development focused on quality of teaching, they are more likely to include learned methods into their own courses (Condon et. al., 2016). But what was not addressed in this study was the classification of the type of professional development that was attended. It would be interesting to see if there was a difference in the type of professional development and use of active learning. How often faculty engage in professional development and active learning would also be interesting as it would help provide guidance on optimal topic and timing of professional development for faculty. Looking at confidence and building faculty confidence is something that would help guide faculty support systems and training. This is important as we saw in the study the positive correlation between confidence and use of active learning strategies.

Level of course was found to be statistically significant but was inconclusive in some respects. Taking a closer look at active learning strategies at different levels of course would be helpful in bringing clarity to the results from this study and future studies. This is also important in that there is some difference seen in studies where graduate level courses were more likely to use active learning strategies. Another component that was part of the study model was how discipline affected the use of active learning strategies. The survey for this study did not provide enough information on

discipline across all three universities to warrant detailed evaluation. There is the potential for discipline to be a predictor of use of active learning strategies. Developing another instrument specifically designed to evaluate discipline taught and use of active learning would be needed to gain insight into the ability to predict learning strategies from type of course.

Scholarship in teaching is a component of the model that was not sufficiently addressed in the present study. Although data was collected it was not presented in a way to optimize comparisons. This would be another case where an instrument developed to address scholarship in teaching would be needed.

Findings that came from the data analysis of barriers demonstrate that logistical barriers were most prevalent. Taking these types of barriers and further assessing the prevalence and how faculty feel about these barriers could benefit the overall institution environment. Further data could help discern solutions to these barriers to minimize their impact. Looking more into the connection to barriers, professional development, and job satisfaction would also be interesting to see the extent of these relationships. Focus groups or interviews could be beneficial in gaining more information. All these findings could help support faculty and develop a community on employees that are successful and work to meet the goals of the university.

Results from this study have provided insight to faculty beliefs on active learning in higher education. The benefits of these results are in being able to better understand what faculty need in the way of professional development support and support in the development and implementation of courses. By understanding the level of interest and use of active learning strategies universities can work to further develop quality

instruction to prepare students to excel post-graduation. Although not all aspects that hinder use of active learning can be addressed or removed, any reduction in obstacles is beneficial.

Chapter Summary

This study sought to evaluate faculty beliefs of active learning in higher education. Overall, the results indicated a high use of active learning strategies, a confidence in using these strategies, and an overall positive job satisfaction. The study found predictor variables to the frequency of use of active learning strategies as well as predictor variables for the overall use of presented active learning strategies. These predictor variables included beliefs on learning, professional development, confidence in use of active learning, and level of course. Relationships were found between variables including job satisfaction, resources, and professional development. It was found that overall, the most prevalent barrier to the use of active learning was that faculty were not trained how to use these strategies. The most prevalent active learning strategy used was Socratic questioning. There were several limitations in the study, and these were acknowledged but overall significant results were obtained that aligned with the research expectations. This study provides insight into the belief set of faculty members as well as the barriers seen by the faculty. This will help universities develop programs and provide support and training to their faculty to aid in their teaching and fostering of student learning. Several avenues for future research were presented to continue gaining insight into the beliefs of faculty member of active learning.

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APPENDICES

Appendix A: Description of Active Learning Strategies

Learning Strategy	Description
Application Cards	Student will write down an application of a principle to a real-world situation to strengthen relevance, generalization and application of learned knowledge and skills.
Breakouts	Students work to solve problems to unlock combinations using knowledge and skills to achieve an end goal.
Case Studies	Scenarios where students will use their acquired knowledge, skills, and attitudes to solve a problem connected to the course content.
Case study analysis	Students are presented with real data set, scenarios or situations in which students will then analyze, reflect, and answer questions regarding the case study.
Categorizing Grids	Students are presented with important concepts and categories that are mixed and then asked to correctly sort the items into a grid.
Classroom assessment techniques	These techniques can encompass other active learning strategies and allow for the instructor to gain formative feedback through real time questions and feedback to gauge students' progress to correct and clarify any misconceptions.
Community Based Learning	Academic learning is completed by engagement with the community and partnership with organizations and individual in the community while they address a need or and identified social change within the community.
Concept Mapping	The creation of a diagram that is a depiction of the relationship between concepts. This helps to build mental scaffolding for better understand and retention of concepts.
Cooperative learning and collaborative learning	Students are placed in small groups to complete tasks as the learn concepts and develop skills. Communication and group accountability can help drive learning and promote focus and support through activities.
Creative Activities	Learning in which students will create and develop some type of item such as drawing, modeling, building, and assembling to develop knowledge and skill sets.

