A QUALITATIVE INVESTIGATION OF COMPLEX ADAPTIVE BLENDED LEARNING SYSTEMS WITHIN RURAL INDIGENOUS COMMUNITIES

A Dissertation

Presented to

The Faculty of the Graduate School

At the University of Missouri-Columbia

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

By:

BRIAN K. OLIVERA

Dr. Cynthia J. MacGregor, Dissertation Supervisor

July 2023

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled.

A QUALITATIVE INVESTIGATION OF COMPLEX ADAPTIVE BLENDED LEARNING SYSTEMS WITHIN RURAL INDIGENOUS COMMUNITIES

Presented by Brian K. Olivera,

A candidate for the degree of Doctor of Education,

And hereby certify that, in their opinion, is worthy of acceptance.

Cynthia J MacGregor

Dissertation Committee Chair

Jeffrey H Cornelius-White

Dissertation Committee Member

John S Turner

Dissertation Committee Member

Patricia (T.C.) Wall

Dissertation Committee Member

ACKNOWLEDGEMENTS

First and foremost, I would like to thank the dissertation committee for the time, effort, guidance, and support throughout my dissertation process. I would like to give a special ‘thank you’ to Dr. Cynthia MacGregor and Dr. Jeffrey Cornelius-White for the extended time they spent helping me succeed through my time conducting the study.

I would also like to thank all of the participants for taking the time and allowing me to interview them for the study. The time many of the participants spent sharing their experiences, and the rich detail many of them gave, was well beyond my expectations. The information they shared was valuable, and their passion for educating all students was evident.

Last, I would also like to thank my friend and classmate Kevin Folk for all of his support and encouragement and taking the time to check in with me throughout the process.

TABLE OF CONTENTS

ABSTRACT

This qualitative bounded case study examined how emergence (of events, ideas, and innovations) occurred from interactions between stakeholders in Kodiak, Alaska's blended learning program. The study examined two research questions with the interviews to reveal experiences of 45 participants who had been or were within the Kodiak rural schools blended learning program, employing a constant comparative method of analysis to identify themes that cut across the data. The first research question examined emergences the spaces between the six components of the CABLS framework with the implementation of Kodiak's blended learning system. The researcher identified three themes that led to emergence: synchronous interactions, real time proximal problem solving, and collaborative sharing with reciprocal feedback loops. Moreover, the research found that the conditions for emergence happened at the point of intersection where the three themes were simultaneously present. The second research question examined the perception of impact that the blended learning program had on student choices for life after high school. The researcher found that the implementation of blended learning led to extended access to resources, expanded social networks, and increased self-confidence had an impact on the choices students made after high school. Future researchers should consider how blended learning is impacting the population in rural Alaska, and its economic environment.

Keywords: Complex Adaptive Blended Learning Systems (CABLS), Agent, Blended Learning, Lever Points, Synchronous Learning, Asynchronous Learning

SECTION ONE:

INTRODUCTION TO DISSERTATION

Background

In many rural parts of the world schools can find themselves struggling to meet the various resource needs of their students. For one rural school district in remote Alaska access to highly qualified teachers are one of those resource barriers. The remoteness of the school district makes finding highly qualified teachers in core content areas difficult. In addition the small community sizes limit the number of teachers that are hired in a given school, and the variety of course offerings for students. These factors can present significant challenges when trying to provide rural school students with the same educational opportunities as larger urban and suburban schools. In an effort to overcome these barriers the rural school district of Kodiak Alaska looked to the integration of technology within the classrooms for a solution (Mishra, Cain, Sawaya, & Henriksen, 2013; O'Byrne & Pytash, 2015; O'Connor, et. al., 2011; Shantakumari & Sajith, 2015; Wang, Han, & Yang, 2015).

Over the past decade technology has been rapidly making its way into the school system, providing new and creative ways for teachers and students to disseminate and acquire knowledge. Teachers and students no longer have to reside in the same space, at the same point in time, learning exclusively with face-to-face instruction (O'Connor et al., 2011). By incorporating blended learning into the teaching-learning processes schools can overcome a variety of barriers such as limited access to highly qualified teachers, diversified course offerings, and minimal social interactions. In Kodiak, schools have removed the classroom walls that confine learning to the traditional face-to-face learning environment. This approach to teaching-learning provides students with a flexible, anytime-anywhere learning experience, in an environment of their convenience (Kuo, et al., 2014; Pace & Mellard, 2016).

Blended learning is a teaching-learning process that combines the traditional face-to-face method of learning with that of technology mediated learning (Gunn & Hollingsworth, 2013; Kuo et al., 2014; O'Connor, et al., 2015). When the combination of these two instructional methods merge they provide an adaptive, engaging, and dynamic approach to the education environment (Kuo et al., 2014; O'Connor et al., 2011; Pace & Mellard, 2016; Wang et al., 2015). The Kodiak Rural School District has taken advantage of this method of instruction in a unique way.

Within rural Alaska access to highly qualified teachers and the limited course selection are not the only factors students face in their schools. The remoteness of the village communities create limited opportunities for social interactions between peers. Blended learning made it possible to expand the social network for students by providing them with opportunities to collaborate in groups and engage in academic discussions with peers from other communities. Without blended learning, opportunities for social interactions would not be easily available.

Statement of the Problem

There are three different teaching models being used in education. These three models are the traditional face-to-face teaching-learning method, full online learning, and blended learning. Blended learning is a relatively new teaching-learning model, only emerging in the early 2000's (Wang et al., 2015). What research has been conducted has occurred primarily in isolation, focusing on the individual components. This makes it difficult to understand how the different components of blended learning interact and function as a whole (Wang et al., 2015).

Blended learning is a dynamic, complex, and interwoven teaching-learning practice requiring its many modalities to be synchronized (Kuo et al., 2015; Wang et al., 2015). Moreover, the interactions in a blended learning system are not a single cause and effect, like

that of linear systems (Florea & Purcaru, 2016; Wang, et al., 2015). Instead, each interaction within blended learning can have a positive or negative affect on multiple elements within that system (Keshavaraz, et al., 2010; Levin, 1998; Lichtenstein, et al., 2006). The need for synchronization results in a fairly complex system relying on the ability to adapt and change, thus making difficult to predict what changes emerge from the interactions (Florea & Purcaru, 2016; Wang, et al., 2015).

The interactions that occur between the agents of a blended learning system make the operating processes adaptive and complex like that of a complex adaptive system (CAS) (Lichtenstein et al., 2006). This can make it difficult to study how the system functions as a whole. In general, what prior research has been conducted typically focused on just one aspect of the system, and not on how all components work together (Keshavaraz et al., 2010; Holland, 2006; Lichtenstein et al., 2006). Consequently, studying how the components work independently can create limitations with understanding how each individual agents in the system impact one another when interacting simultaneously. This creates gaps in the research, and stands to reason why schools sometimes struggle with implementing blended learning effectively (Wang et al., 2015).

Blended Learning Defined

The ambiguity around a common definition of what constitutes blended learning can make research on the subject difficult. The general consensus is that blended learning is a teaching-learning process where students spend some of their time learning independently and other portions of their time learning in a face-to-face setting (Gunn & Hollingsworth, 2013; Kuo et al., 2014; O'Connor et al., 2015). Further complicating how blended learning is defined, there is not a clear distinction on the proportion of technology implementation versus that of face-to-

face instruction within the teaching-learning process. In part, this is due to the uniqueness of each course and blended learning program. As a result, it can be difficult to determine what combination of technology and face-to-face instruction should be implemented from one situation to the next (Sahantakumari & Sajth, 2015). Therefore, results from one study may or may not be generalizable between different programs or within different settings.

Challenges with Blended Learning

Technology is now a part of many people's everyday lives, and the world is connected through it. The globalization of interconnections further increases the number of agents within all complex adaptive systems, including complex adaptive blended learning systems (CABLS). Further compounding the problems in a blended learning system is the fact that technology integration is making its way into the educational world at a rate faster than what schools can keep up with. This only adds to the difficulty teachers have when trying to find ways to effectively implement technology into the curriculum (Gunn & Hollingsworth, 2013; O'Byrne & Pytash, 2015). Therefore, before researchers can say for certain how to effectively implement a blended learning program further research is needed. This is not only true for the individual components of blended learning, but also the way each component interacts with one another (Dooley, 1997; Keshavaraz et al., 2010; Wang et al., 2015).

Purpose of the Study

Blended learning has the ability to self-organize due to the interactions between agents within the various subsystems (Wang et al., 2015). When systems are given space to self-organize freely, insight can be gained and new ideas can emerge as a result of the interactions between the agents within that system (Wheatley, 1999). The purpose of this study was to look at how emergence occurs in rural Kodiak's blended learning program as a result of interactions

between the individual agents as defined by Wang et al. (2015). For this study emergence refers to events, ideas, or instances of innovation that arises from the interactions between agents in the complex adaptive blended learning system implemented in Kodiak, Alaska's rural schools. The researcher conducted this study by analyzing the blended learning program through the complex adaptive blended learning systems (CABLS) framework. The CABLS framework looks at the 6 primary components of a blended learning system (Wang et al., 2015). Specifically, the researcher looked at how emergence occurs in the space between order and chaos through the adaptations and flexibility between agents that resulted from the interactions of the six components in a blended learning program. In addition, the integration of blended learning made for a wider social network, available to students. In this study the researcher also looked at what impact the blended learning program had on influencing student decisions for college and career after high school.

Before technology made its way into the school system many students in rural Alaska had limited opportunities in their education. Their isolation from bigger cities placed limits on what they learned, and the frequency of interactions they had with other people and organizations outside of their rural communities. This in large part was due to the remote isolation of the rural communities. One element of the blended learning program was collaboration, or the promotion of human interaction (Wang et al., 2015). Blended learning offered opportunities to break down walls of isolation and provide greater human interaction and interpersonal experiences. Without the integration of technology and the blended learning method of instruction students in rural Alaska would have run the risk of being deprived of high-quality instruction, advanced academic course selection, and educational resources. These limited resources included things such as online tutorials, synchronous and asynchronous collaboration tools, and education materials that

were accessible on the web. In addition, the geographical makeup of the rural schools created barriers, making access to these things challenging

There were many barriers that affected Kodiak rural schools. In this study, the researcher looked at how Kodiak's blended learning program overcame the school and community isolation that created limited resource availability and access to highly qualified instructors. In particular the researcher looked at how the district overcame these barriers through the interactions of its agents in the blended learning program, and analyzed how emergence occurred in the space between those interactions through a complex adaptive blended learning system framework. One barrier that the rural schools faced was the limited number of k-12 teachers. Before blended learning, providing enough highly qualified teachers to all rural schools was a challenge. Other barriers the rural schools faced were the minimal support staff, and limited educational resources such as library materials and sufficient internet access to online learning content. A second area of focus for the study was how the blended learning model impacted student choices for life beyond high school. The students in the rural school communities were limited in peer to peer and other social interactions. In addition, student exposure was limited to their environments outside of their villages. Moreover, the blended learning program in Kodiak expanded the borders beyond their own communities, and allowed students to connect across villages. Furthermore, the increased social connections that technology brought to the learning environment provided opportunities for increased peer interactions among students. These were just a few of the many challenges the school district had to overcome through changes and adaptations, forcing them to constantly evolve (Dooley, 1997; Holland, 2006; Keshavaraz et al., 2010; Levin, 2002).

Previous research has identified key elements of effective blended learning programs, such as student satisfaction, the importance of curriculum alignment, technology skills for teachers and students, and the importance of student-teacher and student-student interactions (Dooley, 1997; Holland, 2006; Keshavaraz et. al, 2010; Levin, 2002; Lichtenstein et al., 2006; Rogers, Medina, Rivera, & Wiley, 2005; Wang et al., 2015). However, there has not been much research on how the interactions between all of the individual elements work together and evolve, creating opportunities for change and adaptations (Wang et al., 2015). Therefore, this study addressed gaps in the current research which have resulted from each component typically studied in isolation. By looking at the interactions between the multiple components of blended learning this study gives insight into how each element of blended learning implementation impacts one another (Wang, et al., 2015).

Research Questions

Research Question one (RQ1): What emergence occurs in the spaces between the six components of the CABLS framework with the implementation of Kodiak's blended learning system?

Research Question two (RQ2): What is the perception of impact that the blended learning program in Kodiak Alaska has on a student's choices for life after high school?

Conceptual Framework

The blended learning program in rural Alaska is the driving force behind many of the learning opportunities for students. The program gives students and staff the ability to access learning resources and engage in social interactions similar to their peers in the larger rural, urban, and suburban area school systems. This dynamic interactive system blends the complexities of technology with that of social systems, and it is an important part of educating

students. To better understand how the components within a blended learning system work together, Wang et al. (2015) developed the CABLS framework. The CABLS framework lists six primary elements that make up a blended learning system. The CABLS framework was born out of the complex adaptive systems framework. To help build a richer and more detailed understanding of CABLS it is beneficial to understand the parent framework complex adaptive systems. It is the cornerstone for CABLS, which in essence, is a complex adaptive system with the addition of the blended learning component.

Complex adaptive systems can be found in social systems, ecological systems, various cultures, or any other area in which multiple agents interact creating complexity (Dooley, 1997). The systems involve many components that have the ability to self-organize, adapt, and learn through interactions (Dooley, 1997; Holland, 2006; Levin, 1998). The ability of the system to self-organize relies heavily on the sequence of interactions that occur between the individual agents. Typically, the interactions occur in a nonlinear and reciprocal manner where agents themselves exhibit similarities. In addition, the agents are closely connected and have several possible cause and effect scenarios (Lichtenstein et al., 2006).

Complex adaptive systems are open-ended systems that evolve and function within boundaries (Holland, 2006). The boundaries can also be surrounded by additional boundaries causing the complexities to multiply. Furthermore, the components that make up complex adaptive systems are diverse, contain individuality, and have localized interactions. Moreover, agents within complex adaptive systems tend to exhibit autonomy, allowing for enhanced outcomes (Levin, 2002). When considering the properties in a complex adaptive system it is important to recognize that there are lever points. Lever points are the areas where a simple intervention can have a direct and lasting effect on the system (Holland, 2006).

Within large complex adaptive systems are smaller complex adaptive subsystems. These smaller subsystems play a role in the larger whole, and often making inquiry foggy despite the use of a systems approach (Keshavaraz et al., 2010). Within these complex paradigms there are many applications, interpretations, and meanings. Additionally, complex adaptive systems function at multiple levels and have many disciplinary segments that provide an accurate picture of reality (Dooley, 1997). It should be noted, complex adaptive systems can be categorized into artificial systems, natural systems, and social systems. However, the systems do not exhibit a hierarchical form of control. Instead the control is distributed throughout the system giving way for change, adaptation, and emergent results (Keshavaraz et al., 2010).

When trying to understand complex systems it can be hard to find the patterns within because the systems are dependent on observations. The patterns come about by analyzing the conditions of interactions between agents, giving insight into evolutions of the system. It is within the multilevel interactions between agents where emergence occurs (Dooley, 1997; Lichtenstein et al., 2006). Unlike linear systems where only the dependent and independent variables are affected, multiple elements tend to be affected in complex adaptive systems (Keshavaraz et al., 2010). Nevertheless, it is in these nonlinear systems where patterns emerge at the higher level from the interactions at lower levels (Levin, 1998).

According to Dooley (1997) complex adaptive systems typically take on an organic form, and are more suitable for unstable nonlinear environments. Nonlinear environments tend to be more free-flowing, containing fewer types of formal interactions and communication (Dooley, 1997). Typically, complex adaptive systems are open systems with foggy boundaries, dependent on time, space, and proximity. As a result, agents do not always react the same way every time to the same stimulus. (Keshavaraz et al., 2010).

When looking at behaviors of complex adaptive systems the focus is on the system as a whole rather than its individual parts (Lichtenstein et al., 2006). At the system level, control is spread out causing complexities within the agents themselves, and emergence at the systems level (Keshavaraz et al., 2010). In addition, when looking at the behaviors within a complex system a person should analyze the interactive operating processes, the diversity within a space, and the complexities of the organized system (Levin, 2002). Moreover, complex adaptive systems look at the interactions between agents over a period of time to determine relational meanings. Last, agents of complex adaptive systems are the individual elements within the system and interact with other individual elements, giving rise to the complexities that occur between agents and across networks (Lichtenstein et al., 2006).

Networks are an important part of a complex adaptive system. Agent interactions within the networks allow for problem solving through local interactions by multiple individuals. It is these interactions that provide the opportunity for the information within the system to be processed and for learning to occur (Rogers et al., 2005). Furthermore, the interactive perspectives at both the micro and macro levels give rise to emergent patterns and provide evolutionary moments which give form to the system (Levin, 2002). Relationships within these systems are reliant on interactions of heterogeneous agents and not that of a hierarchical order (Lichtenstein et al., 2006).

Complex adaptive systems can be unpredictable, and system behaviors can produce unique challenges due to the dynamic interactions of multilevel agents (Holland, 2006; Keshavaraz et al., 2010). Moreover, outcomes in the system are created by interactions between agents and do not rest with a single person. Instead, as changes occur throughout various situations different individuals may alternate taking lead roles and leveraging their individual

skill sets and experiences. These role changes can occur anywhere within the social system, and despite being interrelated agents do not necessarily have equivalent roles (Lichtenstein et al., 2006).

Agents in a Complex Adaptive System

Complex adaptive systems consist of different components referred to as agents, each with the ability to adapt and learn through interactions (Holland, 2006). In fact, agents are the basic foundation of a complex adaptive system, and the dynamic interactive behaviors that they exhibit give the system its shape (Dooley, 1997). Dooley (1997) defines agents as "a semi-autonomous unit that seeks to maximize some measure of goodness or fitness by evolving over time" (p. 85). Therefore the changes that an agent undergoes does not happen in an instant, making it difficult to predict when an adaptation occurs (Keshavaraz et al., 2010).

Agents work by observing both the environment within other agents and the external environment. The number of agents within a system can be small or large, and through their interactions with other agents have the ability to adapt and learn. In addition, agents exhibit a degree of autonomy, and depend on factors such as prior knowledge, experience, environment, and feedback (Keshavaraz et al., 2010).

Emergence in the space between

It is at the individual agent level where evolution happens, and form is given to a system (Levin, 2002; Rogers et al., 2005). It is here where insight is gained, and emergence occurs from the behaviors of individuals. This is accomplished by gaining an understanding of how feedback influences behaviors (Levin, 2002). Agents within a system interact with other agents that are typically in close proximity with one another. The interaction between proximal agents is generally where emergence occurs for higher-level complex systems (Rogers et al., 2005).

Emergence itself comes from the interactions of multiple agents over a period of time rather than from a single event where individual agents work in isolation (Lichtenstein et al., 2006). Furthermore, these interactions are a bottom-up process giving rise to patterns that are revealed from behaviors of the whole system. These interactions within a complex adaptive system make it possible for the majority of changes to occur. (Keshavaraz et al., 2010; Rogers et al., 2005).

Agents within a complex adaptive system are not separable. They co-evolve allowing for meaning to emerge in the spaces between people or other agents. The space between is where patterns and ideas emerge at the point of interaction between a highly ordered structure and highly chaotic structure. Here the researcher can look at emergence that occurs between the relationships of multiple agents and their complex interactions. It is in this space where interaction, perception, and a sense of understanding happens. This is where reality lives, and it is realized that things are not simple, but rather much more complex in the real world (Lichtenstein et al., 2006).

Schools as complex adaptive systems

Schools can be considered complex adaptive systems due to the interactions within the social systems of the organization. The interactions among agents in a school system occurs across social networks and the social processes can often be complex and messy (Lichtenstein et al., 2006). Furthermore, there are a multitude of agents in a complex social system, and the multiple levels create opportunities for dynamic interactions. These dynamic interactions can bring about emergence, change, and adaptation. In addition to the agents within a school system, the agents themselves can be a complex adaptive system; especially within social networks. For example, when looking at individual agents in schools that make-up the staff population, student population, and community population the individuals themselves have complexity. Each

individual that makes up the corresponding agent has their own diversity in race, ethnicity, socioeconomic levels, language, and experiences that only add to the complexity of the larger system. Often, this multilevel complexity makes it difficult to predict how social complex adaptive systems will react to a change (Keshavaraz et al., 2010).

The Complex Adaptive Blended Learning System Framework

The framework used to support this study is the complex adaptive blended learning systems (CABLS). Much like its parent framework complex adaptive systems, the CABLS framework interlaces the complexities in a social complex adaptive system with the challenges of artificial complex adaptive systems. Like that of a complex adaptive system, CABLS looks at the blended learning system as a whole and how the different elements function and interconnect in dynamic ways (Wang et al., 2015). Within CABLS there are six components that make up a blended learning instructional program. These six components are the institution, teacher, learner, content, technology, and learner support (Wang et al., 2015). Each of these components are part of a larger complex adaptive system, consisting of smaller systems (Rogers et al., 2005).

Keshavaraz et. al (2010) identified artificial systems, natural systems, and social systems as three common types of complex systems. Blended learning is the instructional method that merges the artificial system of technology mediated instruction with that of the traditional face-to-face instruction (Kuo et al., 2014; O'Connor et al., 2011; Pace & Mellard, 2016; Wang et al., 2015). As previously noted, complex adaptive systems are parts of other complex systems. Therefore, the larger the system the more complexities within it (Keshavaraz et al., 2010). The traditional face-to-face education method that takes place in schools in and of itself could be considered a social complex adaptive system. In a blended learning system there are increased challenges to this instructional method due to the technology mediated component which adds

additional complexities in the form of an artificial system (Dooley, 1997; Keshavaraz et al., 2010; Lichtenstein et al., 2006).

Complexities of rural Alaska education

In rural Alaska the complexities of the educational organization extend beyond that of typical school districts. The Kodiak school district faced many of the same complexities as other rural, urban, and suburban districts, but their schools spanned more than 100-miles from each other. The distance between schools and community access added to the complexities of the rural school system. Keshavaraz et. al, 2010 lay out three categories of complex adaptive systems, artificial systems, natural systems, and social systems. Kodiak rural schools can be simultaneously impacted by all three types of complex adaptive systems, compounding the barriers they had to overcome.

