ACTIVE LEARNING MANIFESTED WITHIN A SYNCHRONOUS ONLINE CLASSROOM

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Submitted to the Graduate Faculty of

School of Education in partial fulfillment

of the requirements for the degree of

Doctor of Education

University of Pittsburgh

2015

UNIVERSITY OF PITTSBURGH

SCHOOL OF EDUCATION

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March 23, 2015

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University of Pittsburgh, 2015

The size and scope of online K-12 education is increasing rapidly. Research to develop a deeper understanding of the benefits of and barriers to delivering instruction via the Internet is limited. Traditionally research has shown that strategies of active learning, which when applied properly in K-12 classrooms, contribute to positive student attitudes towards self and learning and increase academic achievement. From a review of the literature, it was clear that there is limited research on synchronous online classrooms and on the indicators of active learning as they are manifested in synchronous online classrooms. Consequently, the aim of this study was to portray the perspectives of synchronous online teachers towards indicators of active learning. Participants for this study were teachers from a single cyber charter school. The participants responded to an online survey designed to elicit perceptions of important indicators of active learning, barriers to implementation of active learning, and strategies used to engage students in active learning strategies in synchronous online classrooms. A simple descriptive research design was applied to analyze the data.

The data show that the most important indicator of effective instruction was teacher preparation required to create engaging learning activities. Teachers perceived all but two of the primary indicators of active learning identified in the literature (time on task and activities that

promote collaboration) as “very important” or “extremely important”. Teachers’ perceptions of these primary indicators as not important contradict the literature on active learning. Teachers generally described the role of the student as the greatest barrier to implementing active learning in a synchronous online learning environment while the role of technology was viewed as only marginally distracting. The perceptions of synchronous online teachers align with what is reported in the literature on active learning in traditional classrooms. The results of this study have implications for teacher evaluation, hiring procedures, professional development and future research into active learning within the synchronous classroom.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PREFACE

I dedicate this doctoral dissertation to my family. To my beautiful wife Amy, you provided love and encouragment every time I was weary and felt like giving up. I love you. You have been there for me every step of this journey and there was no way I was going to let you down. To my inspirations and blessings, Max, Addie and Mia, you give meaning to each step daddy takes. You may not appreciate this now, but I hope one day you will understand the significance of this accomplishment. Nothing worth having in this life is easy. You can accomplish anything you put your heart, soul and sweat into!

To my parents, John and Karin Oberg, your constant love and countless sacrifices throughout my life have never gone unnoticed. I am the man I am today because of you. To my brothers, Chris and Eric, you are role models to me and academically I never wanted to be the 'black sheep" of the family. Thank you for your love and support of my doctoral pursuits. To my mother-in-law Yolanda and brother-in-law Bill, thank you for being a part of my life and supporting me in this endeavor. To all of my family and friends, I stand tall on the shoulders of everyone who has ever impacted my life!

To my advisor and dissertation chair, Dr. Charlene Trovato, I can't begin to thank you enough for the years you have spent working with me on this endeavor. You held my hand and provided much needed guidance to this sometimes "thick-headed" student. I especially appreciate the time and sacrifice you and Dr. Mary Margaret Kerr gave to Saturday dissertation

group. In no small way both of your support helped me to accomplish this dream. To the rest of my committee, Dr. R. Gerald Longo, Dr Bill Bickel and Dr. Terry Doran, thank you for always challenging my thinking, offering pertinent suggestions and seeing me through to a successful dissertation defense. It has been my honor to work with such an amazing team of scholars I appreciate the friendship and guidance of Dr. James Hoover and Dr Nicholas Trombetta. I recognize the statistical expertise of P.J. Grosse. To Sarah Capello, Dr. Jean Aldridge and my sister-in-law, Kristin Oberg, thank you for your outstanding professional knowledge and genuine care in editing this document.

Finally, I thank my Lord and Savior Jesus Christ; I am able to do all things through him. What was meant for my harm, God has used to my advantage.

1.0 INTRODUCTION

Ample investigation has been conducted on the best ways students learn, and, within this research, active learning stands out (Bachelor, Vaughan, & Wall, 2012). Active learning is defined as any instructional approach that employs learners in their educational maturation (Prince, 2004). Studies have indicated that, if applied properly in the classroom, active learning can contribute to positive student attitudes towards self and learning and increase academic achievement (Skinner, Kindermann & Furrer, 2009). In addition, research points to increases in motivation and attendance when students are engaged in classroom activities (Bryson & Hand, 2007; Meyers & Jones, 1993).

Traditionally, many educators think of a classroom as a physical space consisting of desks, chairs and a blackboard housed within a brick and mortar school. Advances in technology and instructional delivery over the last decade have forever changed this definition. Today, when referring to the classroom, the concept should also include the cyber environment or online classroom. The online classroom typically utilizes the Internet and personal computers to deliver instruction and has two types of delivery models: asynchronous and synchronous. Asynchronous refers to education that takes place at any time and in any place without physical association of the teacher and the student (Yang, 2008). This mode of delivery is often called self-paced because communication between teacher and student is not linked to a specific time frame. On the other hand, synchronous delivery is based on a set time and date for meeting between

students and teachers (Skylar, 2009). The synchronous online classroom or virtual classroom ensures that teachers and students have real time communication. This type of online delivery offers them the capability of posing questions and receiving delayed or immediate responses (Duncan et al., 2012; McBrien et al., 2009).

According to Hrastinski (2007), synchronous learning is the preferred approach for online learning and yet few studies are found discussing the synchronous online classroom. This lack of available research is exacerbated when specifically studying the indicators of active learning as they manifest within the synchronous online classroom. Thus, at a time when online learning is rapidly expanding across Pennsylvania and the nation, providing quality and efficient education in this evolving environment is crucial to its' continued growth.

1.1 PROBLEM STATEMENT

The size and scope of online education in K-12 is ardent and thriving. Between 2009 – 2010, there were an estimated 1,816,400 enrollments in online education courses in K-12 school districts (Queen & Lewis, 2011). Students in K-12 attending full-time online schools in 31 states and Washington, D.C. are not included in this estimate (Watson et al., 2012). According to an annual report on online learning, during 2009-2010 there were over 200,000 full-time students and in 2011-2012, 275,000 full-time students in full-time online schools (Watson et al., 2012). For comparison, the number of students enrolled in Pennsylvania cyber charter schools increased by 63 percent, to 32,322 (Parrish, 2013).

The sustained expansion of online education evolves and grows as fast as the technology that delivers it. It is essential that studies be done to develop a deeper understanding of the

benefits and barriers to delivering education via the Internet. Online students' academic progress may suffer as enrollment rates increase and effective instructional practices are not implemented with fidelity. In particular, active learning as applied to synchronous online forms of education has yet to be precisely characterized. An investigation resulting in a description of virtual classroom teacher's perceptions within a framework of active learning indicators, strategies, and barriers to implementation will help future online educators in the design and delivery of their instruction. Furthermore, the study informs policymakers, educational administrators, and K-12 educators on the dynamics of active learning within synchronous online learning.

1.2 PURPOSE OF THE STUDY

I have been involved in online learning in K-12 education since 2006. During this time, I have produced content for various learning management systems (LMS), supervised virtual classroom teachers in the synchronous online classroom, created new models for online delivery, assisted school districts in creating online curriculum, and directed one of the largest cyber charter schools in the nation. The multiple and varying experiences in the burgeoning field of online education in K-12 led to the purpose of this study. Researchers know very little about synchronous learning and the extent to which active learning strategies occur in a synchronous online classroom. Critics claim that students are passive participants and, in fact, do not take an active role in learning. K-12 synchronous online teachers complain that they do not have adequate professional development on strategies to engage their students actively. I, too, worried that with the limited knowledge virtual teachers possess how they may successfully incorporate active learning strategies into their virtual classroom.

It is imperative as online education and, specifically, synchronous online learning continues to proliferate in traditional and cyber charter schools that more research is conducted to identify sound instructional practice. Discovering the perceptions of synchronous online teachers towards active learning strategies in their classroom is an important first step towards this goal. The focus is descriptive in nature with teachers selected for the study employed at a single cyber charter school. An online survey instrument developed from the indicators of active learning was administered to the synchronous online teachers. The survey attempts to connect active learning strategies found in traditional classrooms with the perceptions of teachers in virtual classrooms.

1.3 RESEARCH QUESTIONS

The following research questions address the purpose of the study, which is to provide a description of active learning in K-12 synchronous online classrooms based on the perspectives of online classroom teachers:

1. What do teachers in a synchronous online K-12 cyber charter school perceive as important indicators of active learning in a virtual classroom?
2. What do teachers in a synchronous online K-12 cyber charter school perceive as barriers to implementing active learning in a virtual classroom?
3. Which strategies of active learning do teachers in a synchronous online K-12 cyber charter school report using in a virtual classroom?
4. Which indicators of active learning are teachers in a synchronous online K-12 cyber charter school unsure about without more information?

1.4 THEORETICAL FRAMEWORK

One example of guiding framework is provided by a meta-analysis of sound teaching principles by Author Chickering and Zelda Gamson (1987). The Seven Principles for Good Practice in Undergraduate Education a) encourages contact between students and faculty, b) develops reciprocity and cooperation among students, c) encourages active learning, d) gives prompt feedback, e) emphasizes time on task, f) communicates high expectations, and g) respects diverse talents and ways of learning (Chickering & Gamson, 1987, p.4). Grounded on the model of the Seven Principles, North Central Regional Educational Laboratory (NCREL) expands the research into K-12 education and produces eight indicators of engaged learning. Based on the work of Jones, Valdez, Nowakowski, and Rasmussen (1994), indicators that could be used to evaluate instruction for active learning are: a) vision of engaged learning, b) tasks for engaged learning, c) assessment of engaged learning, d) instructional models and strategies for engaged learning, e) learning context of engaged learning, f) grouping for engaged learning, g) teacher roles for engaged learning, and h) student roles for engaged learning. Suggesting some level of overlap among the Seven Principles, Bonwell & Eison (1991) describe the characteristics of active learning in K-12 as comprising seven indicators which include a) student involvement in more than passive listening, b) student engagement in various activities such as writing, discussing, and reading, c) focusing on the growth of the learner' skills rather than transference of information, d) placing emphasis on exploring the students' values and attitudes, e) increasing student motivation, f) students participating in higher order thinking including synthesis, evaluation and analysis, and g) providing immediate feedback to the learners.

1.5 LIMITATIONS

The primary limitation to conducting a study of active learning within a cyber charter school is the small sample of synchronous online teachers surveyed. The questioning of 27 virtual teachers is expected to reduce the generalizability of the study findings. Rather than extending a particular theory about active learning, the researcher is guided by his enthusiasm in the case itself and did not attempt to generalize across cases.

Issues such as reliability, validity, bias, and response rate may be the second limitation to this survey based study on active learning in a synchronous online classroom. Owing to the recent explosion of online learning in K-12, research is limited on the topic. The researcher created the survey instrument because an instrument with verified reliability and results does not exist. Great care was taken to construct a survey that is based on the theoretical framework of Chickering and Gamson (1987) and aligned to indicators of active learning suggested by the literature review.

1.6 OPERATIONAL DEFINITIONS

Asynchronous – online instruction between students and/or teacher with no physical link to a time frame (often called self-paced)

Barrier – any impediment, real or perceived, which acts as an obstacle

Blended – instruction that delivers content through a mixture of face to face and online interaction between students and teachers

Brick & mortar – name given to traditional classroom and school in the online community

Charter school – publicly funded K-12 schools of choice that operates more independently than traditional schools

Cooperative learning – instructional practice involving students in team projects

Cyber charter school – is a public school that delivers instruction via the Internet or other electronic means

Engaged learning – is considered synonymous with active learning

Online learning – instruction is delivered mostly via the Internet (also referred to as distance education and/or cyber education)

Social expression – the body language, speech patterns and their interpretation during interaction between students and/or teachers

Synchronous – online instruction between students and/or teachers that is linked to the time frame and occurring in real time

Virtual classroom – closely associated to synchronous online learning, this is the environment in which students and/or teacher conduct class via the Internet

Virtual teacher – name given to the instructor in the synchronous online classroom

1.7 SUMMARY

The researcher is optimistic that this study echoes the perceptions of the theoretical framework and active learning in general. The research study anticipates providing all K-12 schools (brick & mortar and online) with essential, pertinent information to consider when implementing active learning strategies in a synchronous online classroom. It is critical to bring to light instructional methodologies utilized in the synchronous online classroom as online enrollments into K-12

online programs proliferate. The research hopes to provide insight for all stakeholders on the critical issue of active learning by documenting the knowledge and perceptions of virtual classroom teachers. Apparently, online learning will continue to grow at every level in K-12 education in Pennsylvania and across the nation. The researcher aims to add to the current context of literature and thought of the present.

2.0 REVIEW OF THE LITERATURE

The present era in American education has been characterized by two trends. First is the transformation of anytime, anyplace education achieved through online learning (iNACOL, 2011). Second is the need for accountability as teachers focus on excelling at instruction, while students look for engaging learning experiences that will ensure successful outcomes (Auster & Wylie, 2006).

Technology has transformed the delivery of education, and explosive growth has been realized in a short period. The North American Council of Online Learning (iNACOL) (2011) states that the K-12 enrollment in online classes reached 1 million students in 2008, increasing 22 times the enrollment level observed just eight years earlier. A Stanford University think tank, the Hoover Institution, says that is just the beginning of the rapid progression in online education. The institute predicts that half of all courses in Grades 9 to 12 will be transmitted online by 2019 (Arnoldy, 2008). While the capability of online learning accounts for this expansion, concerns continue to be centered on engaged learning, student achievement, and the quality of these online programs. Consequently, active learning is being used as a pedagogical practice to respond to this transformation in K-12 education and to the changes in work and economic demands (Biesta, 2009). Active learning instructional approaches such as collaborative learning, prompt feedback, and positive teacher to student interaction have been shown to lead to greater retention of information, enhanced self-esteem and improved academic

performance (Chickering & Gamson, 1987).

The review of literature unifies these themes (active learning and online instruction) by examining classroom-based instructional approaches to active learning, complimented by research of online learning, and models for delivering instruction that may enhance active learning. This review begins by introducing the concept of active learning, clarifying terms, providing historical perspective, and identifying the barriers and challenges to instituting active learning in a traditional classroom. Drawing from seminal research into active learning from Chickering and Gamson (1987, 1991) and Bonwell and Eison (1991), as well research from the North Central Regional Educational Laboratory (NCREL), the literature then focuses on the indicators of active learning along with the corresponding strategies utilized in the classroom to elicit engaged learning.

In order to study active learning in an online learning environment, the literature review shifts to examine what research states about online learning, the models of delivery (synchronous versus asynchronous), and the way the models of delivery differ. The literature review culminates with an exploration of active learning indicators and strategies for online learning, with a particular emphasis on synchronous learning.

2.1 ACTIVE LEARNING

Amidst all of the research on the best ways students learn, active learning figures prominently (Bachelor, Vaughan, & Wall, 2012). Student engagement is judged to be one of the more useful predictors of personal development and learning (Krajewski & Piroli, 2002; Chapman, 2003). Skinner, Kindermann & Furrer (2009) concur with these sentiments and claim a predictor of

increased educational achievement and positive attitudes towards self and learning results from the introduction of active learning in the classroom. Studies indicate that active learning techniques utilized by the classroom teacher can increase student motivation and attendance, as well as reduce feelings of competition and isolation by involving students in cooperative learning (Bryson & Hand, 2007; Chizmar & Walbert, 1999; Meyers & Jones, 1993).

Various strategies of active learning including simulations, group work, journaling, and discussion are said to provide deeper learning, and content understanding compared with passive learning approaches (Dietz-Uhler & Lanter, 2009). The Center for the Integration of Research, Technology and Learning (CIRTL Network) (2013) proposes that the introduction of active learning as an instructional approach will enhance students' critical reading, writing, and thinking skills as well as retention, motivation, and interpersonal skills.

The collaborative nature of active learning may also encourage social skills like decision making, conflict management, and interpersonal communication (Kuh, 2003; Marks, 2000). Bonwell and Eison (1991) sum up the active learning research and deduce it leads to improved student demeanor and enhancements in students' thinking and writing and can augment better group interaction. There have been many quantitative studies that support the benefits of introducing active learning into the classroom (Bonwell & Sutherland, 1996; Chickering & Gamson, 1987; Johnson, Johnson & Smith, 1998).

The notion of active learning is perhaps quite obvious: additional time and energy spent by students working in a subject may lead to them learning more relative to their effort. In the same way, students become more adept at learning in the classroom with extra practice and feedback on their writing, analyzing, and problem-solving (Kuh, 2003; Weaver, 2006). Conversely, studies have shown that when students seem to be passive recipients of teacher

lecturing, the development of higher cognitive processes like analyzing and evaluating came after the precedent of acquirement of information (Johnson et al., 1991; Chapman, 2003). As the name implies, active learning seeks to engage learners actively in their education. Mattson (2005) surmises that the foundation of learning is an active process. In an endeavor to guide the study of this multi-faceted approach, subtopics will breakdown strategies of active learning by navigating through multiple meanings and definitions, investigating the history, and identifying the barriers and challenges to instituting active learning in a traditional classroom.

2.1.1 Historical perspective of active learning

A very influential American philosopher and educational innovator, John Dewey (1859-1952), supported active learning (Weltman, 2007; Farell, 2013; Rud, Garrison & Stone, 2009). Dewey, in his writings, emphasizes that any method of learning should be active: any learning method to be considered serious, should be practical, in accordance with scientific practice. Therefore, any theory in education that cannot be proven will not be regarded seriously (Rud, Garrison & Stone, 2009). From this pragmatic view of education, Dewey asserts that a learner will broaden his or her intellect and develop necessary skills of problem solving and critical thinking (Farell, 2013; Rud, Garrison & Stone, 2009). Undoubtedly, the notion of activity found in teaching cannot be considered a novel issue as it formed the critical dimensions in the pedagogy of John Dewey and underpinned the examination of education by Rousseau (Drew & Mackie, 2011).

Another belief about active learning that has withstood the test of time comes from founding father and enlightened thinker, Benjamin Franklin (1705-1790). According to Weltman (2007), Franklin wrote, “Tell me, and I may forget. Teach me and I may remember. Involve me, and I will learn” (p. 6). However, as a matter of exactitude, it was an English

scholar, R.W. Revans (1907-2003), who introduces the term "active learning", in education (Weltman, 2007). Revans remains very influential in spreading the instructional approach to active learning around the globe. Constructivism as a theoretical framework for leading edge, current learning environments suppose that students engage in knowledge construction through interaction with their learning environment (Van den Bergh, Ros, & Douwe, 2013).

2.1.2 Multiple meanings of active learning

Active learning is surrounded by vagueness that provides academics and policy makers with opportunities for creating definitions aimed at fulfilling specific intentions, and this has led to emptiness in its meaning (Drew & Mackie, 2011). Even the words used to describe the active learning of students have taken on various terms, such as active engagement, student engagement, engaged learning, meaningful student involvement, interactivity, and of course, active learning. Notwithstanding this, Coffield (2008) contends that the orientation of active learning presents problems as it seems to oppose passive learning, which is a concept that is intrinsically implausible given that education is considered as changing values, attitudes, skills, understanding, knowledge and behavior. Other researchers contend that all learning is inherently active, with some classifications of learning being more vigorous compared with others. This research implies that learning involves the construction of understanding and knowledge rather than passive reception of learning (Lorenzen, 2001; Watkins, Carnell & Lodge, 2007; Bonwell & Sutherland, 1996).

Conversely, this fails adequately to address the challenge of defining active learning because constructivism postulates that all knowledge has to be constructed (Drew & Mackie, 2011). Moreover, Munday (2009) states that learning styles considered as passive, such as using

rote learning to understand poetry, can be perceived as facilitating creativity development by allowing learners to experience awakening to the otherness of the poem. Further, owing to the various perspectives present in the literature, it is a challenge to find an authoritative meaning of active learning. It is misconceived that active learning refers to a process where learners are involved in practical activities such as homework and testing (Priestley, 2010; Watkins et al., 2007).

Such a narrowed view of active learning further highlights the problems inherent in finding an authoritative definition of active learning. Following a review of literature on active learning, researchers state that this concept encompasses three facets; social, cognitive, and behavioral (Fredricks, Blumenfeld & Paris, 2004; Furlong et al., 2003; Connell & Klem, 2004; Watkins et al., 2007). Just as it has been difficult for scholars to agree on a unified definition of active learning, so too has are there various descriptions for the three facets of active learning. The majority of the researchers agree on cognitive and behavioral engagement as like terms but uses emotional (Connell & Klem, 2004) and affective (Furlong et al., 2003) to replace the term of social engagement.

The social, cognitive, and behavioral facets of active learning as proposed by Watkins et al. (2007) often appear as combinations in literature (Drew & Mackie, 2011). For instance, cognitive and behavioral dimensions are alluded to in the depiction of active learning characterized by autonomy among learners in terms of accountability and critical thinking in learning and through the provision of flexible tasks by teachers (Kane, 2004). Machemer and Crawford (2007) present a wider perspective by suggesting that active learning is comprised of anything surpassing passive listening and focusing on the social component by stating that cooperative learning for example involves “doing” which is a emphasis of active learning. Other

researchers implicitly recognize that the social, cognitive, and behavioral facets of active learning are instructional activities that focus on student involvement in ``doing things and thinking about what they are doing'' (Bonwell & Eison, 1991, p.2). Unlike Machemer and Crawford's (2007) view of active learning, Bonwell and Eison (1991) stated that active learning surpasses listening and that it enables students to develop critical thinking skills.

Several scholars focus on the importance of learner autonomy in terms of the level and manner through which learners make decisions related to their learning (Halsall & Cockett, 1998; Black & William, 1998, Lorenzen, 2001; Michael, 2006; Wang, 2009). According to Black and William (1998), active learning focuses the responsibility of the learning onto the learners. As the name suggests, students are expected to undertake learning activities that not only challenge them, but require the students to take ownership of (Lorenzen, 2001). In an active classroom, students participate in their education by then directly applying what they have learned. This happens when students are engaged in the content and processing of information through writing, reading, interacting, manipulating, and reflecting rather than merely watching and listening (Conderman, Bresnahan & Hedin, 2012). These researchers go on to state that children will better comprehend and have greater retention of information when they actively process the class instruction in order to learn.

Zweck (2006) is of the opinion that active learning involves both thinking and doing educational tasks (cognitive and social components). Similarly, Skinner (2010) concurs that active learning has three facets; cognitive engagement, experiential learning, and active engagement in learning that is displayed through learning direction and choice. Further, Birenbaum (2002) suggests that the general definition of active learning is the extent of behavioral, motivational, and meta-cognitive activity in learning. Interestingly, other researchers

offered narrowed descriptions of active learning that emphasized a specific facet such as Anthony (1996) who looked at the cognitive element. According to this author, the main aspects of active learning are meta-cognition, student independence, intellectual inquiry, and accountability in learning.

2.1.3 Social component

According to these researchers, the social component is associated with dynamic interaction among students at a resource-based and collaborative level. Finn (1989) points out this affective component also refer to a students' sense of belonging to the class and school setting at large. Furlong et al. (2003) describes it as the students' level of connection or emotional reaction toward schooling. This includes feelings of affection, enjoyment, liking, belonging, bonding and attachment (p. 103). Lastly, other researchers place emphasis on the significance of interaction among students during learning via group work, drama, and talk (Paris, 2004; Marks, 2000, Kuh, 2003; Fredricks, Blumenfeld & Paris, 2004). This linkage between students in a learning environment has been shown to improve educational performance (Connell & Klem, 2004).