Debates	A controversial topic is assigned for the students to debate once given a position to defend. Students must develop and present a logical argument to support their position.
Demonstrations	Students prepare a demonstration using visuals to help them present a concept to others.
Digital Simulators	Digital simulators allow students to work through a strategy or a specific action and skill they need to learn to accomplish. While completing and working through the simulator they can see results as they would in the real-world but with minimal risk.
Direct Paraphrasing	Learning create their own definition or summary of a topic or content to reinforce understanding and retention.
Experiential Leaning	This strategy is where students will learn concepts, skills and values from participating in experiences in which they learn in a real-life situation.
Field Work or Field Trips	Learning that takes the student out of the classroom into the field in which the topic would take place in the real world and learning from firsthand experiences.
Fishbowl	A group of students are placed in a circle with one extra seat and given a controversial topic to discuss. If a student outside the groups would like to join the conversation, they will enter the fishbowl and occupy the empty seat.
Flipgrid	Online grids that facilitate video discussions where learners record answers to prompts and then can respond and communicate with other learnings in the course.
Four Corners	Requiring participation movement and decision-making students will choose a corner to represent their stance on a topic or question.
Gallery Walks	A learning strategy where students will move through a collection of areas that illustrate concepts requiring students to respond with meaningful questions and discussions with each other about the content.
Game Based Learning	Games are conducted where students will need to use the information, they learned on a topic to compete against each other. Game based learning also allows for students to complete tasks in the game to advance when answers are correct providing feedback and reinforcement.
Group Teaching	A strategy where students work on a team to study and teach each other a new topic.

Interactive lectures	A lecture format where the instructor builds in pauses in the lecture to engage the students by asking questions, encouraging reflection, or quick formative assessments to gauge student understanding.
Jigsaw	A strategy where students work together and are dependent on each other to achieve a goal based on their task to achieve or information they can contribute.
Journal Writing	A strategy that is applicable to all subjects where learners will journal about what they are learning and reflect on their learning to identify areas of strength in their understanding as well as area where they need additional clarification. Expanding on the information allows for deeper understanding.
Memory Matrix	Students are asked to create a matrix that helps them organize a large among of information.
Minute Writes	Given an open-ended question about a concept student write a response for 1-2 minutes
Muddiest Point	Usually done at the end of a class session or concept students are given a few minutes to write about the "muddiest point" or most confusing concept covered
Notes Exchange	Lecture is paused for a short period of time where students then compare and exchange notes.
One Sentence Summary	Students develop a concise summary of a concept using a single sentence.
Online Supplementation	Often referred to as blended learning online supplementation may include self-assessment through quizzes, course discussions, digital lessons, or other resources located on course management systems.
Partial Outlines and notes	A strategy that allows students to take notes during a lesson where they complete an outline or record important information. Notes can also be used for a reference during a lesson to conduct and refer to when completing other active learning strategies.
Polling Devices or Audience Response Systems	These systems can gage the students' understanding of the content in real time and in large groups by having the students answer questions using a survey response device.
Portfolio Development	A documentation of student work which involve the student developing a portfolio set showing their work completed over an entire course or course unit.
Pro and Con grid	A grid created to allow students to evaluate the advantages and disadvantages of an issues, procedure, or decision.