First, the distance between schools, and limited road systems across the Island create barriers in transportation. Most of the village communities are not connected by a road system, making the rural schools accessible exclusively by boat or small plane. As a result, weather could potentially have a direct impact on school functions and operations. The blended learning program is reliant on technology an internet connection, which is delivered by satellite. If internet is down or there are other technology related issues the complexities of the natural system compounds the barriers. Rough seas, high winds, or heavy fog can restrict access to the villages by boat and plane. In these instances, it could be several days before the blended learning system is back up and running. Therefore, when the artificial system and natural system collide it creates many challenges, and has a direct impact on the learning environment. Scenarios such as these must be accounted for in Kodiak rural schools blended learning program.

The distance between schools also created isolation, prompting barriers within the social system. Students and teachers alike were limited in their opportunities for peer to peer interactions. The student population within the village communities was small. Blended learning expanded the social environment by connecting students across villages. Students were no longer restricted to interactions with those that were proximal to their village, but instead brought diversity and exposed students to peers all across the state of Alaska. Students were not the only ones with limited peer interactions prior to blended learning. In some instances a rural school had as few as two teachers. This created limited opportunities for teachers' to interact, affecting collaboration and professional development. However, blended learning allowed for the creation of a more robust professional network and increased collaborative opportunities.

For this study, the researcher looked at the six components of blended learning using Wang et al. (2015) CABLS framework. This framework looked at the student, teacher, learner, institution, learner support, content, and technology as a whole to determine how emergence within a blended learning system occured in the spaces between the interactions of the agents in Kodiak Alaska's blended learning program (RQ1). The researcher also used the components of CABLS to determine how the blended learning program impacted student choices for life after high school (RQ2).

There are multiple components that need to be considered when implementing blended learning. Even though each of the components are made up of their own individual elements they must work in unison (Wang et al., 2015). This complex multi-component system make for some drawbacks in the research around blended learning. While some studies have looked at more than one blended learning component within a single study, finding studies that look at how all the components work together collectively can be difficult. In fact, most studies on blended

learning generally study the various components in isolation (Wang et al., 2015). Nevertheless, studying each individual component is still important for giving insight into the particular pieces of a blended learning system. However, studying components individually does not give a clear understanding as to how all components interact together, and in what way they impact one another (Wang et al., 2015). Due to the often-one-dimensional approach of most blended learning studies, and the interconnected concepts, gaps have been created in the research. The research questions in this study will address some of those gaps by conducting interviews that address the interactions between all six components of blended learning.

Design of Study

The research design is a qualitative case study that looks at a blended learning program in rural Alaska. Using a qualitative approach allowed the researcher to obtain an understanding of the lived experience people had with blended learning. In this study, the primary data collection processes for this bounded system was the use of interviews (Creswell, 2014; Merriam & Tisdell, 2016). The researcher was interested in obtaining a cross-sectional perception of the agents which make up the six components of the blended learning program. In particular, the researcher sought to understand how those involved with the program in Kodiak interpreted emergence, and to what extent, if any, the program had on students' life after high school. For the data collection process interviews were conducted using video and audio conferencing. Participant selection for the study was purposive sampling. Purposive sampling was the best method for making sure that all schools and groups were represented by individuals who had knowledge of the program, and could contribute to the research questions (Creswell, 2014; Merriam & Tisdell, 2016).

Research Setting

The setting of this study took place in the rural schools of Kodiak Alaska. Kodiak Island is made up of the city of Kodiak and several village communities located at various points along its coastline. Also included as part of the Kodiak school district is Spruce Island, which consists of an additional rural community. Other than the rural communities and the city of Kodiak, the rest of the island is encompassed by steep mountains and wilderness. Transportation to the rural communities is limited. With the exception of one rural community, all rural areas can only be accessed by boat, small wheel plane, or by float plane.

There are seven schools that make up the Kodiak rural school system. Each school is a k-12 building and typically has between two and four teachers in each school. The learning environment is made up of a blended learning format which utilizes a combination of face-to-face instruction and technology-mediated instruction. The primary method of collaboration and synchronous communication occurs through a video and audio format. The teaching-learning processes and the instructional format of the blended learning program allows teachers to be utilized across buildings, and deliver content virtually.

The delivery set-up for the blended learning program contained both a technology component and face-to-face interaction. The rural schools model relied heavily on the technology side of the program. First, all students had their own device. If a student did not have internet at home they were able to stay after school. Often, school buildings were open in the evenings for community access which gave students opportunities to use the schools internet after school. When weather permitted, students could also connect to the internet from outside the building.

The physical technology set-up included several aspects. First, each teacher had a computer they could attach to a Smart Board. Second, the content was loaded to an online platform and teachers used an interactive whiteboard for delivering instruction. Last, the virtual connection set-up allowed the teacher to see the students, and reciprocal communication could easily occur. All of these technology pieces worked together to create a dynamic and highly interactive teaching-learning model. Additionally, teachers were able to write on the Smart Board and the content is projected onto the students' computers. With the interactive whiteboard the students were also able to project written information back to the teacher and other students. The learning platform where the content was stored provided students with electronic book content, assignments, and interactive communication tools.

The foundation of the blended learning system started with a one-school system approach. Despite there being multiple schools that make-up the rural school system, all buildings operated on the same bell schedule and school calendar. With that structure the district could hire core content teachers and place them at different locations. Furthermore, the one-school system approach allowed highly qualified teachers from different content areas to be hired, and then deliver instruction to students across all schools. Moreover, the blended learning program provided all schools with the same course offerings and times. When one teacher was not teaching a class, the one-school format allowed the teacher to take on the role of a co-teacher and provide support to students at their site. Another important component of the blended learning program was that student support in the form of classroom aids was available to students when content area teachers were not available.

Participants

The sampling process used for this study was purposive sampling, which is commonly used in qualitative research (Merriam & Tisdell, 2016). The objective of the study was to gain an in-depth understanding of the blended learning program, and how all components work together. In order to gain a complete understanding, it was important to gather a cross-section of perspectives from participants associated with each of the different elements within the program. According to Merriam and Tisdell (2016), in qualitative studies, the amount of valuable information and insight that participants can contribute is more important than the number of participants in the study. Therefore, participants were selected based on their specific knowledge and experience as it pertained to the blended learning program. This allowed the researcher to discover and tap into the deeper underpinnings of all the blended learning segments that interact with one another. Using purposive sampling also provided the researcher with the ability to select participants from all rural schools to ensure that multiple perspectives were represented (Merriam & Tisdell, 2016).

The participant groups consisted of five primary groups. These groups included students, administrators, teachers, parents, and technology personnel. The administrator group included any staff member whose work was part of the leadership structure in the school district, and played some role in decision making around the program. The teacher group included any school district staff member that provided support to student learning. This could be through direct teaching or classroom support that assisted students with the learning processes. In regard to the technology group, the participants included any person who provided technology support. The fourth group was made up of former students who had taken part in at least one blended learning course, where some portion of at least one class consisted of live video or audio instruction. The

fifth and final participant group were parents who had a student either currently or previously in at least one virtual course where live video instruction occurred. Each main participant group was made up of both current and former members of the blended learning program. This was true for administrators, teachers, technology personnel, and parents. The exception was with the student participant group. In the student participant group interviews were only conducted with former students over 18-years old.

There were several approaches that the researcher used to determine the participant pool of candidates. First, all participants selected were thought to potentially provide clear and valuable information. The first approach used to gather participants was through key contacts that the researcher had prior knowledge of. These contacts all had knowledge of the blended learning program and included individuals from each research group within the study. Next, through internet searching, the researcher was able to obtain information regarding district personnel that was connected to the study in some aspect. This included teachers, administrators, and other staff members whose role and contact information was available on the district website. Another method used to obtain participants was by contacting the tribal office in each rural school village. The researcher asked employees at the tribal office to reach out to community members and pass on contact information to those who had, or have had, students in the rural schools. Last, the researcher asked participants to share out the researcher's contact information with those who might be interested in participating in an interview for the study.

Tools for Data Collection

The qualitative data collection consisted of interviews. In this study the researcher conducted interviews by connecting virtually through video and audio means (Merriam & Tisdell, 2016). Interviews contained a series of open-ended questions to gain the perspective of

participants. When developing the open-ended questions, the researcher paid close attention to the writing of the questions as to not lead the participants towards their answer, thus preventing predetermined responses (Creswell, 2013). Furthermore, the types of questions varied from a range of highly structured questions, standardized questions, semi-structured questions and open-ended questions (Creswell, 2014; Fink, 2013; Merriam & Tisdell, 2016; Seidman, 2013).

Interviews

Interview questions were utilized to gather qualitative data for the research study in an attempt to gain the perspective of the participants' lived experience (Seidman, 2013). These questions were structured to meet the various roles of the agents that make up the six components of the CABLS framework (Wang et al., 2015). For example, interview questions given to the participants that make up the technology component of blended learning were specific to their role in technology, and how it connects to the other blended learning components. Interview questions for teachers were aligned with their particular role, as well as the interactions that occur between the teacher-technology, teacher-learner, teacher-institution, and other agents in which they interact with. This question format was consistent with all interviews (Appendix 1). Interview questions were conducted in a person-to-person format via video and audio conferencing (Merriam & Tisdell, 2016). Predetermined highly structured and standardized questions were designed to gather information in a specific order. Both semi-structured and open-ended questions sought to address some of the findings of the individual elements that led to the success of a blended learning system as described by Wang, et al. (2015). The purpose of the interview questions was to gain a unique view of the participants representing the various agents of CABLS. Through interviews the researcher was able to gain new insights,

emerging thoughts and ideas, and points of view from those involved with the blended learning program (Wang, et al, 2015).

The goal of the interview was to capture the perspectives, thoughts, and feelings as it pertains to previous and future intentions of the program (Merriam & Tisdell, 2016; Seidman, 2013). For some of the technology personnel, teachers, students, and administrators these questions specifically addressed the development and evolution of the blended learning program (Merriam & Tisdell, 2016). Interview questions were designed to obtain information from the participants about the makeup of the specific agents within the six components in the blended learning system (Wang et al., 2015). The research questions also looked at the interactions that occur between agents. These questions allowed for flexibility within the information given and the data collected (Merriam & Tisdell, 2016; Lichtenstein et al., 2006; Wang et al., 2015).

In order to be mindful of participants' time, the interviews were scheduled for no more than 60 minutes (Seidman, 2013). There were nine different interview groups, each with questions specific to their past or current role with the program. The groups consisting of teachers, technology personnel, administrators, and parents included individuals who were either currently or formerly connected to the program. This made up eight of the interview groups. The ninth interview group was made up exclusively of former students' over eighteen years of age. Each interview was recorded to ensure that the researcher could accurately transcribe the data collected from the interviewee. Having precise and detailed transcripts was an important piece of the data collection process so the researcher could accurately represent the participants' perspectives (Merriam & Tisdell, 2016).

Data Analysis

Merriam & Tisdell (2016) note that gathering and analyzing data at the same time is part of interview data analysis. During the interviews' the researcher jotted down brief notes by the questions being asked to capture important points within the interview, from the researcher's perspective. After each interview the researcher immediately implemented the transcription process by reading through the transcript line-by-line, taking notes in the margins, and capturing information that was relevant to the research questions (Creswell, 2014; Merriam & Tisdell, 2016; Seidman 2013). The transcription of data occurred both by hand transcribing and electronic transcription, depending on the richness and volume of the data collected. As more interviews were conducted the researcher compared the information using the constant comparative method of analysis (Merriam & Tisdell, 2016). Using the constant comparative method for analysis allowed the researcher to code and categorize the data, identifying themes that emerged from the interviews'. Throughout the constant comparative analysis process the researcher went back and forth analyzing the data for similarities, and constantly refining the themes based on how information cut across the data (Creswell, 2014; Merriam and Tisdell, 2016).

Data Summary

Interviews are a common approach used for collecting data in qualitative studies (Merriam & Tisdell, 2016). By taking advantage of technology the researcher was able to conduct interviews using video and audio conferencing means to gather research data. The researcher conducted a series of interviews that included structured questions, semi-structured questions, and open-ended questions that were aligned to the specific role of the interviewed participant. The objective of the interviews' was to gain insight on the participants' lived

experience with the blended learning program in rural Alaska. To increase the validity of the study, the researchers provided transparency to prior connections with the program, and potential research biases (Creswell, 2014; Merriam & Tisdell, 2016; Seidman, 2013). For the purpose of confidentiality, participant information was securely stored and password protected. Additionally, names of participants were replaced with pseudonyms on all confidential data where original names were listed (Creswell, 2013; Merriam & Tisdell, 2016). During the data collection process the researcher immediately transcribed the interviews, and reflected on the conversation between the researcher and participant. Throughout the data analysis process the researcher used the constant comparative method for analysis, looking for themes that cut across the data. The themes were revised throughout the process to accurately depict the information gathered, creating the findings of the study (Merriam & Tisdell, 2016).

Findings

The purpose of this study was to look at the blended learning program in the rural schools of Kodiak, Alaska, guided by two research questions. The first research question looked at how emergence occurred within the rural schools blended learning system. While most studies have looked at how various agents within a blended system work by themselves, this study looked at the interactions of multiple agents and how the system functions as a whole.

It is the interactions between individual agents that give rise to emergence by gaining an understanding of how continuous feedback loops can influence behavior. Emergence does not happen instantly, but rather from the interactions of multiple agents that adapt and evolve over time (Levin, 2002; Lichtenstein et al., 2006; Rogers et al., 2005). To ensure the maximum benefits of blended learning programs it requires collaboration and coordination of all its components (O'Connor et al., 2011; Wang, et al., 2015). In this study the researcher used qualitative methodology to look at the interactions between the six components of a blended

learning system, teacher, learner, institution, content, technology, and learner support (Wang et al., 2015). When talking about the 6 components of blended learning the researcher sometimes refers to the individual components as agents. By using the CABLS framework the researcher sought to address gaps in prior research that resulted from cause and effect linear studies (Florea & Purcaru, 2016; Wang, et al., 2015).

The second research question looked at how the implementation of blended learning in the rural schools affected a student's life after high school. Prior to blended learning the number of courses a student could choose from was limited. Students were also limited in their social networks due to the remoteness of their communities. The implementation of blended learning provided innovative instruction that was able to meet the needs of student by facilitating social interactions, thus increasing student engagement and offering them the same learning benefits as the traditional face-to-face instruction (O'Connor et al., 2011; Shantakumari & Sajith, 2015). In addition, the isolation of rural schools created barriers around the kind of learning experiences students had, and placed limits on their interactions with other students and organizations outside of their community. However, blended learning provided opportunities for students to have increased collaboration and human interactions (Wang et al., 2015).

For research question number 1, which looked at emergence in the space between the six components of the CABLS framework of blended learning, the majority of data came from the experience and perspective of agents in the institution, teacher, technology support, and former student participant groups. For research question number two, which looked how blended learning impacts the student choices after high school, most data came from the teacher, former student, parent, and technology support groups.

Research Question Number One

What emergence occurs in the spaces between the six components of the CABLS framework with the implementation of Kodiak's blended learning system?

Lichtenstein et al. (2006) states that agents in complex adaptive systems are not separable. They evolve together, and in this coevolution process ideas, patterns, and meaning begin to emerge. It is in the space between where emergence occurs, and happens at the point of complex interactions between multiple agents. It is within the complex interactions where perception is formed and a sense of understanding is gained (Lichtenstein et al., 2006).

Agents generally interact with other agents that are close in proximity. These proximal agent interactions are generally where emergence happens for complex systems (Rogers et al., 2005). To answer research question one the researcher analyzed data from the six agents of the blended learning program. In particular, the researcher analyzed interview data from each participant group to determine what types of phenomena occurred from the interactions between the multiple agents that led to emergence.

As the data was analyzed the researcher performed a constant comparative analysis and identified three themes that led to emergence, resulting in the evolution of the blended learning program. All three themes were determined from the overlapping perspectives of the interview participant groups', and were born out of the interactions between these agents (Levin, 2002; Lichtenstein et al., 2006; Rogers et al., 2005; Wang, et al., 2015). For research question number one the themes identified by the researcher were *synchronous interactions, real time proximal problem solving, and collaborative sharing with reciprocal feedback loops*. The researcher found that it was in the space between these interactions where emergence in the rural schools blended learning program occurred.

Research Question Number Two

For the second research question in this study the researcher wanted to know the impact that Kodiak, Alaska's blended learning program had on student choices after high school. The researcher found that the implementation of blended learning into the rural schools led to post-secondary education and careers that might not otherwise have been available. When analyzing the data, the findings indicated three different factors that contributed to why students made the choices they did after they graduated. Regardless of what impacted a student's decision, in all instances the implementation of the blended learning program was the contributing factor for the post-secondary education or career choice that students made. During the constant comparative data analysis the researcher identified three themes that steered students toward the choices they made after high school. While participants expressed different reasons that impacted their choice, the overarching contributing factors of the identified themes were *extended access to resources, expanded social networks, and increased self-confidence.*

Limitations, Assumptions, and Design Controls

Limitations

The indigenous community of Alaska is its own unique and dynamic entity. The remoteness from which the teaching and learning occurs is vastly different from that of other learning institutions and organizations. Its wilderness environment, series of small schools, and limited accessibility presents many challenges that most educational systems do not have to face. However, despite the unique differences, the extent to which the district relies on blended learning could still contribute to the research field and its implications in education. The study on blended learning in rural Alaska has limitations in that it is a cross-sectional, bounded case study, making it exclusive to a specific setting and a single point in time (Creswell, 2014; Field, 2013).

With the setting located in the remote villages of Alaska, predominantly consisting of indigenous communities, there may be some limitations to the generalizability of findings (Merriam & Tisdell, 2016). However, despite some generalizable limits, the research is designed to capture processes, perspectives, and implications of the blended learning instructional methodology across multiple blended learning components as defined by Wang, et al. (2015). These processes and the perspectives of the participants is something that can be beneficial to educational practices in a variety of learning environments. Lastly, the researcher reduced subjectivity by focusing data collection on the key elements within the CABLE framework, thus allowing for a very intentional, purposeful, and deliberate data collection process.

Reflexive bias was also considered in the research applications (Creswell, 2014; Merriam & Tisdell, 2016). It should be noted that the researcher was a virtual instructor for the district. However, the effects of the biases should have minimal, if any, impact on the study approach and results. In addition, reducing limitations and assumptions was important since the researcher had a past history with the organization as a teacher, and some relationships with current and former staff members. Therefore, it was imperative that prior assumptions and beliefs be cast aside throughout the research process (Krueger, 2009). In order to help limit assumptions and bias, the researcher conducted a pilot test with the interview questions to ensure questions were objective, clear, and friendly (Fink, 2016).

Interview questions were written to specifically capture the participants' perspective at a particular moment in time, and not that of the researcher’s time with the organization six years prior (Creswell, 2014; Field, 2013). Furthermore, there were different sets of students, and in some cases different teachers and administrators than when the researcher was with the

organization. This reduced the level of personal connection that the researcher may have previously had when still part of the organization (Creswell, 2014; Merriam & Tisdell, 2016).

Merriam and Tisdell (2016) caution researchers on their own personal biases because it can create limitations to a research study. As a result, it is important for researchers to self-reflect and discuss their own biases that could influence the qualitative portion of a study. To help minimize these limitations, the researcher maintained awareness of personal biases from previous connections to the district. With those biases in mind, careful thought and consideration was put into the interview questions as to not lead the participants in their answers (Merriam & Tisdell, 2016). Furthermore, the researcher continually monitored personal biases through all aspects of the interview data collection processes. This included being mindful of biases when writing the interview questions (Merriam & Tisdell, 2016).

The number of participants for the study was not a large number. Therefore, all of the persons currently connected to the blended learning program had an opportunity to participate in the study. This eliminated some of the limitations that can be created through selective bias during the selection process of participants. Since village communities are very small and interconnected it is possible that responses in a particular village could have been impacted by groupthink (Levi, 2014). The researcher tried to minimize limitations of groupthink and selective bias in the interview process by having representation from all rural schools in the district. While there are a lot of interconnections within villages there are not as many across villages. Having representation from all villages helped to provide a better overall perspective, thus increasing the validity and accuracy of findings (Creswell, 2014).

The use of video and audio technology for interviews can impose limitations when conducting research from a distance (Merriam & Tisdell, 2016). To help reduce the risk of

missing information due to recordings getting cut off, the research used both a recorder on the computer and a second audio tape recorder. Using two recording devices helped the researcher capture each word of the participants so that missing pieces of information would not be lost due to audio failure. Missing information in audio recordings could have potentially influenced the interpretation of what was happening in the interview (Merriam & Tisdell, 2016).

Definition of Key Terms

Complex adaptive systems. A system involving multiple components with the ability to self-organize, adapt, and learn through interactions. Interactions happen in a nonlinear and reciprocal manner by agents that exhibit similarities or close connectedness, and can have several cause and effect scenarios.

Complex adaptive blended learning systems. Six subsystems of the learner, the teacher, the technology, the content, the learning support, and the institution acting in sync.

Space between. The point at which patterns and ideas emerge in interactions between chaos and order, in this study the space between six CABLS agents (content, teachers, learner, institution, supports, and technology), including the structural and human components. It is where learning, a sense of understanding and adaptive innovation happens, often at lever points.

Lever points. Points where a simple intervention has a direct and lasting effect on a system.

Blended learning. Teaching method that bridges the traditional face-to-face teaching method with that of the full online teaching method where students spend some time learning on their own, and some of the time learning in the face-to-face setting.

Face-to-face learning. An instructional method used for the teaching-learning process where the teacher and student occupy the same space and instruction is happening in real time.

Online learning. An instructional method used for the teaching-learning process where the teacher and student do not occupy the same space, and learning does not occur in real time.