Engaged learning in an active learning classroom is characterized as on-task behavior (Perrone, 1994). Examples of this social component are "participating in small and large group discussions; working independently, with a peer or teacher on an academic task, and contributing or attempting to contribute (e.g., raising a hand, making eye contact with the leader) to group discussions. Initiations could be verbal or nonverbal" (Ornelles, 2007, p. 7). Students are academically involved in their learning when they demonstrate engaged behaviors, such as on task activity and expresses interest in their education (Park et al., 2011; Kuh, 2003; Ornelles, 2007). On task activities or engaged time epitomizes students absorbed in their learning

(Intrator, 2005; Chickering & Gamson, 1991). Active learning necessitates that students to do meaningful learning activities and deliberate about what they are performing (Van Amburgh, Devlin, Kirwin, & Qualters, 2007).

Several active learning strategies used to elicit this social component place emphasis on the significance of interaction including cooperative, collaborative, and peer learning as well as teamwork (Drew & Mackie, 2011). For instance, the significance of questioning to facilitate interaction among learners, as a way of contributing to the formation of meta-cognition, has been cited in literature (Gavalcova, 2008). Similarly, other researchers propose that involvement in collaborative tasks ensures that learners participate more in classroom activities and increases interaction among them (Chickering & Gamson, 1987; Machemer & Crawford, 2007; Hrastinski, 2008; Farrell, 2013). Also, it is hypothesized that collaborative working among students is important in building knowledge (Scardamalia & Bereiter, 2006).

2.1.4 Behavioral component

The behavioral components focus on active resource development and employment. Finn (1989) states that students had to acquiesce to the resources being deployed for the strategy to be effective: participating in teacher-created activities and responding to directions and questions directed by the teacher. Behavior that would not be in compliance with this is inattentiveness, misbehavior during class time, and non-participation in active learning activities (1989). Watkins et al. (2007) went on to postulate that behavioral engagement of students entails active use and creation of learning materials. In the Watkins' et al., (2007) classification, the behavioral facet requires that teachers provide students with opportunities for participation that incentivizes them to be engaged in learning. Indeed, it is suggested that engaged learning is

derived from active participation that is supported by a view that students have some opportunities for alternatives and levels of freedom (Stephen et al., 2008; Connell & Klem, 2004).

2.1.5 Cognitive component

However, outside incentivizing, active learning entails students making decisions, evaluation, and thinking actively, which includes the cognitive facet (Drew & Mackie, 2011; Furlong et al., 2003). The cognitive dimension deals with active thinking about the learning experiences to facilitate knowledge construction (Connell & Klem, 2004; Watkins et al., 2007). In addition, meaning making from experiences highlights the importance of reflection on the part of the students (Watkins et al., 2007). When students understand why and what they are doing in the classroom and its overall importance, then the action is said to rise to the level of cognitive awareness (Connell & Klem, 2004).

In their study, Stephen et al. (2008) find that teachers perceive kinesthetic activity incentivize students to be engaged in subjects such as technical studies, home economics, and physical education rather than the objective and pedagogical justification of the particular task. This is contrary to the notion that active learning is characterized by cognitive processes that influence learning through doing (Machemer & Crawford, 2007, p.11). One such process involves students developing critical and analytical thinking proficiencies via engagement in valid problem solving tasks. Engagement in problem solving tasks exposes students to thinking strategies of varied disciplines and prepares them to work in teams in the real world (Furlong et al., 2003; Machemer & Crawford, 2007).

In the research conducted by Fredricks, Blumenfeld and Paris (2004), cognitive engagement is found not to be in exclusion of social and behavioral components, but often inter-reliant. For example, "students with positive attitudes to learning (social component) are more likely to adopt effective learning strategies (cognitive component)" (p. 59). However, Furlong et al. (2003) maintains that the three components are, in fact, separate when examining the student in school engagement.

2.1.6 Definition of active learning

Joel Michael (2006) views active learning as student involvement in participatory, physical, and mental learning together with reflection. The Center for Research on Learning and Teaching (CRLT) (2013) at the University of Michigan defines active learning as the process whereby a learner engages in activities that include writing, reading, discussion, and problem solving so as to promote the analysis, synthesis or evaluation of class content. *Education Scotland* defines active learning as a kind of learning where the engaged learner is challenged to think in both imaginary and real life situations (2013). It can be presented in opportunities such as planned and purposeful plays, spontaneous plays, life, and events experiences, and focused teaching and learning. *Education Scotland* concludes that children learn by doing, exploring, thinking, quality interaction, and drawing relationships, which will boost their abilities and interests across varieties of contexts (2013).

Another implicit definition of active learning is offered by Hohmann and Weikart (1995) who consider it as involving learners ``acting on objects and interacting with people, ideas, and events'' (p.7) in the construction of new knowledge. Tomei (2009) states that active learning occurs when students are mentally alert, physically active, and exploring information as derived

from his/her own senses. Finally, McKinney (2008) defines active learning as a method where instead of students passively absorbing material, they are uncovering, processing, and relating data in the learning process.

2.1.7 Synthesis of active learning definition

From the review of possible definitions of active learning, it is apparent that a unified definition of this concept is not currently available. There are several nuances to the meaning of active learning, particularly as it relates to instructional approaches. In his research into active learning, Michael Prince maintains it is nearly impossible to support universally approved definitions for all nuances because of the myriad of educational researchers and the various contexts in which they are applying the definition (2004). Nonetheless, it is reasonable to provide a few chiefly acknowledged definitions and to point out divergence in the employment of generally used terms. Thus, based on the review of the literature, it is proposed that active learning incorporates two definitions that offer a foundation for further research into active learning. The first is by Watkins et al. (2007), which defines active learning as a balance between the social, cognitive, and behavioral facets of learning in the classroom. The second and more succinct definition by Prince (2004) states that any instructional approach that engages learners in their educational development is active learning. For the purpose of the literature review and subsequent study, both definitions are implicitly referring to active learning activities that are introduced and occur in the classroom.

2.1.8 Benefits of active learning

Conceivably, as some research claims, active learning is an approach rather than a method for incorporation into the classroom (Prince, 2004). The introduction of active learning as an instructional approach offers several benefits in an education context.

2.1.9 Benefits of active learning: Students

A significant benefit of active learning identified in the literature is that students have greater responsibilities over their learning than teachers (Gavalcova, 2008; Michael, 2006; Black & William, 1998; Lorenzen, 2001). In this case, learners have more autonomy or control over the learning process, while the teacher assumes the necessary role of constructor, facilitator, and support person. Active learning creates a dialectal association between students and pedagogy with teachers mediating such a relationship (Gavalcola, 2008). It is hypothesized that in such a relationship the learners and teachers concurrently produce and consume knowledge as partners in cooperating, collaborating, and communicating the pursuit of knowledge, which empowers students to learn (Wang, 2009; Michael, 2006; Halsall & Cockett, 1998; Black & William, 1998; Lorenzen, 2001).

According to *The Economic Network* (2013), a byproduct of active learning as an instructional approach is the transfer of autonomy from the teacher to students within the classroom learning environment. This happens when the teacher employs strategies of involving students in problem solving and drawing their own inferences. Teachers employing an intensive active learning process will have students examining phenomena and developing their own theory (Bart, 2010). Michael (2006) adds that when a student continuously does this, he or she

will naturally feel empowered. These autonomous personal experiences will, therefore, enable the knowledge to be transformed into his or her framework of working meanings that will enable the student to encode and decode efficiently (Bart, 2012; Michael 2006).

In addressing the benefits of active learning, Fontichaiaro (2007) and Weimer (2002) point out that an active learning classroom develops students' skills. When students are seriously and regularly engaged in active learning, their analytical skills will develop. Rigorous class activities such as role-playing will enable them to examine questions on selected topics from different angles. Therefore, the students will learn to appreciate various points of view as advanced by teachers, experts or even their peers (Bart, 2010, Davis, 2009; KNLT, 2009). As *The Economic Network* adds, when the teacher provides all students in the classroom with tasks to do, they will apply and/or transfer directly or indirectly the theoretical knowledge acquired in class into their task, which will develop their analytic skills (2013). Furlong et al., (2003) postulates that the analytical development of students will support them as they make presentations in class or outside of it.

O'Neil et al. (2008) and Weimer (2012) report that active learning will enhance independence, creative, and critical skills. This is related to the previous point given that for a student to be creative, independent, and critical, he or she must have had the teacher's materials, so that he or she can analyze, practice, and comment. Teachers can facilitate the process in an active learning classroom by giving students activities that enable them to analyze and synthesize them before developing a critique (Weimer, 2012). Examples for these benefits can be arrived at by giving students case studies that have problem-solving tasks (Fontichaiaro, 2007). Kane (2004) asserts that debate in the active learning classroom is also important in developing skills in critical thinking and logical reasoning. This emanates from the teacher presenting a topic that

elicits competing viewpoints where the students can defend or critique, in oral or written exercises. When these are presented in class, students will be stimulated to reflect on materials of their peers, explore ideas, and develop reasoned judgment and/or arguments (Connell & Klem, 2004). Thus, teachers should give their learners opportunities to evaluate and critique other ideas, as well as their own (Eison, 2010, KNLT, 2009).

Experts at *Stanford University* indicate that active learning encourages students to develop productive collaborations and therefore, interpersonal skills (2013). When teachers create tasks in collaborative groups, it can be extremely useful, especially when handling a large class. These may involve small group discussions, where the teacher will allow for short think-pair-share breaks in the class. They would help the learners to effectively understand and retain the learnt materials. Moreover, this will also serve to promote the wider goal of effective communication skills while increasing awareness about peers and this in turn develops positive interpersonal relationships. The other strategy that develops collaborative learning and hence interpersonal relationships is the peer instruction exercises. Being aware that the results of their groups will either build or harm each of them in a group, students will actively bond to take part and develop interpersonal skills. To support their assertion, experts at *Stanford University* note that research has been done in cognitive psychology that suggests the best way of enhancing interpersonal skills in class is employing active learning strategies such as student presentations, study groups, breakout sessions, and so forth (2013).

Another benefit that experts advance is that active learning promotes students' motivation and performance (KNILT, 2009; Bryson & Hand, 2007; Eison, 2010). When students are invited to actively participate in their learning environment, they are more responsible for their performance in the course. Similarly, when an environment is created for engaged learning in

which students make decisions about their learning, they will see the class as being valuable (Eison, 2010: Weimer, 2012; The Economic Network, 2013). Students value the class because they will be made aware of how they will use the knowledge they are acquiring and how it relates directly to their goals. For example, acquiring and disseminating knowledge can happen during brainstorming sessions where the students will choose a topic or a concept so that they can generate some ideas on how it is applicable in certain problem solving situations (Eison, 2010; Michael, 2006). Increased motivation and performance levels also intensify student engagement levels, making them assess their knowledge and skills and forcing them to have deeper understanding of the material they study (Eison, 2010). The incorporation of these instructional methods into the classroom is meant to avoid a situation where students merely rely on surface knowledge as presented by teachers (The Economic Network, 2013).

Consistent with Farell (2013), Bart (2010) and Fontichaiaro (2007), the strategy of implementing active learning in the classroom also boosts students' self-esteem. When students discuss a concept in groups, they find it easy to communicate it in front of others. According to this research, this is because students would have already conceived a well-organized response. This happens because as they try out each other's response in groups, a better one often develops and may be refined. Students may even find it unbelievable that they understood the concept better than they first assumed (Farell, 2013). As personal satisfaction occurs, they will have a greater connection to the learning content. Together with enjoying whatever they learn, students will improve their self-esteem, and often become authoritative in their subject areas or careers (Fontichaiaro, 2007).

Cooperative learning, as an instructional strategy of active learning, has been found to provide various benefits including utilization of problem solving, and higher reasoning

strategies, improved self-esteem, and achievement (Gillies & Boyle, 2011). In a study comparing learners' classroom behavior and academic performance between use of teacher instruction and cooperative group activities, it was found that students participating in small cooperative groups achieve higher outcomes in learning and have higher engagement in interactions compared with students involved in classroom discussions directed by teachers (Galton, Hargreaves & Pell, 2009). Similarly, Gillies (2008) compared the performance of students in junior high and discovered that those learners performing well came from schools where students had opportunities for engaging in group work regularly. Additionally, teachers in these classrooms had training in embedding cooperative learning into the educational curriculum.

Indeed, student interaction is considered a critical aspect of group activity in active learning because it allows learners to access required resources and materials, acquire constructive feedback for enhancing task performance, and acquire information and explanations for increasing understanding (Gillies & Boyle, 2011). Howe et al. (2007) investigated organizational components supporting learning in group activity in an elementary science class. This study finds that group size, the role of the teachers as a guide, and interactions among students played critical roles in learning. Further, the study finds that the completion of cooperative, challenging, and flexible tasks encourages learning and discussions.

Webb et al. (2009) support these outcomes in their study on students' dialogue in group activities in an elementary mathematics classroom where they discover that probing for students' explanations in uncovering problem solving and thinking strategies accounts for increased learning. Gillies and Boyle (2011) investigated teachers' perceptions about cooperative learning approaches in social science curriculum with evidence showing that the interaction among students in group activity increases their confidence, learning, and makes lessons more exciting.

In addition, Farell (2013) notes that instructional strategies that incorporate collaboration between the students aide learners in developing effective interpersonal skills. This may involve small group discussion which could help the students comprehend and recall the learned materials more effectively (Fontichiaro, 2007*).*

2.1.10 Benefits of active learning: Teachers

A teacher will also benefit from incorporating active learning as an instructional approach. Integrating this type of an instructional approach engages learners directly into the learning process (Eison, 2010). Students will have to read more materials, from journal articles, books, and varied media sources, as they prepare to attend lessons and then apply knowledge in the activities being undertaken in class or in their own research. (As we will discover in the next section, this will also be a barrier for implementing active learning classrooms.) By doing this, students will be gaining a strong ownership of class processes, which is a contrast to just reacting to what the teacher does in class. Nevertheless, when a teacher cultivates a culture of active learning, class discussions will become free-flowing. The students will be able to draw out key features of the topic in discussion, listening, and reacting to others' contributions. According to *The Economic Network* (2013) and Weimer (2012), unlike teaching by lecturing, active learning enables the teacher to meet the specific needs of a student's interest.

As Bart (2010) and Batts, Colaric & McFadden (2006) illustrate, employing active learning strategies enhances good interaction between students and teachers. As projects become complex, teachers and students find time to interact to find a solution. For some students, this typically becomes an opportune time to personalize their experience with their teachers (Bart, 2010). This is the time that the teacher has the opportunity to answer questions that cannot really

be answered without close interaction. Additionally, the questions will be addressed promptly and any misunderstandings quickly and easily resolved (*The Economic Network*, 2013).

Farell (2013), an expert in K12 learning, notes that through the use of active learning strategies, teachers can encourage learners to develop effective collaborations and therefore interpersonal skills. When teachers issue tasks to collaborative groups, it can be extremely useful, especially when the class size is large. These may involve small group discussions, where the teachers allow for short thinking share breaks after a lengthy lecturing demonstration. This would help the learners to understand and retain the learned materials more effectively. Moreover, this will also serve to develop their wider goals of good communication skills while increasing awareness about their peers, which, in turn develops positive interpersonal relationships (Fontichiaro, 2007; *The Economic Network*, 2013*).*

According to Green et al. (2011), active learning reinforces state standards and assessments by enabling teachers to create learning experiences that ensure reflective, emotional, and physical outcomes connected to objectives affecting achievement of goals and growth of students. These researchers are also of the opinion that the active learning strategies that ensure interaction and cooperation among learners are linked with research supporting education standards. Wilson, Pollock, & Hamann (2007) states that active learning improves students' learning more than recitation and memorization of factors and it is associated with the development of higher order thinking skills, including application or analysis. Scheyvens et al. (2008) concur by observing that the use of active learning strategies including simulations, role play, and small group activities increases students' motivation and interest and develops social, problem solving, and critical thinking skills (Scheyvens et al., 2008; Lorenzen, 2001; Webb et al., 2009).

2.1.11 Challenges of active learning

There are also barriers that hinder the implementation of active learning in a K-12 environment. Teachers and students alike face challenges with the technology utilized in synchronous learning. The following review highlights the challenges with the aim of overcoming them by addressing the challenges up front.

2.1.12 Challenges of active learning: students

According to *Instructor Web* (2013), there is a conviction that as a form of active learning, hands-on approach will not essentially do everything in every learning situation. Educators have argued that while the approach is useful for young children, it may not be the best approach at a more advanced level of education. To support their assertion, they advance various reasons. First, teachers may always be on the run to cope with teaching a large number of students. These large classes will only be well served if students have the ability to absorb large amounts of material and make summaries of them later to better synthesize the material (Eison, 2010; *Instructor Web*, 2013). Moreover, there is growing agreement that a large classroom restricts strategies of active learning processes. For instance, in a class of more than 100 students, it would be difficult for a teacher to involve all of the pupils in different active learning strategies such as discussion groups. In this case, the teacher may find it hard to give everybody a chance to comment on the responses of others (*Instructor Web*, 2013). It can be burdensome in this scenario to prepare materials and effectively manage time so as to involve all learners in active learning (*Instructor Web*, 2013; Wang, 2009).

Eison (2010) also indicates that sometimes student's performances may be problematic as a result of their poor academic background. For instance, when a teacher assigns reading materials, the student may not be able to read or comprehend the materials independently. On another note, some students may deliberately refuse to cooperate, unpleasantly surprising the teacher with fierce negativity (Eison, 2010; Weimer, 2009). Consequently, some teachers who may not be anticipating these resultant behaviors may simply give up and resort to methods that are more comfortable, but less operational (Eison, 2010).

Furthermore, any attempt by a teacher at providing an active learning classroom is of no benefit to the learner unless the student processes the questions and participates in the learning activities. Participation by students in the active classroom is not guaranteed; basic student behaviors such as not complying with school and class rules as well as being non attentive and not answering questions posed by the teacher are often deterrence to application of active learning (Schweitzer & Brown, 2007).

2.1.13 Challenges of active learning: teachers

First, there tends to be anxiety among educators concerning the efficacy of the active learning pedagogy. In part this is due to the scarcity of empirical evidence demonstrating the worth of this approach to learning and instruction (Drew & Mackie, 2011). Notably, in their study, Bonwell & Sutherland states that there is a deficiency of research supporting assertions about active learning (1996).

Citing a past study, Watkins et al. (2007) demonstrates that engaged learning in challenging intellectual tasks results in improved attainment in mathematics and reading. Similarly, Meyer et al. (2008) cites previous research and suggests that employing active

learning strategies enhances student motivation and increases scores on tests. Concerns have been raised concerning the effectiveness of active learning in the development of sophisticated understanding and knowledge (Machemer & Crawford, 2007). Heightened critical thinking and an appreciation of other perspectives can be stimulated through instructional strategies that engage the learner (Schweitzer & Brown, 2007). However, any attempt at providing an active learning classroom is of no benefit to the learner, unless the student processes the questions and participates in the learning activities.

The change to the teacher's role in learning presents a considerable barrier to implementation of active learning in schools (Drew & Mackie, 2011; Wang, 2009). This is linked to the belief that in the educational field, the teacher is identified as playing the role of transmitting knowledge to students (Alexander, 2009), which contradicts the teacher's function in active learning as a guide or facilitator (Wang, 2009). Moreover, in active learning, teachers are positioned in an often unaccustomed marginal role that might prevent them from adopting this pedagogy (Drew & Mackie, 2011).

Another obstacle to integrating active learning as an instructional approach is related to the limited understanding of active learning. Teachers do not have enough confidence to pursue unfamiliar types of pedagogy, which might lead to criticism from school administrators, peers, and students (Pundak & Rozner, 2008). Specifically, educators might be concerned about the idea of letting students control discussions in the classroom (Wang, 2009). In addition, the conventional focus on observable outcomes of learning that is associated with accountability issues is a hindrance to the adoption of active learning (Priestley, 2010). Priestley (2010) goes on to state that accountability concerns limit change in pedagogical practice due to trepidation about taking risks among educators.

Additionally, some teachers argue that they may lose control of their class if faculty implements active learning strategies (Felder, 2013). They fear that the students may take a lot of time on both topic and off topic issues. This may mean that teachers spend some time bringing the class back to attention. It may go on to result in a more severe problem when some cases of disobedience start to emerge (*Instructor Web*, 2013).

The other obstacle for teachers implementing active learning classrooms is that some teachers see themselves as being the best (Bonwell & Eison, 1991). This limits their likelihood of changing. They have not realized that although teaching by lecturing may be the best way of transmitting information, it may not always mean that learners are equally learning. This kind of teacher will always be practicing one way communication without being aware of student problems (Bonwell & Eison, 1991). Things may become worse when the teachers themselves lack the proper communication skills to enable students to learn effectively (*CIRTL Network*, 2013).

Teachers also fear that students will not use higher order thinking in the process of the class. As Cole (2013) notes, sometimes students can be afraid to write wrong answers even in their book before discussing in class. For such students, it may be hard to engage them to think aloud. The fear will always stifle their thinking, which will further limit their problem-solving capability (Cole, 2013). Such students will not want to make mistakes unless the teacher confirms to them that what they are writing or saying is correct.

Teachers are apprehensive about the effectiveness of group work in promoting cooperative learning as an aspect of active learning (Drew & Mackie, 2011). Specifically, sometimes teachers have limited understanding of the various skills required for successful group work and also face time constraints that present obstacles to the implementation of group

activities as part of active learning (Drew & Mackie, 2011). Machemer & Crawford (2007) concur by stating that group work activity is unpopular especially among highly performing students who may feel that this pedagogy eliminates the teacher-focused approach that contributes to the success of such learners. It is also postulated that this pedagogy requires peer learning that might be an issue for students with little confidence and this may lead to passivity among such learners as a way of reducing publicity of their failure to their peers (Watkins et al., 2007).

The role of resource and time constraints necessary for the development of active learning has been presented in literature (Machemer & Crawford, 2007; Priestley, 2010). Priestley (2010) states that the short period allocated for each lesson prevents the implementation of dialogical, experiential, and collaborative instructional and learning strategies. Machemer and Crawford (2007) agree with this statement by saying that teachers have to be involved in preparing learners for exams that limit their autonomy in employing innovative practices as they have fears that this will reduce time necessary for completion of the syllabus or comprehensively covering the curriculum, thus resulting in the use of conventional pedagogy. Bonwell & Eison (1991) note that the significant range of resources, equipment, and materials required to carry out activity based learning can also be problematic. In fact, they report the hands on approach are thought to be impractical in many departments within schools when the listed requirements are in short supply or deficient.

2.2 INDICATORS OF ACTIVE LEARNING

2.2.1 NCREL indicators of engaged learning

After a review of the literature on active learning instructional methods, it is now important to identify the indicators of active learning. Scholars have reached an agreement on the importance of active learning in the classroom and recognize specific indicators need to be developed to identify engaged learning. The North Central Regional Education Laboratory (NCREL) provides resources based on the work of Jones, Valdez, Nowakowski, and Rasmussen (1994) that specify eight learning indicators that could be used to evaluate instruction for active learning. The eight indicators are:

a) Vision of engaged learning
b) Tasks for engaged learning
c) Assessment of engaged learning
d) Instructional models and strategies for engaged learning
e) Learning context of engaged learning
f) Grouping for engaged learning
g) Teacher roles for engaged learning
h) Student roles for engaged learning (p. 9)

The NCREL (1994) framework for engaged learning describes in detail the indicators of effective teaching and learning when present in the classroom (Table 1).