Problem Based learning	A strategy where students learn by solving a problem, often a real-world situation where they work to generate solution and ways to implement those solutions followed by reflection on how their solutions worked or could work if implemented.
Questioning	This strategy can be a simple or complex as needed. Students are asked questions verbally or through written questions to get students to think and reflect on their learning and either answering the questions either through verbal or written response.
Research Based Learning	Learning which requires the learner(s) to conduct research to gain understanding of a topic.
Role Plays	Students are assigned a role to play in a situation. This strategy allows for tasks to be accomplished as improves communication and understanding.
Scavenger Hunts	A learning strategy where students use clues to complete tasks. Digital scavenger hunts such as with the platform GooseChase allow for digital scavenger hunts where students earn points by completing missions.
Service Learning	A range of learning activities in which the community or others are benefited as the learning goals of the course are met.
Socratic Questioning	Instructor questions students in a way that aids them in coming up with the answer themselves.
Sorting	A strategy where students will work to sort concepts, terms, or topics to help categorize concepts and begin developing understanding.
Structured Controversy	A type of cooperative learning a controversial topic is introduced where the learners will need to discuss the topic from multiple perspectives and analyze and evaluate the content being discussed.
Students Presentations	Student(s) are assigned a topic which they then research and develop a presentation to present to others.
Summary of another student's work	Students will develop a summary of another students' work.
Think Pair Share	Students are given a problem or topic to think about for a few minutes then they are to spend a few minutes discussing their thoughts with another student
Turn and talk	After a concept is taught students will have a few minutes to two and discuss the content with a partner or small group to help reinforce the content or find areas that are unclear and need more clarification.

Visual based active learning	Learning that incorporates the use of visuals to encourage learning and the interpretation and understanding of the visuals being used to explain concepts.
WebQuests	Inquiry based lesson which students will use guided instructions to gain information and knowledge through searching the web.
Work at the Whiteboard	Students use a board to solve a problem to help strengthen and support critical thinking skills in addition to solving the problem associated with the content being learned.

Appendix B: Perceptions of Active Learning in Higher Education Faculty Survey

Faculty Perceptions of Active Learning in Higher Education

We would like to request your participation in a research study for the doctoral dissertation of Margaret Salter at the University of South Alabama. We are requesting your help with this survey as we are interested in gaining faculty beliefs on the use of active learning in higher education, identifying potential barriers of active learning, and establishing what factors may predict use of active learning.

If you choose to participate, you will complete a survey. This survey will help us learn more about methods to support faculty professional development, implementation of active learning strategies, and academic scholarship endeavors. The survey will take about 15-20 minutes to complete. You can skip questions that you do not want to answer or stop the survey at any time. The survey is anonymous, and no one will be able to link your answers back to you. Please do not include your name or other information that could be used to identify you in the survey responses.

You will have the option to submit information to be entered into a drawing at the end of the survey. Information entered for the drawing cannot be connected to your survey submission and will maintain the anonymity of your answers.

If you choose, you will be included in a drawing for one of 20, $10.00 Starbucks Gift Cards for the completion of the questionnaire. The likelihood of being chosen is dependent on the number of participants and it is expected that 100 will be completed. The drawing will be conducted at 3800 University Commons Professional Studies Office in the presence of James Van Haneghan, Advisor on October 7, 2022. You will be contacted by email if you have been selected.

Questions? Please contact Margaret Salter (mms1423@jagmail.southalabama.edu, 251-380-2861 or James Van Haneghan (jvanhane@southalabama.edu, 251-380-2760). If you have questions or concerns about your rights as a research participant, you can call the University of South Alabama Institutional Review Board at (251) 460-6308.

If you want to participate in this study, click the Agree button and click on the right arrow to start the survey. Otherwise, click exit, close this page, or exit the browser.

○ I agree

do not include your name or other information that could be used to identify you in the survey responses.

Questions? Please contact Margaret Salter (mms1423@jagmail.southalabama.edu, 251-380-2861 or James Van Haneghan (jvanhane@southalabama.edu, 251-380-2760). If you have questions or concerns about your rights as a research participant, you can call the University of South Alabama Institutional Review Board at (251) 460-6308.

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○ I agree

1.

Select the frequency you use active learning strategies. Use the following scale: never, rarely, sometimes, very often, always.