Synchronous learning. Learning and interactions that occur in real time as a continuous feedback loop.

Asynchronous learning. Learning and interactions that are delayed. The processes and communications that occur do not happen in real time.

Significance of the Study

Contributions of Scholarship

This study sought to add to the contribution of scholarship in a couple ways. First, blended learning has many inner working parts that are closely connected and rely on one another for an overall effective practice. Therefore, the many parts of this system must function as one unit. Currently, most research done on blended learning looks at the various components of the blended learning teaching-learning model in isolation, and not at how the different elements impact one another. This study addressed how the six primary components of a blended learning program work in conjunction with one another through complex adaptive blended learning processes. Using the CABLS framework the study looked at multiple components of the blended learning program in rural Alaska and how the teaching learning model impacted the educational experience for students who live in remote indigenous communities.

The study also contributes to the scholarship by looking at how blended learning methods provide an enhanced learning experience for students. Blended learning can increase a rural school district's ability to connect more students with highly qualified teachers and expand accessibility to learning resources that they otherwise may not have had access to. Moreover, by looking at emergence that arises at points of interconnection within the blended learning system

the study helped to identify how occurrences in the space between these interactions impacted student learning. Finally, the study contributes to the scholarship of blended learning by looking at how the teaching-learning model impacted students beyond high school.

Contribution to Practice

Although technology is quickly making its way into the school system there are still many challenges that teachers face with its integration. This is especially true with the newest teaching-learning modality, blended learning, and aligning the technology component with the curriculum delivery of the traditional face-to-face learning model (Wang, et al., 2015). In particular the study looks at how multiple components of the blended learning system work together. Currently, much of the research on blended learning had looked at how each system component works independently. While this is important for the teaching-learning process it does not give an overarching view of how this complex system works as a whole. Through this study practitioners can gain a further understanding on how each component is dependent on the interactions of the other components.

When using blended learning instruction organizations must work to strengthen all aspects of the system, not just one of the components. This study looked at how emergence happened in the spaces between the interactions of the multiple components of a blended learning system. Furthermore, the study sheds light on how adaptability, flexibility, and autonomy within a system can lead to creative and innovative processes that have a lasting impact, giving rural school students greater academic opportunities.

Summary

Blended learning is a relatively new educational modality that integrates the three most prominent teaching-learning processes currently used in education. Those modalities are the

traditional face-to-face format, full-online learning format, and the blended learning instructional processes. While the agreed upon definition of exactly what constitutes blended learning is not universally agreed upon, the general consensus is that it is some combination of technology teaching modalities with face-to-face instruction. The primary rule is that some portion of the learning occurs where the student and teacher share the same space at the same time, and where other portions of teaching-learning occur in different spaces and at different times (O'Connor et al., 2011).

Schools located in remote communities of Alaska can find getting highly qualified teachers for academic instruction, and acquiring adequate resources for their students a challenging task. However, with the emergence of technology and the development of blended learning instruction Kodiak school district found creative and innovative ways to overcome those barriers. The blended learning method of education provided schools with an extended opportunity to utilize both synchronous and asynchronous instruction as a means of increasing the interpersonal skills for a student's life beyond high school, and expanding their academic opportunities.

The purpose of this study was to look at the blended learning program in Kodiak Alaska using the complex adaptive blended learning framework (Wang et. al,). This study used a qualitative research approach to conduct a bounded case study, and look at how one remote school district was using the blended learning process in creative and innovative ways to meet the educational needs of its students. The researcher looked at the processes through the CABLS framework to gather data for the research questions (Wang et al., 2015). Specifically, the researcher used interviews to get the perspective and lived experience of those who were part of the blended learning process in Kodiak Alaska.

The researcher looked at the interconnections of the six components that make up a blended learning system according to Wang et al. (2015) to discover how emergence occurs in the spaces between leading to creativity and innovation. Furthermore, through the qualitative analysis the researcher gathered data from the participant's experience, looking at what influence the blended learning program had on student life after high school.

What set this study apart from many of the other studies on blended learning is that it looked at multiple components of blended learning simultaneously, and not just at each component in isolation. By looking at all components together, the researcher was able to make contributions to scholarship and practice through analysis of the blended learning processes as a whole, and how one element of a program impacts all other elements. Additionally, this study looked at blended learning as a nonlinear system where actions and reactions are reciprocal in nature, and how they must be navigated as they interact with one another.

SECTION TWO

PRACTITIONER SETTING FOR THE STUDY

Introduction

The department of education for each state in the U.S. has specific academic and certification policies in which school districts must comply. In Alaska, these policies include educators having a highly qualified teaching status within the various academic content areas. With that, schools are required to provide course instruction through teachers that are highly qualified in their content area. For small rural schools in remote areas of Alaska filling all of their instructional positions within each individual school can be a challenge. The Kodiak School District faced this exact challenge in their rural schools. In an attempt to tackle this challenge, the school district began to look for creative ways to provide instruction with highly qualified teachers. Where many organizations might look to outside consultant specialists to overcome challenging problems, Kodiak instead looked to their own internal transformative leadership team for instructional transformation (Bolman & Deal, 2013). The district's desire to provide all rural school students with highly qualified teachers was the driving force for this transformational change that led to the blended learning model. It was within the Kodiak rural school's department where the movement toward blended learning implementation started. To do this the district had to restructure their more traditional approach of face-to-face instruction to a more dynamic and creative approach. With the movement, the district was able to take advantage of the benefits that technology added to the teaching-learning process in order to meet the educational needs of their rural school students. The technology allowed students to gain access to all teachers within the school district regardless of their physical buildings. The technology also provided both students and teachers with access to learning resources, increased class selection, and differentiated learning in a way that was not previously available. Making such a transformation was not able to happen overnight. Bolman and Deal (2013) discuss the four

frames of an organization. The frames in which they note within an organization are the structural frame, human resource frame, political frame, and symbolic frame. As the district moved from the traditional teaching-learning approach to the blended learning model it required working through all four frames due to the complexities at the core of the education system in Kodiak.

As the school district's transformational leadership made the educational change they used a mental model to frame the idea of integrating technology into the rural schools so that they could meet the education needs of the students (Bolman & Deal, 2013). The reframing of this educational approach started with expanding the availability of teaching-learning resources; especially as it relates to increasing capacity to deliver face-to-face instruction in the rural villages. As part of the program expansion the district made sure that every student had their own computer so schools could function as a one device per student teaching-learning environment. The district also contracted with communication companies to provide audio and video connections between all the schools. This allowed the teacher and students to see one another and communicate verbally. Furthermore, the district provided a live interactive whiteboard where students and teachers could write on their electronic devices in a synchronous manner. The interactive whiteboard included live and immediate tech support, as well as co-teachers and support staff for students.

When you look at traditional schools, in what many in Alaska consider the lower-48, schools are expected to adhere to an approved curriculum throughout the entire year that tends to focus on core content. In addition, students are generally expected to attend school every day. In fact, in many instances when a student misses too many days the student can be deemed truant. Within the rural schools of Kodiak flexibility is required as it relates to the traditional school

expectations regarding attendance. Hunting and fishing is a way of life and often a necessity for subsistence living in the villages. In some instances, students may have to miss school for work or family obligations. This could include a day or two for hunting, or up to a few weeks when fishing. Therefore, schools must be flexible and accommodate these circumstances while also meeting the academic needs of the students. It is here where politics come into play. In rural Alaska the need for understanding and being flexible is intertwined with the importance of the events that conflict with the traditional school setting, and its symbolic significance (Bolman & Deal, 2013).

History of Organizational Setting

Kodiak is the second largest Island in the United States. The 6,500-square mile island in the Gulf of Alaska is located about 250 miles southwest of Anchorage Alaska. A large portion of Kodiak's economic system relies on its fishing industry, which brings in migrant workers from all over the world. Other economic contributions for the island come primarily from recreational hunting, tourism, and the government. The Island communities consist of one major city, the city of Kodiak which contains a population of about 6,500 people. However, when considering the island villages and the largest U.S. coast guard base the total island population is approximately 13,500 people.

Within the village communities the population consists of anywhere between 40-260 people, represented by tribes and recognized by the federal government as Native Americans. Accessibility throughout the island is limited. The road system on the island stretches along the island coastline for about 40 miles in one direction, and about 15 miles from the coastline toward the center of the island. The rest of the island is only accessible by boat, small wheel planes, or

float planes. Other than the villages and the city of Kodiak the rest of the island is primarily wilderness.

The Kodiak School District was established in 1948. The city of Kodiak consists of a single high school, one middle school, and four elementary schools. In addition to the city schools, there are seven village schools that make up the rural school district. The city schools and rural schools fall under the same central office administrative umbrella and district school board. In the rural schools, approximately 80% of the students in village schools are of the Russian-Aleut culture, known as Alutiiq Alaska Natives. Each rural school building is composed of k-12 students. Depending on the school, a building could have as few as 10 students, and at times 40 or more students. For a school to open, a minimum of 10 students is required. Schools that meet the minimum enrollment requirement are staffed with two teachers. For each additional 10 students another teacher is added to the rural school's staff.

Prior to blended learning, each rural school relied solely on the teachers within their building to provide all of the educational experiences for those students. Furthermore, each rural school also operated independently from one another. That allowed each school model to maintain their own class schedule, and to some extent, their own classes. As technology advanced and made its way into the rural school setting, the district implemented a one-school system philosophy. The one-school system was a scheduling format where each village school had the same class and bell schedule. This allowed for an instructional practice where all schools receive course offerings at the same time. For example, during algebra I, all students taking algebra I have it at the same time, regardless of which rural school they attend. The same was true for all other courses. With that format other content teachers who were not teaching courses acted as co-teachers for their students at the virtual sites. Furthermore, this unique learning

environment format consisted of students that were receiving face-to-face instruction while simultaneously attending class with students who were not in the same location. Additionally, the virtual setup allowed for real time interactions and delayed interactions between the students, and between the students and teacher.

The teacher support systems set in place by the administration is one aspect of the Kodiak blended learning program that made it unique. There were two ways in which students received teacher support during the virtual classroom instruction time. For students who shared the same physical space with the instructor, learning support was provided by that instructor in the classroom. For students participating in classes from the virtual sites, support was received from an adult within the building who acted as the co-teacher on their end. In this co-teaching format, the main content teacher taught the course while another adult assisted the students at their home site, where the instruction was being received. For example, the math teacher at one site might be delivering the Algebra I instruction, but a science teacher or language arts teacher would be providing co-teacher support at a different location. The reciprocal of that might be happening during the science block where the math teacher would be providing support, or another content teacher, for students at their home site during the science instruction.

In order to meet the educational needs of its rural school students, Kodiak took a transformative instructional approach by moving away from the traditional face-to-face teaching-learning methods and implementing the blended learning education model. By using the blended learning method, the district was able to maximize their teaching and learning resources to overcome the struggle of acquiring highly qualified teachers for each of the individual rural schools. The delivery system for Kodiak's blended learning program started with each student having their own computer for learning. The digital format of the class utilized video

conferencing to help deliver instruction so that teachers could interact with students visually. Each learning site contained a large television that projected the image of class participants at all rural school sites, allowing the teacher to see the classroom environment. In addition, the instructor used a smartboard attached to their computer to project instruction from the teacher's site to the virtual site where the students were located. The blended learning program also used an interactive whiteboard in which all students were able to interact and participate. For example, a student could write or share information from the computer on the interactive whiteboard and others would receive the information being shared. Last, the curriculum the teachers used for instruction was shared digitally by uploading it on a learning platform that contained an asynchronous format. It was through this dynamic blend of technology modalities consisting of live instruction and teacher-student interactions, from which the blended learning program in Kodiak operated.

Organizational Analysis

Structural Frame Analysis

The structural framework of Kodiaks blended learning system was an important element of the program (Bolman & Deal, 2013). The district's had a goal to provide all students the opportunity to receive their academic instruction from highly qualified teachers. In order to accomplish this, the use of technology for developing a blended learning format became a necessity. The village schools in and of themselves do not field enough highly qualified teaching staff to cover all the courses students are required to take throughout their elementary and secondary school careers. However, this is not due to a lack of effort. Enrollment numbers may limit schools to as few as two teachers, which can often result in there not being enough teachers to cover all the required content for students to graduate. Therefore, in order for a school to

provide highly qualified instruction in all core content areas, a teacher would have to be highly qualified in multiple subject. The blended learning method made it possible for the district to overcome these barriers.

To meet its goals, Kodiak used technology to increase academic performance and instructional proficiency by spreading out the highly qualified teachers from different academic content areas throughout the rural schools. This division of labor allowed the district to place highly qualified teachers in all of the necessary contact areas (Bolman & Deal, 2013). Blended learning made this possible by having a teacher in one building deliver the instruction to all of the rural schools simultaneously. For example, one rural school could employ a highly qualified math teacher while another school would employ a highly qualified science teacher. Further adding to the efficiency, the one-school system made it possible for the math teacher in one location to deliver math to all of the rural school students during the same time slot. In order for this process to be effective, careful coordination had to be developed so that all agents and processes fit together and were in sync. Part of that process included an immediate link between the teacher in the classroom and the technology department. This connection allowed for instant support if the technology stopped working. It also prevented a loss of instructional time by giving teachers technology assistance if they were having difficulties with the instructional aspects of a lesson that required the use of technology. Another important aspect of the coordination was the relationship and connection between the teacher conducting the instruction and the co-teachers at the virtual sites; especially with scheduling. Since there were a limited number of core content teachers there may have only been one time slot for course offerings. In those instances, the students schedule had to revolve around the limited times and offerings of a specific course.

The complex adaptive system in Alaska creates a sense of understanding that despite best intentions things do not always go as planned (Bolman & Deal, 2013). It is an environment where wind gusts or fog can quickly pop up, potentially impeding travel. This can affect things such as repairing or replacing equipment or even the travel of teachers and students. These unanticipated situations require adaptability and flexibility since communities may not be accessible for one reason or another. When problems did arise, the district coordinated and collaborated to come up with solutions (Bolman & Deal, 2013). As certain challenges were presented and solutions were being thought up, problem-solving teams would test the proposed solutions. For example, when the district searched for video conference platforms they arranged for a team to log onto the learning platform. Their goal was to see how many individuals the platform would hold before it began to bump people off. Another example was when they had people begin streaming on devices to determine how far the bandwidth could be pushed before it started to lag. By determining when the lag began, problem solvers could gain an idea of how much bandwidth was needed for the blended learning process to be efficient.

Political Frame Analysis

Kodiak School District consists of both city schools and rural schools. This creates a unique political dynamic due to the district having to navigate both city politics and the politics supported by the Native American tribes in the village communities (Bolman & Deal, 2013). Within the city schools the residents of Kodiak are made up of both Alaskan Native American and non-Alaskan Native Americans. On the other hand, the rural schools are made up of a larger percentage of Alaskan Native Americans. The different learning environments between the city school and rural schools create two different political landscapes. In the rural schools, technology is the primary way students connect to their teachers and learning materials. For this

reason, technology is essential for the rural schools, making the technology resources and the financial investment for those resources a priority. This can create challenges when trying to determine resource allocation. In fact, this reality can often be seen when trying to navigate the political landscape of an organization (Bolman & Deal, 2013).

Preserving the Aleut culture is another political hurdle the district faced (Bolman & Deal, 2013). Symbolism is very important to the people in the Kodiaks rural communities. Therefore, instances arise where politics and symbolism are interwoven. One place these two frames merge is with the school schedule. For at least one week a year instruction is dedicated to teaching and learning about the culture and history of the Aleutic people. This is important to the communities for passing on the skills and ancestral ways of life. This element of education does not necessarily align directly with the academic curriculum and state standards, but it is an important aspect of education in the rural communities. During culture week the schools make the facilities available to outside guests who come to teach students about their history.

Bolman and Deal (2013) note that one of the challenges within the political space of an organization is determining who gets what when it comes to dividing and distributing available resources. Within education, resources include things such as financial allocations, computers, internet access, and many other materials that are needed within an educational setting. The required teaching-learning resources for village teachers is one instance where resource allocation had to be considered. When considering financial allocations for staff, teachers who worked in the villages received an additional stipend, as well as housing subsidies for rent. Along with the already mentioned salary for village teachers', they were provided with travel to and from the villages each semester, and given a freight allowance at the beginning and end of the year. While the salary schedule is the same for all teachers, teachers in the city schools did

not get many of these same benefits. These additional financial resources are some of the things that are considered by the school district and its board of education. Financial resources in the rural schools were to provide help with the recruitment of highly qualified teachers. Another scenario of resource distribution was with the allocation of technology. The blended learning method was a necessity for students in the rural schools in order for them to obtain instruction by highly qualified teachers. The video and audio-conferencing portion of blended learning provided students with face-to-face instruction. Therefore, it was imperative that students in the rural communities have their own computer. This required the district to prioritize the allocation of financial resources to ensure that computers were possible.

The foresight of the district to provide education through a blended learning format with so many complex barriers took a detailed vision and genuine innovation. However, the vision itself was not enough. It took the artful and delicate navigation of leadership to bring the many groups of people together in a cohesive and organized manner so that the vision and goals could be accomplished (Bolman & Deal, 2013). Bringing all of the moving parts together to work through multiple obstacles was not an easy task for such a comprehensive objective and goal. In part, this was because resources are often more restricted than what you would see in a typical school system. For example, in rural areas such as Kodiak Alaska, schools do not have the option of a hardwired internet system like schools in well developed areas; everything is satellite based. When issues arise, repair specialists do not have a quick and easy method for reaching the rural schools to fix on-site problems. Many places do not have to consider these barriers. Furthermore, the isolated nature of the rural schools reduced the available market of providers for internet options. In turn, schools are limited in what they can do based on the availability of technology companies, service systems, and technology support services. In an area like Kodiak, this only

added to the political navigation that is needed to organize and mobilize others to put forth successful initiatives (Bolman & Deal, 2013). Nevertheless, the Kodiak district overcame the challenges due to their ethical beliefs that all of the students have a right to a high quality education, regardless of the communities in which they live.

To get the blended learning program underway, Kodiak's leadership had to set an agenda, create goals, and formulate a plan (Bolman & Deal, 2013). The district saw the need for students in the rural schools to have high quality instruction, and looked for innovative ways to provide it. Kodiak's leadership sought out grant funding to get the initiative off the ground and to help fund the resources needed for the project start up. Throughout the process, a coalition of people had to be organized by networking, building relationships, drafting an approach, and getting the right people on board with the plan (Bolman & Deal, 2013). Finally, leadership had to work with all stakeholders to determine a plan of sustainability once the grant funding for the project ran out. This required the district to reallocate some resources to the new teaching-learning approach for the rural schools that were not previously in place. Some of these requirements were more-simple than others, such as utilizing teachers in the city schools for instruction when teachers were not available in the rural schools. When that occurred, it meant a teacher with a class full of students in the traditional face-to-face setting would simultaneously teach students in the rural schools. Other less simple considerations, for example, were the increased budgeting that needed to be allocated to the rural schools for funding technology upkeep, and increased bandwidth for delivery. Lastly, the dilemma around where the money would come from had to be considered.

Human Resource Frame Analyses

The primary purpose of starting the blended learning program was propelled by the challenges of obtaining enough highly qualified teachers instruct rural school students within a

wide variety of subject areas. That reason alone makes the human resource frame a critical piece of the organizational leadership process. Bolman and Deal (2013) discuss the importance of motivation for the workers within an organization, which includes many different types of extrinsic motivators. One such extrinsic motivator is money. Kodiak provides various forms of financial benefits for the rural school teachers in order to recruit highly qualified educators. Some of these financial motivators come as physical payments while others come in the form of various perks that reduce the cost of living for teachers in the rural schools. These benefits include extra pay for working in a village community and housing stipends to reduce rent costs. Additional benefits for working in the rural schools includes paid freight and transportation to and from the village community. These perks occur four times per year.

While the financial perks are one motivator for drawing teachers to the rural schools, it is not the only process within the human resource frame used by the Kodiak district. Teachers in the rural schools also have a fair amount of autonomy (Bolman & Deal, 2013; Levi, 2014). The administrative leadership team at the institutional level is located in the city of Kodiak. Therefore, staff members have a significant amount of autonomy and control over their work. With autonomy, teachers have a great deal of responsibility due to the limited day to day oversight by leaders (Bolman & Deal, 2013; Levi, 2014). Teachers must be flexible and have the ability to adapt in unpredictable situations. This required they be trusted and empowered in their decision-making processes (Bolman & Deal, 2013). It is also important for certified teachers and classified staff members to have good working relationships. With minimal staff assigned to each school all staff members had to take part in a variety of duties. These duties included cooking breakfast, assisting with lunch, keeping facilities clean, and the education responsibilities within the teaching-learning processes. Therefore, in order for things to work efficiently it required a

strong sense of group dynamics (Levi, 2014). In Kodiak, the blended learning system functions with a one-school system philosophy. This approach means that all rural schools are on the same daily schedule, and function as a single school. This requires many of the organizational systems to be in sync within and across buildings. Additionally, staff members needed to have a common goal, shared interest, and collective purpose due to the level of communication that was required. Moreover, the extent of collaboration and co-teaching that took place to conduct classes required extensive interaction between several team members (Levi, 2014).

Symbolic Frame Analysis

The Kodiak region of Alaska is filled with diversity and culture. Whether it be the migrant workers in fishing canneries and on fishing boats, Russian immigrants, or the Alaskan Native people, culture and symbolism are rooted in the area. Symbols are important to people, making for important considerations that need to be accounted for in the decision-making process (Bolman & Deal, 2013). Kodiaks village communities are steeped in the Russian Orthodox religion. This comes from the early ties to Russian cultures prior to Alaska becoming part of the United States. In fact, Kodiak was home to the Russian Orthodox priest, Father Herman, who was ordained a saint and buried on Spruce Island. In honor of Saint Herman there is a cross at the top of a mountain on Spruce Island, symbolic of his life in Kodiak. This mountain is known to locals as Mount Saint Herman, and is frequented by Russian missionaries, adding to the symbolic complexities of the area.