Table 1 *NCREL Framework for Engaged Learning*

Variable	Indicator of Engaged Learning	Indicator Definition
Vision of Learning	Responsible for learning	Learner involved in setting goals, choosing tasks, developing assessments and standards for the tasks; has big picture of learning and next steps in mind
	Strategic	Learner actively develops repertoire of thinking/learning strategies
	Energized by learning	Learner is not dependent on rewards from others, has a passion for learning
	Collaborative	Learner develops new ideas and understanding in conversations and work with others
Tasks	Authentic	Pertains to real world, may be addressed to personal interest
	Challenging	Difficult enough to be interesting by not totally frustrating, usually sustained
	Multidisciplinary	Involves integrating disciplines to solve problems and address issues
Assessment	Performance-based	Involving a performance or demonstration, usually for a real audience and useful purpose
	Generative	Assessments having meaning for learner; maybe produce information, product, service
	Seamless and ongoing	Assessment is part of instruction and vice versa; students learn during assessment
	Equitable	Assessment is culture fair
Instructional Model	Interactive	Teacher or technology program responsive to student needs, requests (e.g., menu driven)
	Generative	Instruction oriented to constructing meaning; providing meaningful activities/experiences

Table 1 (*continued*)

Variable	Indicator of Engaged Learning	Indicator Definition
Learning Context	Collaborative	Instruction conceptualizes students as part of learning community, activities are collaborative
	Knowledge-building	Learning experiences set up to bring multiple perspectives to solve problems such that each perspective contributes to shared understanding for all, goes beyond brainstorming
Learning Context	Empathetic	Learning environment and experiences set up for valuing diversity, multiple perspectives, strengths
Grouping	Heterogeneous	Small groups with persons from different ability levels and backgrounds
	Equitable	Small groups organized so that over time all students have challenging learning tasks/experiences
	Flexible	Different groups organized for different instructional purposes so each person is member of different groups, works with different people
Teacher Roles	Facilitator	Engages in negotiation, stimulates and monitors discussion and project work but does not control
	Guide	Helps student to construct their own meaning by modeling, mediating, explaining when needed, redirecting focus, providing options
	Co-learner/co-investigator	Teacher considers self as learner; willing to take risks to explore areas outside his or her expertise; collaborates with other teachers and practicing professionals
Student Roles	Explorer	Students have opportunities to explore new ideas/tools; push the envelope in ideas and research
	Cognitive Apprentice	Learning is situated in relationship with mentor who coaches students to develop ideas and skills that simulate the role of practicing professionals (i.e., engage in real research)
	Teacher	Students encouraged to teach others in formal and informal contexts

2.2.2 Seven principles of good practice in undergraduate education

Through an extensive analysis of the research, an article that first appeared in March 1987 from the American Association of Higher Education (AAHE) appears to be another reference point for identifying the indicators of active learning. "Seven Principles of Good Practice in Undergraduate Education," by Arthur Chickering and Zelda Gamson, was a meta-analysis of over 50 years of research on sound teaching principles (1987; 1991). Chickering and Gamson concede that the seven principles pertain to instructional practice in any setting (1987). The seven principles are:

a) Encourages contact between teacher and students
b) Encourages interaction and collaboration between students
c) Uses active learning techniques
d) Gives prompt feedback
e) Emphasizes time on task
f) Communicates high expectations
g) Respects diverse talents and ways of learning (p.3)

Similarly, Bonwell and Eison (1991, p.1) describe the characteristics of active learning as comprising of a) student involvement in more than passive listening, b) student engagement in various activities such as writing, discussing, and reading, c) focusing on the development of student skills rather than transmission of information, d) placing emphasis on exploring the students' values and attitudes, e) increasing student motivation, f) students participating in higher order thinking, including synthesis, evaluation, and analysis, and g) providing immediate feedback to the learners. Wang and Morgan (2008) posit that these principles should be utilized

in online education settings. These indicators of active learning are described in detail in relation to traditional learning environments.

2.2.3 Good practice encourages contact between teacher and students

According to Chickering and Gamson (1987), frequent contact between teachers and students is a vital factor in student involvement and motivation. In the traditional classroom, there is regular face-to-face contact between students and teachers that promotes positive communication between them. In such a setting, the communication is both auditory and visual because the teachers and students are physically present within the same location and interaction occurs during the lesson (Watson & Sutton, 2012). Chickering and Gamson (1991) state that student and faculty interaction in the traditional classroom is encouraged through learning students' career and educational goals, advising students, sharing values, positive attitudes with students, knowing the students, and mentoring learners.

In the context of online learning environment, Chickering and Erhmann (1996) advance that communication technologies provide students with increased access to teachers, assist them in sharing useful resources, and provide shared learning and problem solving. Watson and Sutton (2012) state that synchronous technologies offer high contact between students and teachers that extends beyond video/audio formats to include text chats and emoticons that support simultaneous interaction between students and teachers.

Simultaneous interaction between the teachers and students results from active interaction and participation within the context of online learning (Center for Teaching Excellence, 2009). Hrastinski (2008) provides a working definition of participation in the online classroom as a ``process of learning by taking part and maintaining relations with others. It is a complex process

comprising doing, communicating, thinking, feeling and belonging'' (p.1761). Other researchers conceptualize student participation as interaction. A definition for student interaction is `` a reciprocal communication and learning process between instructors and other learners'' (So, 2010: p.256). Participation and interaction among students provides them with opportunities to be involved in active learning instead of passive absorption of knowledge. Additionally, participation offers learners prospects of learning from their peers. To increase the value of active learning in the synchronous online class, it is necessary to ensure interaction among students and teachers, as well as student participation in discussions. Indeed, researchers posit that the degree of interaction among students in synchronous class is a critical factor in demonstrating learning effectiveness (Offir, Lev & Bezalel, 2008).

Hrastinski (2006) explores the effect of instant messaging and synchronous communication on student participation in online group work activity. In the study, the researcher used a control and an experimental cohort with comparisons showing that adopters of instant messaging in the synchronous learning environment report a higher level of participation and more time communicating with peers and understanding the content than those who did not adopt these technologies. In their study, Wang and Morgan (2008) discover that using instant messaging for synchronous online discussions of a chapter in a textbook increase the learners' perceptions of interaction with the teacher as receiving encouragement and advice from the instructor.

2.2.4 Good practice encourages collaboration between students

Chickering and Gamson (1987) confirm that real learning is social and collaborative because working within a group increases student involvement in learning. Cooperation among students

can be supported through using collaborative learning and teaching techniques, project teams, and study groups (Chickering & Gamson, 1991). Eison (2010) states that the pause and think-pair-share procedures are effective instructional strategies for supporting cooperation among students in active learning in traditional classrooms. The pause technique involves the teachers pausing for about two minutes during a lecture and grouping students into pairs to enable them to rework and discuss notes devoid of student and teacher interaction. On the other hand, the think-pair-share technique promotes structured interactions by allowing students to think about answers to a question posed by the teacher, followed by pairing and sharing their reactions with each other. Such collaborative learning strategies have been shown to improve self-esteem, productivity, and engagement among students (Batts et al., 2006).

In one of the earliest papers to focus on the application of this practice in synchronous learning environments, researchers theorize that, similar to traditional classrooms, teachers can utilize group projects to promote collaboration (Newlin & Wang, 2002). In synchronous classes, discussions and chats enable students to share their ideas to achieve group-based learning objectives (McCabe & Meuter, 2011). Wang and Morgan (2008) perceive that the immediate communication found in synchronous learning environments, such as instant messages, encourages cooperation among students by reducing intellectual and emotional isolation.

In their study, Chiu, Yang, Liang, and Chen (2010) examine the participation styles used by elementary students in synchronous online collaboration and communication. The study uses a sample of 278 students who are grouped into three cohorts for discussion and completion of a group assignment. Data analysis is used in statistical classification of students based on their textual discussions. The study shows that students participating in online synchronous communication with their peers display various participation styles including communicative and

coordination emphasizing (Chiu et al., 2010). Further, the researchers discovered that students exhibiting communicative participation styles have higher knowledge retention and learning performance than those displaying less contributing or coordination emphasizing participation styles. Grouping students in synchronous learning environments supports interactive problem-solving, which promotes collaboration among learners (Wang and Morgan, 2008).

2.2.5 Good practice uses active learning strategies

Chickering and Gamson (1987) declare that students "must talk about what they are learning, write about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves" (p. 3). This statement is similar to Bonwell and Eison's (1991) view that students are involved in more than passive listening. This underscores the importance of student engagement as an aspect of active learning (Watson & Sutton, 2012). Indeed, active learning is attained through reflection and experiences (Schiller, Goodrich & Gupta, 2013). Experiences describe doing and observation. Observation entails learners watching or listening to others performing actions related to the topic that leads to discovery and understanding of concepts. Doing entails application of acquired knowledge in performance of tasks that leads to the formulation of new experiences and knowledge (Schiller et al., 2013).

Reflection is another aspect of active learning where students focus on the meaning of the learning experiences. Student engagement focuses on issues such as student collaboration, interactions with peers and teachers, the amount of completed assignments, and active participation in learning (Yang, 2011). Researchers posit that student engagement is associated with personal development, fulfillment, passion and enjoyment for learners (Case, 2007; Bryson

& Hand, 2007). Further, engagement is more likely to lead to improved learning among students (Bryson & Hand, 2007).

Bonwell and Eison (1991) state that in traditional classrooms, active learning occurs through asking learners to present their work to the class, requiring students to relate outside activities or events to content in the course and encouraging students to challenge ideas and analyze concrete situations. Raghallaigh and Cunniffe (2013) investigate students' experiences in active learning and student engagement via participation in seminars. The approach for collecting data involves questionnaires and using focus group discussions. The results of the study show high student engagement was reported in the study sample and that the components of active learning including doing, observing, and reflecting collectively contribute to student engagement. This study underscores that active learning facilitates student engagement in the traditional classroom; however, educators should consider the significance of the learning atmosphere to attain desired student outcomes.

Synchronous online learning environments allow educators to promote active learning by allowing students to reflect, chat, and study at specific times (Yang, 2011). Studies have been carried out to evaluate active learning in online learning environments. Investigators designed and implemented an active learning pedagogy of SL (Second Life) project and evaluated its effectiveness on student learning and engagement using qualitative and quantitative data (Schiller et al., 2013). The findings demonstrated an increase in student engagement and learning that was attributed to the "doing" experience together with other learning activities in the project.

Positive outcomes of active learning in synchronous learning environments are also reported by McBrien, Jones, and Cheng (2009) in a study investigating student engagement using the Elluminate software that delivers synchronous online learning. The researchers acquire

the data for their study by administering a survey to students to determine their experiences about virtual classrooms. The results show that synchronous learning environments increased student engagement in discussion and increase learner autonomy in processing course content and concepts. Similarly, the study finds that this system offers students more time to engage in reflection and increases their participation in the course. In a similar study, Wang and Morgan (2008) show that active learning is achieved in synchronous learning environments by enabling students to prepare to participate in discussions, improving their ability to provide contributions based on real-life teaching, and increasing responsibility and active participation among the learners.

2.2.6 Good practice gives prompt feedback

Chickering and Gamson (1987) indicate that learners need teacher feedback on performance to benefit from class instruction. Van de Ridder et al. (2008) describe feedback as particular information comparing observed performance and a certain standard, which is aimed at improving the learner's performance. Essential to this approach is questioning designed to inform instruction and improve student learning (Kearsley & Blomeyer, 2003; Bonwell, 1997; Chizmar & Walbert, 1999; Black et al., 2004). The standards used in comparing students' performance are based on learning goals and feedback providing critical information concerning the learner's current performance in relation to established criteria (Nicole & Macfarlane-Dick, 2006). Constant measurement and assessment of students during class also provides students with criterion for checking their progress and adjusting their study strategies (Ragan, 2007).

The concept that students engaged in knowledge creation through interaction with their learning environment is grounded in the social constructivist theory of learning (Van den Bergh,

Ros, & Douwe, 2013). Other researchers note that the feedback in active learning should be constructive by providing students with hints for enhancing their performance (Kearsley & Blomeyer, 2003; Nicole & MacFarlane-Dick, 2006). Van den Bergh et al. (2013) conclude that in active learning settings, teachers should place emphasis on providing feedback aimed at improving social learning and meta-cognition among the students. This is similar to findings in another study that show that feedback on the learner's meta-cognition is highly effective in enhancing learning (Hattie & Timperley, 2007).

Some of the activities related to feedback in the conventional classroom are comprised of giving students immediate feedback on class tasks, evaluating the students' work throughout the term, providing written comments on weaknesses and strengths of class assignments, and discussing outcomes of exams and class assignments with the class and student (Chickering and Gamson, 1991). However, in synchronous learning environments, it is suggested that feedback be provided through text-chat messaging, pacing indicators and emoticons by establishing protocols on when and how to utilize these feedback tools (Tremblay, 2006). According to Schiller et al (2013), assessment of learning and provision of feedback in active learning in synchronous environments should utilize creative, innovative, and nonconventional techniques including peer evaluation, non-graded feedbacks, and assessment as learning (p.58).

McCabe and Meuter (2011) posit that chat and discussions tools provide prompt feedback to learners in synchronous learning environments. Specifically, discussions in synchronous classes enable learners to obtain immediate feedback concerning their input into the topic being discussed (Watson & Sutton, 2012). Rollag (2010) contends that grading of students' work in the synchronous classes enables teachers to observe interaction among students as it is not easy for learners to hide their expression of understanding and participation in the discussion.

Similarly, Chickering and Ehrmann (1996) postulate that the provision of continuous feedback in online environments allows teachers to offer the support required for guiding students. Indeed, Wang and Morgan (2008) opine that the presence of the teacher in an interactive conversation with learners facilitates prompt feedback.

In a study on assessments, Zerr (2007) uses an online quiz system as a tool for supplying feedback to students in a calculus class. The objective of this approach is the creation of an online environment that encourages active student engagement outside the context of the classroom. This system enables the students to receive instantaneous feedback and increases their capability in completing related problems following the review of feedback. Moreover, Wang and Morgan (2008) indicate that instant messaging in synchronous online discussions supports prompt feedback by allowing students to obtain responses to their queries from the teacher and peers and also aid them in determining the extent to which the teacher and peers agree with individuals' contributions. Another key finding in this study is that the teacher and peers corrected an unsupportive contribution from classmates.

2.2.7 Good practice emphasizes time on tasks

Researchers posit effective time management in discussions, assessments, and reading among students is vital to learning (Chickering & Gamson, 1987; Chickering & Erhmann, 1996). According to Chickering & Gamson (1987), ``time plus energy equals learning. There is no substitute for time on task'' (p.3). McCabe and Meuter (2011) suggest that articulation of the amount of time required to carry out a task facilitates time management, while development of course processes and materials with high engagement motivates students to allocate more time on a task, that promotes attainment. In traditional classrooms, effective management of time

occurs through setting of expectations about prompt completion of assignments, communicating the time required for class preparation and assignments, assisting learners to establish challenging learning goals, and encouraging prior preparation of oral presentations (Chickering & Gamson, 1991).

Time management strategies evolve in synchronous classes through the setting of deadlines for class activities (Center for Teaching Excellence, 2009). Similarly, other researchers suggest that teachers should employ the calendar function for ensuring students perform tasks within the required deadlines and learning modules and goals for signaling expectations about the course(McCabe & Meuter, 2011). Chickering and Erhmann (1996) explain that in online environments teachers can use available technologies for documenting students' time on class tasks and recording learner interaction and participation. Newlin and Wang (2002) state that using regularly scheduled chat rooms allows teachers to timely and directly deal with issues hindering effective management of time by students.

2.2.8 Good practice communicates high expectations

The importance of high expectations is demonstrated by Chickering & Gamson (1987, p.5) who state that ``high expectations are important for everyone…expecting students to perform well becomes a self-fulfilling prophecy when teachers and institutions hold high expectations of themselves and make extra efforts''. Indeed, it is reported that there is an association between achievement expectations and performance (McCabe & Meuter, 2011). In traditional classrooms, expectations are articulated through encouraging student excellence, providing positive reinforcements, assisting students in establishing challenging goals, and publically acknowledging excellent performers (Chickering & Gamson, 1991).

As in the traditional classroom setting, synchronous learning environments allow for high expectations to be articulated through providing challenging assignments to the students, modeling what to do, offering public recognition for exemplary work, and using rubrics (Center for Teaching Excellence, 2009; McCabe & Meuter, 2011). Furthermore, in a seminal paper on integrating this pedagogical practice into online environments, Newlin and Wang (2002) describe some of the ways through which high expectations can be communicated to synchronous online learners. They include communicating the course objectives and goals, delineating the ways through which the students will achieve the objectives and goals and the strategy for providing performance feedback, reiterating the objectives and goals chats, and providing regular feedback to communicate performance expectations in a supportive way (Newlin & Wang, 2002). Similar views are expressed by Chickering and Erhmann (1996) who hypothesize that online technologies can provide teachers with an effective way of articulating the criteria for performance evaluation.

2.2.9 Good practice respects students' diverse talents and ways of learning

Noted educational scholars state that students have varied learning styles and talents; hence, they should have the opportunities for learning in ways that are suitable for them (Chickering & Gamson, 1987; 1991; Black & William, 1998; Lorenzen, 2001). In recognition of varied learning styles among students, Chickering and Gamson (1991) indicate that they may apply diverse teaching techniques to meet the full range of learners in traditional classrooms. Other approaches include selecting readings and designing activities to reflect the learners' background, providing extra tasks or materials for students with limited skills and knowledge, and providing students with opportunities for expression when they fail to understand course content. Conversely, it is

argued that the fast paced and competitive learning environment found in conventional classrooms fails to provide multiple learning techniques (Watson & Sutton, 2012).

Similar to the traditional classroom, the synchronous learning environment should be perceptive to the diverse learning expectations, needs, and styles of students (Mupinga, Nora & Yaw, 2006). Other researchers note that online synchronous learning environments provide learners with a variety of learning techniques including chats, discussions, lectures, online assessments, and access to several information sources via web links that may be difficult to broadcast in the conventional classroom (McCabe & Meuter, 2011). Similarly, Chickering and Erhmann (1996) posit that synchronous learning environments provide students with broad and effective learning repertoires through visuals, direct experience, and tasks for evaluation and synthesis, which support self-reflection, collaboration, and problem solving.

2.2.10 Active learning matrix

In order to summarize and visualize the second guiding question of the literature review (*What does the literature say are the indicators of active learning in traditional and synchronous online learning environments?*) a matrix was created (Table 2). The frequency chart/matrix captures the indicators of active learning based on the review of the literature. In its basic form, the matrix displays as its specific criteria the researchers from the literature review who wrote about indicators of active learning. The measure of performance then was determined by whether or not the researchers referred to the specific indicators of active learning. A total of 51 articles from the review of the literature were analyzed, and a tally was taken which produced a total of 13 indicators of active learning.

The 13 indicators of active learning then were categorized as either primary or secondary. Six primary indicators and seven secondary indicators are identified for a total of 13 indicators of active learning. The six primary indicators represent a minimum of 26 or more peer-reviewed articles (at least half of the researched literature) that refer to the indicator as important to active learning. The seven secondary indicators represent 25 or less peer-reviewed articles (less than half of the researched literature) that refer to the indicator as important to active learning. For the purpose of this study, I want to present to the K-12 synchronous online teachers the six primary indicators of active learning. The rationale for the six primary indicators is that they are the most frequently identified indicators of active learning from the literature.

Table 2 *Active Learning Matrix*

Literature Review	Student to Teacher	Student to Student	Active Learning Design	Prompt Feedback	Time on Task	Communicate High Expectations	Respect Diverse Talents	Course Evaluation	Learner Autonomy	Supportive Campus Environment	Parent Involvment	Meta Cognition	Integration of Technology
Chickering & Gamson 1987	■	■	■	■	■	■	■						
Bonwell & Eison 1991	■	■	■		■	■	■						
NCREL 1994	■	■	■	■	■								
Halsall & Cockett 1998	■	■	■			■			■				
Michael 2006	■	■	■	■	■	■	■						
Wang 2009	■	■	■	■	■	■	■		■			■	
Lorenzen 2001	■		■										■
Bart 2010	■	■		■	■	■	■						
Zwack 2006	■	■	■										
Black & William 1998			■	■	■	■			■			■	
Conderman et al 2012	■	■	■	■	■	■	■	■				■	
Birenbaum 2002	■	■	■	■	■	■	■		■				
Anthony 1996	■	■	■										
Finn 1989			■	■	■	■			■			■	
Furlong 2003	■	■	■										
Connel & Klem 2004	■	■	■										
Intrator 2005	■	■	■	■	■	■	■		■	■	■		■
Van Amburgh et al 2007		■			■	■							
Gavalcova 2008		■	■	■	■	■							
Hrastinski 2008	■	■	■	■	■	■	■						
Stephen et al 2008	■	■			■	■	■		■	■			
Drew & Mackie 2011	■	■	■	■	■	■				■	■	■	
Machemir & Crawford 2007						■	■	■	■				
Fredericks et al 2004	■	■	■	■		■							
Watkins et al 2007	■	■	■	■			■						
Prince 2004	■	■	■	■	■	■	■		■			■	
Tomei 2009	■	■		■	■	■							
Hohmann et al 1995	■	■	■	■									
Mckinney 2008	■	■		■		■		■				■	
Ornelles 2007	■	■	■	■	■	■	■		■				
Park 2011	■	■		■	■	■							
Farell 2013	■	■	■	■									

2.3 ONLINE LEARNING

Recognizing the terms and related measures is necessary for progressing research and practice associated with active learning in a virtual classroom. It has become unmistakable that we need to extend this line of inquiry to the synchronous online learning environment. Due to the expansive growth in cyber charter and traditional schools throughout Pennsylvania and across the country and the unique characteristics of teaching online, further research is needed. The goal of the literature review is to define and identify the strategies of active learning as they manifest in the classroom and to discuss the models of delivery created for online learning.

Research into active learning in traditional classrooms exists, and it points to the positive effect this environment has on improving learner engagement, retention, and motivation. However, in researching active learning in online education, I found very little in the way of research into a synchronous learning environment and its impact on K-12 schooling. Critics of online learning make the claim that students in this setting are turning on the computers and walking away or, at best, passively partaking in the education, but are not actively engaged in the lesson.

The definition of online learning is not standardized; Dichev et al. (2013) review current literature on this topic and define it as "teacher-led education that utilizes technology with Internet based tools and resources as a delivery method for instruction, research, assessment, and communication. It may be synchronous (in real time) or asynchronous (separated by time) and accessed from multiple settings'' (p.93). Currently, virtual schools are providing supplemental or full time online courses for students in K-12 (Watson et al., 2010). Presently, K-12 online education is offered through consortium programs, private schools, blended programs, university programs, single district programs, multidistrict programs, charter schools, and virtual schools

(Dichev et al., 2013; Cavanaugh, Barbour & Clark, 2009). Recent estimates show that in 2010 alone, 1.5 million in secondary and elementary schools were involved in some online education (Wicks, 2010). Further estimates indicate that 275,000 participated in full online schools between 2011 and 2012 (Watson et al., 2012).