	Never	Rarely	Sometimes	Very Often	Always
How often do you use active learning strategies in your courses?	○	○	○	○	○

2. Select your confidence level in using active learning strategies. Use the following scale: not confident, somewhat not confident, undecided, confident, highly confident.

	Not confident	Somewhat not confident	Undecided	Confident	Highly confident
What is your confidence level in using active learning strategies?	○	○	○	○	○

3.

The following are active learning strategies often used to **practice** learned content. Please select the frequency you use these strategies that best fits with your classroom and teaching. Use the following scale: Always, Very Often, Sometimes, Rarely, Never

Please read the strategy description if you are unclear of what the strategy entails.

	Never	Rarely	Sometimes	Very Often	Always
Think-Pair-Share *Short individual written response to a prompt, then discuss with a peer, then discuss with a larger group*	○	○	○	○	○

Please select the frequency you use these strategies that best fits with your classroom and teaching. Use the following scale: Always, Very Often, Sometimes, Rarely, Never

Please read the strategy description if you are unclear of what the strategy entails.

	Never	Rarely	Sometimes	Very Often	Always
Application Activity *Activity where students apply 1-2 principles and concepts to a real-life situation*	○	○	○	○	○
Student Generated Questions *Students create questions for quizzes and exams focused on central elements of the concepts*	○	○	○	○	○
Quizzes or Surveys *Used to determine comprehension of learned content*	○	○	○	○	○
Role Playing or Simulations *Students perform specific roles for demonstration purposes*	○	○	○	○	○
Categorizing grids or pro/con lists *Students presented with 2-3 categories along with a scrambled subordinates terms, images, equations or other items that belong in one or another of the superordinate categories*	○	○	○	○	○
Cooperative Learning *Scenario-based problem-solving activity using small groups to tackle specific questions issues form a larger list*	○	○	○	○	○

	Never	Rarely	Sometimes	Very Often	Always
Concept Mapping *Drawings of diagrams showing mental connections students make between major concepts presented as well as other concepts they have learned*	○	○	○	○	○
Peer Teaching *Students teaching each other a topic*	○	○	○	○	○
One-minute paper *Short writing task to allow student to focus attention of an important term or concept*	○	○	○	○	○
Computer Based Learning *Participation in a digital or traditional game presenting a lesson to enhance learning and practice of knowledge*	○	○	○	○	○
Polling Devices or Response Systems *Students submit answers presented during a lecture for the instructor to gauge understanding*	○	○	○	○	○
Brain Dump or Free Write *Students write down everything they know about an announced topic*	○	○	○	○	○

4.

The following are active learning strategies often used in **application** of learned content.

	Never	Rarely	Sometimes	Very Often	Always
Fieldwork or Field trips *Learning content in the field or on-site learning*	○	○	○	○	○
Debates *Small or large group structured exploration of central concepts, data, beliefs, values*	○	○	○	○	○

5.

The following are active learning strategies often used in **evaluation** of learned content. Please select the frequency you use these strategies that best fits with your classroom and teaching. Use the following scale: Always, Very Often, Sometimes, Rarely, Never

Please read the strategy description if you are unclear of what the strategy entails.

	Never	Rarely	Sometimes	Very Often	Always
Muddiest Point *During a class presentation student will take a break and write a response to a prompt "What was the muddiest point in ___"*	○	○	○	○	○
Small Group Presentations *Presentations on course content and material*	○	○	○	○	○
Case Studies *Scenarios that require students to integrate their skills to solve problems that relate to course material*	○	○	○	○	○

	Never	Rarely	Sometimes	Very Often	Always
Jigsaw *Team-based strategy where each member becomes subject matter experts in certain areas and then each member teaches the other members*	○	○	○	○	○
Self/peer review and assessment *Requires students to assess performance against applicable criteria and offer suggestions for improvement*	○	○	○	○	○

6.

The following are active learning strategies often used in **creation** while using learned content. Please select the frequency you use these strategies that best fits with your classroom and teaching. Use the following scale: Always, Very Often, Sometimes, Rarely, Never

Please read the strategy description if you are unclear of what the strategy entails.