A final aspect to the Kodiak region is that it is home to the largest U.S. Coast Guard base in the world. The U.S. military consists of people of all races, religions, and cultures. The variations of cultures have to be considered when implementing policy and academic practices into the education system. This means obtaining feedback from a variety of community members

and stakeholders to help generate buy-in with decision making (Bolman & Deal, 2013). In order to obtain buy-in for change the district had to find ways to increase the academic needs of its students, while at the same time being cautious not to encroach on the history and symbolic representations of the diverse community members that call Kodiak home. The result of such complexities is one that requires an acceptance and flexibility with the impact that cultural symbols can have on all systems in Kodiak, including the school system (Bolman & Deal, 2013).

Leadership Analysis

A key aspect of the leadership traits in the Kodiak School district is with the leadership's ability to provide clear vision and direction toward goals and initiatives (Bennis, 2009; Kouzes & Posner, 2007). The district knew what they wanted to accomplish with the blended learning program, and they were steadfast in their approach to make it happen (Bennis, 2009). Using technology in education through the blended learning model was a change from the traditional education model of face-to-face instruction. This meant that not only did the leadership have to be willing to take risks, but they had to provide opportunities and support for risk-taking from others (Bennis, 2009; Kouzes & Posner, 2007). Bennis (2009) emphasizes that with the implementation of any new program there will be failures and setbacks. Transitioning to a blended learning approach also meant they had to be willing to accept there would be errors during the process, and they would need to allow others to learn from those mistakes. Through teamwork, collaboration, and problem-solving Kodiak was able to adapt and evolve. The flexible approach the district took ensured that the blended learning program got a strong foothold, and was able to provide an education format that could provide the increased teaching-learning resources, as well as the highly qualified instruction that it was seeking to deliver (Bennis, 2009).

The leadership approach in the development of the blended learning program was done through transformational leadership. According to Northouse (2016) a component of a transformational leader is the ability to motivate followers. Another common trait is that others share in the leader's vision. Overhauling the teaching-learning approach in the rural schools from a traditional face-to-face format to that of a highly complex blended learning approach took a great deal of vision and organization (Kouzes & Posner, 2007; Northouse, 2016). This was especially true considering the overlap of multiple complex adaptive systems that needed to be worked through (Northouse, 2016). Throughout the transformation process not only did students have to adapt to how they were learning, but teachers and faculty members also had to adapt to the new instructional approach. This meant preparing and supporting teachers in the development of new skills, many of which were more advanced, thus requiring continuous improvement (Northouse, 2016).

One of the key factors displayed by Kodiak's leadership was their capacity to evoke trust with their followers while at the same time setting standards of high expectations. Within these processes staff members are provided autonomy and flexibility to take new and unique approaches in their teaching practices (Northouse, 2016). This allows teachers to be creative and challenge themselves. Within the process teachers are empowered to take risks without the fear of retribution (Northouse, 2016; Kouzes & Posner, 2007). Additionally, leadership provided a space where teachers could strive to reach their full potential, and a collaborative environment that promoted a sense of safety. The environment created by the rural schools leadership was one where people felt comfortable to ask questions, share their thoughts, and try new things without negative consequences (Levi, 2014). With the trusting culture, feedback between team members was rich productive, reciprocal, and permitted a multitude of insights. This all led to constant

improvements in the program, making communication effective and valuable where good information could be taken away (Levi, 2014). Furthermore, the leadership was open to the voices of staff members and provided the necessary assistance for them to be successful in their roles (Northouse, 2016).

To help meet the educational needs of the rural school students the Kodiak leadership took an innovative approach with the content delivery through their instructional design (Kouzes & Posner, 2007). Throughout the development of the innovative process the leadership consistently acknowledges the contributions others make to the program by giving credit to those contributors. Moreover, the leadership empowered others in decision-making and gave them space to try new things. As a result, stakeholders in the program were able to grow and improve, creating an ongoing evolution that enhanced the processes of the program as a whole (Kouzes & Posner, 2007).

While the district took a transformational leadership approach with the restructuring and changing of the teaching-learning model, it would not have been possible without some sense of structural framework and the attributes that come with managing an organization (Levi, 2014; Bolman & Deal, 2013). The extent of change, and the multiple complex systems the organization had to work through required the leadership to apply both a structural and management leadership approach (Levi, 2014; Bolman and Deal, 2013).

Levi (2014) notes that the work of the group is more than the individuals could accomplish separately. The teaching and support teams in Kodiak share the belief that for such a complex system to be effective a mutual respect and understanding has to be present. Team members realized that it took everyone to accomplish the daily teaching-learning tasks, and no one person could accomplish all tasks on their own. Those in the program not only knew their

roles, but they acknowledged the roles of one another (Levi, 2014). One thing that helped with that understanding was the virtual component of the system. The leaderships' ability to develop strong and effective teams was also apparent (Levi, 2014). Team members were made up of both certified and classified staff. Each team member's role was very clear, and everyone knew the responsibilities that went with their role (Levi, 2014).

Implications for Research in the Practitioner Setting

The research conducted on the blended learning program in Kodiak Alaska provides practitioners with a unique look at how using multiple modalities of technology simultaneously can create a teaching-learning process that mirrors a traditional face-to-face setting. By using blended learning, the district increased the educational opportunities for students in remote areas of Alaska that would otherwise not have had access to quality instruction, and would have lacked the necessary resources for learning.

Although technology has made its way into the school systems, successful integration into the learning environment is still a challenge; especially as it relates to curriculum. This study gives practitioners a look at how all six components of blended learning affect one another within a blended learning system. The study further contributes to the research in a practitioner setting by providing researchers a look at the synchronicity needed between the various components of a blended learning program. By looking at the six components through the CABLS framework, the study provides practitioners with a view of how the multiple components work together rather than how they work in isolation. Looking at the interconnections of the multiple agents within blended learning, the researcher provides insight to practitioners on how the key elements within the system impacts the program as a whole.

The students in rural Kodiak live in remote communities which limit the amount of social interaction you would likely see in larger more populated areas. This restricts how students connect with others outside of their community. The blended learning program has provided students an opportunity not only to access other students and people in different communities, but it also provides opportunities to develop interpersonal skills through these connections. In addition, the study looks at how these extended connections impact their life once they finish high school. The remoteness of the rural areas in Kodiak Alaska, as well as other parts of Alaska make its demographics and geography unique. The remote environments of the rural schools, place limitations on resources and create barriers with providing highly qualified instruction to students. Practitioners could potentially utilize elements from the findings in this study to mirror components of Kodiaks program that might affect their students in similar ways.

Summary

Located in the Gulf of Alaska sits Kodiak Island, the second largest island in the United States, with an economy relying primarily on recreational hunting, tourism, and the government. The geographical makeup consists of a short road system along its coastline, relative to the size of the Island, and vast amounts of wilderness with dense populations. Other than its one City, the City of Kodiak, all of the populated communities are remote villages accessible primarily by boat or small plane.

The Kodiak rural school district population is largely made up of Russian-Aleut culture composed of Alutiiq Alaska Natives indigenous people. The remoteness of the Island limits the education system within the rural schools due to resource accessibility and recruiting highly qualified teachers for hire. In order to ensure that highly qualified instruction is delivered to all rural school students, the leadership in Kodiak Alaska implemented a blended learning program.

This required the leadership to provide a specific combination of resources for rural schools to help bring in teachers. Part of these resources included providing the necessary teaching and learning tools, such as increased bandwidth for the internet and providing each student and teacher with the right technology set-up. In addition, obtaining and keeping highly qualified teachers in rural Alaska is not always an easy task. To help keep personnel, the district provided extra incentives to help draw teachers to the schools.

The complexities surrounding the education system in Kodiak Alaska required a great deal of vision and innovative thinking (Bolman & Deal, 2013). It also required an extensive amount of planning to transform the teaching-learning processes because of the multiple complex adaptive systems that had to be worked through. To help make this process successful a mental model was used to plan and organize the transformation of the traditional face-to-face education model to a blended learning model (Bolman and Deal, 2013). In order to make this education modality change, the district had to navigate through a structural frame, human resource frame, symbolic frame, and political frame (Bolman & Deal, 2013). Furthermore, while the vision for blended learning came from transformational leadership, it was the empowerment of others that helped grow the program. With the district empowering others, staff members had a significant amount of autonomy and flexibility to allow for new approaches in their teaching processes (Northouse, 2016). This created a working environment where teachers were able to take risks (Northouse, 2016; Kouzes & Posner, 2007; Levi, 2014). Last, the educational team in Kodiak worked collectively to ensure the teaching-learning system was effective and efficient, which required everyone to be aware of not only their roles, but the roles of others (Levi, 2014).

The one-school system was a key element in the operations and integration of the blended learning model. The one-school system philosophy made it possible for the district to utilize its

highly qualified instructors more efficiently by spreading out teachers between the various rural schools (Bolman & Deal, 2013). Furthermore, this made it possible for the district to hire highly qualified teachers from various content areas and place them into the different rural schools. Moreover, the schools were able to share teachers due to the co-teaching model that supported learning at the virtual sites. Using the blended learning model allowed both teachers and students to have real time interactions, thus providing similar school experience to that of a traditional face-to-face model.

This bounded case study on the integration of technology in rural Alaska can provide practitioners of blended learning programs with insight into how the multiple components of a complex adaptive blended learning system interact, and how they affect one another (Creswell, 2014; Wang et al., 2015). Additionally, the research can provide other rural school districts with insight into alternative and innovative ways to meet the learning needs of students. Finally, the study provides practitioners with research-based findings on how utilizing a blended learning program within an educational system can impact students in their life after high school.

SECTION THREE:

SCHOLARLY REVIEW FOR THE STUDY

Introduction

The integration of technology has made its way into the traditional brick and mortar school system by combining elements of online-learning with classroom instruction. This dynamic instruction-learning process is often referred to as blended learning (Nanclares & Rodriguez, 2016). This innovative approach to learning is changing the landscape of education, and becoming an intricate part of many schools (Kwak, Menezes, & Sherwood, 2015; Nanclares & Rodriguez, 2016; Pace & Mellard, 2016). The technology aspect of blended learning allows for innovative instructional delivery methods to meet the individual needs of students. Additionally, technology can increase the interactions of participants, while simultaneously offering the benefits of the traditional face-to-face teaching-learning model (Shantakumari & Sajith, 2015).

The constant changes in technology, and its instructional modalities and methods are one of the reasons this dynamic educational method has been created. This approach to learning provides the ability for the teaching-learning environment to respond to changes, and was made possible due to the various delivery approaches that are available when combining face-to face instruction and the online components of blended learning (Kuo et al., 2014; Wang et al., 2015). In fact, the use of technology for education is becoming a necessity in many parts of the world. This globalization phenomenon has begun to transform the way we communicate, think, and interact across the globe (O'Byrne & Pytash, 2015).

Prior to the inception of online learning, which is believed to have been introduced in the 1980's, education was implemented in a face-to-face setting where the instructors were the deliverers of knowledge and the students were simply the recipients. However, somewhere in the 2000's a new dynamic and innovative form of education often referred to as blended learning

began to emerge (Dang et al., 2016; Moore et al., 2011; Tselios et al., 2011). O'Connor et al. (2011) note that it is the earlier forms of technology and electronic information distribution that are responsible for paving the way for current educational technology implementations. However, even though blended learning has become increasingly utilized, little research has been done on the topic (Dang et al., 2016; Moore et al., 2011; Tselios, Daskalakis, & Papadopoulou, 2011). Of the research that has been conducted, the two most commonly studied components of blended learning are that of the learner and that of content (Wang et al., 2015). This would include studies that have covered the evaluation and description of a course structure (Dang et al., 2016).

Blended Learning Defined

With the limited research on blended learning, a person can find several other terms that are used interchangeably regarding blended learning. When reviewing research, terms such as mixed mode learning, mediated learning, enhanced learning, and hybrid learning may also be used to describe blended learning (O'Connor et al., 2011; Wang et al., 2015). This can make defining it a bit ambiguous due to inconsistencies in the various understandings of what makes up blended learning. Nevertheless, the common understanding is that it is the merger of face-to-face instruction with technology-based instruction (Gunn & Hollingsworth, 2013; Kuo et al., 2014; O'Connor et al., 2015). However, what is beginning to become more apparent, and less ambiguous with the integration of technology is that this dynamic digital method of interaction has started making its way into the school systems and is changing how we picture teaching and learning (Nanclares & Rodriguez, 2016; O'Byrne & Pytash, 2015). In fact, blended learning has become an intricate part of many educational school settings at both the k-12 and post-secondary level (Kwak et al., 2015; Pace & Mellard, 2016).

Wang et al. (2015) refer to blended learning as an ever-changing complex approach to the teaching and learning process. One that is an interwoven system of teaching and learning elements consisting of the teacher, learner, learning supports, technology, institution, and content. One benefit of blended learning is that it has the ability to provide innovative instructional delivery methods which can meet the needs of individual students. One way to do that is by increasing the social interactions of participants thus increasing student engagement while at the same time offering the benefits of the traditional face-to-face teaching-learning model (O'Connor et al., 2011; Shantakumari & Sajith, 2015). A second benefit to the blended learning process is the reduction of time that a student spends in the physical classroom when compared to the traditional teaching-learning model. A study done at the University of Florida indicated that face-to-face class time was reduced by up to one-third when courses transitioned to the blended learning process (O'Connor et al., 2011). Furthermore, blended learning provides real time, anywhere learning via audio and video conferencing, and provides an opportunity for students to learn at a time and location of their convenience (Kuo et al., 2014; Pace & Mellard, 2016).

Increased Implementation of Blended Learning

Blended learning has begun to increase in popularity creating a surge in implementation due to the new approaches taken by students in their learning; especially at the university level (Kuo et al., 2014; O'Connor et al., 2011). Kuo et al. (2014) noted that 55% of all universities are now offering some form of blended learning course. Additionally, O'Connor, et al. (2011) credit resource accessibility and an increase to the access of group collaboration and participation, as contributing factors for the growth of blended learning (O'Connor et al., 2011). According to O'Connor et al. (2011), this new age generation learner is often referred to as the net generation.

It is the idea that the mastery of digital media creates a learning community where groups of individuals can reflect on their own experiences as they seek knowledge through social media and the increasing virtual world (O'Connor et al., 2011).

Educational Delivery Models

Blended learning is composed of both face-to-face and full online learning practices. To better understand how to implement the blended learning model it is helpful to understand all education delivery models. There are three evolutions within education that have occurred throughout time. These delivery models are the face-to-face instruction, full online learning, and the teaching-learning method often referred to as blended learning (Kuo et al., 2014; Kwak et al., 2015; O'Connor et al., 2011; Pace & Mellard, 2016). Within the blended learning model, instruction and learning can occur through either a synchronous approach or an asynchronous approach. Recognizing the difference between these two approaches can further help in the development of effective instructional design and delivery (Wang et al., 2015).

The first of the education delivery models is the traditional brick and mortar face-to-face style of learning. This is where the instructor and student share the same physical space, and the learning and instruction happens at the same time (Kwak et al., 2015; O'Connor et al., 2011; Pace & Mellard, 2016). Additionally, within the face-to-face setting the instructor is at the center of the learning. This is where information is simply delivered by the instructor while the student is the recipient of that information (Kuo et al., 2014). The second form of the teaching-learning processes in the educational evolutionary chain is full online learning through distance education. The full online delivery model is where innovative technology methods are used to deliver course content (O'Connor et al., 2011). Furthermore, full online learning utilizes teaching strategies which allow for all instructional materials and assessments to be loaded and taken

online (Kwak et al., 2015; Pace & Mellard, 2016). In a full online model the teacher and student are in different locations and the teaching-learning process is happening at different times. In blended learning, the educational approach merges the full online aspects with that of the traditional face-to-face model. This approach allows students to meet with their instructor and peers in the physical classroom, while at the same time receiving the benefits of technology (Wang et al., 2015). Full online learning differs from face-to-face and blended learning in that instruction is driven solely by technology, and occurs in the absence of face-to-face instruction. Additionally, in the full online model, the teacher and student are in different locations and the teaching-learning process is happening at different times. With full online learning the student is at the center of the learning and does not occupy the same space as the teacher (O'Connor et al., 2011). The third, and most recent, evolutionary element in the teacher-learning approach is typically known as blended learning (Dang et al., 2016; Kuo et al., 2014; O'Connor et al., 2011). Unlike full-online learning where the instruction is completely technology-mediated, blended learning is a two-component educational model that merges the technology aspects of full online learning with that of the traditional face-to-face model (O'Connor et al., 2011). Moreover, it allows students to meet with their instructor and peers in the same space at the same time, while also receiving the benefits of technology (O'Connor et al., 2011; Wang et al., 2015). In blended learning the learner-instructor relationship is one of the most important factors. It is this relationship that makes students able to feel more competent in their work, and helps to prevent them from feeling isolated (Kuo et al., 2014). Furthermore, recognizing the differences between the various instructional approaches can help in the development of effective instructional design and delivery (Wang et al., 2015).

Blended learning programs are unique and cannot be carbon copied from one program to the next. They are dependent on the connections between the various elements that go into the teaching-learning process and the strategies that are appropriate for each individual program. However, one necessity that all blended learning programs do rely on is the continuous feedback that occurs between students, teachers, and policy makers (Shantakumari & Sajith, 2015). Moreover, blended learning can provide many benefits to the education system for both students and teachers. This innovative instructional delivery method provides educators with the ability to meet the individual needs of each student by increasing the interaction of participants while at the same time offering the benefits of the traditional face-to-face teaching-learning model (Shantakumari & Sajith, 2015).

A Dynamic Approach to Teaching-Learning Barriers

Blended learning provides an educational approach to the teaching learning process that would otherwise not be available to many people. Prior to technology many people across the world were not able to access education. This dynamic digital method of teaching-learning interaction has begun making its way into the school system thus allowing the educational environment to reach people in many parts of the world. In fact, it is becoming a necessity for teaching and learning in some places around the globe (O'Byrne & Pytash, 2015). These changes in the approach to education have propelled blended learning to the point where a variety of courses are now offered to students in remote places. Places where access to educational resources and content knowledgeable teachers are not easily accessible (Cook, Bell, Nugent, & Smith, 2016; Mishra et al., 2013; O'Connor et al., 2011; O'Byrne & Pytash, 2015; Shantakumari & Sajith, 2015; Tseng & Walsh, 2016; Wang et al., 2015). With the advancement and integration of technology, a variety of courses can be delivered to students of all demographics that meet

student needs even when they are not in the same space as their instructor (O'Connor et al., 2011; Shantakumari & Sajith, 2015). An additional benefit to blended learning is that it allows for the teacher-learner not only to have control of the learning environment, but also the resources available to them (Florea & Purcaru, 2016). This has all been made possible due to changes in the approach of teaching and learning that blended learning provides (O'Connor et al., 2011).

Challenges in Blended Learning

Implementing a blended learning program does not come without its challenges. The emergence of technology has been making its way into the schools learning environment at a rate in which schools are struggling to keep up with (O'Byrne & Pytash, 2015). According to Gunn & Hollingsworth (2013), the rate at which technology is making its way into the education world is also causing many teachers to struggle with implementing instruction. Specifically, teachers are finding it difficult to integrate the curriculum and technology with the more common traditional practices that typically occur in the face-to-face setting (Gunn & Hollingsworth, 2013). Despite these challenges, the multiple teaching-learning subsystems that make up a blended learning program provides instructors with the ability to modify their academic delivery approach. In turn, this allows the teaching-learning process to evolve as teachers gain new skills that enhance student learning (Wang et al., 2015).

According to O'Connor et al. (2011), there are four concepts of blended learning. The first of these concepts are media combinations of live video connections, self-paced learning, collaborative learning, and the use of audio streaming or text messaging. The second concept of blended learning is how the pedagogy is approached to meet the learning goals, and the third is the use of web-based instruction, such as video recordings. The final concept of blended learning

is the mixture of technology with active task implementation so that it can be integrated with actual work (O'Connor et al., 2011). It is important to note that regardless of how well a teacher prepares for students to utilize technology it rarely goes as planned. Therefore, teachers need to be flexible, and allow the user of the technology to guide the learning process (Mishra et al., 2013). Additionally, each program is unique, so it is imperative to have the right instructional design, otherwise important elements will be stifled and affect the learning process (O'Connor et al., 2011; Sahantakumari & Sajth, 2015). Furthermore, it is important to understand that it is the instructional design that creates the learning, not the blended learning process itself. It is equally important that instructors understand when to implement the technology. This can be a major challenge during the integration process "because there is no one perfect method" (O'Byrne, & Pytash, 2015, p.139). Another challenge with blended learning is knowing when to utilize the human interaction elements of the face-to-face component. Knowing the strengths and limitations of both the face-to-face and the digital components of the programs, and when to deliver each of these components is important (O'Connor et al., 2011). When developing an effective blended learning program, teachers need to create a stimulating learning environment that encourages students to become self-regulated learners by constantly evolving and adapting in ways that meet the needs of their students (Florea & Purcaru, 2016). In addition, it is critical that course curriculum be aligned and the technology and face-to-face components are synchronous.

Further assurance of a successful blended learning program occurs with careful assessments to ensure that the maximum benefits of a course or program are achieved (O'Connor et al., 2011). This requires appropriate collaboration and coordination between all components (Wang, et al., 2015). Furthermore, previous experience by the learners, and the availability of

required materials need to be considered. These factors will help to ensure that the blended learning experience is both engaging and motivating (Osgerby, 2013). Other factors necessary for success are the educators themselves. Educators need to be familiar with the technology and how to align the curriculum with the digital elements. This is crucial if the course is going to have an effective pedagogy. Bridging the curriculum pedagogy with the technology seems to be a difficult barrier to cross for many blended learning programs. However, when implemented effectively there can be an increased level of student engagement, and improved academic achievement (Benton-Borghi, 2013; Donovan, Green, & Mason, 2014; Gunn & Hollingsworth, 2013; Kwak et al., 2015; O'Byrne & Pytash, 2014; Tseng & Walsh, 2016; Voogt, Erstad, Dede, & Mishra, 2013). A final component for a successful blended learning program is it needs to be supported by the administration. Administrative support is paramount and the subsystem level that holds all other subsystems together (O'Connor et al., 2011; Wang et al., 2015).