Online education has a rich history in the USA with television and radio being incorporated into one-way instructional designs; however, this was not considered as an ideal option for students (Dorniden, 2009). As of 1972, technological advancements supported bidirectional communication between teachers and students, while half of the end of the 20th century witnessed the emergence of online, interactive, and videoconferencing courses (Dorniden, 2009). The spread of online learning to K-12 education started in the 1990s (Cavanaugh et al., 2009). It was initiated by the formation of University of Nebraska's high profile CLASS online high school in 1996, which was followed by the Florida Virtual High School, and Concord Consortium Virtual High School (Clark, 2013).

To ensure the efficacy of K-12 online education, the International Association for K-12 Online Learning (2011) described eleven national standards for quality online teaching that focus on the teacher's knowledge, understanding, and abilities. The standards provide a framework for rating teachers' competence in online teaching. Furthermore, the same organziation describes the national quality standards for quality online courses, which address areas of content, instructional design, student assessment, technology, course evaluation, and support (International Asociation for K-12 Online Learning, 2011). These standards have to be adopted by all schools offering K-12 online learning to ensure the quality of online education. Researchers have also described the key trends in K-12 online education to include e-learning

continuity, competency learning, and blended learning (Barbour et al., 2011; Dichev et al., 2013).

Garrison et al. (2001) conjectures that learning in an online environment is achieved through collaboration. The Community of Inquiry (COI) model promotes collaboration among students and their teachers and is distinguished by three aspects: cognitive presence, teaching presence, and social presence. The COI model suggests that knowledge construction in the online environment develops from joint efforts among learners and teachers and is characterized by suitable teaching presence and supportive social presence (Shea & Bidjerano, 2013; Angelaina & Jimmoyiannis, 2012). The teaching presence concept describes tasks including direct instruction, facilitation of discussion, design and organization of the online course (Garrison et al., 2001). Teaching presence may be used to indicate instructional quality in the online environment with empirical evidence finding correlations between teaching presence quality and student learning and satisfaction (Bangert, 2008). The researchers of the COI model postulate that social presence is demonstrated in the online learning environment that supports cohesion, interaction, and positive affect. Indeed, various empirical investigations show that social presence mediates the association between learners' view of teaching presence and assessment of learning (Shea & Bidjerano, 2008, 2009).

In the opinion of Garrison et al. (2001), the learning processes resulting from a cycle of practical inquiry is described precisely by cognitive presence. Cognitive presence involves the triggering event, exploration, integration, and resolution which are attributed to four phases of practical inquiry (Garrison et al., 2001). According to the researchers of the inquiry design, the triggering is the initial stage of practical inquiry where online students initiate an issue. The exploration phase entails students expressing their ideas, views, explanations and discussions

that lead to information exchange (Angelaina & Jimoyiannis, 2012; Garrison et al., 2001). During the integration phase, the students display cognitive presence by synthesizing ideas and formulating conclusion. The resolution stage is marked by providing students with opportunities and expectations for applying newly constructed knowledge (Angelaina & Jimoyiannis, 2012; Garrison et al., 2001). Although the COI model was originally developed for asynchronous online learning (Garrison et al., 2001), this model is also applied to synchronous learning (Wanstreet & Stein, 2011). Consequently, this makes this COI model effective for understanding learning in an online context.

2.4 MODELS OF ONLINE EDUCATIONAL DELIVERY

2.4.1 Blended learning

Blended learning refers to the fusion of conventional classroom teaching and learning with online delivery of instruction and content (Barbour et al., 2011). According to Barbour et al. (2011) competency learning focuses on how technology is facilitating student empowerment by offering opportunities for personalized instruction, and e-learning continuity deals with how educators plan and manage instructions over technological models. Dichev et al. (2013) identify issues such as cloud computing, mobile learning, and education via social media as other trends affecting K-12 online education. These trends will continue to shape online learning in K-12 school settings.

2.4.2 Asynchronous learning

Asynchronous learning or "self-paced" online learning is the most prevalent mode of delivery in online education (Yang, 2008; Hull & Saxon, 2009). Asynchronous learning is an effective online instructional tool for students spread across varied time zones because it allows learners to participate in class based on individual convenience (Duncan et al., 2012). Students take asynchronous classes because they provide flexibility in scheduling activities, especially for learners who are parents and employees (Hrastinski, 2008). In asynchronous learning, students are not required to provide immediate responses that provide opportunities for processing of information (Al-Shalchi, 2009; Hrastinski, 2008).

Meyer (2007) suggested that asynchronous discussions provide learners with more information for enhanced meaningful analysis. Students in asynchronous discussions can research and think about the study topic prior to participating in a discussion (Al-Shalchi, 2009). Researchers are of the opinion that the quantity of educational material obtained through an asynchronous platform and the quantity of interaction among students have a positive impact on performance (Perera & Richardson, 2010). However, limited opportunities for effective communication and isolation are considered the weaknesses of asynchronous learning (Hrastinski, 2008). Limited interaction is associated with social engagement theories that emphasize the importance of interaction among students in cognitive development.

Asynchronous online learning can also provide advantageous learning environments for the students since asynchronous courses produce a just-in-time educational opportunity for students (Hrastinski, 2007). Here students are not bound by the teachers' predetermined schedule and have a flexible structure to plan for the courses. Examples of programs based on the asynchronous learning are message boards, blogging, and threaded discussion (Hrastinski, 2007).

Asynchronous learning takes two forms in its approach: facilitated and self-paced programs. Facilitated asynchronous learning involves a flexible interaction between the course instructor and a group of learners who set their own time of learning. The primary task for the instructor is to give an online assignment which requires the student's participation through searching for responses using materials from online web resources. After searching for materials, the students engage in the online discussions about the assignment through the threaded discussions (Alexander & Robin, 2007). The final part of the program is for the students to submit the search findings of the assignment to the instructor through email or digital drop box. The interesting part of this program is that teachers can provide individualized attention to students, and the potential exists for peer to peer collaboration learning (Kinshuk & Nian-Shing, 2006).

According to research done on a seminar presentation Offir et al. (2008) there is a positive learning experience in asynchronous discussion for both a smaller group and a large group category. The research indicates that asynchronous learning is useful in learning programs that involve content. However, the disadvantage of this online learning approach is that constant isolation of the students from their teachers can lead to a situation where the students feels as if they are not part of the learning process. This can only be enhanced through teacher-student online interactions that are not usually part of this learning model (Kinshuk & Nian-Shing, 2006). Additionally, this mode of study requires a comparatively larger group of students to be effective. In this way, the learner is allowed time to understand the issue before he or she gives a response, thus creating and individual's ability to process vital information. According to Kuyath (2008), an exchange of about 600 words requires approximately 6 minutes for a difficult

group task in a one-one setting. This gives the learner enough time to comprehend issues and give a precise response.

2.4.3 Synchronous learning

According to Hrastinski (2007), synchronous learning, which is a preferred method of online learning, involves interacting with the course instructors through an online learning platform simultaneously even if the teacher and instructor are not in the same place. This is why synchronous learning is often referred to as at the same time. Antitheticaly, asynchronous learning is designed to give the learner time to complete the web base instruction at a time convenient to him or her on a preferred schedule, without necessarily having a one to one interaction with the course instructor (Alexander and Robin, 2007). As such, it is commonly referred to as "not at the same time." The recent advancement in technology has affected how both synchronous and asynchronous learning have been implemented in all levels of learning. For example, asynchronous learning is widely preferred in many university curriculums over synchronous learning due to its flexibility with which it allows students and instructors to carry out the learning process (Hrastinski, 2007).

Synchronous learning ensures that teachers and students have real-time communication, which offers them the capability of posing questions and receiving delayed or immediate responses (Chiu, 2010; Duncan et al., 2012; McBrien et al., 2009). Synchronous learning is based on a set time and date for meeting between students and teachers (Skylar, 2009). Therefore, students lack authority over the time they have to engage in discourse for knowledge acquisition (Hrastinski, 2008). Synchronous learning is conducted through various media including instant messaging, satellite broadcast, Internet telephony, live television broadcasting,

live radio broadcasting, online chatting, and video or audio conferencing (Negash & Wilcox, 2008; Hrastinski, 2008). Stephens and Mottet (2008) state that using video and audio tools in synchronous environments support interactivity in the learning experience. In such sessions, students are engaged in the learning process through voice communication and text chatting functions (Skylar, 2009). Hrastinski (2008) states synchronous communication improves student motivation.

Jones et al (2009) investigate the development, delivery, and evaluation of a course via live interactive broadcasting and find that out of the 14 students in their study, 12 report that synchronous techniques are related to feedback and interactions from peers and teachers. Other researchers note that synchronous learning environments support collaborative work between teachers and students and ensure instant feedback from the teacher to the students or among the students (Hrastinski, 2008; Al-Shalchi, 2009). In addition, they facilitate social interaction among the students and teacher that decrease the level of isolation and improves individual participation and motivation (Hrastinski, 2008).

Similarly, research conducted by Bezuidenhout (2009) on synchronous online learning indicates how indispensable social presence is to the growth of cognitive ability among students. The synchronous model supports higher interactivity between students and teachers; however, it has been found that learners show reluctance in engaging in this kind of communication approach (Wells, De Lange & Fieger, 2008). Researchers attribute this reluctance to students' perception that online materials are not an ancillary learning tool (Love & Fry, 2006). Despite this, students give high ratings for synchronous online classrooms owing to the quality of discourse, autonomy, and convenience they provide (McBrien, Jones & Cheng, 2009).

Synchronous learning takes various forms, the most common one being the virtual classroom. Here the instructor holds a classroom session in real time with the learners potentially from around the globe (Bezuidenhout, 2009). This form of online learning is effective because it involves the teacher "broadcasting" audio and video out to the learners directly from the virtual classroom. Various technologies can be used in the broadcasting through either web-based audio and video conferencing or a simple telephone call (Hrastinski, 2007). The learners are, at the very same time, supposed to be connected through the teleconferencing web site link where they observe teacher presentations utilizing slide shows to convey the content of the lesson. The technology caters to all learning activities because learners have a chance to participate in the presentation through asking questions, clarifications or comments throughout either calling the phone line or in most cases a direct live chat provided in the web site link interface (Kock, 2006). These features of synchronous learning make it more reliable and standard among the distance learning community at all levels of learning.

This method of online learning provides an open field to support other types of communication during the learning process (Alexander & Robin, 2007). However, discussions under this mode are restricted primarily to the amount of time allocated for the live instruction. Both small and larger groups can effectively use this mode of online learning as it gives room for discussing other important issues outside the course content (Kinshuk, Nian-Shing, 2006). Based on the argument presented on the Kock's media naturalness hypothesis (2006), a synchronous communication can advance psychological arousal. Kock's arguments rely on the fact that an individual's ability to interpret facial expressions and body language is enough to stimulate cognitive activation. Therefore, these features in an individual are important to the learning process.

From research, it has been established that synchronous learning is a more social approach of online learning. Additionally, this mode of learning provides a basis for observing the student's response to a message giving the learners further motivation through the reply (Kinshuk & Nian-Shing, 2006). On the other hand, the sender of the message is psychologically involved in the learning process because he or she expects feedback. Alternatively, this method is time conscious because learners will respond immediately to the instructor to keep pace with the live conversations. The limitation of this model of study is that it encourages more emphasis on quantity than on quality through a need for a quick response (Alexander & Robin, 2007).

2.4.4 Comparison of asynchronous and synchronous learning

Empirical research demonstrates that both asynchronous and synchronous communication supports various pedagogical objectives (Hrastinski, Keller & Carlsson, 2010; Pfaffmann, 2007). For instance, studies suggest that the asynchronous communication provides students with more time for reflection of the content than the synchronous model (Giesbers et al., 2013; Alexander & Robin, 2007). Conversely, another author states that learners in asynchronous learning environments face challenges in constructive conveyance of their message (Paulus, 2006). In fact, it has been indicated that there is less engagement among learners in asynchronous learning owing to variations in the quality and quantity of contributions made in the discussion forums (Rientes et al., 2009). On the other hand, synchronous learning supports direct feedback and interaction among teachers and students that supports rectification of misconceptions, which might result in more student engagement (Hrastinski, Keller & Carlsson, 2010). Pragmatic evidence shows that synchronous communication ensures social support and strengthens relationships among students that facilitate the online learning process (Hrastinski et al., 2010).

The Skylar study (2009) on online delivery methods reports students' satisfaction with both synchronous and asynchronous methods. The outcome indicates that 80.5% of the students report that they have a higher performance on weekly quizzes in synchronous than asynchronous instruction. Other findings are that 87.8% state that participation in synchronous learning improves understanding of course material together with using materials from text lectures while 73.2% reported that they preferred synchronous online courses to asynchronous ones.

Ward, Peters, and Shelly (2010) seek to identify teacher and student perceptions regarding the quality of online synchronous instruction. The study uses survey research and qualitative phenomenological research to achieve the aims of their investigation. The results demonstrate that both the teachers and students are of the belief that the quality of learning in synchronous learning environments is high. Specifically, they highlight the importance of interaction between peers, as well as interaction between instructors and students, as increasing the quality of learning in the synchronous online context.

Kuyath (2008) investigates social presence among students in synchronous and asynchronous communication using two cohorts with equivalent GPA, ethnicity, gender, and age. The researcher subjects the two cohorts to a group of students without comparable characteristics. The study participants respond to pretest and posttest assignments using the appropriate communication model for asynchronous and synchronous communication. The results of this study show that synchronous communication results in higher levels of social presence than does asynchronous interaction between the students.

In a related research, Rockinson-Szapkiw (2009) conduct a comparative study of teaching presence, social presence, and cognitive presence, as well as anticipated learning among students using only asynchronous interaction and those utilizing both synchronous and asynchronous

communication tools. The cohort using a mixture of asynchronous and synchronous courses communicates via chat and audio for discussion and collaboration. The investigation's conclusions suggest that students combining both learning models reported greater social presence than those in the asynchronous course, although a small effect size is reported for this outcome. The qualitative findings in this study indicate that synchronous communication increases collaboration and interaction compared with asynchronous communication. Therefore, Rockinson-Szapkiw (2009) study supports the findings in Kuyath's (2008) research.

Johnson (2008) conducts an analysis of learning outcomes in research where learners utilize asynchronous discussions and synchronous chats in four case studies. The researcher uses a multiple choice exam and students' opinions on the two modes of educational delivery to evaluate differences in learning outcomes. Interestingly, the researcher fails to find significant differences in learning improvements between synchronous and asynchronous modes.

Comparable discoveries are reported by Somenarain et al. (2010) in their study on the effects of online learning on student achievement and students' attitudes and perceptions pointing to online education. The researcher compares satisfaction surveys and course grades from students in asynchronous and synchronous instructional groups and discovers a lack of significant differences in satisfaction and course grades between the two modes of online learning. The findings in these two studies contradict Kuyath's (2008) findings in relation to student performance in synchronous and asynchronous modes where it found that students in synchronous learning had higher performance on assignments than those in asynchronous learning environments.

In a similar study, Offir et al. (2008) compare deep and surface learning process in synchronous versus asynchronous systems with findings showing that those students in the

synchronous instruction group report higher achievements in a course than those in the asynchronous cohort. Furthermore, the study shows that synchronous learning is more effective among learners with high cognitive capability than it is for those with a low cognitive capability.

Hrastinski (2008) conducts an analysis on synchronous and asynchronous online classes by interviewing students about their perceptions of the two models. The researcher employs both quantitative and qualitative measures of actual and perceived participation applying synchronous and asynchronous communication. Hrastinski concludes that synchronous learning increases motivation among students while the asynchronous mode increased cognitive participation among students. In an earlier study, Hrastinski (2007) classified participation in two components, namely cognitive and personal participation. The researcher notes that asynchronous communication induces higher cognitive efforts by providing learners with more time for reflection while synchronous interactions stimulate higher rates of motivation and reduced ambiguity due to immediate feedback.

With the increased quest for access to education in the United States and all over the world, the only real response is through online education. This takes two forms: synchronous and asynchronous learning. Synchronous learning ensures that teachers and students have real time communication, which offers them the capability of posing questions and receiving delayed or immediate responses. Asynchronous learning is a valuable online instructional tool for learners spread across various time schedules because it allows learners to participate in class at their own time and in their space, wherever that may be. To a large extent, the two instructional delivery models have been found to be sufficient in providing online education, asynchronous learning has faced the most challenges. Asynchronous learning can lead to isolation of the

learner from the instructor, thus psychologically affecting the student. Further, asynchronous learning can lead to promoting quantity rather than quality of learning.

3.0 METHODS

The purpose of this study was to describe the perspectives of teachers in K-12 synchronous online learning in regards to active learning in their classroom. The focus is descriptive in nature with teachers selected for the study from a single cyber charter school. An online survey instrument developed from the indicators of active learning was administered to the synchronous online teachers to gauge their perceptions. This chapter includes the problem statement, context of the problem, research questions, research design, theoretical framework, descriptions of instruments, participants, outreach efforts, and data collection, and analysis. Four exploratory questions that guide the inquiry are introduced along with evidence from the literature review to address each question.

3.1 STATEMENT OF PROBLEM

In addition to dedicated, committed educators, the success of synchronous online learning in K-12 schools depends on practical, systematic studies to inform and shape virtual classroom pedagogy. For example, there is significant research examining the nature of active learning in traditional classrooms. Teachers who facilitate active learning in their classrooms see increases in student educational achievement, positive attitudes to learning, and self-efficacy (Skinner, Kindermann & Furrer, 2009). However, there is little research about active learning in the

context of synchronous online classrooms. Critics of this online learning environment claim that students are passive participants and in fact do not take an active role in learning. K-12 synchronous online teachers complain they do not have adequate professional development on strategies to engage their students actively. Consequently, a quantitative study of active learning in a K-12 synchronous online classroom is warranted.

The literature review aims to inform policymakers, educational administrators and K-12 educators on the dynamics of active learning and synchronous online learning, as well as, to improve research and practices for active learning in the virtual classroom. Examination of active learning indicators in the traditional classroom and the portrayal of synchronous online teachers in a K-12 cyber charter school can enrich the advancement of insight and skills essential to understanding how active learning manifests in the virtual classroom. As such, this exploration of the perceptions of K-12 synchronous online teachers and the role of active learning in a cyber charter school is situated within the department of Administrative and Policy Studies (ADMPS) at the University of Pittsburgh.

3.2 CONTEXT OF PROBLEM

As described in chapter 2, the operational definition of active learning for this research study is any instructional approach that engages the student in the classroom with their educational development (Prince, 2004). A review of the literature situates active learning indicators, active learning strategies or tactics and impediments to implementing active learning in traditional classrooms. The online classroom typically uses the Internet and personal computers to deliver instruction and has two types of delivery models: asynchronous and synchronous. Asynchronous

refers to education that takes place at any time and in any place without physical association of the teacher and the student (Yang, 2008). This model of delivery is often called self-paced because communication between teacher and student is not linked to a particular time frame. In asynchronous instruction, often the only time the student and teacher interact is through the grading of assignments. On the other hand, synchronous delivery is based on a set time and date for meeting between students and teachers wherever they may reside (Skylar, 2009). The synchronous online classroom or virtual classroom ensures that teachers and students have real time communication, which offers them the capability of posing questions and receiving delayed or immediate responses (Duncan et al., 2012; Chiu, 2010).

According to Hrastinski (2007), synchronous learning is the preferred method of online learning and yet few studies are found discussing the synchronous online classroom. This lack of available research is exacerbated when specifically studying the indicators of active learning as they manifest within the synchronous online classroom. In the context of this study, asynchronous instruction is not examined because it does not include facets of a classroom setting like synchronous online learning. Nor does the asynchronous model provide opportunities to implement active learning strategies, primarily due to the fact students and teachers do not meet in a reoccurring, structured environment like the synchronous classroom. Thus, at a time when online learning is rapidly expanding across Pennsylvania and the nation, providing quality and effective education in the synchronous online classroom is crucial.

The following research questions address the purpose of this study which is to provide an initial description of the perspectives of teachers in K-12 synchronous online learning in regards to active learning in their classroom:

3.3 RESEARCH QUESTIONS

1. What do teachers in a synchronous online K-12 cyber charter school perceive as important indicators of active learning in a virtual classroom?
2. What do teachers in a synchronous online K-12 cyber charter school perceive as barriers to implementing active learning in a virtual classroom?
3. Which strategies of active learning do teachers in a synchronous online K-12 cyber charter school report using in a virtual classroom?
4. Which indicators of active learning are teachers in a synchronous online K-12 cyber charter school unsure about without more information?

3.3.1 Research question 1

In recent years, my investigation of active learning has guided school-wide implementation protocols for teacher evaluation, teacher training, continuous professional development and hiring practices for the cyber school environment. In regards to K-12 cyber education, the researcher anticipated the first question highlighting the perceptions of synchronous online teachers towards indicators of active learning. Specifically, to what degree do synchronous online teachers rate the importance of each indicator in respect to their virtual classroom.

To address this question, the researcher first created a table that illustrates the number of researchers that have identified an indicator of active learning (Figure 1) in the literature. The theoretical framework for determining the indicators was established on a meta-analysis of over

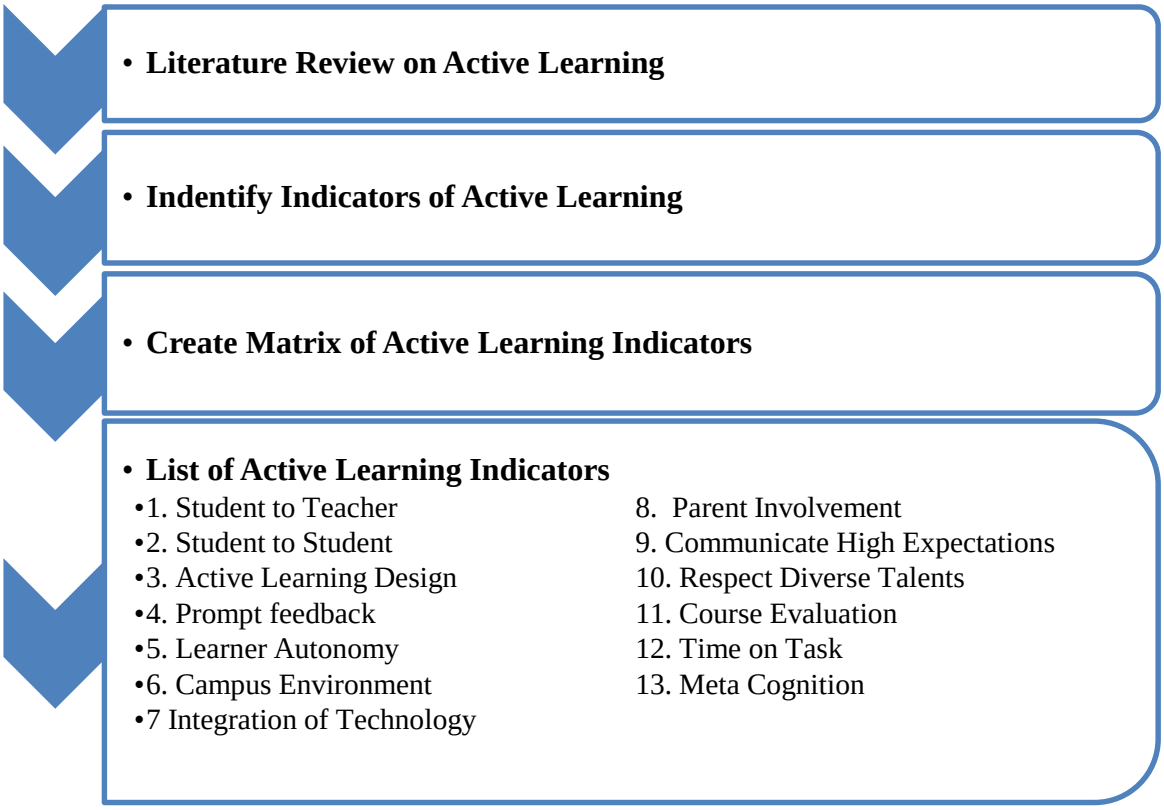


Figure 1. Indicators of Active Learning

50 years of research on sound teaching fundamentals, "Seven Principles of Good Practice in Undergraduate Education", by Arthur Chickering and Zelda Gamson (1987, p. 3). The seven principles are:

a) Encourages contact between teacher and students

b) Encourages interaction and collaboration between students

c) Uses active learning techniques

d) Gives prompt feedback

e) Emphasizes time on task

f) Communicates high expectations

g) Respects diverse talents and ways of learning

Following the review of 51 additional related research articles on active learning, the indicators of active learning were categorized into primary and secondary. Six primary indicators and seven secondary indicators were identified for a total of 13 indicators of active learning. The six primary indicators represent a minimum of 26 or more peer-reviewed articles (at least half of the researched literature) that refer to the indicator as important to active learning. The seven secondary indicators represent 25 or less peer-reviewed articles (less than half of the researched literature) that refer to the indicator as important to active learning. For the purpose of answering this question, the survey asked the synchronous online teachers (what did the survey ask? the six primary indicators of active learning. The rationale for the six primary indicators was that they are the most frequently identified indicators of active learning from the literature, and the researcher wanted to see if the synchronous online teachers recognize them as important to active learning in their classroom.