	Never	Rarely	Sometimes	Very Often	Always
Socrative Questioning *Instructor questions students in a way that aids them in coming up with the answers themselves*	○	○	○	○	○
Problem Based Learning *Students working together to learn course content by solving a presented problem to solve*	○	○	○	○	○

	Never	Rarely	Sometimes	Very Often	Always
Portfolio Development *A documentation of student work which involves the student developing a portfolio set showing their completed work over an entire course or unit.*	○	○	○	○	○
Research Based Learning *Learning which requires the learner to conduct research to gain understanding of a topic*	○	○	○	○	○
Structured Controversy *A type of cooperative learning where a topic is introduced and the learner will have to discuss the topic from multiple different perspectives and analyze all content being discussed*	○	○	○	○	○

7. If there are any active learning strategies you use in your classroom that were not previously listed, please list the strategy and provide details as to the frequency of use and method of implementation.

Active Learning Barriers

8. Please select your level of agreement to the following statements regarding barriers to the use of active learning strategies in higher education. Use the following scale: strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Active Learning requires too much preparation time	○	○	○	○	○
Provided classroom spaces do no allow for active learning	○	○	○	○	○
Students do not understand active learning	○	○	○	○	○
Active learning requires too much class time	○	○	○	○	○
Active learning reduced teacher control	○	○	○	○	○
Active learning is ineffective	○	○	○	○	○
Students will not participate in active learning strategies	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Students lack maturity to engage in active learning strategies	○	○	○	○	○
Assessing student learning with active learning strategies is too difficult	○	○	○	○	○
There is a lack of institution support for active learning	○	○	○	○	○
Class size does not allow for active learning	○	○	○	○	○
Active learning does not allow for learning to take place	○	○	○	○	○
Faculty reward structure does not encourage use of active learning strategies	○	○	○	○	○
Class schedule does not allow for active learning	○	○	○	○	○
Faculty are not trained on how to use active learning strategies	○	○	○	○	○
There are a lack of resources to support active learning	○	○	○	○	○

Resources

9.

Please read the following questions and select the level of agreement that best fits with the following statements regarding resources available for your use in teaching students. Use the following scale: strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree.

	Strongly disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Strongly agree
I teach in the same classroom	○	○	○	○	○
I have the technology I need in the classrooms where I teach	○	○	○	○	○
The classrooms where I teach have flexible seating options	○	○	○	○	○
The classrooms where I teach allow for collaborative groups	○	○	○	○	○
I have access to automated response system software and devices to use when I teach	○	○	○	○	○
I have access to reliable and efficient internet networks	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Strongly agree
I have the hardware I need to effectively teach my courses	○	○	○	○	○
I have access to the software I need to teach my courses	○	○	○	○	○
I have the necessary audio equipment needed to teach my courses	○	○	○	○	○
I have the technology equipment such as projectors, screens, smart boards needed to teach my courses	○	○	○	○	○
I have sufficient time allocated to prepare for my course	○	○	○	○	○
I have fluent understanding of the technology I need to use to teach my courses	○	○	○	○	○
The classrooms I teach in provide a comfortable temperature	○	○	○	○	○
The classrooms where I teach have adequate lighting	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Strongly agree
I have the basic resources I need to effectively teach my courses	○	○	○	○	○
I have sufficient curriculum materials needed to teach my courses	○	○	○	○	○
I have sufficient physical materials needed to teach my courses	○	○	○	○	○
My students have the resources needed to learn	○	○	○	○	○
My students appear to be comfortable in their learning environment	○	○	○	○	○
The learning environment engages the students	○	○	○	○	○