Blended learning is not designed as a one-size-fits all. It is specific to the needs of the course content and objectives (Sahantakumari & Sajth, 2015). Blended learning is also dependent on student motivation and satisfaction, which can be greatly impacted by the instructor's characteristics. When implementing blended learning, determining the kind of training, and best practices that are implemented is important. This would include things such as ensuring appropriate pedagogy, flexibility, collaboration, and critical thinking. Implementation should also consider the program's ability for differentiation and creativity. These dynamics can create a learning environment through technology that is scaffolded and consists of balanced instructional support, pacing, and interaction-planning (O'Byrne & Pytash, 2015). There are two basic categories that come into play when integrating technology into the classroom for a successful program. The first of the two categories is found in the instructional delivery method,

which can be further broken down into blended learning and full online learning. The other category encompasses the elements of technology integration, which consists of differentiation and creativity. While the instructional delivery methods within blended learning are not one-way processes, they do allow for a combination of multiple elements that can be intertwined for a rich learning experience (O'Byrne & Pytash, 2015; O'Connor et al., 2011).

Student Satisfaction

The level of student satisfaction plays an important role in the effectiveness of a blended learning program (Dang et al., 2016; Shantakumari & Sajith, 2015; Wang et al., 2015). When considering the effectiveness of a blended learning course the overarching theme and determining factor seems to be the degree to which the students themselves are satisfied. While there are many dynamic parts to a successful blended learning course it is the theme of student satisfaction that appears to be the umbrella in which all other blended learning elements point. Additionally, when considering student satisfaction, it is important to keep in mind that it is the perception of the students that matter, not that of the instructor or institution (Shantakumari & Sajith, 2015). The importance of this is further supported by Dang, et al. (2016) who indicate student satisfaction is determined by how well a student thinks their needs and goals have been met by the blended learning course. Many blended learning studies note student satisfaction is one of the most important factors that need to be accounted for when implementing blended learning. For this reason, understanding the importance of student satisfaction in a blended learning course is significant (Dang et al., 2016; Shantakumari & Sajith, 2015; Wang et al., 2015).

There are three kinds of interactions that occur within blended learning. Those interactions are the learner-learner, learner-instructor, and learner-content. One of the most

important factors in blended learning is the interaction that occurs between people. It is the human interactions that affect blended learning the most (Kuo et al., 2014). The first, and possibly the most important of these factors is that of student interactions. This is particularly true as it relates to the interactions between the instructor and the student (Kuo et al., 2014). Kuo et al. (2014) note that the student and teacher interaction is one of the most significant elements of a blended learning course. They imply that effective interaction allows for reciprocal feedback between the teacher and student, thus improving the quality of the course. In turn, this improves the likelihood of increased student performance. A second important form of interaction, according to Kuo et al. (2014), is the interaction that occurs between students. The learner-learner interaction allows for a reciprocal relationship between the learners through information and knowledge sharing of the specified course (Kuo et al., 2014; Mishra et al., 2013). Furthermore, interactions that occur between learners can encourage community between the blended learning participants, and is a primary factor in student satisfaction (Kuo et al., 2014). The third type of interaction that occurs in blended learning is that of the connection the student has with the content. When students discuss and reflect on the course content then student success and engagement is likely to increase (Kuo et al., 2014; Mishra et al., 2013).

While the interaction of the learner is one of the most important aspects of a blended learning program, there are additional factors that should also be considered. According to Kuo et al. (2014), student personalities can also play a role in the effectiveness of a blended learning program. Students who tend to have more of an extroverted personality tend to interact more in blended learning than those who have a more introverted personality, and generally may be more satisfied with blended learning. Factors such as the type of teaching-learning method, the characteristics of the instructor, and student efficacy levels with the use of technology also plays

a role in student satisfaction (Dang et al., 2016; Kuo et al., 2014; Shantakumari & Sajith, 2015). Kuo et al. (2014) note in their researc h that things such as the type of courses, the degree to which courses differ, the expectations students have on themselves, and the individual student's attitude can impact student satisfaction as well (Kuo et al., 2014; Shantakumari & Sajith, 2015). In addition to the above factors Dang, Zhang, Ravindran, & Osmonbekov (2016) indicate how much students enjoy the course, how accomplished they perceive themselves, and the environment from which the blended learning program is instructed are also variables affecting blended learning success and student satisfaction levels.

Six Components of Blended Learning

Blended learning is made up of many elements that are all woven together in one interconnected system (Wang et al., 2015). This dynamic instructional model allows for a diverse application of many frameworks. Unfortunately, the various components of blended learning are generally studied in isolation rather than focusing on how all of the blended learning components work together (Wang et al., 2015). This can create a multitude of gaps in the research because it leaves people with a one-way approach to blended learning when it is really a combination of interconnected concepts. Therefore, gaining clarity on the blended learning system as a whole can be challenging due to how one component can affect another (Wang et al., 2015).

One such framework used in blended learning studies is the instructional strategy framework. Johnson and Aragon (2003) explain that this theory centers on the idea that the implementation of blended learning is dependent on ideas from multiple perspectives. This particular framework's primary focus is on the instructional design element of blended learning. It is an integration of several other theories such as, but not limited to, behavioral learning theory, cognitive learning theory, and social learning theory. Within this framework the focus is

on the social interaction, student reflection, real life context, individual differences, information overload, hands-on activities, and student motivation. In essence using this framework allows a researcher to adjust or add to the framework based on what elements around instructional design are implemented (Johnson & Aragon, 2002).

Garrison, Anderson, and Archer (2000) utilized the community of inquiry framework (COI) in their study looking at the elements of an educational experience. Again, this framework only looks at one dimension of the blended learning model. The framework looks at the social presence, cognitive presence, and teaching presence around community-mediated communication. This framework might be used when looking at how the blended learning process connects and applies new ideas, and how the transfer of information is used to analyze cognitive presence. Emotions and the promotion of collaboration would be two indicators to look at when analyzing social presence, while the initiation of discussion topics and personal meaning would be applied to the teaching presence. When utilizing this framework, a researcher can look at both synchronous and asynchronous modes of the blended learning model (Garrison, Anderson, & Archer, 2000; Wang et al., 2015).

Nuria, Hernandez, Nanclares, & Monica Perez Rodriguez (2016) utilized an identification of delivery framework that can look at how instruction in a face-to-face environment is received, and also how technology is used to deliver instruction. They refer to these delivery methods as transmission and Praxis. Within the transmission portion of the framework the content that is to be learned is determined by the instructor, and the learner receives the knowledge. The part of the framework that applies the praxis concept allows for the student to take ownership in their learning, and the instructor plays a supporting role (Nuria, 2016).

When assessing a blended learning program, it is important to look at how all blended learning subsystems affect one another. For example, it is important to look at both the educational aspect in regard to the learner, but also the technology and support elements as well. These subsystems all work together like spokes inside a wheel. Therefore, it is important to consider the multiple components when implementing a blended learning program (Wang et al., 2015). It is this complex multi-component system that makes for some of the drawbacks regarding much of the research around blended learning. While there have been some studies that have looked at more than one blended learning component within a single study, it is very difficult to find studies that look at all of the components associated with blended learning. In fact, in most studies on blended learning the various components are generally studied in isolation (Wang et al., 2015). Due to the often one-dimensional approach of most blended learning studies and its interconnected concepts, gaps are often created in the research. Nevertheless, the study of each individual element can still be important because it gives insight into each specific component and how it plays its part within the blended learning system as a whole. Unfortunately, it does not give a clear understanding as to how all components work together and in what way they impact one another (Wang et al., 2015).

To help give a more complete picture of blended learning Wang et al. (2015) used a complex adaptive blended learning systems (CABLS) approach to look at how the different blended learning elements impacted one another. The CABLS framework looks at the blended learning method as a whole. This is done by breaking it into six-components providing a more complete understanding of how the multiple elements work together (Wang et al., 2015). These six components are the teacher, learner, institution, content, technology, and learner support. While each of the six areas that make up the CABLS framework are made up of their own

unique and individual elements, they should all still work in unison and be in sync with one another. When all parts of the CABLS approach to blended learning are in sync, a rich and engaging learning experience can be provided for both the teacher and the student (Wang et al., 2015).

Learner Support

The learner support element of the CABLS framework relates to the academic and technical support in a blended learning system. One of these supports is how the teacher supports the learner, and how they evolve with the other subsystems of the CABLS framework (Wang et al., 2015). Wang et al. (2015) noted in their study that there is little information regarding learner support. However, one of the make-ups for the CABLS component relates to the relationship between the teacher and the student and the support that is given to the learner. This is particularly true for more complex subjects or assignments. Ultimately, these supports have to come from the institutional level since the learner support component of the CABLS framework also relates to the relationship between the learner and the institution. However, support from the teachers for the learner may occur through means of instant messaging, email, web-based tutorials, phone conferences, or other materials that would assist the learner when facing challenges. These methods of support would meet the criteria for learner support; especially in the area of academic content. Within learner support, the CABLS framework also suggests that the teachers and learners should guide the needs for the support elements of the technology (Wang et al., 2015).

Learner

The learner portion of CABLS relates to the learner's ability to evolve with the other subsystems and the ability to adapt and change their identity (Wang et al., 2015). This evolution

creates a cycle of change in the learner's identity by focusing on how the learner changes and adapts to the multimodal environment via the transformation from a passive learner to an active learner (Wang et al., 2015). Kuo et al. (2014) describes the learner-learner interaction as one that is human interaction. According to Wang et al. (2015) the continuous changes and advancements in technology are what makes the ability to adapt and evolve a necessity. Furthermore, within blended learning the elements of the learner are associated with the learner-content, learner-technology, and learner-learning support (Wang et al., 2015). Additionally, at the learner level the focus is on the relationship between the learner and the institution itself. Therefore, the learner criteria would look at student performance and satisfaction, and measure it by how the learner connects to the content, technology, and the support provided to the learner. The learner's connection with the technology itself also comes into play when implementing a successful blended learning program or course (Wang et al., 2015). In the study done by Wang et al. (2015) connectedness between the learner and the technology was the second most discussed topic in their findings. It was paramount to the learner's attitude, and information and communication technology (ICT) competence (Wang et al., 2015).

Teacher

The teacher subsystem of the CABLS framework looks at how the teacher co-evolves to the blended learning environment through the acquisition of multiple skills. This evolution should occur with the student and transform teachers from being a disseminator of information to someone who facilitates learning (Wang et al., 2015). Other elements associated with the teacher subsystem of CABLS are the teacher-content, teacher-technology, teacher-learning support, and the relationship between the teacher and the institution. Furthermore, this subsystem looks at the extent to which the culture within the institution provides professional development supports

initiatives, experimentation, and a climate of collaboration. The teacher subsystem also looks at how the teacher evolves with the student throughout this teacher-learner process. This is done by looking at how the teacher goes from a controller of knowledge to a promoter of learning through advisement and facilitation (Wang et al., 2015).

Content

Within the content subsystem of CABLS researchers look at how students engage with the various learning elements of the blended learning process. This would include how the learner engages with the content itself, the design of the course, and how the curriculum is delivered. These elements within the content subsystem of CABLS may also include the learning, the individual pace of the students' learning, course customization, the extent of collaboration, and the level of course individualization. Furthermore, it doesn't matter if it is online or offline, or whether or not it is structured. Additionally, with the proper application of the technology-based side of blended learning, the learner can get more out of the face-to-face portion which provides a better use of the contact hours (Wang et al., 2015). In order for a blended learning program to be successful and to obtain its full benefits, the right curricular and instructional design must be in place. This includes bridging the curriculum pedagogy with technology, which is often one of the most difficult barriers for many blended learning programs to cross (Wang et al., 2015). However, Wang et al. (2015) imply in their CABLS framework that because course content and its delivery is one of the most critical subsystems for the effective implementation of blended learning, the ability to bridge the curriculum and technology is a must (Wang et al., 2015). O'Connor et al. (2011) support that notion by noting without quality instructional design important elements of blended learning, such as the collaboration component, can be stifled and have a negative impact on the learning process (O'Connor, et al.,

2011). Nevertheless, when blended learning is done appropriately the cross between technology and face-to-face instruction can result in increased student engagement, and improved academic achievement (Donovan et al., 2014; Tseng & Walsh, 2016; Benton-Borghi, 2013; Gunn & Hollingsworth, 2013; Voogt et al., 2013).

There are two components to the content delivery methods of blended learning that need to be considered when creating a course design. These components are the synchronous and asynchronous delivery models. Synchronous learning is an instructional method that allows for the teacher-learner or the learner-learner interaction to happen in real time. This allows for collaboration with a continuous feedback loop to happen simultaneously (Kuo et al., 2014; Shantakumari & Sajith, 2015;). Here, learning can happen in an actual face-to-face setting, or audio and video conferencing could be used to connect the instructor with the student in a virtual format of the face-to-face setting. Instant messaging where there is an immediate response, and real-time chat boards would be other examples of synchronous learning (Kuo et al., 2014).

The asynchronous component of blended learning refers to learning where the technology elements allow the teaching and learning to happen at different times and in different places (Heinerichs, Pazzaglia, & Gilboy, 2016; Nanclares & Rodriguez, 2016; O'Byrne & Pytash, 2015). Asynchronous learning would include things such as online learning platforms, emails, discussion or chat boards, with delayed responses between participants, quizzes, essay reflections, and various online materials for the course (Kuo et al., 2014). Another form of asynchronous learning is the flipped classroom (Heinerichs et al., 2016; Nanclares & Rodriguez, 2016; O'Byrne & Pytash, 2015).

In the flipped classroom students watch pre-recorded videos allowing them to learn the content ahead of time, prior to entering the face-to-face class. The flipped instruction allows

students to be exposed to the knowledge part of the learning prior to class, and in turn allows for classroom time to be used for activities and collaboration (Heinerichs et al., 2016; Nanclares & Rodriguez, 2016; O'Byrne & Pytash, 2015). Nanclares and Rodriguez (2016) noted in their study that when considering student engagement, 65% of the students favor the flipped classroom over the traditional class setting as it relates to student engagement. In addition, 60% of the students in their study indicated they were motivated when learning the course content in a flipped classroom format (Nanclares & Rodriguez, 2016).

Technology

The technology subsystem of CABLS is how reliable the technology infrastructure for the organization is as a support system. For a blended learning program to be successful a strong technology support system is a must. Within this subsystem researchers look at how the blended learning system responds and adapts to the various challenges and constant changes within the technology world. Additionally, the technology subsystem focuses on its ability to be flexible while simultaneously maintaining its internal structure (Wang et al., 2015). This also means that the teachers need to be flexible, and allow the user of the technology to guide the learning process (Mishra et al., 2013). Furthermore, when considering the technology portion of the CABLS framework, the blended learning system should look at how the system responds to the ever-changing world of technology. This would include how the available technology is able to adapt to new challenges as technology is pushed into the learning environment (Wang et al., 2015). Wang et al. (2015) refer to the technology subsystem within a blended learning system as "the edge of chaos" (pg. 382). This means that the technology portion of CABLS is "stable enough to maintain its internal structure, but sensitive enough to the changing need of the learner." (pg. 384). This reference describes the continuing advances and changes that come with

technology. It is also important to note that these changes are constantly presenting new challenges with the integration of technology into the learning environment (Wang et al., 2015).

Institution

At the institutional level the focus is on how blended learning operates at the institutional level. Due to the interconnection of all CABLS subsystems, it is the institutional subsystem that drives all other systems within the CABLS framework. It is at this level where all other systems are developed, maintained, and sustained. The criteria for this subsystem would relate to curriculum design, and the experiences of the stakeholders. Furthermore, the institutional subsystem looks at how the technology elements and its implementation are conducted and aligned with the other subsystems at an institutional level. Additionally, it is here where researchers look at the policies, system supports, and sustainable strategies for implementation (Wang et al., 2015).

Summary

Technology is much more advanced and part of people's everyday life than it was two decades ago. As a result, the use of technology in schools allows students to access more information, at a much faster rate, than in the past (Florea & Purcaru, 2016). However, there was a time that education was only possible when the teacher and learner occupied the same space. In today's educational world technology provides teachers and learners with the ability to connect in many dynamic ways. It is through technology where these connections can happen at different times and with the teacher and learner in separate locations. This new teaching and learning process that allows for self-paced, multimedia instruction is referred to as blended learning (Dang et al., 2016). Still, it is not the intention for blended learning to replace face-to-face instruction, but rather to enhance it by integrating technology into the teaching-learning process

(Florea & Purcaru, 2016). One might think of blended learning as face-to-face learning through technology and the online component acting as its extension (O'Connor et al., 2011).

The integration of technology into the traditional classroom setting can help educators meet the diverse needs of students (Tsneg & Walsh, 2016). Additionally, the use of blended learning to deliver courses allows for a greater variety of teaching and learning methods to be utilized with both instructors and students (Dang et al., 2016). However, in order to implement an effective blended learning course, it is also important to understand how to incorporate the online elements of blended learning with the course design (Nanclares & Rodriguez, 2016). Moreover, blended learning has the unique ability to self-organize throughout its subsystem due to the interactions within the various subsystems, as laid out in the CABLS framework (Wang et al., 2015). Blended learning also provides a flexible approach to learning by allowing innovative course design to support learning any time and any place. At the same time, blended learning combines an element of convenience without losing the face-to-face component of teaching and learning (O'Connor et al., 2011). In fact, many studies have indicated equal or better outcomes in student achievement when using blended learning versus the traditional face-to-face environment (Shantakumari & Sajith, 2015). It is also important to note that blended learning makes for a mobile learning environment which can enhance the teacher's ability to modify content delivery (Pace & Mellard, 2016).

As with all programs and educational methods, none come without some form of issues. Education through blended learning is no exception (Florea & Purcaru, 2016; Voogt et al., 2013). While researchers look for answers as to what blended learning is, and how technology is integrated into the schools, gaps in the research remain (O'Byrne & Pytash, 2015). Additionally, all blended learning programs have variables that need to be accounted for if they are to be

successful (Dang et al., 2016). Despite the challenges of technology integration within the classroom, blended learning provides students with greater opportunities than not having it (Gunn & Hollingsworth, 2013). Nevertheless, it is not enough to simply put devices into the classroom because the benefits of blended learning do not just spontaneously occur (Florea & Purcaru, 2016; Voogt et al., 2013). For a blended learning program to achieve the maximum benefits the teacher, learner, institution, content, technology, and learner support need to be accounted for (Wang et al., 2015). Therefore, those utilizing the blended learning approach need to be mindful of how the multiple elements of the teaching-learning process work and affect one another (Wang et al., 2015). This is important because most studies related to blended learning and its various components are studied independently of one another without looking at how all parts are interconnected. This can create issues with the blended learning approach because it misses the spider web of interconnections that are imperative to a successful blended learning program (Wang et al., 2015). Moreover, it is critical within the blended learning process to pay close attention to the student satisfaction levels since it is one of the most important variables when establishing a successful blended learning program (Dang et al., 2016; Shanatakumari & Sajith, 2015). Aside from the educational aspects for the learner, the technology and service systems, and content within a course, are need to be considered when implementing blended learning programs and courses (Dang et al., 2016). Nevertheless, despite the challenges blended learning poses, and relatively limited amounts of research on the topic, it can be a good compromise for the face-to-face and full online methods of education.

SECTION FOUR:

CONTRIBUTION TO PRACTICE

Executive Summary

A QUALITATIVE INVESTIGATION OF COMPLEX ADAPTIVE BLENEDED LEARNING SYSTEMS WITHIN RURAL INDIGENOUS COMMUNITIES

Introduction

This study used a qualitative approach to investigate how emergence occurs in the blended learning program of Kodiak Alaska's rural schools. In addition, the study looked at how the blended learning program impacted a student's life choices after high school.

Purpose

The purpose of this study was to determine how emergence occurs in rural Kodiak's blended learning program as a result of interactions between the individual agents as defined by Wang et al. (2015) and how blended learning impacts student life choices after high school. Specifically, the researcher looked at how emergence occurs in the space between order and chaos through the adaptations and flexibility between agents resulting from the interactions of the 6 components in a blended learning program. In addition, the integration of blended learning provides a wider social network for students.

Blended Learning

Blended learning is a teaching-learning process that combines the traditional face-to-face method of learning with technology mediated learning (Gunn & Hollingsworth, 2013; Kuo et al., 2014; O'Connor et al. 2015). It is adaptive and engaging, and the proportion of face-to-face instruction versus that of technology implementation is dependent on the uniqueness of each course.

Conceptual Framework

The researcher conducted the study using the Complex Adaptive Blended Learning Systems (CABLS) framework, developed by Wang et al., (2015). CABLS is a complex and interactive

blend of technology and social systems that involves multiple components with the ability to self-organize, adapt, and learn through interactions. Wang et al., (2015) identify 6 components of a blended learning system. These components are the Learner, Teacher, Technology, Content, learning support, Institution. By conducting this study using the CABLS framework, the researcher was able to examin how Kodiak's blended learning program functions as a whole.

Blended Learning Research

Much of the research conducted on blended learning has focused on just one aspect of the system and not on how the components work together (Holland, 2006; Keshavaraz, Nutbeam, et al. 2010; Lichtenstein et al., 2006). This narrow focus limits understanding of how each element works independently, and can make it difficult to understand how the different components of blended learning interact and function as a whole. Conducting a one-dimensional study can create issues with the blended learning approach because it misses the spider web of interconnections that are imperative to a successful blended learning program (Wang et al., 2015).