3.3.2 Research question 2

The review of literature provides the basis for understanding active learning as important for the classroom, any classroom, and for framing future research on the examination of synchronous learning and whether or not active learning principles do occur there. Thus, research question two sought to understand the perspective of virtual classroom teachers through a constructed survey. The bank of questions asked teachers about barriers to implementing active learning in a virtual classroom. The conceptual basis for these questions hails from the 51 articles utilized to create primary indicators of active learning and the essential strategies of each indicator. In addition, the teachers were presented with an open ended question that asks them to list

additional barriers within the synchronous online classroom that they face, but was not presented as a choice in the survey.

Most of the research on the benefits and barriers to implementing active learning has focused on the traditional classroom. Research question three served to highlight the perceptions of K-12 synchronous online teachers towards barriers they may face in their online classroom. The goal of an open ended question was to portray additional barriers that exist in synchronous online classrooms that have not been described in the review of the literature due to the gap in research in the online environment.

3.3.3 Research question 3

The purpose of question three is, in part, a direct response to the question, "How do you know students are engaged, and how does the teacher create an active learning environment in the virtual classroom?" Part of the answer lies in the literature review within Chapter 2, and the rest was addressed through further questioning of K-12 teachers in synchronous online classrooms. Question 3 has led me to examine and portray the nature of active learning through essential strategies being employed by the synchronous online teachers at a K-12 cyber charter school.

Active learning is an instructional approach, and strategies are the tactics utilized by teachers in the classroom to engage learners. The researcher presents a series of closed-ended and open-ended questions through an online survey to garner the opinions of the synchronous online teachers towards these strategies. The strategies of active learning represent examples of each of the six primary indicators identified through the active learning matrix (Table 1). A minimum of two questions for each indicator of active learning were presented to reflect the array of strategies implemented in the classroom. In addition, the survey asked the synchronous

online teachers to identify additional strategies of active learning they utilize in the synchronous online classroom, but were not presented in the online survey. The purpose of this line of questioning was to identify strategies that these teachers think are necessary for their classroom that haven't already been established in the traditional classroom.

3.3.4 Research question 4

Online education and, in particular, the virtual classroom setting is still in its infancy, and therefore research is needed to portray the perceptions of K-12 synchronous online teachers in regards to instructional practices that promote active learning. In a series of survey questions relating to active learning indicators, the synchronous online teacher were asked which indicators of active learning they want to learn more about through a "yes" or "no" response. The goal of this pole question was to gauge the teachers' understanding of six primary indicators of active learning as identified in the literature.

After an analysis of 51 articles related to active learning in education, a tally was taken which produced a total of 13 indicators of active learning that were categorized as either primary or secondary. Six primary indicators (a. interaction between teacher and student, b. interaction between students, c. prompt feedback, d. active learning strategies, e. time on task, and f. communicates high expectation) represent a minimum of 26 or more peer-reviewed articles (at least half of the researched literature) that refer to the indicator as important to active learning in the classroom. The justification for the six primary indicators is that they are the most frequently identified indicators of active learning from the literature.

One of the primary indicators (active learning strategies) is inherent in all of the primary indicators and thus was not included as a stand-alone item. Instead, due to nuances in the

remaining five primary indicators, a bank of seven items was created. Interaction between teacher and student and gives prompt feedback were given two examples each. The rationale for constructing the item this way can be viewed in Figure 2.

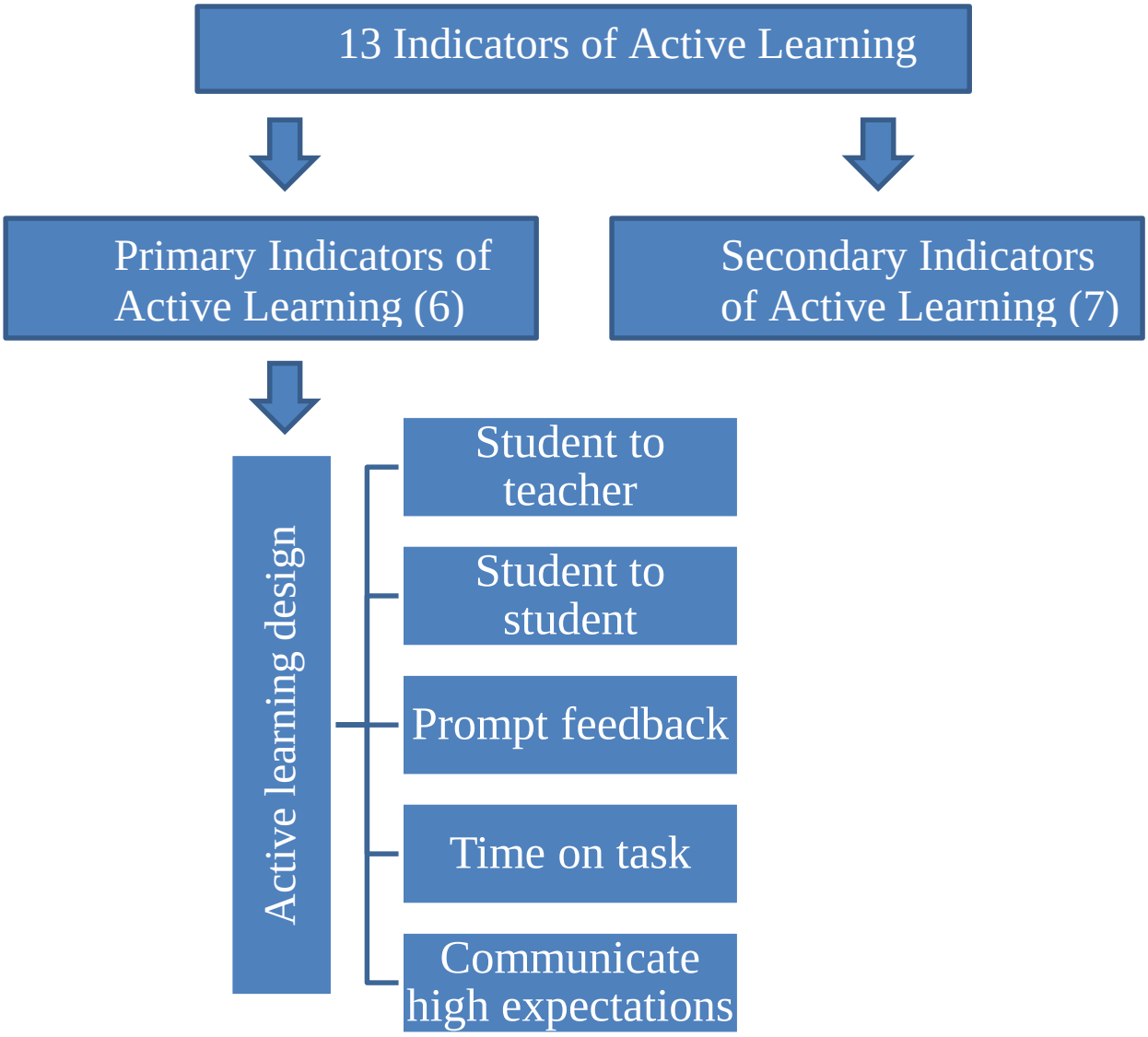


Figure 2. Rationale for Item Constructions of Question 4

3.4 RESEARCH DESIGN

3.4.1 Descriptive design and survey research

Descriptive design using a survey instrument was the research strategy for this study. The purpose of descriptive research is to study a phenomenon that is occurring at a specific time and place (Mertens, 2010). Gall, Gall, & Borg (2003) define a descriptive study as a "means to produce detailed descriptions of a phenomenon, develop a possible explanation of it, or evaluate the phenomenon" (p. 439). Creswell (2005) states that the goal of descriptive research is to describe what, how or why something is happenings. Yin (2013) describes a study were the researcher's interest in the case is more important than generalizing or extending the theory of a case as descriptive or intrinsic in nature. This study describes teachers' perceptions of what active learning strategies were being implemented in a synchronous online classroom at a point in time.

This descriptive research was an exploratory analysis of a K-12 cyber charter school and the perceptions of its synchronous online teachers towards active learning strategies (Creswell, 2007). The study portrayed the perceptions, beliefs, and understandings of those synchronous online teachers participating in the survey at that point of time at one cyber charter school. The descriptive study did not address other cyber charter schools or programs and classrooms that may contribute to the phenomena. These other cyber charter schools include cyber educational programs offered by Intermediate Units and traditional school districts, variations in delivery of online classroom instruction, and asynchronous online classes offered during the time of this study.

In survey research, the simple descriptive approach was chosen because it was "a one-shot survey for the purpose of describing the characteristics of a sample at one point in time" (Mertens, 2010, p. 177). The online survey was administered to a purposeful sample of synchronous online teachers in a cyber charter school in order to describe their perspectives of active learning. Analysis of data collected through the survey described the current state of active learning in synchronous online classrooms through the teachers' opinions and attitudes. Alternatively, the investigator endeavored to recognize significant criteria and themes in the data with the intent of developing a greater understanding (Merriam, 1998). Detecting the multiple aspects of the phenomenon may prove to be important variables in subsequent quantitative studies (Yin, 2009). It is important to note that this is not generalizable but could lead to further research into active learning in a synchronous online classroom. The decision to utilize the survey approach also preserves the confidentiality of those partaking in the study in a cost effective and timely manner (Mertens, 2010).

3.4.2 Theoretical framework

Research conducted from 2006 – 2013 on active learning serves to define and describe the benefits and barriers of implementing active learning in a traditional classroom, the indicators associated with active learning in both a traditional and virtual classroom, the essential strategies of each active learning indicator, and the models of learning utilized in online education. A review of the literature formed the conceptual basis of the survey (Mertens, 2010). The theoretical framework for determining the indicators and the strategies of active learning is based

on the research of Chickering & Gamson (7 Principles for Good Practice in Undergraduate Education) (1987).

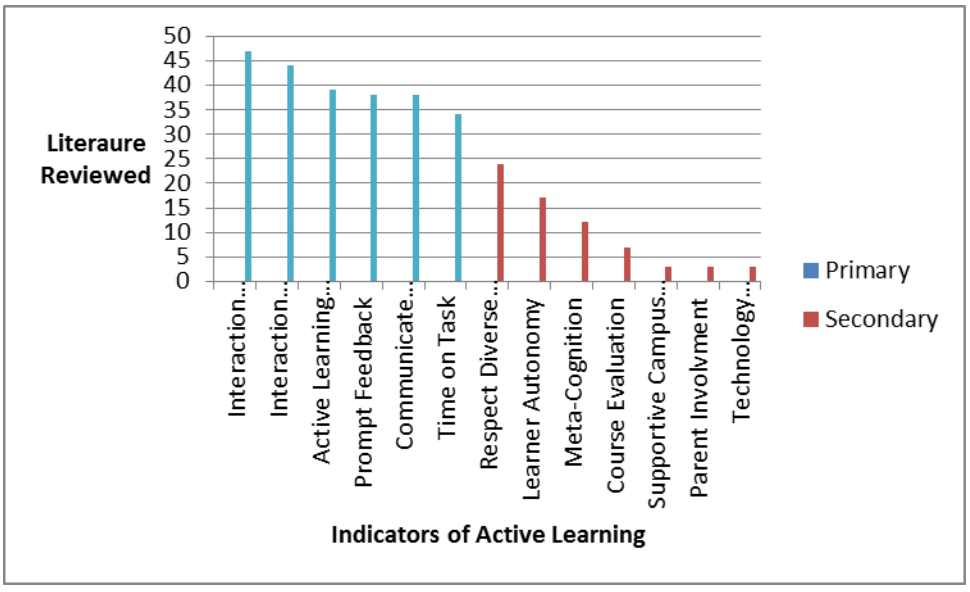
Chickering and Gamson (1987) focus on active learning techniques in higher education through a meta-analysis of over 50 years of research on good teaching principles. However, because the study conducted by Chickering and Gamson concentrates on active learning techniques in higher education and not K-12, which is one of the focuses of this study, it is necessary to expand the framework. Additional foundations to this framework are formulated from a North Central Regional Educational Laboratory study (8 Indicators of Engagement) (1994) and research by Bonwell & Eison (7 Common Characteristics of Active Learning) (1991). Grounded in the model of the Seven Principles, North Central Regional Educational Laboratory (NCREL) expands the research into K-12 education and produces eight indicators of engaged learning. Based on the work of Jones, Valdez, Nowakowski, and Rasmussen (1994), indicators that could be used to evaluate instruction for active learning are: a) vision of engaged learning, b) tasks for engaged learning, c) assessment of engaged learning, d) instructional models and strategies for engaged learning, e) learning context of engaged learning, f) grouping for engaged learning, g) teacher roles for engaged learning, and h) student roles for engaged learning. Suggesting some level of overlap among the Seven Principles, Bonwell & Eison (1991) describe the characteristics of active learning in K-12 as comprising of seven indicators which include a) student involvement in more than passive listening, b) student engagement in various activities such as writing, discussing, and reading, c) focusing on the development of student skills rather than transmission of information, d) placing emphasis on exploring the students' values and attitudes, e) increasing student motivation, f) students participating in higher order thinking

including synthesis, evaluation and analysis, and g) providing immediate feedback to the learners.

3.4.3 Survey question development

Centered on this study's four research questions, a three-phase process was used to develop the survey questions based on active learning. In phase 1, a table (Table 2) was created based on the theoretical framework and additional studies of active learning. In order to generate primary indicators, the researcher records the primary elements of what the literature suggests are indicators of active learning in the traditional classroom and, in some cases, the virtual classroom. Active learning is broken into primary indicators that have been illustrated by a minimum of 26 researchers (at least half of the researched literature) and secondary indicators that have been illustrated by 25 researchers or less from the review of the literature (Table 3).

Table 3 *Primary & Secondary Indicators of Active Learning*



In an effort to further refine the primary and secondary indicators as criteria of active learning, the researcher then grouped them into two classifications according to the important role that the participants play in this environment, the teacher and the student. This is necessary for two reasons. First, the division helps the researcher identify the primary role of the teacher and the student as connected to or independent of each other. Secondly, the simple descriptive research design is focused on the perceptions of the teacher, and therefore the researcher wanted to identify strategies or tactics of active learning indicators utilized in the classroom by the teacher.

In phase 2, each of the six primary indicators identified in the literature are then analyzed for essential strategies of each indicator. Active learning is an instructional approach, and strategies are the tactics that teachers utilize to engage students in learning. Each of the primary indicators has strategies to elicit the desired outcome for the indicator. For example, two strategies of the primary indicator "Student-Teacher Interaction" is:

1. Teacher acts as a facilitator of learning (e.g., move from information giver to guide and learner).
2. Teacher creates a classroom environment that fosters a shift in the roles of the student-teacher and aids in the development of exploration and involvement by the students.

The correlation between primary indicators and the strategies that make up each indicator of active learning indicators is used to develop the second research question (Figure 3). The research question is focused primarily on how teachers utilize these strategies within the classroom to create active learning environments. This is an important distinction as some strategies of active learning can be developed for outside the classroom.

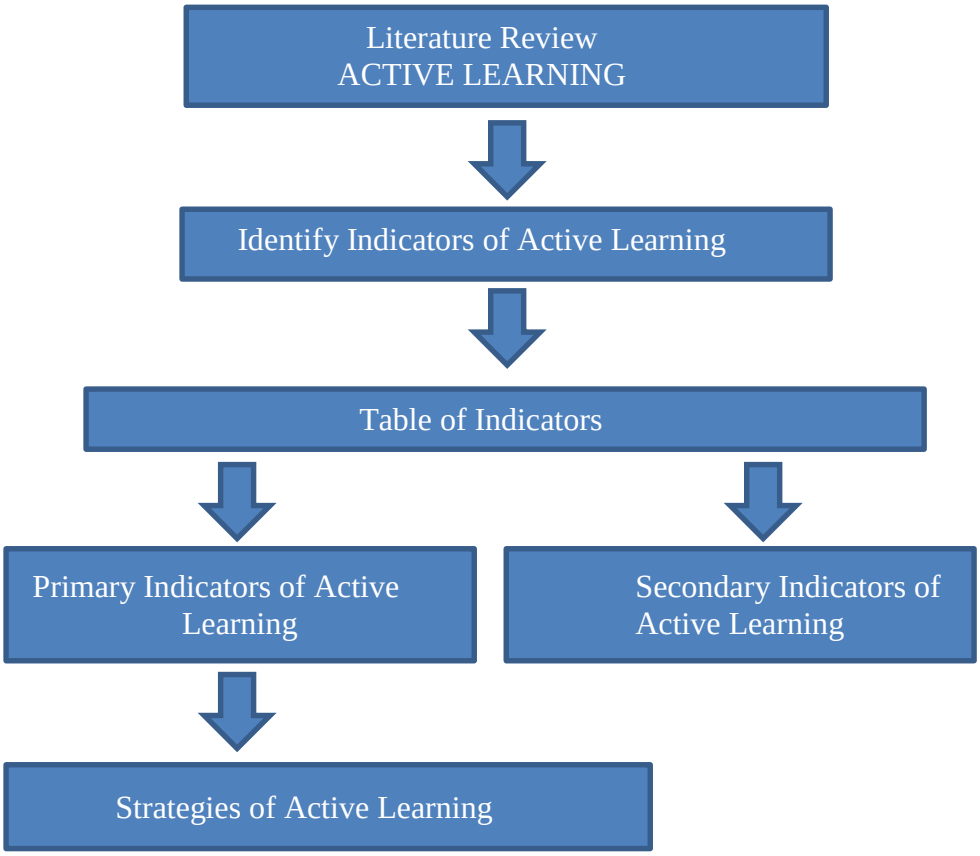


Figure 3. Strategies of Active Learning Indicators

Phase 3 centers on the review of the literature and the extent to which implementation of active learning strategies in the classroom are hindered by various issues. Due to the gap in the literature on active learning and the synchronous online classroom, the examples of barriers to implementation of active learning are grounded in the traditional classroom. A review of the literature describes instructional practices, policies, and interactions that can act as barriers to implementing active learning (Research question 2). It is of interest to see if the same barriers to implementing active learning in a traditional classroom manifest themselves in a virtual classroom. It is also a benefit to identifying other barriers to implementing active learning that K-12 synchronous online teachers face that have not been reported in the review of the literature.

3.4.4 Pre-test pilot

Focus is placed on the alignment of survey items to each research question and whether the answers collected reflect the purpose of the study. Next, the researcher sent a draft version of the survey to his editor at Kent State University to proof and make grammatical changes. From there, the draft survey was sent to five cyber charter school administrators and a teaching fellow at University of Pittsburgh who teaches statistics. The administrators are selected because of their background as classroom teachers, involvement in cyber charter schools, and fundamental understanding of active learning. The teaching fellow was chosen to test the survey for face validity and alignment. Additionally, the research fellow aided the researcher in analyzing the survey data. Each participant was provided a pilot survey and asked to make revisions based on the following questions:

1. Is the wording of the survey clear?
2. Which questions cause confusion or embarrassment to answer?
3. Are the objectives of the survey clear to the participants?
4. Is the survey design easy to follow with directions that are clear and concise?
5. Do the participants feel comfortable answering the questions?
6. Are there any issues that have been overlooked in the survey?
7. Are question and answer choices compatible with participant's experience?

Utilizing this combined feedback, further alterations were made to the survey before presenting for Overview Defense. The five members of the Overview Committee made final requests for changes to the survey questions. The survey was then uploaded into an online format (Qualtrics Survey Service) and submitted to the Institutional Review Board (IRB) for

approval. Upon IRB approval and permission for release from the dissertation chair, the online survey went live to the K-12 synchronous online teachers at a cyber charter school.

3.4.5 Description of the instrument

The survey instrument was designed to collect data on the perceptions of teachers in synchronous online classrooms at a cyber charter school regarding indicators of active learning, barriers to implementation, and utilization of active learning strategies within their online classroom (Appendix D). Therefore, the survey used in this study serves two purposes. The purpose of the survey instrument is to examine perceptions of synchronous online teachers regarding active learning. Second, the survey data on active learning strategies the teachers report using in their online classroom, the indicators they wish to learn more about and the barriers they face in implementing active learning.

The first section of the survey was presented as eight items contained within the primary indicators of active learning scored on a five-point Likert scale. Each question corresponds to a primary indicator and teachers are asked to supply ratings based on the importance of these indicators to teaching K-12 synchronous online classes. Teachers may rate each indicator as 1 (not important), 2 (of little importance), 3 (moderately important), 4 (very important) or 5 (extremely important). Additionally, teachers could select "unsure without more information," for example, a choice that can help to judge teachers' familiarity with various active learning indicators.

The next series of questions asked teachers to rate the perceived barriers of implementing active learning in a virtual classroom. A total of ten items, which were taken from the review of the literature on active learning, were rated on a five-point Likert scale. Teachers were asked to

rank each barrier as 1 (never a barrier), 2 (rarely a barrier), 3 (sometimes a barrier), 4 (often a barrier) or 5 (always a barrier). At the end of this section, participants were given the opportunity to respond to an open-ended question. Teachers were asked, "Are there any barriers to implementing active learning in the virtual classroom that we missed?" An alternative option allowed teachers to rate the open-ended responses separately using the same five-point Likert scale used in section 1 for their personal ratings.

After teachers answered questions about indicators and barriers to active learning in a virtual classroom, a ranking of how regularly they utilize specific strategies of active learning was requested. This time teachers rated each of the 16 items as 1 (never use in virtual classroom), 2 (rarely use in a virtual classroom), 3 (sometimes use in a virtual classroom), 4 (often use in virtual classroom) or 5 (always use in virtual classroom). As in section 2, teachers were asked to respond to an open-ended question. The question was, "Are there strategies of active learning that you utilize in the virtual classroom that we missed?" The final question ascertains the knowledge of synchronous online teachers towards indicators of active learning. Teachers were asked to respond with "yes" if they knew the indicator as described for the item or "no" if they were unsure about the indicator without more information.