Beliefs of Learning

10. Please select your level of agreement with the following statements about student learning. Use the following scale: strongly disagree, somewhat disagree, neither agree nor

disagree, somewhat agree, strongly agree.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Faculty should operate as a facilitator of learning	○	○	○	○	○
Faculty should operate as a resource for learners	○	○	○	○	○
Learning depends on the quality of the teacher	○	○	○	○	○
Faculty should be the center of the learning environment	○	○	○	○	○
Students have experiences they can offer to the class	○	○	○	○	○
Students should be active in the development of their learning	○	○	○	○	○
Learners depend largely on their teachers for knowledge	○	○	○	○	○
Students actively receive knowledge from their teachers	○	○	○	○	○
The only resource a student needs is a teacher	○	○	○	○	○
Learning should not include technology	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Lower Division students can contribute positively to the course	○	○	○	○	○
Upper Division students can contribute positively to the course	○	○	○	○	○
Students need strict structure in the classroom in order to learn content	○	○	○	○	○
Active learning is an effective way to learn and retain content	○	○	○	○	○

11. Please select your level of agreement with the following statements on how people learn. Use the following scale of strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Peoples intellectual potential is fixed at birth	○	○	○	○	○
Some people are born with certain gifts and talents	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Smart people are born that way	○	○	○	○	○
No matter who you are, your intelligence can be changed	○	○	○	○	○
Learning most concepts is easy	○	○	○	○	○
Knowledge is partially based on prior knowledge	○	○	○	○	○
Students should be allowed to reflect on their learning	○	○	○	○	○
Student motivation affects how they learn	○	○	○	○	○
Collaboration with others can help students learn	○	○	○	○	○
Students learn best with they can learn in a hands-on application manner	○	○	○	○	○
Learning is most effective when students are actively engaged	○	○	○	○	○
Students should be allowed to have choice in how they show competency	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Students learn best listening to information	○	○	○	○	○
Students learn best with real-world application lessons	○	○	○	○	○

Professional Development

12. Please select you level of agreement to the following statements regarding professional development. Use the following scale of strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree.

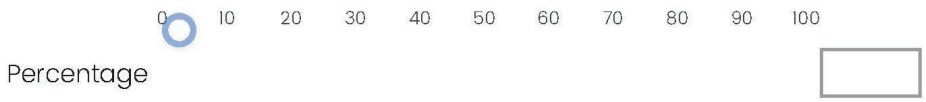
	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
My university provides professional development to improve my teaching	○	○	○	○	○
I participate in professional development to improve my teaching	○	○	○	○	○
My university provides resources to help faculty develop their courses	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The professional organizations I am a member of provide me with strategies to improve my teaching abilities.	○	○	○	○	○
Research responsibilities limit my time to participate in professional development	○	○	○	○	○
If offered I would participate in professional development to improve my teaching	○	○	○	○	○
The university provides a learning center and staff to help faculty develop and teach courses	○	○	○	○	○
I am aware of where to locate professional development resources	○	○	○	○	○
Professional Development is important to faculty to help them meet the needs of their students	○	○	○	○	○

Scholarship of Teaching

13. How many publications have you completed in your career?

14. What percentage of your publications have been focused on scholarship of teaching in your field?



15. How many presentations have you completed in your career?

16. Have you written any book chapters in your career? If yes please indicate how many you have written and if not applicable, please type N/A

17. Have you written any books in your career? If yes please indicate how many you have written and if not applicable, please type N/A

18. Do you serve or have you served on any committees focusing on improving academics and scholarship of teaching in your field? If yes, please describe your position and contribution.

- ○ Yes
- ○ No

19. Have you participated in any research specifically addressing the improvement of teaching strategies in your

field or in teaching in higher education in general. If yes, please provide more information about the research.

- ○ Yes [ ]
- ○ No

20. I am a member of professional organizations within my field. If yes, indicate if they provide assistance in scholarship of teaching in your field.