Design of Study

The research design was a qualitative case study of a blended learning program in rural Alaska. Using a qualitative approach allowed the researcher to obtain a cross-sectional perception of the lived experiences of those associated with the blended learning program (Creswell, 2014; Merriam & Tisdell, 2016) The researcher sought to understand how those involved with the program in Kodiak interpreted emergence, and to what extent, if any, the program impacted students' lives after high school.

Data Collection

For the data collection process interviews were conducted using video and audio conferencing. Participant selection for the study was purposive sampling. Purposive sampling was the best method for making sure that all schools and groups were represented by individuals who had knowledge of the program, and could contribute to the research questions (Creswell, 2014; Merriam & Tisdell, 2016). Data was collected through interviews to understand the lived experience of 45 participants, from five interview groups familiar with the rural schools blended learning program (Creswell, 2014; Seidman, 2013).

Research Questions

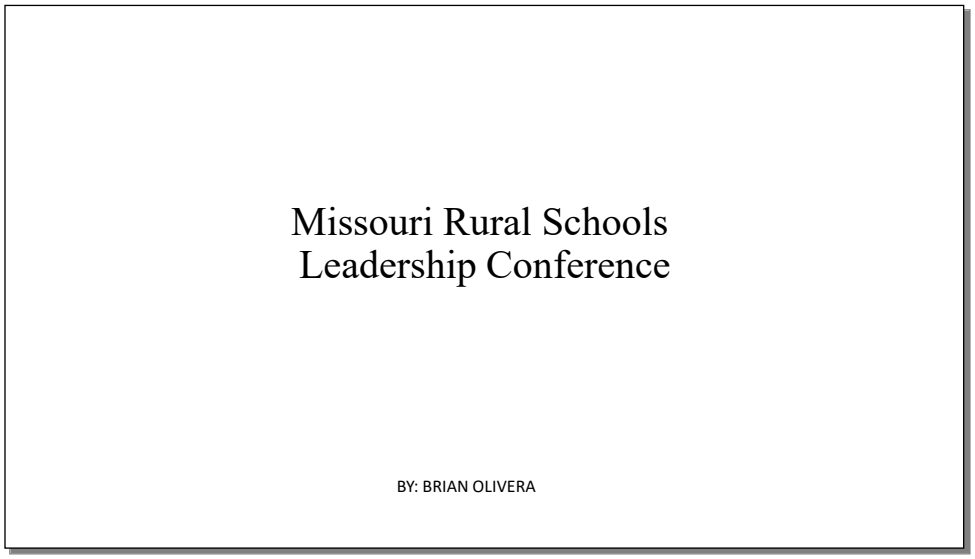
1. What emergence occurs in the spaces between the six components of the CABLS framework with the implementation of Kodiak's blended learning system? The findings included the themes:
    a. *Synchronous interactions*,
    b. *Real time proximal problem solving*, and
    c. Collaborative sharing with reciprocal feedback loops.

    The conditions for emergence generally happened at the point of intersection where the three themes were simultaneously present.
2. What is the perception of impact that the blended learning program in Kodiak Alaska has on a student's choices for life after high school? The findings included the main themes:
    a. *Extended access to resources*,
    b. *Expanded social networks*, and
    c. Increased self-confidence.

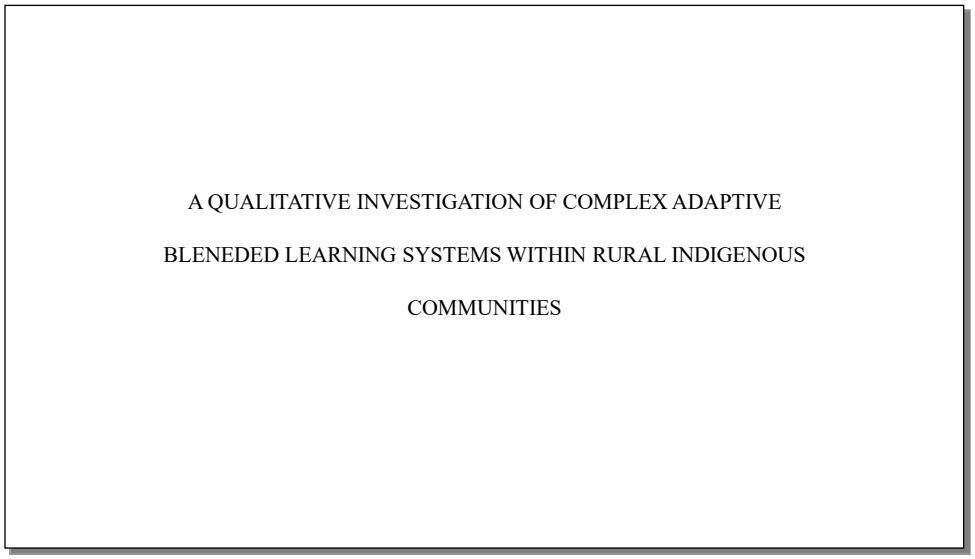
A Model for Rural Schools

Kodiak's Rural Schools blended learning program can be a model for other rural schools that face similar challenges. Like the Indigenous students in the rural communities of remote Alaska, rural communities in the lower-48, including Missouri, have the opportunity to work collectively with other rural schools, combine resources, and expose their students to more broad and diverse learning experiences, thereby expanding their post-high school options.

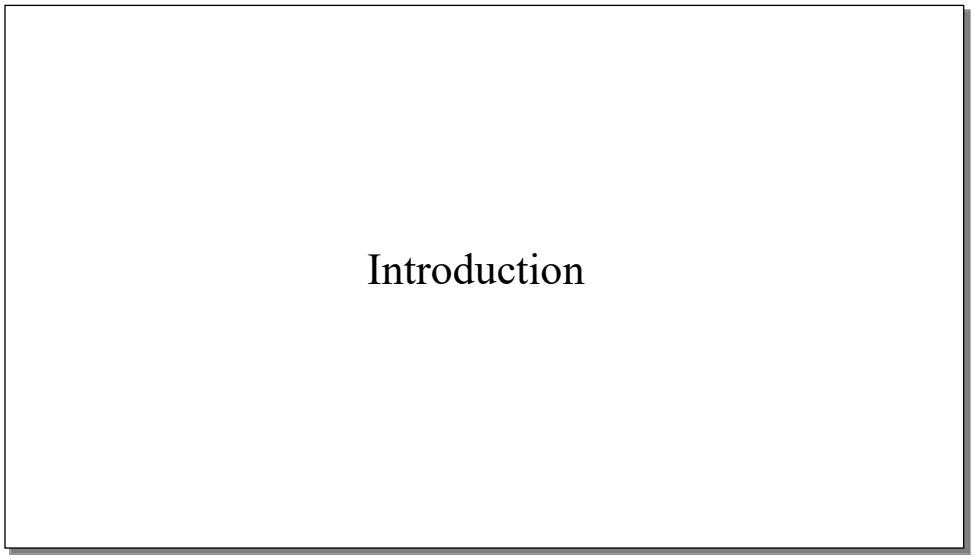
Slide 1


Missouri Rural Schools
Leadership Conference
BY: BRIAN OLIVERA

Slide 2


A QUALITATIVE INVESTIGATION OF COMPLEX ADAPTIVE
BLENEDED LEARNING SYSTEMS WITHIN RURAL INDIGENOUS
COMMUNITIES

Slide 3



Slide 4

Research Problem

- Blended learning systems can be difficult to predict because the interactions are not a single cause and effect, like that of linear systems (Florea & Purcaru, 2016; Wang, et al., 2015). Instead the operating processes are adaptive and complex, a complex adaptive system (CAS) (Lichtenstein et al., 2006).
- Prior research on blended learning has generally focused on just one aspect of the system, conducted primarily in isolation, and not on how the components work together (Keshavaraz et al., 2010; Holland, 2006; Lichtenstein et al., 2006).
- This can lead previously researched findings limited to how each element works independently from one another.
- Consequently, this creates gaps in the research and stands to reason why schools sometimes struggle with implementing blended learning effectively (Wang et al., 2015).

Slide 5

Purpose of Study

- The purpose of this study was to look at how emergence occurred in rural Kodiak's blended learning program as a result of interactions between the individual agents as defined by Wang et al. (2015), and examine what impact the blended learning program had on influencing student decisions for college and career after high school,

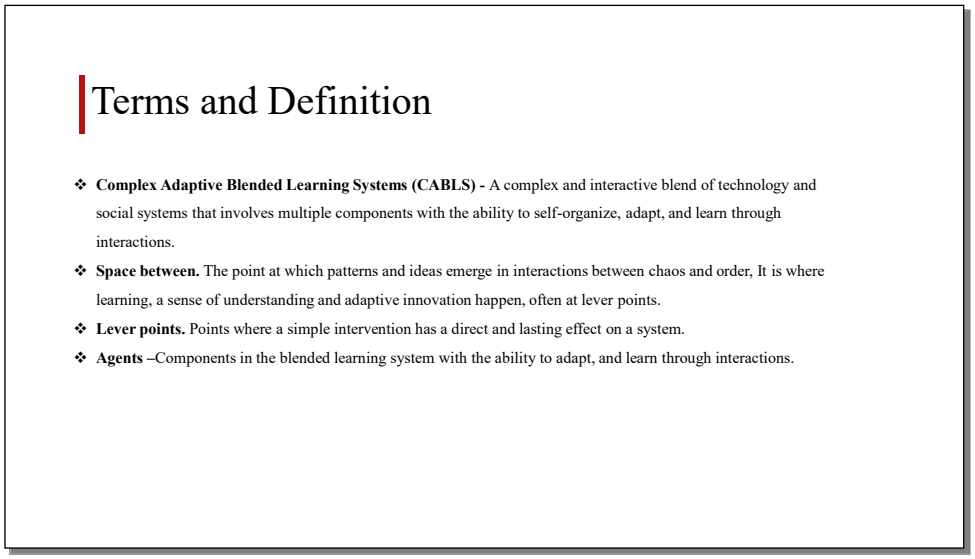
Slide 6

Blended Learning

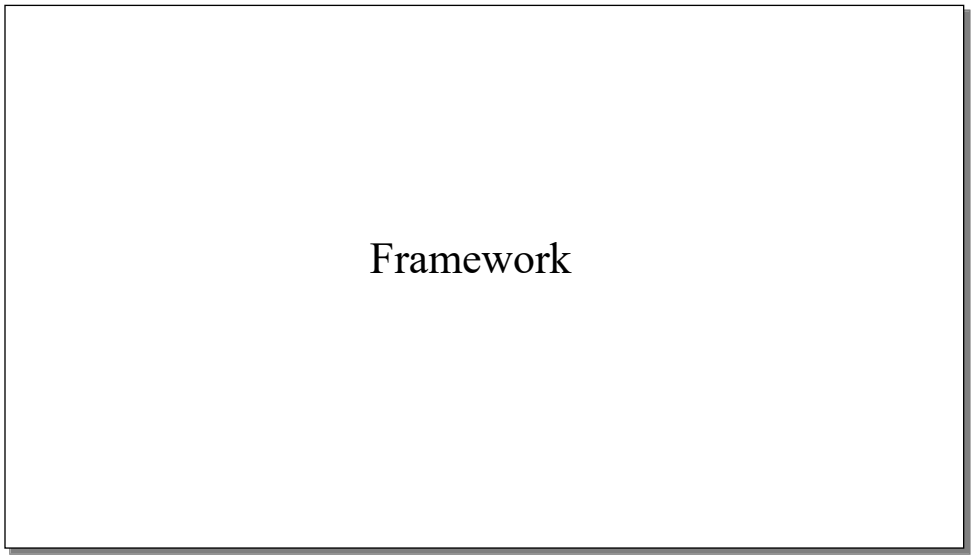
- Blended learning is a teaching-learning process that combines the traditional face-to-face method of learning with that of technology mediated learning.
- Some time is spent learning independently and other portions learning in a face-to-face setting.
  - No clear distinction on the proportion of technology versus face-to-face instruction.
  - Each course is unique so the proportion of technology and face-to-face can vary between coursed.

(Gunn & Hollingsworth, 2013; Kuo et al., 2014; O'Connor, McDonald, & Ruggiero, 2015; Sahantakumari & Sajth, 2015; Wang et al., 2015)

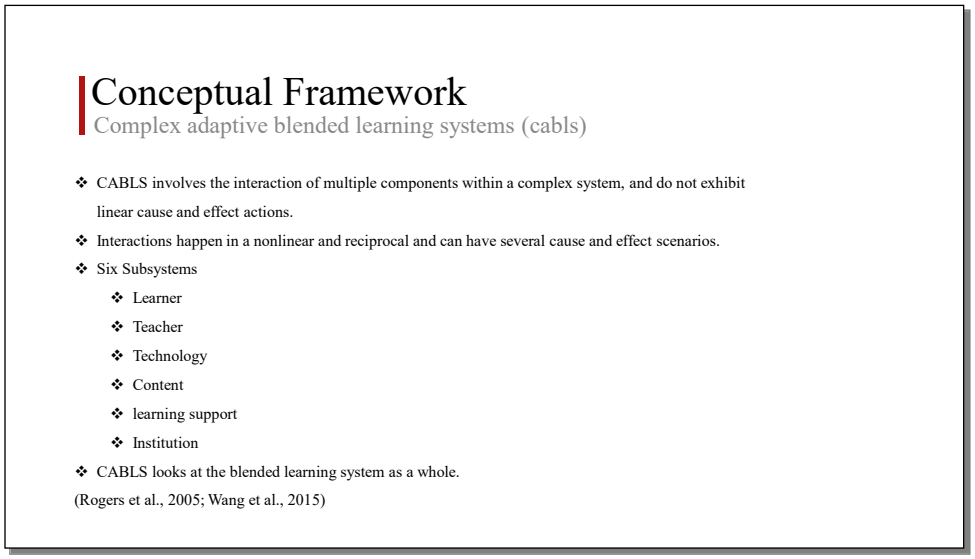
Slide 7


Terms and Definition
Complex Adaptive Blended Learning Systems (CABLS) - A complex and interactive blend of technology and social systems that involves multiple components with the ability to self-organize, adapt, and learn through interactions.
Space between. The point at which patterns and ideas emerge in interactions between chaos and order, It is where learning, a sense of understanding and adaptive innovation happen, often at lever points.
Lever points. Points where a simple intervention has a direct and lasting effect on a system.
Agents –Components in the blended learning system with the ability to adapt, and learn through interactions.

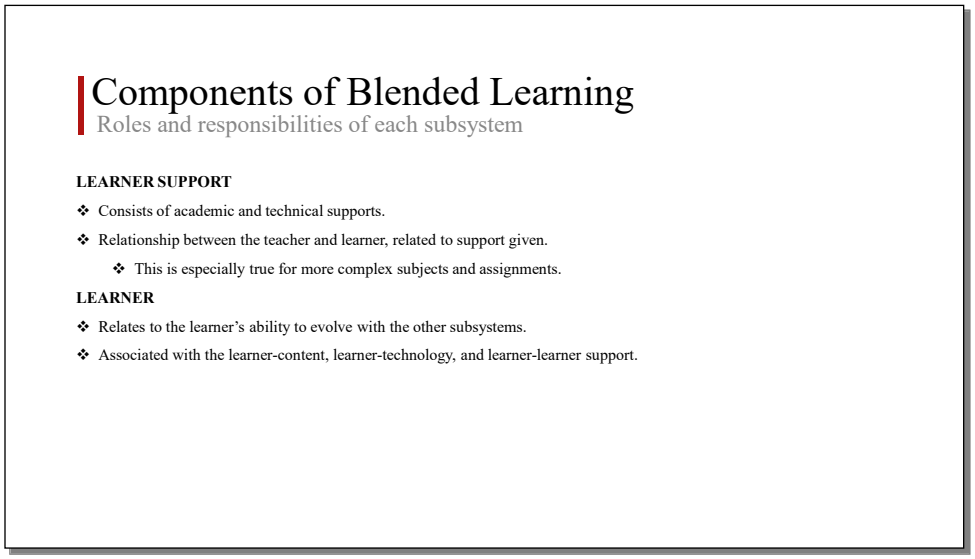
Slide 8



Slide 9


Conceptual Framework
Complex adaptive blended learning systems (cabls)
❖ CABLS involves the interaction of multiple components within a complex system, and do not exhibit linear cause and effect actions.
❖ Interactions happen in a nonlinear and reciprocal and can have several cause and effect scenarios.
❖ Six Subsystems
❖ Learner
❖ Teacher
❖ Technology
❖ Content
❖ learning support
❖ Institution
❖ CABLS looks at the blended learning system as a whole.
(Rogers et al., 2005; Wang et al., 2015)

Slide 10


Components of Blended Learning
Roles and responsibilities of each subsystem
LEARNER SUPPORT
❖ Consists of academic and technical supports.
❖ Relationship between the teacher and learner, related to support given.
❖ This is especially true for more complex subjects and assignments.
LEARNER
❖ Relates to the learner's ability to evolve with the other subsystems.
❖ Associated with the learner-content, learner-technology, and learner-learner support.

Slide 11

Components of Blended Learning

Roles and responsibilities of each subsystem

TEACHER

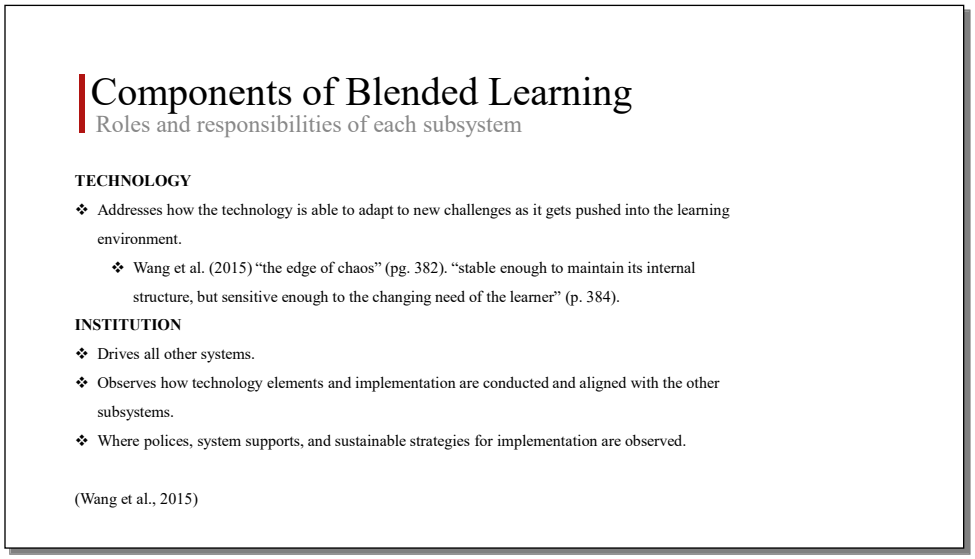
- How the teacher co-evolves to the blended learning environment through acquisition of multiple skills.
- Transforms teachers from a disseminator of information into a promoter of learning through advisement and facilitation of learning.
- Associated with the teacher-content, teacher-technology, teacher-learning support, and teacher-institution.

CONTENT

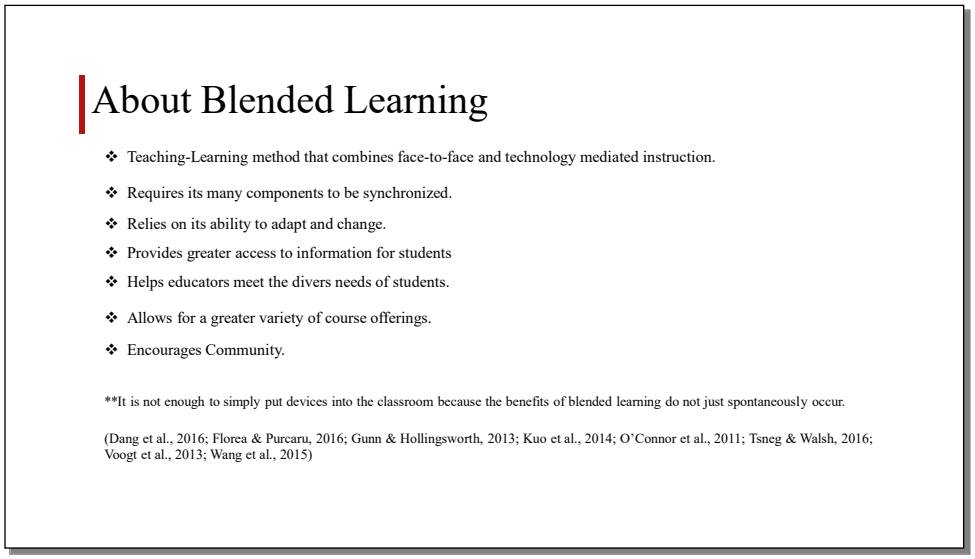
- Design of the course, and how learning engages with content
  - Curriculum is delivery, Pace of learning, Course customization/individualization, Extent of collaboration.
- Ability to bridge curriculum pedagogy with technology.

**Instructional design is critical to prevent other elements of blended learning from being stifled and negatively impacting the learning process.