3.5 DATA COLLECTION

3.5.1 Study population

Data were collected in a cyber charter school serving approximately 500 students in kindergarten through 12th grade. The cyber charter school has been in existence for ten years and employed

42 employees, including 27 virtual classroom teachers. The population of interest for this research (27 virtual classroom teachers) is certified to teach by the state's department of education and is considered highly qualified under the provision of the No Child Left Behind Act. These certified teachers can teach from onsite at the home office of the cyber charter school or, in some cases, from their home. Teaching experience ranges from first year teacher to 15 plus years with a minority of the teachers having experience in both brick and mortar and virtual classroom. The selected population is indicative of a simple descriptive research design that chooses to focus on the phenomenon (active learning within synchronous online classroom), because the cyber charter school teachers are of fundamental importance to the exploration. The investigation was directed by my aspiration to know more about active learning within synchronous online learning. Additionally, the study was not intended to show how this case may epitomize other cases or try to build a theory based on the study's conclusions (Stake, 1995).

The model for instructional delivery, as is with most cyber charter schools, is a blending of asynchronous and synchronous class participation. K-6 students in this cyber charter school are required to attend 900 hours or 180 days of instruction. That equates to 5 hours per day or 25 hours per week. In the study case, K-6 students are required to participate in 6 hours of whole-group synchronous online learning with their teachers and peers or about 25% of their instructional hours. That compares to roughly one hour per week that K-6 students attend a virtual classroom with other students from across the state and their synchronous online teacher. The remainder of their instructional time is spent in self-paced, asynchronous learning units and office hours or study sessions working with the teacher in a synchronous classroom setting. The office hour for K-6 students is not optional, but the time spent here is not structured, the students

can come and go as they please, and the focus is on reviewing instruction for the week. In this cyber charter school, one teacher is assigned to teach all of the core subjects in each grade for K-6 students. The student to teacher ratio for K-6 students in synchronous online classrooms is 19:1.

For 7-12 students, the requirement is 990 hours equating to 5.5 hours per day or 27.5 hours per week. In the study case, 7-12 students are required to participate in 7 hours of whole-group synchronous online learning with their highly qualified teachers and peers or about 27% of their instructional hours. Similar to K-6 students in this cyber charter school, the balance of their instructional time is asynchronous learning with no physical link to a time frame. However, unlike K-6 students, one teacher is assigned to each of the core classes in grades 7-12 and students have the option of attending office hours with any or all of their teachers. Again, the office hours are not structured, the students can come and go as they please, and the time is spent primarily reviewing instruction for the week. The student to teacher ratio for 7-12 students in synchronous online classrooms is 25:1.

In the 2014-2015 school years, the amount of instructional time in the synchronous online learning classroom increased from 6 to 10 hours of whole-group synchronous online learning for students in grades K-6 and from 7 to 15 hours of whole-group synchronous online learning for students in grades 7-12. This instructional time with their students in re-occurring, live classrooms is facilitated by a web-based platform to transmit instruction as described in the review of the literature in chapter 2.

3.5.2 Outreach efforts

An initial correspondence (Appendix A) was sent via email to the CEO of the cyber charter school to prepare the data collection process. This invitation to participate explains the purpose of this doctoral dissertation, the nature of the study and the population to be studied within the cyber charter school. Emphasis was placed on the significance of active learning as an instructional model and the need to portray it within a synchronous online classroom. The email states that teacher involvement is completely voluntary and all data retained is confidential. Furthermore, every precaution to protect the identity of participants is taken to ensure accurate and candid responses from the teachers. An email exchange then ensued in which the CEO agreed to the study and that a meeting with the researcher would be appropriate to move the study forward. A meeting between the researcher and the CEO was held at the home office of the cyber charter school to discuss in more detail the nature and scope of the dissertation, key demographic information of the teachers to be surveyed (years of service, certification, deployment of teachers, etc.) as well as demographic information of the cyber charter school (number of students, years in operation, total number of staff, etc.). Additionally, an invitation was sent to the CEO to ask permission for the administrative team at the cyber charter school to participate in a pilot study of the online survey instrument. Permission was granted and feedback to the pilot study that was conducted over a three day period was graciously provided.

The CEO sent an endorsement email of this study to the virtual teachers asking that they extend every courtesy to the researcher. An email invitation followed this (Appendix B) from the researcher to the virtual teachers to participate in an online survey. Again, the nature and scope of the study was explained as well as the fact that their participation is entirely voluntary and that precautions would be taken to keep confidentiality. Part of the invitation to participate explains

that subjects are not be paid or otherwise incentivized to partake in the research study. The email concluded by saying another email would be sent in the coming weeks releasing the online survey to them.

A link was sent to the participating teachers to access the online survey through Qualtrics Survey Service. Again, the teachers were told that the survey is voluntary, information is kept confidential, and completion of the survey is the teachers' permission to participate. Prior to answering the questions in the online survey, teachers are provided with an explanation of the survey and the definition of active learning based on the review of the literature (Appendix C). Due to the ease of use of the online format and the ability to answer the questions at any time of the day, teachers were asked to complete the survey during a two week time frame. A reminder email was sent to teachers who had not completed the online survey after the first week. After the survey was completed by the participant, the results were available through Qualtrics. All data were kept confidential. All collected results from the survey were preserved in the researcher's password protected computer databank. Information collected from the school or the individual teachers were not recorded in the survey results.

3.5.3 Vehicle for data collection

For this study, Qualtrics Survey Service, an online survey platform was the vehicle for data collection. Qualtrics is used to create the survey instrument, collect, and store data securely and analyze data through a web-based service. The survey collected information regarding online teacher's perceptions of active learning; information about the barriers they face to implementing active learning; information about strategies of active learning online teachers utilize in their classroom; and indicators of active learning they want to learn more about. Collection methods

relied on purposive sampling and structured data collection instruments to summarize, compare, and generalize the results. Secure files were created in the computer to house the database for the closed and open-ended participant responses.

All IRB requirements for non-sensitive data storage were met. Guarantees of confidentiality made to all participants are maintained after the study is completed and throughout the data storage process. This means data has been anonymously collected from teachers and identifiers cannot be linked to individual participants. In this type of study, data storage simply must be protected to the extent it can be recovered quickly by the researcher in response to a request for ethical review by IRB. When stored electronically through personal computer, the data must also be backed up on a separate storage device. All data in this study has been backed up on an external hard drive and independent flash drive.

3.5.4 Data analysis

Data analysis was undertaken in order to provide an initial explanation of the perceptions of synchronous online teachers towards active learning. It is essential to note the intent of the analysis was not be to generalize from the research participants to a larger population. The following sections review data analysis procedures, controlling for bias, and reporting procedures for case studies. Table 4 provides a summary of the four research questions, alignment of the data collection procedures, data analysis procedures, and reporting (frequencies that include mean and standard deviation).

Table 4 *Research Question, Concepts/Data, Data Analysis, and Reporting*

	Research Question	**Concepts/Data Collection**	**Data Analysis Procedures**	**Reporting**
1.	What do teachers in a synchronous online K-12 cyber charter school perceive as important indicators of active learning in a virtual classroom?	Online survey based on the theoretical framework of Chickering & Gamson/Matrix / Primary Indicators Closed-ended	Summary and analysis of virtual classroom teacher responses Frequency table /mean/standard deviation Descriptive Analysis	Summary of virtual teacher responses and comparison to Primary Indicators Comparing the findings of the initial evidence with this explanation and revising
2.	What do teachers in a synchronous online K-12 cyber charter school perceive as barriers to implementing active learning in a virtual classroom?	Online survey based on review of literature and barriers to Active Learning Closed & Open ended	Summary and analysis of synchronous classroom teacher responses Frequency table /mean/standard deviation Descriptive Analysis	Summary of virtual teacher responses and comparison to Primary Indicators Comparing the findings of the initial evidence with this explanation and revising
3.	Which strategies of active learning do teachers in a synchronous online K-12 cyber charter school report using in a virtual classroom?	Online survey (open and closed-ended) based on strategies of Primary Indicators in Active Learning	Summary and analysis of synchronous classroom teacher responses Frequency table /mean/standard deviation Descriptive Analysis	Summary of virtual teacher responses and comparison to Primary Indicators Comparing the findings of the initial evidence with this explanation and revising
4.	Which indicators of active learning are teachers in a synchronous online K-12 cyber charter school unsure about without more information?	Online survey based on the theoretical framework of Chickering & Gamson/Matrix / Primary Indicators Closed-ended.	Summary and analysis of synchronous classroom teacher responses Table of frequencies/percentages Descriptive Analysis	Summary of virtual teacher responses and comparison to Primary Indicators Comparing the findings of the initial evidence with this explanation and revising

3.5.5 Data analysis procedures

Collecting quantitative survey data from the participants of the K-12 cyber charter school allowed the research to apply methodological triangulation. Survey data were organized into four main categories based on the correlation of each online survey question to one of four research questions in the study (Table 5).

Table 5 *Research Questions, Survey Questions, and Data Analysis*

	Research Question	**Survey Question(s)**	**Data Analysis**
1.	What do teachers in a synchronous online K-12 cyber charter school perceive as important indicators of active learning in a virtual classroom?	#1-13 Close-ended	-Frequency distribution of ratings, mean, standard deviation
2.	What do teachers in a synchronous online K-12 cyber charter school perceive as barriers to implementing active learning in a virtual classroom?	#14-23 Close-ended	-Frequency distribution of ratings, mean, standard deviation
		#24 Open-ended	-Themes & trends
3.	Which strategies of active learning do teachers in a synchronous online K-12 cyber charter school report using in a virtual classroom?	#25-43 Close-ended	-Frequency distribution of ratings, mean, standard deviation
		#44 Open-ended	-Themes & trends
4.	Which indicators of active learning are teachers in a synchronous online K-12 cyber charter school unsure about without more information?	#1-12 Close-ended	-Frequency distribution of ratings, mean, standard deviation

The data was uploaded to the statistical analysis software within Qualtrics and Microsoft Excel 2010 for analysis of the teacher's close-ended survey feedback. The researcher analyzed the data collected from close-ended questions by frequencies and measures of distribution

according to descriptive statistics. The majority of the descriptive analysis comes from frequency ratings since demographic statistics were excluded from this study.

Every open-ended response (Questions #19 & #39) from the online survey was read as well. If participants provide a large amount of text, responses were coded to organize content and reveal patterns. Coding also assists in detecting general themes and significant exceptions to trends. Reviewing this data helps to evaluate whether participants described employing other strategies or encountered other barriers to active learning not included in the online survey. To analyze, organize and demonstrate a collection of themes, categories, and patterns, a keyword matrix was constructed. The analysis saught to strengthen or refute these themes by measuring them against initial and developing therories of active learning in a synchronous learning environment. Care was taken to search for supportive evidence and alternative explanations alike.

3.5.6 Controlling for bias

The research study was of personal interest to the researcher. Thus, measures were taken to control opinions or reactions during data collection, analysis, and reporting out. This was crucial to control during the recruitment and survey phase of the selected population so as not to skew their views of the research study. Furthermore, all measures were taken to control for validity by inviting the readers to compare and contrast their interpretations of the data with that of the researcher and requesting feedback that details the extent to which their interpretation coincides with that of the author.

3.5.7 Reporting survey research

What makes simple descriptive research design distinctive from alternative methods of research is the report itself. The researcher posed a series of online survey questions, collected and quantified the data responses, and drew inferences about this particular population of synchronous online teachers. The report generated through descriptive research is a significant communication device that reports the correlational statistics. A descriptive study can convey research-based reports about a phenomenon to a variety of non-specialists who have an awarenss of the phenomenon, but may be unacquainted with the subject matter (Stake, 1995; Yin 2009). Hence, the manner in which this descriptive study is reported is readily comprehensible to non-specialists.

The disadvantage to reporting survey research is the reliance on self-reporting data from the participants. The participants might believe something is true even if they are not sure or respond incorrectly due to not understanding the context of the question. Furthermore, self-reported data can lead participants to give the researcher what he wants to hear due to a problematic question. A final disadvantage to survey research is that it captures a fleeting moment in time and may not be generalizable to future studies as time and circumstances change. However, data collected through the survey was intended to describe the current situation of active learning in synchronous online classrooms, and it is not the intended to be generalizable, but to describe a situation at present.

4.0 RESULTS

The goals of this study were to describe the indicators of active learning strategies, identify the barriers to implementation of active learning in a synchronous classroom, and ascertain the active learning strategies used by teachers in a synchronous online learning environment. Specifically, this study examined the perspectives of teachers in a synchronous online K-12 cyber charter school towards active learning as an instructional practice. Discovering the perceptions of teachers in synchronous online classes towards active learning strategies is an important first step to identifying sound instructional practices. This chapter offers an analysis of data to answer the four research questions:

1. What do teachers in a synchronous online K-12 cyber charter school perceive as important indicators of active learning in a virtual classroom?
2. What do teachers in a synchronous online K-12 cyber charter school perceive as barriers to implementing active learning in a virtual classroom?
3. Which strategies of active learning do teachers in a synchronous online K-12 cyber charter school report using in a virtual classroom?
4. Which indicators of active learning are teachers in a synchronous online K-12 cyber charter school unsure about without more information?

To address the four research questions, an examination of responses based on an online survey instrument developed from the indicators of active learning was conducted. The study

included 10 sets of questions from which demographic data, review of closed-ended question data, and qualitative responses from the Qualtrics Survey Service were analyzed. Statistical analysis could not be provided for open-ended data from item 3 of the survey ("Are there any barriers to implementing active learning in the virtual classroom that you feel we missed?") and item 5 ("Are there elements (strategies) of active learning that you utilize in the virtual classroom that we missed?"). However, initial interpretations might be able to support trends identified in the quantitative survey results. To provide a descriptive analysis of the survey data from the closed-ended responses, frequency distribution of ratings, means, and standard deviation were calculated by Qualtrics software. The frequency distributions of ratings were used to present K-12 online synchronous teachers perceptions towards:

1. Important indicators of active learning;
2. Barriers to implementing active learning;
3. Strategies of active learning used in a virtual classroom; and
4. Indicators of active learning that they are unsure about.

The data analyzed from the survey responses were summarized. The results generated through the descriptive statistics aide in describing the phenomenon of active learning in the synchonous online classroom.

4.1 PARTICIPANT CHARACTERISTICS

The participants in the study were teachers from a K-12 cyber charter school in Pennsylvania. The teachers were certified to teach by the Commonwealth's department of education and were considered highly qualified under the provision of the No Child Left Behind Act. Twenty-six of

twenty seven teachers of synchronous online learning from the cyber charter school participated in the research study, which resulted in a 96% response rate. At the time of data collection the cyber charter school educated approximately 500 students in kindergarten through 12th grade. The model for instructional delivery, as is with most cyber charter schools, is a blending of asynchronous and synchronous class participation.

Three questions at the beginning of the survey are demographic in nature but not meant to be used to identify individuals. Instead, demographic information was collected to represent the grade span taught by the participants, total number of years teaching in a public and/or private school and total number of years teaching in cyber charter school. Table 6 provides an overview of the 26 participants' characteristics in each of these categories.

Table 6 *Participant Characteristics*

Teacher	Grade Span (K-6/7-12/K-12)	Total Number of Years Teaching Experience (Span)	Number of Years Teaching Experience in Cyber Charter School (Span)
A	K-12	10-12	1-3
B	K-6	4-6	4-6
C	K-12	4-6	4-6
D	K-6	4-6	4-6
E	7-12	7-9	7-9
F	K-6	7-9	4-6
G	K-12	1-3	1-3
H	7-12	7-9	7-9
I	7-12	10-12	7-9
J	7-12	1-3	1-3
K	7-12	10-12	7-9
L	7-12	7-9	4-6
M	7-12	7-9	4-6
N	K-12	7-9	1-3
O	7-12	7-9	7-9
P	7-12	1-3	1-3
Q	7-12	10-12	7-9
R	7-12	7-9	1-3
S	7-12	4-6	4-6
T	K-12	7-9	1-3
U	7-12	1-3	1-3
V	7-12	7-9	7-9
W	K-6	4-6	4-6
X	7-12	13-15	10-12
Y	K-6	1-3	1-3
Z	K-6	1-3	1-3

The majority of the participants or 58% (n=15) taught in the 7-12 grade span, while 23% (n=6) taught in K-6 and 19% (n=5) taught across both spans (K-12) as shown in Figure 4. The cyber charter school was the first teaching experience for 58% (n=15) of the survey participants, whereas 42% (n=11) of the participants had at least one year or more of teaching experience in public and/or private school before joining the cyber charter school. The total number of years taught in K-12 ranged from1-6 years of experience for 42% (n=11) of the participants to 10 years

or more for 19% (n=5) of the participants. In contrast, 70% (n=18) of participants reported teaching in the cyber charter school between 1-6 years while only 4% (n=1) reported teaching in

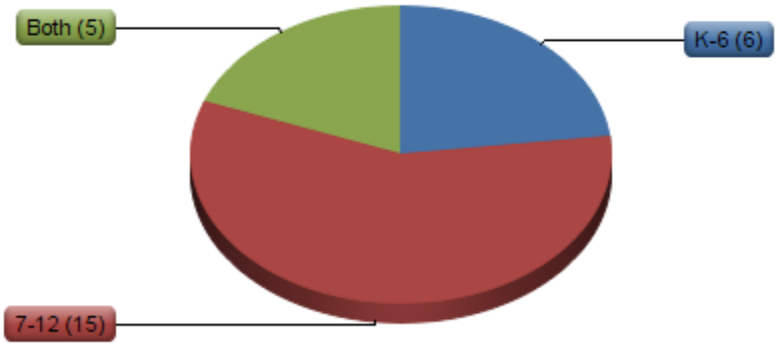


Figure 4. Grade Span of Participants

the cyber charter school 10 years or more. Figure 5 presents participants' years of cyber charter experience.

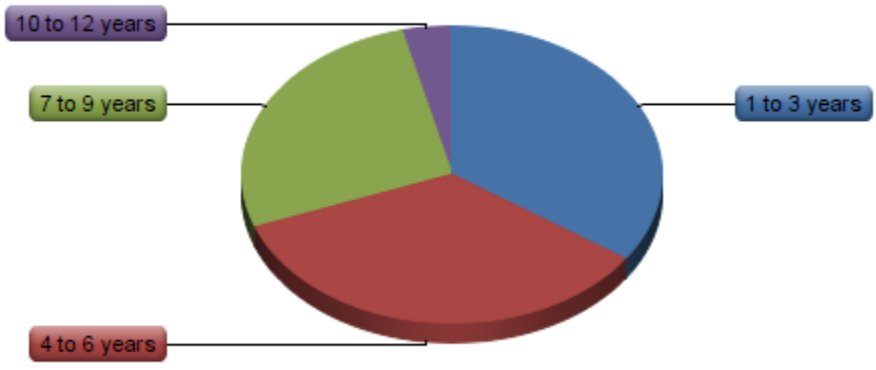


Figure 5. Cyber Charter School Experience

4.2 IMPORTANT INDICATORS OF ACTIVE LEARNING IN A VIRTUAL CLASSROOM

Descriptive statistics were used to gauge teachers' responses related to levels of strongest agreement. This section includes findings regarding the perceptions of teachers in a K-12 synchronous online environment toward important indicators of effective instruction in the virtual classroom. Teachers were presented with 12 indicators of effective instruction. Eight of the 12 indicators presented derive from the primary indicators of active learning as recognized in the literature review presented in Chapter 2. The primary indicators of active learning established from the literature are: (1) interaction between teacher and student, (2) interaction and collaboration between students, (3) prompt feedback, (4) time on task, (5) incorporation of active learning strategies, and (6) communicate high expectations.

Several interesting and revealing patterns emerged in the response data related to indicators of effective instruction in the virtual classroom. Of all the indicators listed in the survey, none was rated as "not important". Likewise, five of twelve indicators were rated as "slightly important", with none of these receiving more than 7.7% (n = 2) of the responses. By combining the response data for "very important" and "extremely important", a near unanimity of opinion (>90%) emerged regarding consensus indicators (Table 7). Since respondents would consider these response classifications quite close in the qualitative interpretation, the responses differentials were considered a distinction without a difference.

The indicator rated the most important addresses teacher preparation required to create engaged learning in the virtual classroom. The highest number of respondents rated "teacher preparation is required to create engaging learning activities" as "extremely important" (n=18, 69.2%). However, both teacher preparation and teacher designs questioning that frequently

assess and measure have a consensus score of 96% when combining "very important" and "extremely important". Again, both require a time commitment and preparation to create an environment that incorporates active learning strategies.

Table 7 *Teachers' Consensus Towards Effective Instruction*

Question	Number of Respondents Rating Very or Extremely Important	Total Score
Teacher designs questioning that frequently assess and measure student achievement	25	96%
Teacher preparation is required is required to create engaging learning activities	25	96%
Teacher provides students with personal feedback to right and wrong answers in class	24	92%
Teacher addresses individual leaning styles of each student	24	92%
Teacher and student develop mutual respect and trust	24	92%

All of the other questions related to effective instruction indicators received a greater than 90% consensus if scores from "moderately important" to "extremely important" were combined and are represented by the bracketed responses in Table 8. The majority of teachers believed that all of the indicators presented were of some importance to effective instruction in their synchronous online classroom. Even though the following indicators of effective instruction were not recognized as either primary or secondary indicators of active: (1) teacher emphasizes lecture or direct instruction, (2) teacher plans independent practice activities or homework to reinforce concepts taught in class, (3) teacher promotes the acquisition of knowledge through note taking and, (4) teacher promotes the acquisition of knowledge through repetitive practice.

Indicators of effective instruction reported most often by teachers in the survey were "questioning that frequently assess and measures student achievement" (M = 4.50, Mdn = 5), "teachers and students develop mutual respect and trust" (M = 4.50, Mdn = 5), "personal feedback to right and wrong answers" (M = 4.50, Mdn = 5), "teacher defines roles of the student and the learning objectives" (M = 4.27, Mdn = 4), and "independent practice activities or homework to reinforce concepts" (M = 4.23, Mdn = 4). This implies that teachers perceived these indicators of effective instruction on average as either "very important" or "extremely important". Indicators of effective instruction reported least often by teachers in the survey are "acquisition of knowledge through repetitive practice" (M = 3.54, Mdn = 3), "emphasizes time on task" (M = 3.60, Mdn = 3), "emphasizes lecture or direct instruction" (M = 3.65, Mdn = 3), and "encourages learning activities that promote collaboration" (M = 3.65, Mdn = 3). Teachers reported these indicators of effective instruction on average as either "moderately important" or "very important".

The teachers' responses of important indicators of effective instruction also established awareness with most of the indicators on the survey. For this item, teachers were given the options (1=Not Important, 2=Slightly Important, 3=Moderately Important, 4=Very Important, 5= Extremely Important, 0=Unsure without more information) to indicate their familiarity with K-12 synchronous online teachers. The only indicator from the survey that received the response "unsure without more information" was "teacher promotes the acquisition of knowledge or skill through note taking" (n = 1). From the teachers' responses, it has been concluded that most of the participants believed they had enough knowledge to rate the indicators of effective instruction because no other indicator received a rating.