- ○ yes [ ]
- ○ No

Work Criteria

21. How many courses do you teach per semester?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

22. What percent of your position is focused on teaching courses?

- ○ > 10
- ○ 11-20
- ○ 21-30
- ○ 31-40
- ○ 41-50
- ○ 51-60
- ○ 61-70
- ○ 71-80
- ○ 81-90
- ○ 91 <

23. Which of the following best describes your primary work focus?

- ○ Research
- ○ Teaching
- ○ Service

24. How would you classify the majority of the courses you teach?

- ○ Face to Face
- ○ Online Distance Learning
- ○ Blended format with both face to face and online learning

25. Which of the following best describe your primary work location?

- ○ On campus site
- ○ Remote work site
- ○ A combination of on campus and remote work locations

26. How many days per week are you engaged in on-campus or synchronous-online teaching?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

27. The next several statements are related to your feelings regarding your current job. Please select you level of agreement to the following statements. Use the following scale: strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am satisfied with my job	○	○	○	○	○
I feel I make a positive contribution to the students I teach	○	○	○	○	○
I have positive support from my university	○	○	○	○	○
I feel I am compensated appropriately for my experience and job performance	○	○	○	○	○
I value the role of faculty and teaching in higher education	○	○	○	○	○
I feel my workplace is a positive environment	○	○	○	○	○
I am motivated to achieve in my current position at my university	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel I am acknowledged for the work I do	○	○	○	○	○
I feel I am able to use my knowledge and skills to positively affect the university's mission	○	○	○	○	○
I feel that I have the appropriate work-life balance I need to be happy	○	○	○	○	○

Conditions of Work

28. Please select the university where you work.

University

29. Please select the college that best fits within the university in which you work.

College

30. Please list the primary course subjects you teach.

31. What level of courses do you teach?

- Lower division courses
- Upper division courses
- Graduate level masters courses
- Graduate level (doctorate of philosophy)
- Graduate level (medical)

32. Do you teach courses that have a laboratory component to the course requirement?

- Yes
- No

33. On average what is your typical class size?

34. Do you have graduate assistants and if yes please state their primary role in helping you.

- ○ Yes
- ○ No

Demographic Information

35. Which category below includes your age?

- ○ 25-34
- ○ 35-44
- ○ 45-54
- ○ 55-64
- ○ 65 or older

36. Which accurately describes your race?

- ○ Caucasian
- ○ African America or Black
- ○ American Indian
- ○ Asian
- ○ Hispanic or Latino
- ○ Other

37. What is your gender?

- ○ Male
- ○ Female
- ○ Prefer Not to Answer

38. Which of the following do you consider to be your first language?

- ○ English
- ○ Spanish
- ○ French
- ○ Mandarin
- ○ [ ] Other, Please specify

39. Which defines your current employment status?

- ○ Adjunct Professor
- ○ Visiting Professor
- ○ Assistant Professor
- ○ Associate Professor
- ○ Full Professor
- ○ Endowed Professor
- ○ Professor Emeritus
- ○ Instructor
- ○ Teaching Professor

40. Which category below includes the number of years you have been teaching within higher education?

- ○ 4 or less
- ○ 5-9
- ○ 10-14
- ○ 15-19
- ○ 20-24
- ○ 25-29
- ○ 30 or more

41. If you taught in K-12 Education prior to working in higher education which category below includes the number of years you taught?

- ○ 4 or less
- ○ 5-9
- ○ 10-14
- ○ 15-19
- ○ 20-24
- ○ 25-29
- ○ 30 or more

42. What is you current contract year schedule?

- ○ 10 month non-tenure
- ○ 12 month non-tenure
- ○ 10 month tenure
- ○ 12 month tenure

Open Ended Questions

43. How has navigating teaching during the Covid-19 Pandemic altered your teaching strategies?

44. Please use this portion of the questionnaire to provide us with any additional comments you would like to share regarding active learning in higher education.

Appendix C: Breakdown of Research Questions, Survey Item Number, and Topic Association