Slide 12


Components of Blended Learning
Roles and responsibilities of each subsystem
TECHNOLOGY
❖ Addresses how the technology is able to adapt to new challenges as it gets pushed into the learning environment.
❖ Wang et al. (2015) "the edge of chaos" (pg. 382). "stable enough to maintain its internal structure, but sensitive enough to the changing need of the learner" (p. 384).
INSTITUTION
❖ Drives all other systems.
❖ Observes how technology elements and implementation are conducted and aligned with the other subsystems.
❖ Where polices, system supports, and sustainable strategies for implementation are observed.
(Wang et al., 2015)

Slide 13


About Blended Learning
❖ Teaching-Learning method that combines face-to-face and technology mediated instruction.
❖ Requires its many components to be synchronized.
❖ Relies on its ability to adapt and change.
❖ Provides greater access to information for students
❖ Helps educators meet the divers needs of students.
❖ Allows for a greater variety of course offerings.
❖ Encourages Community.
**It is not enough to simply put devices into the classroom because the benefits of blended learning do not just spontaneously occur.
(Dang et al., 2016; Florea & Purcaru, 2016; Gunn & Hollingsworth, 2013; Kuo et al., 2014; O'Connor et al., 2011; Tsneg & Walsh, 2016; Voogt et al., 2013; Wang et al., 2015)

Slide 14

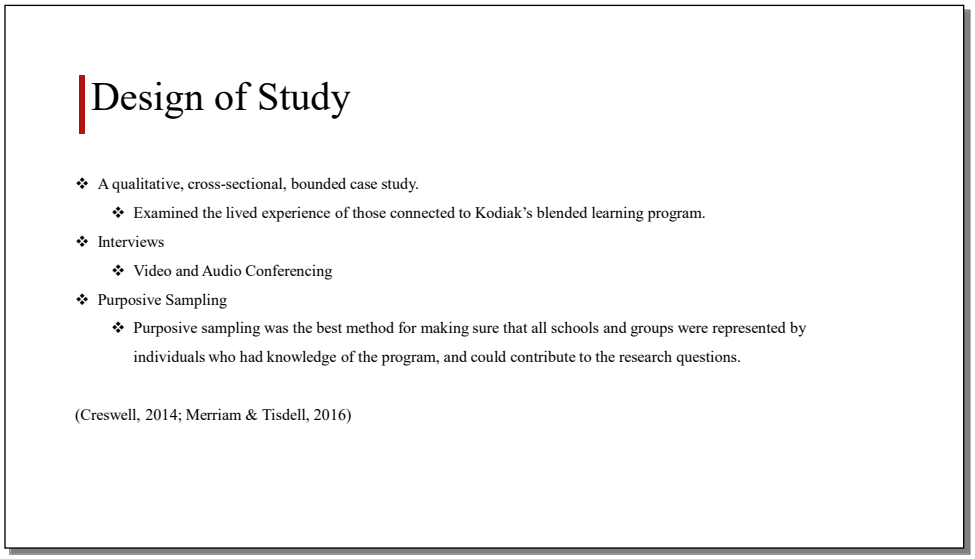
Blended Learning Research

- Generally focuses on just one aspect learning, and not on how the components work together.
  - Limit the understanding with how the components interact and function as a whole.
- Conducting a one-dimensional study misses the spider web of interconnections, imperative to a successful blended learning program.

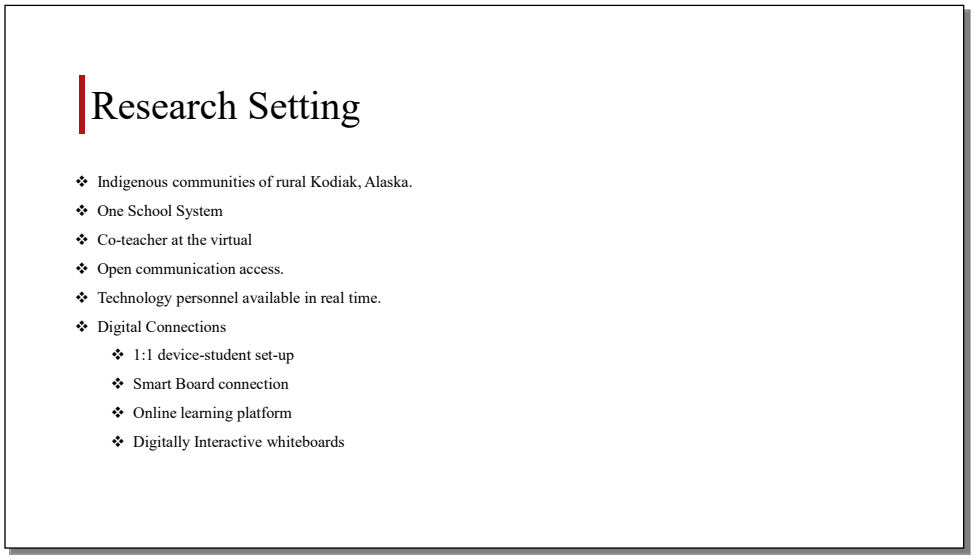
(Keshavaraz, Nutbeam, Rowling, & Khavarpour, 2010; Holland, 2006; Lichtenstein et al., 2006; Wang et al., 2015)

Slide 15

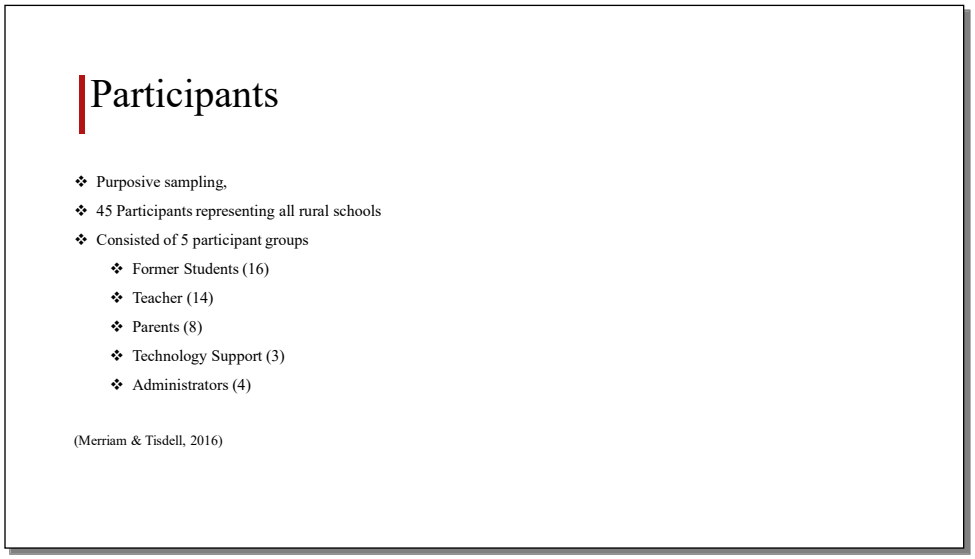
Slide 16


Design of Study
A qualitative, cross-sectional, bounded case study.
Examined the lived experience of those connected to Kodiak's blended learning program.
Interviews
Video and Audio Conferencing
Purposive Sampling
Purposive sampling was the best method for making sure that all schools and groups were represented by individuals who had knowledge of the program, and could contribute to the research questions.
(Creswell, 2014; Merriam & Tisdell, 2016)

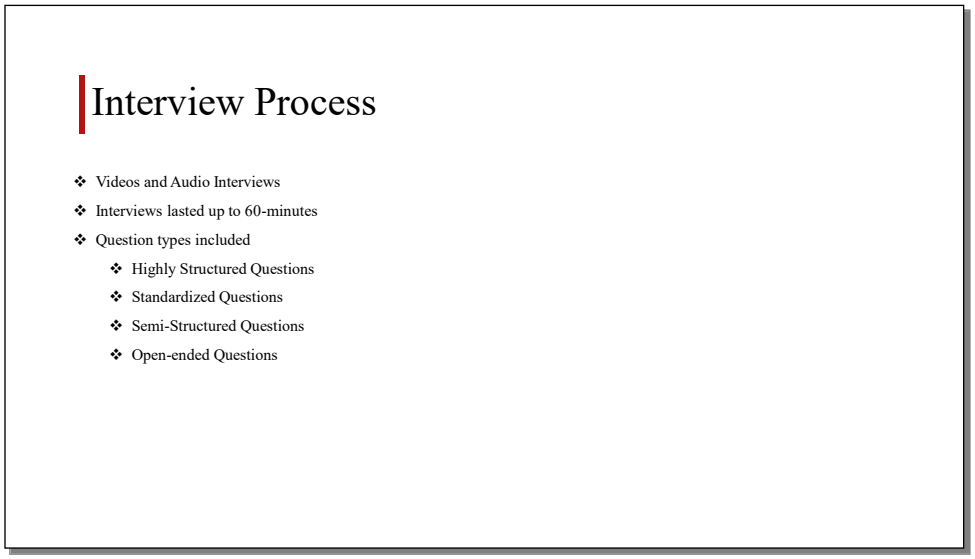
Slide 17


Research Setting
Indigenous communities of rural Kodiak, Alaska.
One School System
Co-teacher at the virtual
Open communication access.
Technology personnel available in real time.
Digital Connections
1:1 device-student set-up
Smart Board connection
Online learning platform
Digitally Interactive whiteboards

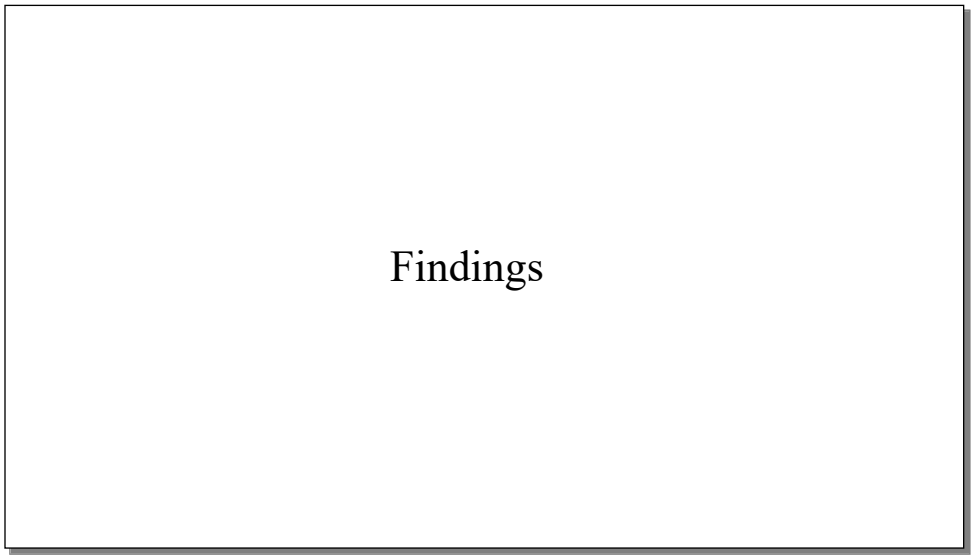
Slide 18


Participants
Purposive sampling,
45 Participants representing all rural schools
Consisted of 5 participant groups
Former Students (16)
Teacher (14)
Parents (8)
Technology Support (3)
Administrators (4)
(Merriam & Tisdell, 2016)

Slide 19


Interview Process
Videos and Audio Interviews
Interviews lasted up to 60-minutes
Question types included
Highly Structured Questions
Standardized Questions
Semi-Structured Questions
Open-ended Questions

Slide 20



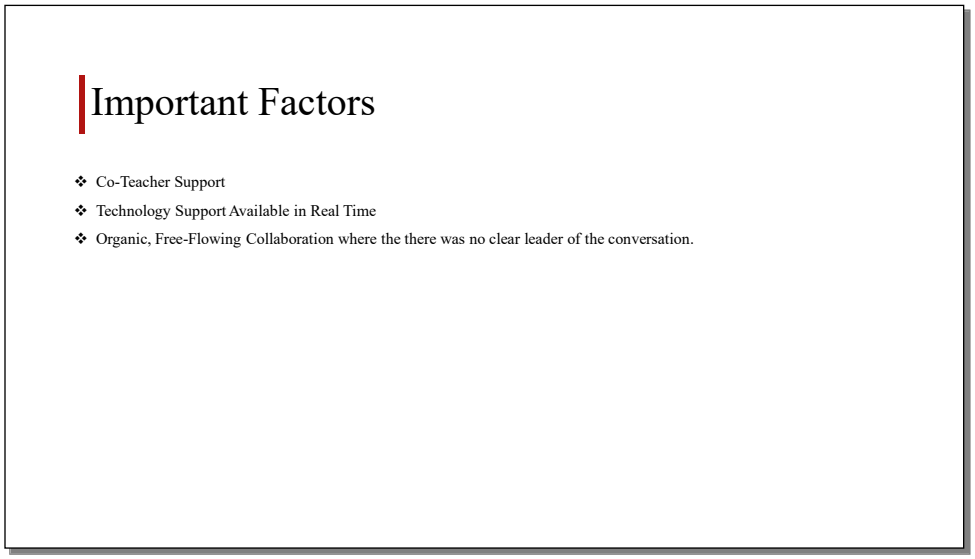
Slide 21

Research Question 1

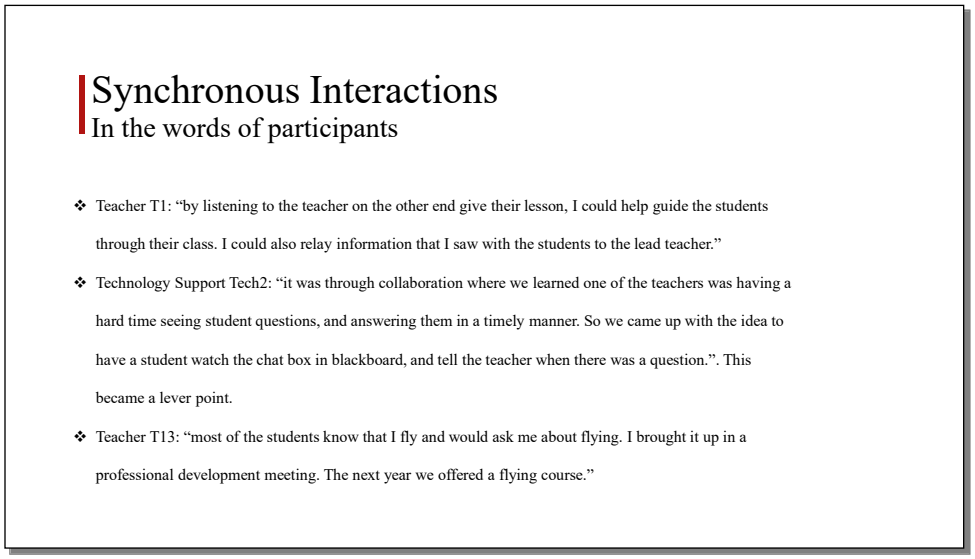
What emergence occurs in the spaces between the six components of the CABLS framework with the implementation of Kodiak's blended learning system?

- Constant comparative analysis: Three themes that led to emergence.
  - Synchronous Interactions
  - Real Time Proximal Problem Solving
  - Collaborative Sharing with Reciprocal Feedback Loops
- The conditions for emergence generally happened at the point of intersection where the three themes were simultaneously present. The researcher found that it was in the space between these interactions where emergence in the rural schools blended learning program tended to occur.

Slide 22


Important Factors
❖ Co-Teacher Support
❖ Technology Support Available in Real Time
❖ Organic, Free-Flowing Collaboration where the there was no clear leader of the conversation.

Slide 23


Synchronous Interactions
In the words of participants
❖ Teacher T1: “by listening to the teacher on the other end give their lesson, I could help guide the students through their class. I could also relay information that I saw with the students to the lead teacher.”
❖ Technology Support Tech2: “it was through collaboration where we learned one of the teachers was having a hard time seeing student questions, and answering them in a timely manner. So we came up with the idea to have a student watch the chat box in blackboard, and tell the teacher when there was a question.”. This became a lever point.
❖ Teacher T13: “most of the students know that I fly and would ask me about flying. I brought it up in a professional development meeting. The next year we offered a flying course.”

Slide 24

Collaborative Sharing with Reciprocal Feedback Loops
In the words of participants

- Technology Support Tech1: “I think that connection between students from the two countries was kind of the turning point. For me I realized the power and potential of that connectivity, despite being in Alaska. It was incredible. That initial connection began an approach that started connections with a network of schools, organizations, and businesses. We began connecting with.”

- Teacher T7: “Tech1 was able to connect hundreds of kids and educators all around the state, including schools from the lower-48. It was his direct influence that led to a string of new ideas in the program. We began having regular discussions about things we wished were possible.”

Slide 25

Real time Proximal Problem Solving
In the words of participants

- Teacher T2: “There were times tech support would actually come out and stay in the village for two to three days watching virtual class and monitor it from our point of view. Then when they would go back and monitor it from their point of view. So they would observe from both sides of the classroom, and I think that was a big benefit.”

- Teacher T11: “if I was in the middle of a lesson and thought of something I had not thought of during my lesson planning, I could just ask technology support to find a picture, a video, or whatever I was needing. They would then project it through my computer. It was great because I didn’t have to stop teaching and it improved instruction.”

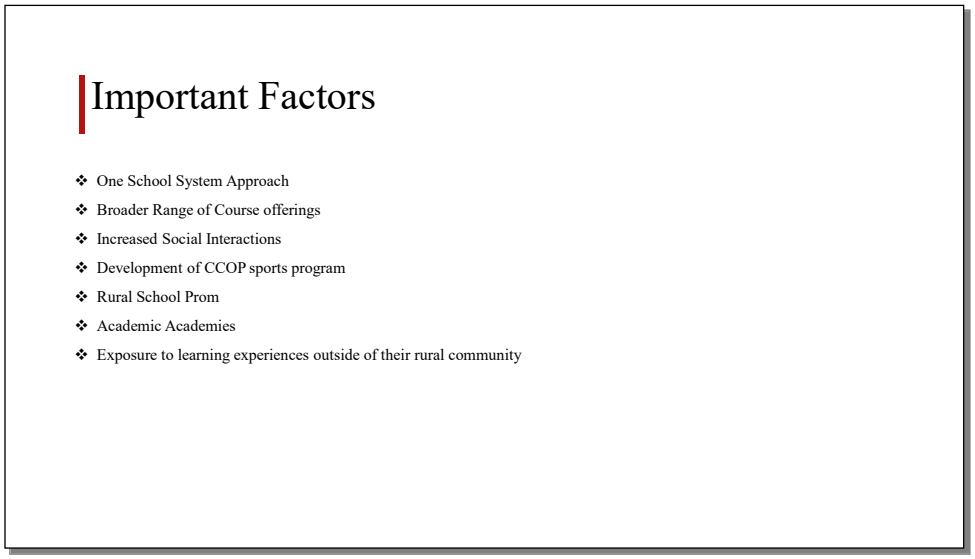
Slide 26

Research Question 2

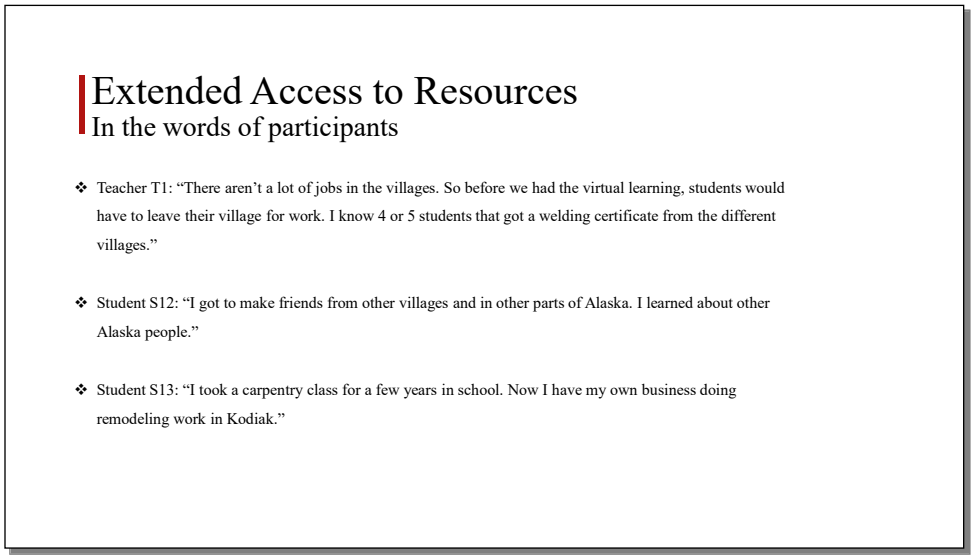
What is the perception of impact that the blended learning program in Kodiak Alaska has on a student's choices for life after high school?

- As the data was analyzed for research question number two the researcher performed a constant comparative analysis and identified three themes that led to emergence.
  - Extended Access to Resources
    - Sub-theme 1: Access to job opportunities
    - Sub-theme 2: Pathways to college
  - Expanded Social Networks
  - Increased Self Confidence
- Regardless of what impacted a student's decision, in all instances the implementation of the blended learning program was the contributing factor for the post-secondary education or career choice that students made.

Slide 27


Important Factors
One School System Approach
Broader Range of Course offerings
Increased Social Interactions
Development of CCOP sports program
Rural School Prom
Academic Academies
Exposure to learning experiences outside of their rural community

Slide 28


Extended Access to Resources
In the words of participants
❖ Teacher T1: “There aren’t a lot of jobs in the villages. So before we had the virtual learning, students would have to leave their village for work. I know 4 or 5 students that got a welding certificate from the different villages.”
❖ Student S12: “I got to make friends from other villages and in other parts of Alaska. I learned about other Alaska people.”
❖ Student S13: “I took a carpentry class for a few years in school. Now I have my own business doing remodeling work in Kodiak.”

Slide 29

Expanded Social Networks
In the words of participants

- Technology Support Tech2: “Who you grow up with is very limited when you live in a village. So I feel like blended learning opened some doors for them in that way. They were able to make friends with kids in town and in other villages. Not just in the villages of Kodiak, but all over the state.”
- Teacher T9: When speaking about the students T9 said “they were able to develop relationships with other students that they wouldn’t have had the opportunity for before. They have gained more appreciation of their community and what their community can provide or not provide for them.”
- Teacher T7 said “I had one student in a writing club. I talked to her about this writing camp in Michigan, and we were able to get grants from the tribal association to pay for everything. She went to that writing camp and was invited back the next year as a counselor and presenter. She was like the star of the camp.” Participant T7 went on to say, “she told me, I'm finally with my people. It took that experience in virtual learning, working with others, talking about themselves as writers that built her confidence up to see herself as a writer. She was like, this is the first time I've ever been in a place where I feel like I belong.”