Table 8 *Important Indicators of Effective Instruction in a Virtual Classroom*

Indicator	Moderately Important	Very Important	Extremely Important	Median	Mean
Teacher preparation is required to create engaging learning activities	0	[7	18]	5	4.62
Teacher provides students with personal feedback to right and wrong answers in class.	2	[9	15]	5	4.50
Teacher and student develop mutual respect and trust.	2	[9	15]	5	4.50
Teacher designs questioning that frequently assess and measures student achievement.	1	[11	14]	5	4.50
Teacher addresses individual learning styles of each student.	2	[11	13]	5	4.42
Teacher defines the roles of the student and the learning objectives.	4	[11	11]	4	4.27
Teacher plans independent practice activities or homework to reinforce concepts taught in class.	3	[11	11]	4	4.23
Teacher encourages learning activities that promote collaboration.	[14	7]	5	4	3.65
Teacher emphasizes lecture or direct instruction to teach a skill or provide information	[14	7]	5	4	3.65
Teacher emphasizes time on task.	[9	8]	5	3	3.60
Teacher promotes the acquisition of knowledge or skill through repetitive practice	[13	6]	5	3	3.54
Teacher promotes the acquisition of knowledge or skill through note taking.	[13	6]	4	3	3.48

(1=Not Important, 2=Slightly Important, 3=Moderately Important, 4=Very Important, 5= Extremely Important)

To further amplify the perceptions of synchronous teachers towards indicators of effective instruction, the participants were then asked (question 2) to select the three most important indicators of effective instruction but no more than three from the twelve presented. These twelve indicators are identical to the closed-ended items in question 1. Table 9 presents the twelve indicators, the number of responses for each indicator, and the percentage of

responses for that indicator. As before, eight of the twelve indicators presented to the participants corresponded to primary indicators of active learning as identified in the literature and are highlighted in Table 9.

The participants reported "Teacher designs questioning in the classroom that frequently assess and measures student achievement" (n = 18, 69%) as the most important indicator. Additional indicators of effective instruction reported most often by teachers in the survey are "Teacher preparation is required to create engaging learning activities" (n = 15, 58%), "Teacher addresses individual learning styles of each student" (n = 13, 50%), and "Teacher and student develop mutual respect and trust" (n = 10, 38%). The clustering of responses among three or four variables is significant when considering that there are 220 possible different combinations of responses for each participant. The clustering pattern correlates to the primary indicators of active learning identified in the literature. Unexpected from this item was the number of primary

Table 9 *Highest Total Response: Three Most Important Indicators of Effective Instruction*

Indicators of Effective Instruction	Total Response	Total Percentage
Teacher designs questioning in classroom that frequently assess and measures student achievement.	18	69.2%
Teacher preparation is required to create engaging learning activities.	15	57.7%
Teacher addresses individual learning styles of each student.	13	50.0%
Teacher and student develop mutual respect and trust.	10	38.5%

indicators teachers reported as not very important. "Teacher emphasizes time on task" (n = 0, 0.0%) did not receive a response despite being a staple of active learning. For this researcher, this was surprisingly followed closely by "Teacher promotes collaboration" (n = 1, 4%), and "Teacher defines the roles of the student" (n = 1, 4). Only "Teacher emphasizes lecture" (n = 0, 0.0%) was not identified and was expected to be listed near the bottom (Table 10).

Table 10 *Lowest Total Response: Three Most Important Indicators of Effective Instruction*

Indicators of Effective Instruction	Total Response	Total Percentage
Teacher encourages learning activities that promotes collaboration.	1	3.8%
Teacher defines the roles of the student and the learning objectives.	1	3.8%
Teacher emphasizes lecture or direct instruction to teach a skill or provide information.	0	0.0%
Teacher emphasizes time on task.	0	0.0%

The top five indicators of active learning as chosen by the teachers were all examples of primary indicators derived from the literature (see Figure 6). Conversely, three out of four indicators that received the fewest responses from the teachers were also examples of primary indicators of active learning: (1) Teacher emphasizes time on task, (2) Teacher encourages learning activities that promotes collaboration, and (3) Teacher defines the roles of the student and the learning objectives.

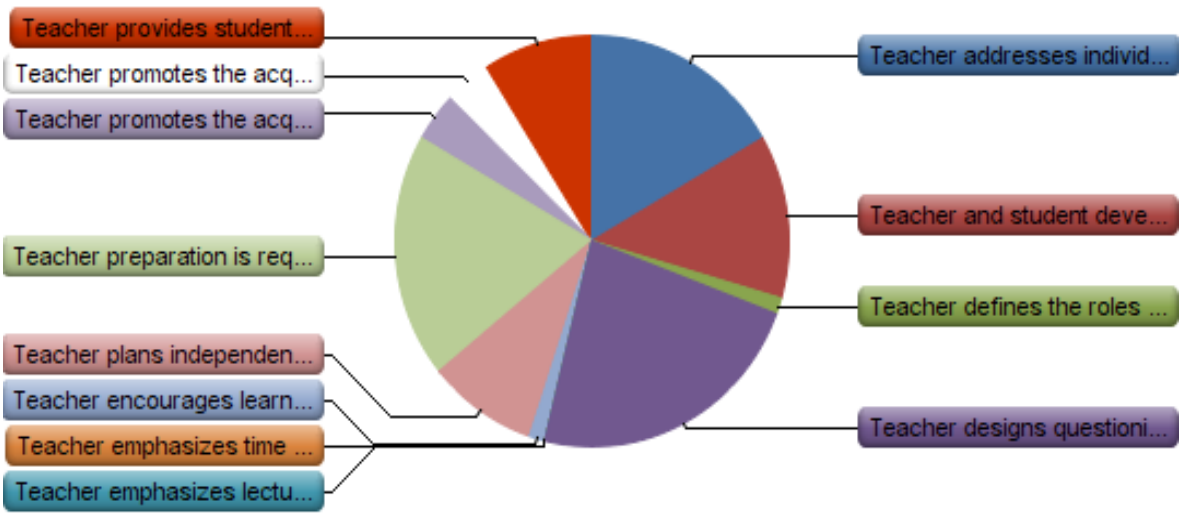


Figure 6. Pie Graph of Important Indicators

4.3 BARRIERS TO IMPLEMENTING ACTIVE LEARNING IN A VIRTUAL CLASSROOM

The survey attempted to understand the barriers that K-12 synchronous online teachers face when implementing active learning instructional practices into the virtual classroom. Descriptive statistics of teachers' perceptions are presented in Table 11. This section of the survey included 10 items inviting teachers to rate barriers to implementing effective instructional practices in the virtual classroom. The barriers relate to the interplay between teacher, student and technology to incorporate active learning strategies in the classroom.

Of great interest was the fact that respondents reported student as barriers to implementing active learning in three out of the top four. Teachers reported role transformation of the student (M = 3.42, SD = 0.64), student dissatisfaction (M = 3.27, SD = 0.83), and not enough time in the class (M = 3.19, SD = 0.85) as the greatest hindrance to implementing active learning, while the role of technology was viewed as only marginally distracting. Role transformation showed the lowest variance (.41) among the respondents. The tighter distribution indicates more agreement among the respondents that this barrier to implementing active learning was particularly prevalent in their instructional environment. Large class size (.55), role of the teacher (.50), and student dissatisfaction (.68) also showed lower variances, which indicate a more compact distribution of responses to these prompts. Not sure if this is due to the function of the online environment or any kind of K-12 classroom.

Conversely, three items were reported by teachers as "never" or "rarely" being a barrier to active learning with more than half (n = 13, 50%) the respondents agreeing. Proportionally, limited professional development on active learning techniques (n = 20, 76.9%), limited incentive for staff to implement active learning in classroom (n = 19, 73.1%), and class

preparation time is not sufficient (n = 18, 69.2%) as "never" or "rarely" a barrier. Class preparation time is not sufficient showed the largest variance value indicating that this active learning barrier showed the largest disparity in responses. Teachers also identified limited interaction between student and teacher in the virtual classroom as "rarely" or "sometimes" the vast majority of the time. However, these instruction barriers also showed a greater variation (>1) in the responses.

Table 11 *Ten Items of Perceived Barriers to Implementing Active Learning*

Statistic	Role transformation of student is difficult	Student dissatisfaction as engaged learner	Not enough time in class	Class size is too large	Limited interaction between student and teacher	Use of technology hinders instruction	Role of teacher is that of lecturer	Limited incentive for staff to implement active learning in classroom	Class preparation time is not sufficient	Limited professional development on active learning techniques
Mean	3.42	3.27	3.19	2.92	2.88	2.62	2.50	2.23	2.15	2.08
Median	3	3	3	3	3	3	2.5	2	2	2
Variance	0.41	0.68	0.72	0.55	1.07	0.89	0.50	1.14	1.18	0.71
Standard Deviation	0.64	0.83	0.85	0.74	1.03	0.94	0.71	1.07	1.08	0.84

(1=Never a barrier, 2=Rarely a barrier, 3=Sometimes a barrier, 4=Often a barrier, 5=Always a barrier)

From the research pertaining to barriers it is somewhat surprising to read that synchronous teachers did not feel professional development or incentives for staff to incorporate active learning limited them. Typically, teachers fail to implement active learning because they do not feel supported by administration due to the lack of training, support and limitations due to technology. Conversely, class preparation time was reported on average as "never" or "rarely" a barrier. This means to me that teacher feel well prepared and equipped to create and deliver

active learning strategies with the preparation time allotted. This was also surprising because teachers indicated that they felt there was not enough time in class and yet they indicated they had enough time to prepare for the class. Table 12 provides an overview of the 26 participants' responses to the following categories: (1) Never/Rarely a barrier, (2) Sometimes a barrier, and (3) Often/Always a barrier.

Table 12 *Perceived Barriers to Implementing Active Learning: Never or Rarely*

Barriers to Implementing Active Learning	Never/Rarely a barrier n (%)	Sometimes a barrier n (%)	Often/ Always a barrier n (%)	Median	Mean	SD
Limited incentive for staff to implement active learning in classroom	19 (73.1%)	3 (11.6%)	4 (15.4%)	2	2.23	1.07
Class preparation time is not sufficient	18 (69.2%)	5 (19.2%)	3 (11.6%)	2	2.15	1.08
Limited professional development on active learning techniques	20 (76.9%)	4 (15.4%)	2 (7.7%)	2	2.08	0.84

(1=Never a barrier, 2=Rarely a barrier, 3=Sometimes a barrier, 4=Often a barrier, 5=Always a barrier)

The last item of Question 3 asked, "Are there any barriers to implementing active learning in the virtual classroom that you feel we missed?" The goal was to attain qualitative data about barriers synchronous teachers in a cyber charter school face when implementing active learning that were not addressed by the survey. Only 7.7% (n = 2) of the teachers chose to answer this question. The first response stated, "Disengagement of the student after they enter the classroom." In this case, the participants' notion of a classroom was speaking to the synchronous platform used by teachers and students to conduct class on the Internet. The second text response stated, "When student technology/Internet is not working properly".

4.4 STRATEGIES OF ACTIVE LEARNING IN A SYNCHRONOUS ONLINE K-12 CYBER CHARTER SCHOOL

The primary goal of this research question was to learn how the K-12 synchronous online teachers would rank the strategies used to create active learning environments in the classroom. An analysis of the response pattern related to active learning strategies presented in Table 13 revealed some interesting evidence regarding the engagement approaches utilized by virtual teachers as a group.

It was not unexpected to find that in ten of the sixteen strategies, respondents did not indicate that the strategies were "never/rarely" used in the classroom. To a degree it validates that many of the instructional strategies found in traditional classrooms are also reported in synchronous classrooms. Four of the strategies, "respond positively to student questions and praises verbally for a job well done" (M = 4.73, Mdn = 5), "provide well defined learning objectives" (M = 4.56, Mdn = 5), "reinforce student efforts verbally" (M = 4.50,Mdn = 5), and "show enthusiasm for subject and strategies" (M = 4.35, Mdn = 5) had a median value of 5. Additionally, each indicator received almost universal endorsement by the participants with over 90% responding that test strategies were "often" or "always" used. This finding highlights the importance respondents place on the role of teacher and student in enacting active learning in their classroom. It also demonstrates an affective side to active learning that goes beyond the technology required to delivery instruction. The top strategies reported was an example of two of the primary indicators: (1) teacher and student interaction, and (2) provide prompt feedback.

Table 13 *Strategies Utilized to Create Active Learning Environments*

Active Learning Strategy	Never/ Rarely use n (%)	Sometimes use n (%)	Often/ Always use n (%)	Median	M	SD
Respond positively to student questions and praises verbally for a job well done	0 (0.0%)	1 (3.9%)	25 (96.2%)	5	4.73	0.53
Reinforce student efforts verbally to sustain engagement	0 (0.0%)	2 (7.7%)	24 (92.3%)	5	4.50	0.65
Show enthusiasm for subject and strategies used during class	0 (0.0%)	2 (7.7%)	24 (92.3%)	5	4.35	0.63
Engage students with humor, enthusiasm and connect with students on personal level	0 (0.0%)	2 (7.7%)	24 (92.3%)	5	4.19	0.57

(1=Never use, 2=Rarely use, 3=Sometimes use, 4=Often use, 5=Always use)

The last item in question 4 asked, "Are there strategies of active learning that you utilize in the synchronous classroom that we missed?" The goal of asking this open-ended question was to assess whether teachers in a cyber charter school report using elements of active learning not included on the survey. In addition, reviewing the qualitative data may support developments revealed in the quantitative survey data. Only 12% (n = 3) of the teachers chose to respond to this item. I do not have a hypothesis for why such a low number of responses other than the teachers throughout have responded that they are familiar with the indicators. Two of the responses, "peer teaching" and "I give students the opportunity to facilitate," align with the indicator "interaction between students" and, therefore, were not missed by the survey. However, the third text response, "encouraging students to use virtual emoticons and clapping for each other when someone demonstrates," speaks to the use of technology in the synchronous learning classroom that was not addressed as an element of active learning.

4.5 INDICATORS OF ACTIVE LEARNING TEACHERS IN A SYNCHRONOUS ONLINE K-12 CYBER CHARTER SCHOOL ARE UNSURE ABOUT WITHOUT MORE INFORMATION

The main objective of this item was to ascertain the knowledge of synchronous online teachers at a K-12 cyber charter school towards indicators of active learning. Specifically, the items were derived from the six primary indicators of active learning that are described in Chapter 3. Table 14 displays the results of the yes or no poll question.

Teachers were asked to respond with "yes" if they knew the indicator as described for the item or "no" if they were unsure about the indicator without more information. A strong majority of synchronous teachers reported knowing all seven indicators of active learning with a 93% response (M = 24.1, SD = 1.77) of "yes". Item #1 and #2 relate to the primary indicator of teacher to student interaction. Synchronous teachers responded with 24 "yes" and 2 "no" (92% reported knowing the indicators) for both. Item #3 and #4 relate to giving prompt feedback to students as an indicator of active learning. This time synchronous teachers responded with 26 "yes" and 0 "no" (100% reported knowing the indicators) for both. Of all the indicators of active learning in this poll, item #6 "time on task" (n = 21, SD = 3.54) reported the most average variability followed by item #7 "communicates high expectations" (n = 23, SD = 2.12). Based on so few of the synchronous teachers reporting "unsure about the indicator without more information," it is expected these participants hold sufficient information to answer questions about indicators of active engagement.

Table 14 *Teacher Knowledge of Active Learning Indicators*

Active Learning Indicators with Examples	Yes	No
Interaction between teacher and student (e.g., Shift in roles of teacher-student relationship; the teacher becomes the facilitator of knowledge and the student takes responsibility for learning and is self-sufficient)	24	2
Interaction between teacher and student (e.g., Teacher and student develop mutual respect and trust that promotes support, academic growth and encouragement)	24	2
Gives prompt feedback (e.g., Designs questioning in classroom that frequently assesses and measures student achievement)	26	0
Gives prompt feedback (e.g., Provides personal feedback to right and wrong answers that promotes support, growth and risk-taking when students answer questions)	26	0
Interaction between students (e.g., Classroom atmosphere that encourages a sense of community and promotes learning activities such as small group, collaborative learning, role playing, etc.)	25	1
Create learning activities that maximize student attention to task, as well as challenging enough to motivate students, but not so challenging that students fail to engage in the learning)	21	5
Communicates high expectations (e.g., The roles of the student and the learning objectives for the classroom are well defined by the teacher)	23	3

4.6 CHAPTER SUMMARY

This chapter examined the perspectives of teachers in a synchronous online K-12 cyber charter school towards active learning as an instructional strategy. A descriptive analysis of the numerical data was undertaken in order to provide an initial explanation of these perceptions. The goal was to report teachers' opinions and attitudes toward: (1) important indicators of active learning, (2) barriers to implementing active learning, (3) active learning strategies in the virtual classroom, and (4) indicators of active learning the teachers were unsure about. It is crucial to note that the intent of the analysis was not to generalize from the research participants to a larger population but rather to describe the characteristics of a sample at a point in time (Mertens,

2010). What follows is a summary of the analysis identified through descriptive statistics collected from the Qualtrics survey.

Teachers reported that the most important indicator of effective instruction was the teacher preparation required to create engaging learning activities. A large proportion of teachers identified all the indicators as at least moderately important to effective instruction in the virtual classroom. All but two of the primary indicators of active learning as identified in the literature (time on task and activities that promote collaboration) were perceived by the teachers as "very important" or "extremely important". This appears to be an outlier, as both indicators are deemed necessary for active learning in the literature. Conversely, three out of five indicators described as "moderately important" were not considered by the literature as primary indicators of active learning. The only indicator not identified as primary to active learning to be considered either "very important" or "extremely important" was teacher plans independent practice activities.

Teachers ranked the top three most important indicators of effective instruction as: (1) teacher designs questioning in classroom that frequently assess and measures student achievement, (2) teacher preparation is required to create engaging learning activities, and (3) teacher addresses individual learning styles of each student. The five most important indicators of effective instruction in a synchronous classroom all derived from primary indicators of active learning. However, two primary indicators (teacher defines role of student and learning objective and teacher encourages learning activities that promotes collaboration) received one response each and a third (teacher emphasizes time on task) did not receive a response.

Finally, analyzing the strategies used by synchronous teachers to create active learning environments yielded the following discoveries: reinforcing student efforts verbally and showing

enthusiasm for the subject taught was perceived to be just as important as developing systematic assessments and frequently assessing during class. Predominantly, teachers reported responding to student questions and praises verbally for a job well done as the most used strategy and providing collaborative learning activities as the least used. Teachers were asked if they were unsure about any of the indicators of active learning as presented, and a large majority (93%) responded that they did know the indicators. The item that received the most responses was related to time on task with five teachers out of twenty-six selecting "unsure about the indicator without more information".

5.0 CONCLUSIONS, INTERPRETATIONS, AND RECOMMENDATIONS

5.1 SUMMARY OF STUDY

Online education continues to expand across the United States. In 2009-2010, there were approximately 200,000 K-12 students enrolled in online education (Watson et al., 2012). In the 2012-2013 school year, nearly 750,000 K-12 students were enrolled in online courses (Watson et al., 2013). The broadening sphere of online education demands that an increased focus be placed on the pedagogy of the virtual classroom. Specifically, research needs to be conducted to identify sound instructional practice in the synchronous online classroom, because it is the preferred method of online learning by both teacher and student (Hrastinski, 2007).

There is considerable research investigating the best ways students learn within a traditional classroom setting, and, within this research, active learning stands out (Bachelor, Vaughan, & Wall, 2012; Chickering & Gamson, 1987; Bonwell & Eison, 1991). Nevertheless, insufficient research exists that examines the nature of active learning in a synchronous online classroom. Discovering the perceptions of synchronous online teachers towards active learning strategies in their classroom is an important first step towards filling this research gap.

5.1.1 Primary indicators of active learning

A total of 51 articles from the review of the literature were analyzed, and a tally was taken that produced a total of 13 indicators of active learning. The 13 indicators of active learning were then categorized as either primary or secondary. Six primary indicators and seven secondary indicators are identified for a total of 13 indicators of active learning. The six primary indicators represent a minimum of 26 or more peer-reviewed articles (at least half of the researched literature) that refer to the indicator as important to active learning. The six primary indicators of active learning are: (1) interaction between teacher and student, (2) interaction and collaboration between students, (3) prompt feedback, (4) time on task, (5) incorporation of active learning strategies, and (6) communicate high expectations.

5.1.2 Three pillars

In order to understand the perceptions of the synchronous online K-12 cyber charter school teachers who participated in this study, it is important to first understand the intertwined relationship of students, teachers, and technology in regard to active learning. To do this we must deconstruct the roles that students and teachers play when utilizing technology for teaching and learning and then put them back together again. This tight integration and the consideration that multiple factors impact effective instruction in technologically driven learning environments were reported in several research studies (Chickering & Ehrmann, 1996; Chizmar & Walbert, 1999; Arbaugh & Hornik, 2006).

In fact, the relationship between what I henceforth will call the three pillars (student, teacher & technology) in a synchronous online classroom is ever apparent in the primary

indicators of active learning. The six primary indicators of active learning established from the literature were researched and reported in a traditional classroom setting. We might take for granted that in this dynamic the classroom itself plays a role in active learning and effective instruction along with the teacher and student. As we transfer the indicators to a synchronous online classroom environment, we are revising the expectations for the classroom to include technological components and the interplay between teacher and student. As the research shows, how successfully each is navigated will determine the success or barriers to implementing active learning.

For example, literature related to the first indicator (interaction between teacher and student) demonstrates the impact an online learning environment has on teacher immediacy and student interaction (Arbaugh, 2001; Arbaugh & Hornik, 2006). There are both positive and negative experiences reported by the teachers and students in the online (technology) format. The instructional strategies used by the teacher and the various ways a student can engage in online learning is impacted by technology. This relationship holds true for each of the primary indicators of active learning as well as being an example of effective instruction. Again, it might seem like common sense that the three pillars of active learning are connected due to the nature of online learning; however, this cannot be taken for granted in online education for effective professional development, teacher recruitment, formal evaluation and student engagement.

5.2 SUMMARY OF FINDINGS

How do we know that students are actively engaged when attending a cyber charter school? And more specifically, how do we know if students are engaged in their learning when attending a

synchronous online classroom? Those questions were posed to me many years ago and frame this study of teachers' perceptions of active learning in a virtual classroom. The following summary is an integration of the four research questions based on active learning and making meaning out of what is important to note and what is not through the lens of the literature, data analysis, and professional experience.

5.2.1 Indicators and barriers of effective instruction

The 26 synchronous online teachers who participated in this study were asked to identify the most important active learning indicators. Five of the twelve indicators exhibited agreement among the respondents (>90%) as "very important" and "extremely important" to effective instruction in the synchronous online classroom. What was revealing about these indicators was that all five were examples of primary indicators as identified in the literature. The survey question asked for the most important effective instructional practices, and the teachers identified all of the strategies related to primary indicators of active learning nonetheless. Jones, Valdez, Nowakowski, and Rasmussen (1994) identify these five indicators as part of eight total that should be used to evaluate active learning in classroom instruction. The North Central Regional Education Laboratory (NCREL) provides resources based on this work and classifies all five as important indicators of engaged learning (1994).

Overall, teacher preparation required to construct engaged learning and teacher designs questioning that frequently assess and measures student achievement received the highest consensus score (96%). From my experience working with teachers in virtual classrooms, this response is not surprising because of the amount of time required to plan lessons that include active learning strategies in an online environment. Both indicators share preparation as their

common bond. Researchers suggest it can be burdensome in this scenario to prepare materials and effectively manage time so as to involve all learners in active learning (*Instructor Web*, 2013; Wang, 2009). From my perspective working in both traditional and virtual classrooms, teachers in synchronous online environments must put the same effort into lesson planning as traditional classroom teachers, if not more, to ensure that elements of active learning are present.