Research Question	Survey Question Numbers	Question Topic
Frequency of Use of Active Learning	1	Select the Frequency You Use Active Learning Strategies
Confidence	2	Confidence in using Active Learning Strategies
What are the faculty perceptions regarding the use of active learning in higher education learning environment?	3, 4, 5, 6, & 7	Use of Presented Active Learning Strategies
	10 & 11	Beliefs on Learning
	43 & 44	Open-ended impact of COVID-19 and additional comments
What are the potential barriers to the use of active learning in higher education learning environments?	8	Barriers to Active Learning
	9	Resources
Are there predicting variables to whether a person is more likely to use active learning strategies in their course design and teaching?	12	Professional Development
	13, 14, 15, 16, 17, 18, 19, & 20	Scholarship in Teaching
	21, 22, 23, 24, 25, 26, & 28	Work Criteria
	27	Job Satisfaction
	29 & 30	University and Subject
	31	Student Level
	32, 33, & 34	Course Structure & Graduate Students
Demographics	35, 36, 37, & 38	General Demographics
	39, 40, 41, & 42	Employment Status

Appendix D: IRB Approval Letter University of South Alabama

irb@southalabama.edu

UNIVERSITY OF
SOUTH ALABAMA

TELEPHONE: (251) 460-6308
AD 240 · MOBILE, AL. 36688-0002

INSTITUTIONAL REVIEW BOARD
June 16, 2021

Principal Investigator:	Margaret Salter		
IRB # and Title:	IRB PROTOCOL: 21-199 [1751735-1] Faculty Beliefs on Active Learning Strategies in Higher Education: Identification of Predictors for Use of Active Learning		
Status:	APPROVED	Review Type:	Exempt Review
Approval Date:	June 16, 2021	Submission Type:	New Project
Initial Approval:	June 16, 2021	Expiration Date:	
Review Category:	45 CFR 46.104 (d)(2): Research that only includes interaction involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior (including visual or auditory recording): ii. Any disclosure of the human subjects' responses outside of the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation		

This panel, operating under the authority of the DHHS Office for Human Research and Protection, assurance number FWA 00001602, and IRB Database #00000286 or #00011574, has reviewed the submitted materials for the following:

1. *Protection of the rights and the welfare of human subjects involved.*
2. *The methods used to secure and the appropriateness of informed consent.*
3. *The risk and potential benefits to the subject.*

The regulations require that the investigator not initiate any changes in the research without prior IRB approval, except where necessary to eliminate immediate hazards to the human subjects, and that **all problems involving risks and adverse events be reported to the IRB immediately!**

Subsequent supporting documents that have been approved will be stamped with an IRB approval and expiration date (if applicable) on every page. Copies of the supporting documents must be utilized with the current IRB approval stamp unless consent has been waived.

Notes:

Appendix E: IRB Approval Letter University of West Florida

UNIVERSITY of WEST FLORIDA

Research Administration and Engagement
11000 University Parkway
Building 11, Office 110
Pensacola, FL 32514

DATE:	September 13, 2022
TO:	Margaret Salter; Principal Investigator
FROM:	University of West Florida IRB
PROJECT TITLE:	[1931249-2] Faculty Beliefs on Active Learning Strategies in Higher Education: Identification of Predictors for Use of Active Learning
REFERENCE #:	
SUBMISSION TYPE:	Revision
ACTION:	APPROVED
APPROVAL DATE:	September 13, 2022
EXPIRATION DATE:	September 12, 2023
REVIEW TYPE:	Expedited Review

Thank you for your submission of Revision materials for this project. The University of West Florida IRB has APPROVED your request for site approval. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

All UNANTICIPATED PROBLEMS involving risks to subjects or others (UPIRSOs) and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

Your documentation for continuied site approval review must be received with sufficient time for review and continued approval before the expiration date of **September 12, 2023.**

If you have any questions, please contact the Research Integrity Office at 850.474.3484 or irb@uwf.edu. Please include your project title and reference number in all correspondence with this committee.

office 850.474.2824
fax 850.474.2082
uwf.edu/rae

BIOGRAPHICAL SKETCH

Name of Author: Margaret M. Salter

Graduate and Undergraduate Schools Attended:

Pensacola State College, Pensacola Florida

University of West Florida, Pensacola Florida

Auburn University, Auburn Alabama

University of South Alabama, Mobile Alabama

Degrees Awarded:

Doctor of Philosophy, University of South Alabama, 2023

Master of Science, Auburn University, 2014

Bachelor of Science, Auburn University, 2010

Associate in Arts, Pensacola State College, 2006