Teachers were asked to select the three most important indicators of effective instruction in their synchronous online classroom out of the list of twelve. Recognizing that there are a possible 220 different combinations of responses for each participant, the pattern of this data was deemed significant. Four indicators of effective instruction were selected most frequently by the respondents, and, interestingly, they correlate to the primary indicators of active learning. At least 50% of the respondents selected individual learning styles, teacher preparation, and question design as the most important strategies. The fourth, teacher and student develop mutual respect, was selected by more than 35% of the respondents. Conversely, a well-established effective learning strategy, time on task, was not selected by any of the participants. Since there were only 26 participants that were limited to three responses out of twelve with eight research established effective strategies on the list, it is not unusual for an established strategy to receive little of no support by the participants. However, it is curious that this fundamental indicator of active learning was perceived as not very important overall.

An interesting consideration stemming from the data was why time on task was not important in teachers' perspectives when the literature says effective time management in discussions, assessments, and reading among students is vital to learning (Chickering & Gamson, 1987; Chickering & Erhmann, 1996). It is possible that this has something to do with the amount of preparation that is required by students outside of class to be able to participate during

class. Teachers may have seen this phenomenon as not consistent with effective instructional strategies that occur during class. It is important to note that when asked to rate how important time on task was on a Likert scale, twelve of twenty-six teachers (46.2%) viewed it as "slightly important" and "moderately important" to effective instruction and 14 teachers (53.8%) viewed it as "very important" and "extremely important" to effective instruction in their synchronous online classroom. The data suggests that there may be some disconnect in the thinking about the importance of this indicator or terminology. This may be due to the nature of training and whether or not time on task has been sustained or a focus of teacher training. Perhaps the teachers did not find this indicator as important as the others because of prior knowledge acquired in higher education or because the technology employed in the synchronous online classroom limited their application.

Two other primary indicators of active learning were outliers in the data as well. When asked to choose the three most important indicators of effective instruction, "collaboration" and "teacher defines roles" garnered one response each (4%). Chickering and Gamson (1987) confirm that real learning is social and collaborative, because working within a group increases student involvement in learning. Instructional strategies and teaching techniques implemented by the teacher can support collaborative learning and increase cooperation among students (Chickering & Gamson, 1991; Eison, 2010). Such collaborative learning strategies have been shown to improve self-esteem, productivity, and engagement among students (Batts et al., 2006). Given that this is critical to active learning I desire to extend this study with informal observations of the synchronous online classroom. I want to see if technology, time constraints, lesson planning or prior knowledge limits incorporation of collaborative learning. The results suggest that multiple indicators are not being implemented in the online classroom. A deeper

inspection of the synchronous classroom may lead the researcher to find that, in fact, they are present or that further teacher training may be required.

Findings regarding barriers to implementing effective instructional practices in a virtual classroom were interesting. First, teachers reported the role of the student, time in class and class size as the greatest hindrance to implementing active learning while the role of technology was viewed as only marginally distracting. The findings that were reflected in these data about the role of the students as a barrier to implementing active learning strategies was similar to findings reported in traditional classrooms. On the other hand, it might be assumed that technology would be more of a hindrance to active learning in a synchronous classroom due to the heavily reliance on it. This may make sense when considering that teachers viewed limited incentives for staff to implement active learning, limited professional development, and class preparation time as "never" or "rarely" a barrier. It's possible that adequate training with the technology has led teachers to perceive this as less a barrier. In addition to technology, teachers reported their interaction with students as not viewed as a barrier as well. Teachers identified limited interaction between student and teacher in the virtual classroom as "rarely" or "sometimes" a barrier.

The barriers to implementing effective instruction fall into the three pillars of teacher, student, and technology. The research says participation by students in the active classroom is not guaranteed; basic student behaviors such as not complying with school and class rules as well as being non-attentive and not answering questions posed by the teacher are often deterrence to active learning (Schweitzer & Brown, 2007). Furthermore, synchronous learning ensures that teachers and students have real-time communication, which offers them the capability of posing questions and receiving delayed or immediate responses (Duncan et al.,

2012; Chiu, 2010). Synchronous learning is based on technology providing real-time learning opportunities between teachers and students (Skylar, 2009). The lack of authority students exhibit over the time they have to engage in discourse for knowledge acquisition can be problematic for the student and the teacher (Hrastinski, 2008).

Interestingly, the top barriers to effective instruction in the synchronous online classroom focus on students as opposed to the influence of teachers and technology. Three of the top four barriers indicated by the synchronous teachers related to student involvement were: (1) role transformation of the student, (2) class size is too large and (3) student dissatisfaction in the role as engaged learner. The literature in part agrees with the teachers' perceptions. When designing active learning classrooms, teachers need to recognize and integrate students' levels of engagement (Briggs, 2005). There is growing agreement that a large classroom restricts strategies of active learning processes (Eison, 2010; *Instructor Web*, 2013; Wang, 2009). Role transformation of students is congruent with the work of Eison (2010) and Weimer (2009) who report that students' participation can be problematic to creating active learning environments.

Teachers in this survey were right to say students can be a barrier to effective instruction. The research along with my personal experience in traditional and virtual classrooms points to the integral role students play in creating an active learning environment. Bonwell and Eison (1991) state that in traditional classrooms active learning occurs through asking learners to present their work to the class, requiring students to relate outside activities or events to content in the course, and encouraging students to challenge ideas and analyze concrete situations. It would be fascinating to know how this perceived barrier is being dealt with in a synchronous classroom. How are opportunities to engage students being promoted? Has this cyber charter school recognized that its teachers view the role of the student as a barrier?

Teachers can be identified as barriers as well. Five of the ten barriers to implementing effective instruction dealt with the role of the teacher. However, none of the five were perceived by the teachers to be much more than "sometimes" a barrier. Interestingly, the indicator related to teachers that received the highest response was limited interaction between student and teacher. At that, only 42% of the respondents thought limited interaction was sometimes a barrier, and the indicator speaks to the relationship between teacher and student. Research indicates that synchronous technologies offer high contact between students and teachers that extends beyond video/audio formats to include text chats and emoticons that support simultaneous interaction between students and teachers (Watson & Sutton, 2012). The results suggest the teachers in this cyber charter school recognize the benefits of technology to connect with students.

Research shows inadequate professional development as a hindrance to implementation of effective active learning strategies. The change to the teacher's role in learning presents a considerable barrier to implementation of active learning in schools (Drew & Mackie, 2011; Wang, 2009). However, teachers reported in the survey that changing to a facilitator role was not a barrier. "Limited professional development on active learning techniques" (n = 20, 76.9%) was recorded by the majority of the teachers as "never" or "rarely" being a barrier to active learning. Of the 26 participating teachers more than half (n = 13, 50%) of the respondents agreed.

One item within the barriers to effective instruction was telling in how it was answered. The role of the teacher as that of lecturer (n= 25, 96.2%) was viewed as "never" or "rarely" a barrier. What struck me was that teachers reported lecturing as not being a barrier to effective instruction. According to the research, however, lecturing was not considered a primary or

secondary indicator of active learning. I am not sure if the answer is a function of teacher interpretation of the question or whether they feeling strongly that lecturing was not a barrier. However, from a teaching perspective, lecturing was one of the most effective instructional approaches in traditional and online classrooms.

The third pillar of active learning in a synchronous online classroom, technology, was not viewed as a barrier. Twenty-one of the respondents (80.8%) reported that technology was "never" or "rarely" a barrier. This surprising finding led the researcher to believe it may be a false positive, because it begged the question, "Is technology being utilized to its fullest potential to delivery effective active learning strategies?" Perhaps teachers use the synchronous platform without being proficient or maybe the teachers are highly proficient using the synchronous tools but use them at a very low level and do not know the difference. Conceivably, they have a deep understanding of technology due to extensive training or practical experience teaching in the synchronous classroom. A final question that arose from the findings on technology as a barrier was: were teachers hired based on their technology competence or was this pillar addressed in professional development and therefore not considered barrier?

Based on the data, I believe the participants from this cyber charter school have had professional development that in part is focused on active learning strategies for the synchronous classroom. This assumption is based on their ability to identify the top effective instructional strategies, as identified by the literature says as top active learning strategies. Also, when asked if professional development was a barrier to implementing effective instruction in their classroom, the participants responded it was not. Additionally, I wanted to know if teachers at this cyber charter school were given incentives to implement active learning in their classroom. Nineteen teachers (73.1%) said it was "never" or "rarely" a barrier to implementing active

learning. Finally, the survey asked teachers if there were any indicators of active learning they were unsure about. A strong majority of teachers reported knowing all the indicators with a 93% response of "yes", which indicates they knew the indicator as described for this item.

Given that professional development was not viewed as a barrier to implementing effective instruction, I am curious about the nature of professional development at this cyber charter school. Examining professional development plans may allow us to see how to target teachers and students and to verify if there is a focus on active learning instructional practices.

When asked to list the three most important indicators of effective instruction, why were the top three or four indicators selected by the teachers? Why did three primary indicators rank so low from the teachers' perspective? It may be important to find out if professional development or formal and informal evaluation of these synchronous online teachers focuses on these indicators. Is the training sustained, specific to active learning strategies and I am curious if the training was done by employees of the school or by an outside expert? I also want to get to the heart of why teachers don't view time on task, collaboration and teacher defines roles of the student and the learning objectives as critical to active learning instructional strategies.

5.2.2 Recommendations

How are we preparing online teachers for the three pillars of active learning (teacher, student and technology)? It is important to consider that cyber charter schools and synchronous online classrooms think about deliberate strategies for addressing active learning and eliminating barriers to its implementation. For example, the teacher and student could be acclimated to the technology in advance of the first day of online class by holding meet the teacher or new technology events. Similarly, schools could implement deliberate strategies to aide teachers with

active learning strategies such as providing comprehensive training to first year teachers, mentorships between new and experienced online teachers and informal observations that bring to light best practice. Preparing teachers to be immersed in a synchronous online classroom begins with a review of professional development plans.

Further research should be conducted into how professional development, hiring practices, and teacher evaluation impact the implementation of active learning in the synchronous online classroom. It might be fruitful to critique professional development plans using the three pillars of active learning as identified in the literature. Furthermore, each of the components of active learning critical to synchronous online learning could be studied separately. A next step would be for someone to look at the role of teacher, the role of student, and the role of technology to examine how this information could be used in the interview process as part of the questioning and teacher selection. The results may help cyber charter schools examine their own professional development plans based on the strengths and weakness of the three pillars of active learning. Additionally, interview questions could be generated to gauge a baseline of a prospective teacher's understanding of effective instructional practice. Finally, it might be important for future research to focus on the student's perspective to active learning in a synchronous online environment. In particular, it would be interesting to ask students to rate the importance of each indicator of active learning and their perspectives on which strategies they believe help them to learn best in the synchronous classroom.

5.2.3 Limitations

The nature of survey research and descriptive statistics is to summarize a sample, rather than use the data to generalize to a larger population. This type of study does not allow me to make

conclusions beyond the data analyzed or reach conclusions concerning any hypothesis I might have made.

The primary limitation to conducting a study of active learning within a cyber charter school is the small sample of synchronous online teachers surveyed. The questioning of 26 virtual teachers was expected to reduce the generalizability of the study findings. Rather than extending a particular theory about active learning, the researcher was guided by his enthusiasm in the case itself and will not attempt to generalize across cases.

Issues such as reliability, validity, bias, and response rate may be the second limitation to this survey based study on active learning in a synchronous online classroom. Owing to the recent explosion of online learning in K-12, research is limited on the topic. The researcher created the survey instrument because an instrument with verified reliability and results does not exist currently. Great care was taken to construct a survey that was based on the theoretical framework of Chickering and Gamson (1987) and aligned to indicators of active learning suggested by the literature review.

One variable not adequately measured was instructional strategies that synchronous online teachers may use in class to elicit active learning. This was not presented in the survey.

5.2.4 Reflection

This study evolved over an eight year period when I worked at a cyber charter school and was responsible for thinking about how we hire teachers, prepare them for the virtual classroom, evaluate their instructional practice, and incorporate active learning and other effective instructional strategies into daily lessons. Over the eight years, I focused on the question that ultimately engaged me in this research: “How do we know students are engaged in the virtual

classroom?" This study gave me an opportunity to continue to think deeply about how we develop the pedagogical, technological, and interpersonal skills of teachers to be effective synchronous online teachers. Without question, my focus on the three pillars of active learning will continue.

APPENDIX A

INVITATION TO PARTICIPATE

Date

Dear Cyber School Administrator:

My name is Andrew Oberg and I am a doctoral candidate at the University of Pittsburgh requesting your assistance with my research study. I am investigating the indicators of active learning as they are manifesting in a synchronous online learning environment within a cyber charter school. The research study intends to collect data from synchronous online teachers through a constructed survey to portray the indicators of active learning. I am directing my initial correspondence to your attention because I need your support to carry out the study.

There is significant research examining the nature of the effect of active learning in traditional classrooms. Active learning is considered to be among the better predictors of learning and personal development. Teachers who facilitate active learning in their classrooms see increases in student educational achievement, positive attitudes to learning, and self-efficacy. However, little in the way of research is known about active learning in the context of the synchronous online classroom. Critics of this environment have made the claim that students are passive in their role as participants and in fact, do not take an active role. Consequently, it is hoped this study will enlighten all stakeholders on strategies of active learning in the synchronous online learning environment and aid in developing programs and policies to enhance the teachers' role in engaging learners.

Participation is completely voluntary, and all information will be kept completely confidential. The success of the study will depend on participants giving honest answers to the survey questions. I recognize that accurate and candid responses are to be expected only if participants are confident that the information they supply will be kept confidential and secure. Please be assured that I will take every precaution to protect the identity of participants.

I hope you will consider assisting me with this research project. If you have any questions regarding my dissertation I can be reached at 412-961-2070 or amo53@pitt.edu. I thank you in advance for your time and consideration.

Kind regards,

Andrew Oberg

APPENDIX B

INVITATION TO PARTICIPANTS

Date

Dear Cyber School Teacher:

My name is Andrew Oberg and I am a doctoral candidate in the Educational Leadership program at the University of Pittsburgh. I would like to invite you to participate in a research study that aims to portray active learning as it manifests in the synchronous online classroom within a cyber charter school.

There is significant research examining the nature of active learning in traditional classrooms, but very little in the way of synchronous online learning environments. My study and subsequent survey questions are intended then to draw attention to the benefits and barriers of engaging learners in a synchronous online classroom. It is my intention at the conclusion of this study to share these findings to enlighten all stakeholders of online learning and aid in developing programs and policies that enhance synchronous online learning.

I am requesting your help and support through the administration of an online survey. Your participation is completely voluntary; choosing not to do so will not have a negative effect on you. If you chose to participate, the information you provide will be kept secure and confidential and only to be used for the study.

The success of the study will depend on participants giving honest answers to the survey questions. I hope you will consider assisting me with this research project. If you have any questions regarding my dissertation, I can be reached at 412-961-2070 or amo53@pitt.edu. I thank you in advance for your time and consideration.

Kind regards,

Andrew Oberg

APPENDIX C

ACTIVE LEARNING SURVEY INTRODUCTION

Active Learning Survey: K-12 synchronous online teachers

This survey is given to you to ask for your help in providing feedback on Active Learning in a virtual classroom. As a teacher who works for a cyber charter school, the researcher considers you to be an important stakeholder and will highly value the information you can provide.

Your ratings will not be considered individually but will be included with others in a summary of findings. The results will be used to portray the perceptions of synchronous online K-12 cyber charter school teachers in regards to indicators of active learning.

Each item is presented as a statement, and you are asked to mark the response number that most closely aligns with your observations and knowledge of active learning indicators in a synchronous online classroom. The ratings are on a five-point scale, except for the final series of questions that will ask you to check a box. You should not discuss this questionnaire with anyone prior to completing it.

Research Questions:

1. What do teachers in a synchronous online K-12 cyber charter school perceive as important indicators of active learning in a virtual classroom?

2. What do teachers in a synchronous online K-12 cyber charter school perceive as barriers to implementing active learning in a virtual classroom?

3. Which strategies of active learning do teachers in a synchronous online K-12 cyber charter school utilize in a virtual classroom?

4. Which indicators of active learning are teachers in a synchronous online K-12 cyber charter school unsure about without more information?

APPENDIX D

ACTIVE LEARNING SURVEY: K-12 CYBER CHARTER SCHOOL

Effective Instruction in a Synchronous Online Learning Environment: Demographic Information

The first three questions are demographic in nature, but will not be used to identify individuals. Please take a moment to answer questions related to grade span taught and number of years you have been teaching.

Q1 What grade span do you teach in the cyber charter school?

K-6 (1)
7-12 (2)
Both (3)

Q2 How many years total have you been teaching in public and/or private schools?

1 to 3 years (1)
4 to 6 years (2)
7 to 9 years (3)
10 to 12 years (4)
13 to 15 years (5)
16 years or more (6)

Q3 How many years total have you been teaching in a cyber charter school?

1 to 3 years (1)
4 to 6 years (2)
7 to 9 years (3)
10 to 12 years (4)
13 to 15 years (5)

16 years or more (6)

Effective Instruction in a Synchronous Online Learning Environment: Survey

The following survey will ask you to answer questions related to your time teaching in the synchronous online classroom. Please consider only the time you spend with your students in the synchronous online classroom when answering. The survey is not taking into account instruction delivered asynchronously or through teacher office hours.

Effective Instruction in a Synchronous Online Learning Environment

Q4 Let's begin the survey! I want you to tell me how important each of the indicators of effective instruction listed below is in your synchronous online classroom.

	Not Important (1)	Slightly Important (2)	Moderately Important (3)	Very Important (4)	Extremely Important (5)	Unsure without more information (6)
Teacher and student develop mutual respect and trust. (1)						
Teacher addresses individual learning styles of each student. (2)						
Teacher encourages learning activities that promote collaboration. (3)						
Teacher emphasizes lecture or direct instruction to						

teach a skill or provide information (4) Teacher preparation is required to create engaging learning activities (5) Teacher promotes the acquisition of knowledge or skill through repetitive practice (6) Teacher designs questioning that frequently assess and measures student achievement. (7) Teacher plans independent practice activities or homework to reinforce concepts taught in class. (8) Teacher provides students with personal feedback to right and wrong answers in class. (9) Teacher emphasizes time on task. (10) Teacher promotes the acquisition of knowledge or skill through note taking. (11) Teacher defines the roles of the student and the						

learning objectives. (12)						

Effective Instruction in a Synchronous Online Learning Environment

Q5 OK, now I want you to think about the three most important indicators of effective instruction in a synchronous online classroom. Please click on no more than three of the indicators listed below.

(1)Teacher becomes the facilitator of knowledge and the student takes responsibility for learning.
(2)Teacher and student develop mutual respect and trust.
(3)Teacher addresses individual learning styles of each student.
(4)Teacher encourages learning activities that promotes collaboration.
(5)Teacher emphasizes lecture or direct instruction to teach a skill or provide information.
(6)Teacher preparation is required to create engaging learning activities.
(7)Teacher promotes the acquisition of knowledge or skill through repetitive practice.
(8)Teacher designs questioning in classroom that frequently assess and measures student achievement.
(9)Teacher plans independent practice activities or homework to reinforce concepts taught during class.
(10)Teacher provides students with personal feedback to right and wrong answers in class.
(11)Teacher emphasizes time on task.
(12)Teacher defines the roles of the student and the learning objectives.

Barriers to Effective Instruction

Q6 Great! Now that you have thought about indicators of effective instruction, let's start thinking about barriers to effective instruction. The following is a list of barriers to implementing effective instructional practices in the classroom. Please tell us to what degree the following examples are barriers to implementing effective instruction in the virtual classroom.

	Never a barrier (1)	Rarely a barrier (2)	Sometimes a barrier (3)	Often a barrier (4)	Always a barrier (5)
Class size is too large (1)					

Not enough time in class (2) Use of technology hinders instruction (3) Limited interaction between student and teacher (4) Role of teacher is that of lecturer (5) Limited incentive for staff to implement active learning in classroom (6) Role transformation of student is difficult (e.g., From passive to engaged learner) (7) Limited professional development on active learning techniques (8) Class preparation time is not sufficient (e.g., Increased teacher preparation is spent in lesson planning to create active learning classroom) (9) Student dissatisfaction in role as engaged learner (10)					

Q7 Are there any barriers to implementing active learning in the virtual classroom that you feel we missed? If so, please tell us about these barriers.

Active Learning Strategies

Q8 Thank you. You are almost finished! Let's turn to strategies you use to create active learning in a virtual classroom. The following is a list of strategies that some teachers utilize to create active learning environments. Please tell us which tactics of active learning you use in the virtual classroom.

	Never use (1)	Rarely use (2)	Sometimes use (3)	Often use (4)	Always use (5)
Act as facilitator of learning (e.g., Move from information giver to guide					

and learner) (1) Create classroom environment that aids in the development of exploration (2) Engage students with humor, enthusiasm and connect with students on personal level (3) Show enthusiasm for subject and strategies used during class (4) Provide collaborative learning activities (e.g., cooperative learning groups, think-pair-share, gaming, peer instruction, role playing, informal small groups, etc.) (5) Create classroom atmosphere that promotes a sense of community among students (6) Develop systematic assessment opportunities for students (e.g., Poll questions, true/false, matching, voluntary response, cold calling, etc.) (7) Create well defined roles for the student (e.g., expectations, participation, etc.) (8) Provide well defined learning objectives for the classroom (9) Determine the level of student participation before class begins (10) Design questions to inform instruction and improve student learning (11) Frequently assess during class to measure student achievement (12) Reinforce student efforts verbally to sustain engagement (13) Respond positively to student questions and praises verbally for a job well done (14) Provide benchmarks for monitoring student progress and adjusts learning strategies (15)					

Use questioning to hold students accountable for their work/effort in class (16)					

Q9 Are there elements (strategies) of active learning that you utilize in the virtual classroom that we missed? If so, please tell us about these elements.

Q10 OK, this is the last item! Your views are important to us. Please tell us which indicators of active learning you know and which you are unsure about without more information. Simply click "yes" for indicators you know and "no" for indicators you are unsure about.

	Yes (1)	No (2)
Interaction between teacher and student (e.g., Shift in roles of teacher-student relationship; the teacher becomes the facilitator of knowledge and the student takes responsibility for learning and is self-sufficient) (1)	❍	❍
Interaction between teacher and student (e.g., Teacher and student develop mutual respect and trust that promotes support, academic growth and encouragement) (2)	❍	❍
Gives prompt feedback (e.g., Designs questioning in classroom that frequently assesses and measures student achievement) (3)	❍	❍
Gives prompt feedback (e.g., Provide personal feedback to right and wrong answers that promotes support, growth and risk-taking when students answer questions) (4)	❍	❍
Interaction between students (e.g., Classroom atmosphere that encourages a sense of community and promotes learning activities such as small group, collaborative learning, role playing, etc.) (5)	❍	❍
Emphasizes time on task (e.g., Create learning activities that maximize student attention to task, as well as challenging enough to motivate students but not so challenging that students fail to engage in the learning) (6)	❍	❍
Communicates high expectations (e.g., The roles of the student and the learning objectives for the classroom are well defined by the teacher) (7)	❍	❍

You have completed the survey! Thank you so much for your time and cooperation with this research study. The information you have provided will be invaluable to my doctoral dissertation.

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