Slide 30

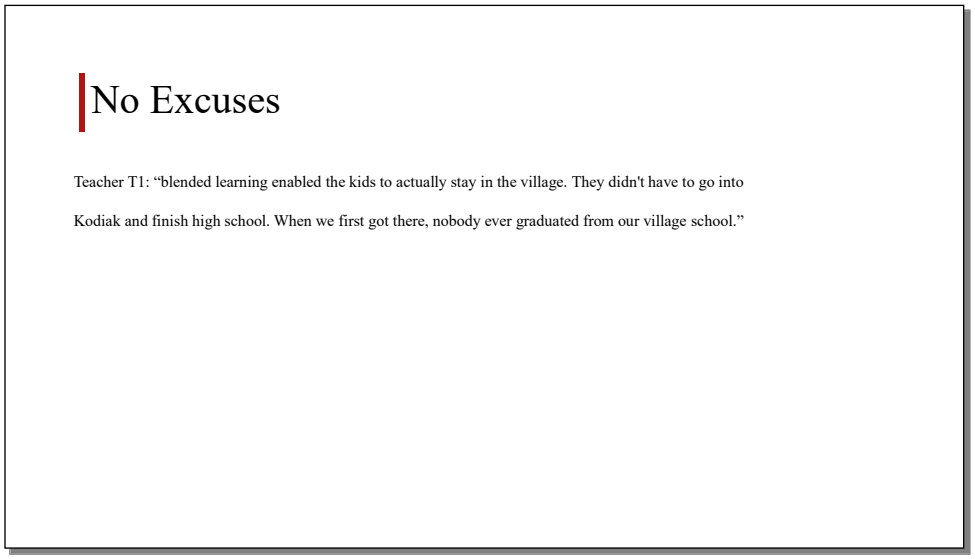
Increased Self-Confidence
In the words of participants

- Teacher T5: “the blended learning eventually led to COOP sports. So students would travel to other schools, and stay there to practice together a couple days before tournaments.”
- Teacher T1: “I'll just say, seeing other kids from other school districts. I just think it brought the kids together closer. Almost as if you were in the same classroom together taking high school classes.”
- Teacher T7: Speaking about one of her students that reached out to her after graduation. The student was taking college classes online from her village. Speaking about the students’ experience with online college.
  - Teacher T7: “She wasn't scared. It enabled her. What I think is great about it is it then enabled someone to stay in their community, help develop their community and become a leader in their community. That is just huge. If you're looking at tiny communities that are slowly crumbling away, this is the revitalization. Her story demonstrates that it gave her the confidence to learn online.”

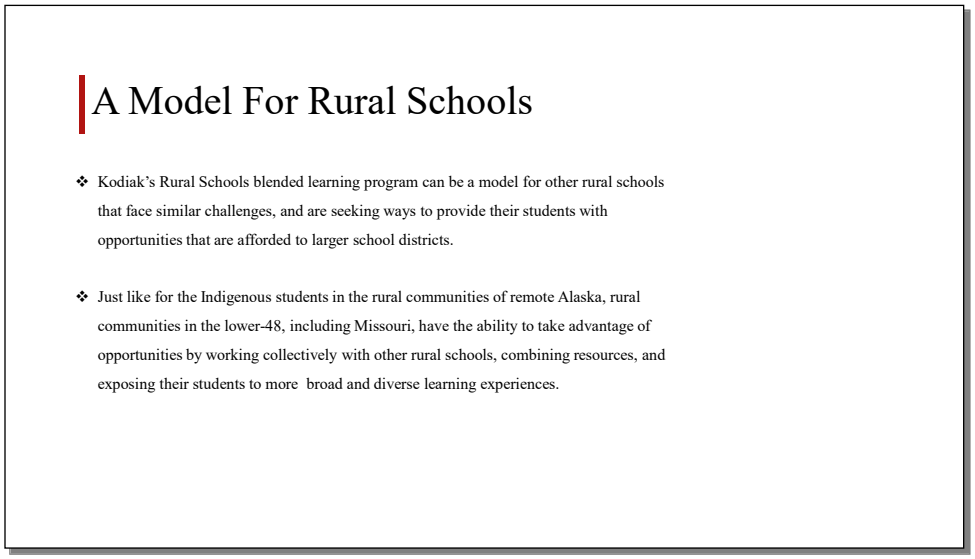
Slide 31


Implications for Future Research
Future researchers should consider how blended learning is impacting urbanization in rural Alaska, and its economic environment.

Slide 32


No Excuses
Teacher T1: “blended learning enabled the kids to actually stay in the village. They didn't have to go into Kodiak and finish high school. When we first got there, nobody ever graduated from our village school.”

Slide 33


A Model For Rural Schools
❖ Kodiak's Rural Schools blended learning program can be a model for other rural schools that face similar challenges, and are seeking ways to provide their students with opportunities that are afforded to larger school districts.
❖ Just like for the Indigenous students in the rural communities of remote Alaska, rural communities in the lower-48, including Missouri, have the ability to take advantage of opportunities by working collectively with other rural schools, combining resources, and exposing their students to more broad and diverse learning experiences.

Slide 34

SECTION FIVE:

CONTRIBUTION TO SCHOLARSHIP

A qualitative investigation of complex adaptive blended learning systems (CABLS) within rural indigenous Alaska

Brian K. Olivera * Cynthia J. MacGregor * Jeffrey H. Cornelius-White * John S. Turner * Patricia T.C. Wall

Abstract

This qualitative bounded case study examined how emergence (of events, ideas, and innovations) occurred from interactions between stakeholders in Kodiak, Alaska's blended learning program. The study examined two research questions with the interviews to reveal experiences of 45 participants who had been or were within the Kodiak rural schools blended learning program, employing a constant comparative method of analysis to identify themes that cut across the data. The first research question examined emergences the spaces between the six components of the CABLS framework with the implementation of Kodiak's blended learning system. The researcher identified three themes that led to emergence: synchronous interactions, real time proximal problem solving, and collaborative sharing with reciprocal feedback loops. Moreover, the research found that the conditions for emergence happened at the point of intersection where the three themes were simultaneously present. The second research question examined the perception of impact that the blended learning program had on student choices for life after high school. The researcher found that the implementation of blended learning led to extended access to resources, expanded social networks, and increased self-confidence had an impact on the choices students made after high school. Future researchers should consider how blended learning is impacting the population in rural Alaska, and its economic environment.

Keywords: Complex Adaptive Blended Learning Systems (CABLS), Agent, Blended Learning, Lever Points, Synchronous Learning, Asynchronous Learning

Introduction

Technology has been making its way into school systems, providing teachers and students with new and creative ways to disseminate and acquire knowledge. Teachers and students are no longer confined to specific spaces, at the same point in time, learning exclusively with face-to-face instruction (O'Connor et al., 2015; Shantakumari & Sajith, 2015). In today's educational world, teachers and learners have the ability to connect in many creative and dynamic ways. Furthermore, technology allows students to access more information at a much faster rate than in the past (Florea & Purcaru, 2016). This new teaching and learning process, referred to as blended learning, is a complex multi-component system that provides self-paced multimedia instruction (Dang, et al., 2016).

Blended Learning

Blended learning is a teaching-learning process that combines the traditional face-to-face method of learning with that of technology mediated learning (Gunn & Hollingsworth, 2013; Kuo, et al. 2014; O'Connor et al., 2011). When the combination of these two instructional methods merge they provide an adaptive, engaging, and dynamic approach to the education environment (Kuo et al., 2014; O'Connor et al., 2011; Pace & Mellard, 2016; Wang et. al, 2015). While blended learning is a dynamic, complex, and interwoven teaching-learning practice, it requires the many modalities within the system to be synchronized (Kuo et al., 2015; Wang et al., 2015). The need for synchronization results in a fairly complex system that relies on the system's ability to adapt and change. In addition, within a blended learning system, changes that emerge can be difficult

to predict since interactions are not a single cause and effect like that of linear systems (Florea & Purcaru, 2016; Wang, et al., 2015).

The integration of technology into the traditional classroom setting can help educators meet the diverse needs of students (Tsneg & Walsh, 2016). For blended learning programs it is important to consider how all blended learning subsystems affect one another. The subsystems in blended learning work together like spokes inside a wheel. Therefore, multiple components have to be supported when implementing a blended learning program (Wang et al., 2015). Simply putting devices into the classroom is not enough because the benefits of blended learning do not just spontaneously occur (Florea & Purcaru, 2016; Voogt, et al., 2013). In order to achieve the maximum benefit, the teacher, learner, institution, content, technology, and learner support need to be accounted for (Wang et al., 2015).

One of the most important factors in blended learning is the interaction that occurs between people. Human interactions affect blended learning the most (Kuo et al., 2014). The first, and possibly the most important of these factors is student interactions. This is particularly true as student interactions relate to the interactions between the instructor and the student (Kuo et al., 2014). Kuo et al.(2014) noted that the student and teacher interaction is one of the most significant elements of a blended learning course. They indicated that effective interaction allows for reciprocal feedback between the teacher and student, thus improving the quality of the course. A second important form of interaction, according to Kuo et al. (2014), are the interactions that occur between students. The learner-learner interaction allows for a reciprocal relationship between the learners through information and knowledge sharing (Kuo et al., 2014; Mishra et al., 2013). Furthermore, interactions that occur between learners can encourage community between the blended learning participants, and are a primary factor in student

satisfaction (Kuo et al., 2014). The third type of interaction that occurs in blended learning is the connection that a student has with the content. When students discuss and reflect on the course content, student success and engagement is likely to increase (Kuo et al., 2014; Mishra et al., 2013).

Blended learning is made up of many elements woven together within one interconnected system (Wang et al., 2015). This dynamic instructional model allows for a diverse application of many frameworks. Unfortunately, the various components of blended learning are generally studied in isolation rather than researching how all blended learning components work together (Wang et al., 2015). This one-way approach to blended learning creates a multitude of gaps in research. Therefore, gaining clarity on the blended learning system as a whole can be challenging due to the impact one component can have on another component (Wang et al., 2015).

Blended Learning systems have two methods of interaction that a learner utilizes throughout the teaching-learning process, namely synchronous and asynchronous learning. Synchronous learning is an instructional method that allows for interaction to happen in real time, providing collaboration with a continuous feedback loop (Shantakumari & Sajith, 2015; Kuo et al., 2014). The asynchronous component of blended learning refers to when the teaching and learning happen at different times and in different places (Heinerichs, et al., 2016; Nanclares & Rodriguez, 2016; O'Byrne & Pytash, 2015).

Blended Learning in Kodiak, Alaska

In many rural parts of the world, schools are struggling to meet the various resource needs of their students. This is often due to the many unique barriers schools in remote places face. Obtaining enough highly qualified teachers for students in core content areas is among one of the many barriers for Alaska rural schools. In addition, the small number of teachers create

limitations with course variety. These factors can present significant challenges when trying to provide rural school students with the same educational opportunities as larger urban and suburban schools. In an effort to overcome these barriers the rural school district of Kodiak Alaska moved toward the integration of technology within the classrooms for a solution (Mishra et al., 2013; O'Byrne & Pytash, 2015; O'Connor, Mortimer, & Bond, 2011; Shantakumari & Sajith, 2015; Wang, et al., 2015).

The remoteness of Kodiak Island limits the education system within the rural schools, affecting resource accessibility and the ability to recruit highly qualified teachers. In order to provide quality instruction to the rural school students, leadership implemented a blended learning program. The complexities around implementing blended learning in Kodiak required vision and innovative thinking to transform the teaching-learning process (Bolman & Deal, 2013). Therefore, the Kodiak School District used a transformative leadership approach to overcome the many barriers they faced to remove the classroom walls. As a result, the blended learning approach provided students with a flexible, anytime-anywhere learning experience, in an environment of their convenience (Kuo et al., 2014; Pace & Mellard, 2016).

The implementation of this transformative method of instruction required the use of a mental model for planning and organizing the shift from traditional face-to face learning to that of blended learning (Bolman & Deal, 2013). In addition, as part of the transformation, implementation required a vision that empowered others and gave autonomy to staff members. Moreover, transforming the way teaching and learning was implemented meant allowing for flexibility with new approaches in the teaching processes (Northouse, 2016). Furthermore, the various education teams had to work together, collectively, to ensure the system was effective

and efficient. This meant that everyone had to be aware of their role, as well as the roles of others (Levi, 2014).

By implementing the blended learning model, the district was able to find creative ways to recruit highly qualified teachers for all rural school sites (Bolman & Deal, 2013). This was done by transforming how instruction was delivered to each building. Transforming the districts teaching-learning approach made it possible for schools to share resources, increase class selection, and differentiate learning in ways that were not previously available. One of the biggest transformations was the implementation of a one-school system. The one-school system was a key element in the operations and integration of the blended learning model, making it possible for the district to share teachers among the various rural schools (Bolman & Deal, 2013). Furthermore, blended learning made possible the hiring of highly qualified teachers from various content areas and placing them into the different rural schools. In turn, this made sharing teachers possible due to the co-teaching model that supported learning at the virtual sites.

Blended Learning Research

There are three types of teaching models being used in education. These three models are the traditional face-to-face teaching-learning method, full online learning, and blended learning. In this study, the different components of blended learning are referred to as agents. The interactions that occur between the agents of a blended learning system make the operating processes adaptive and complex like that of a complex adaptive system (CAS), making it difficult to study how the system functions as a whole (Lichtenstein, Ul-Bien, Marion, Seers, & Orton, 2006). It stands to reason why a majority of research conducted on blended learning has previously focused on just one aspect of the system (Keshavaraz, et al., 2010; Holland, 2006; Lichtenstein et al., 2006). This can create difficulties with understanding how the different

components of blended learning interact and function as a whole (Wang et al., 2015). Moreover, research conducted on the individual components from previous research findings limit the understanding to how each element works independently from one another. Conducting a one-dimensional study can create issues with the blended learning approach because it misses the spider web of interconnections that are imperative to a successful blended learning program (Wang et al., 2015). Consequently, this also creates gaps in the research and limits the effective implementation of blended learning (Wang et al., 2015). Nevertheless, the study of each individual element can still be important because insight is given to each specific component, and how each plays a part within the blended learning system. Unfortunately, studies on individual components do not give a clear understanding as to how all components work together and in what way they impact one another (Wang et al., 2015). The purpose of this study was to determine how independent agents impact one another when multiple components are interacting simultaneously (Wang et al., 2015).

Literature Review

Blended learning is a dynamic teaching-learning method changing the landscape of education, and becoming an integral part of many schools (Kwak, et al., 2015; Nanclares & Rodriguez, 2016; Pace & Mellard, 2016). The flexible and innovative instructional design makes it possible to meet the individual needs of students, as well as increase human interactions, and provide the same benefits as the traditional face-to-face teaching-learning model (Shantakumari & Sajith, 2015). Wang et al. (2015) referred to blended learning as an ever-changing complex approach to the teaching and learning process, one that is an interwoven system of teaching and learning elements consisting of the teacher, learner, learner support, technology, institution, and content.

These teaching and learning elements make up the six components of Wang et al. (2015) CABLS framework.

Conceptual Framework

The researcher conducted the study using the Complex Adaptive Blended Learning Systems (CABLS) framework, developed by Wang et al., (2015). CABLS is a complex and interactive blend of technology and social systems that involves multiple components with the ability to self-organize, adapt, and learn through interactions. Wang et al., (2015) identify 6 components of a blended learning system. These components are the Learner, Teacher, Technology, Content, learning support, Institution. By conducting this study using the CABLS framework, the researcher was able to examine how Kodiak's blended learning program functions as a whole.

Learner Support

The learner support element of CABLS relates to the academic and technical support in a blended learning system. One of these supports is how the teacher supports the learner, and how they evolve with the other subsystems of the CABLS framework (Wang et al., 2015). This would include the relationship between the teacher and the learner, related to the support that is given. Learner support is especially important for more complex subjects or assignments (Wang et al., 2015).

Learner

The learner portion of CABLS relates to the learner's ability to evolve with the other subsystems. This evolution creates a cycle of change in the learner's identity by focusing on how the learner adapts to the environment, transitioning from a passive learner to an active learner (Wang et al., 2015). Kuo et al. (2014) described the learner-learner interaction as one that is human interaction. In addition, the learner component focuses on the relationship between the learner

and institution, and is associated with the learner-content, learner-technology, and learner-learning support (Wang et al., 2015).

Teacher

The teacher subsystem includes how the teacher co-evolves to the blended learning environment through the acquisition of multiple skills. This evolution should co-evolve with the student throughout the teacher-learner process, and transform a teacher from a disseminator of information into a promoter of learning through advice and the facilitation of learning (Wang et al., 2015). Other elements associated with the teacher subsystem are the teacher-content, teacher-technology, teacher-learning support, and the relationship between the teacher and the institution. Furthermore, this subsystem looks at the extent to which the culture within the institution provides professional development, supports initiatives, experimentation, and provides a climate of collaboration (Wang et al., 2015).

Content

The content subsystem of CABLS includes how the learner engages with the content itself, the design of the course, and how the curriculum is delivered. In addition, the content subsystem comprises the pace of the students learning, course customization and individualization, and the extent of collaboration (Wang et al., 2015). In order for a blended learning program to be successful, and obtain its full benefits, the right curricular and instructional design must be in place. The ability to bridge the curriculum pedagogy with technology is a must, and is often one of the most difficult barriers for many programs to cross (Wang et al., 2015). O'Connor et al. (2011) asserted that, without quality instructional design, important elements of blended learning, such as the collaboration component, can be stifled and have a negative impact on the learning process (O'Connor, et al., 2011).

Technology

The technology subsystem of CABLS addresses how the technology is able to adapt to new challenges when pushed into the learning environment (Wang et al., 2015). Wang et al. (2015) referred to the technology subsystem within a blended learning system as "the edge of chaos" (pg. 382). This means that the technology portion of CABLS is "stable enough to maintain its internal structure, but sensitive enough to the changing needs of the learner" (p. 384).

Institution

Within the CABLS framework, the institution subsystem focuses on how blended learning operates at the institutional level. Due to the interconnection of all CABLS subsystems, the institutional subsystem drives all other systems. At this level all other systems are developed, maintained, and sustained. The institution subsystem relates to curriculum design and the experiences of the stakeholders. Furthermore, the institution level observes how the technology elements and implementation are conducted and aligned with the other subsystems. The institution subsystem is where researchers look at the policies, system supports, and sustainable strategies for implementation (Wang et al., 2015).

Research Questions

Research Question 1: What emergence occurs in the spaces between the six components of the CABLS framework with the implementation of Kodiak's blended learning system?

Research Question 2: What is the perception of impact that the blended learning program in Kodiak Alaska has on student choices for life after high school?

Methods

Design of Study

The research design for this study was a qualitative case study that examined a blended learning program in rural Alaska. The primary data collection processes for the bounded system of this study were interviews (Creswell, 2014; Merriam & Tisdell, 2016). Using the six components of blended learning, the researcher sought to obtain a cross-sectional perception in Kodiak, AK (Creswell, 2014). Moreover, the researcher conducted a series of interviews to determine how emergence occurred in the program and to what extent, if any, the program had on students' life after high school (Wang et al., 2015). Interview participants consisted of 45 individuals across five groups. The groups consisted of 14 teachers (T), three technology support staff (Tech), four administrators (A), eight parents (P), and 16 former students of 18-years old. For the data collection process, participant selection was purposive sampling, and interviews were conducted using video and audio conferencing. Purposive sampling was the best method for making sure all schools and groups were represented by individuals who had first-hand knowledge of the program (Creswell, 2014; Merriam & Tisdell, 2016).

Research Setting

The setting of this study was rural Alaska, in the participants' natural school setting where the blended learning classes occurred (Merriam & Tisdell, 2016). When conducting the research, interviews were done off site using digital media in the form of video and audio conferencing. The learning environment utilized a blended learning approach combining virtual face-to-face instruction and technology-mediated instruction. The primary method of collaboration and synchronous communication occurred through a video and audio format. Additionally the

teaching-learning processes and the instructional format provided by the district allows teachers to be utilized across buildings, delivering content virtually.

The technology resources included a SmartBoard, online platform, and an interactive whiteboard for delivering instruction. There was also a virtual connection that allowed teachers to see their students, and reciprocal communication could easily occur. The technology pieces worked together to create a dynamic and highly interactive teaching-learning model. Teachers were able to write on the SmartBoard and project content to the students' computers. With the interactive whiteboard, students could also project information back to the teacher and other students. The learning platform where the content was stored provided students with electronic book content, assignments, and interactive communication tools.

The foundation of the blended learning system utilized a one-school system approach, meaning all buildings were on the same bell schedule, school calendar, and had the same courses and course selections available to them. Core content teachers were placed at different locations, but taught courses to all schools using blended learning. In this model, if a teacher was not teaching a class they took on the role of a co-teacher for other content areas, and provided support to students at their virtual site. If a content teacher was not available for co-teaching support the district would hire classroom aids from the local villages to provide co-teacher support.

Data Collection

The qualitative data collection consisted of interviews, which were conducted virtually, through video and audio means (Merriam & Tisdell, 2016). Interviews contained a series of open-ended questions to gain the perspective of participants. The researcher paid close attention to the writing of questions as to not lead the participants towards their answer, thus preventing

predetermined responses (Creswell, 2013). Furthermore, the types of questions varied from a range of highly structured questions, standardized questions, semi-structured questions, and open-ended questions (Creswell, 2014; Fink, 2013; Merriam & Tisdell, 2016; Seidman, 2013).

Results

The first research question asked, what emergence occurs in the spaces between the six components of the CABLS framework with the implementation of Kodiak's rural schools blended learning system? As the data was analyzed for research question number one the researcher performed a constant comparative analysis and identified three themes that led to emergence. The themes identified by the researcher were *synchronous interactions*, *real time proximal problem solving*, and *collaborative sharing with reciprocal feedback loops*. The conditions for emergence generally happened at the point of intersection where the three themes were simultaneously present. The researcher found that it was in the space between these interactions where emergence in the rural schools blended learning program tended to occur.

Creating Emergence

During the data collection process the findings commonly revealed that emergence occurred in real time, with synchronous interactions that were collaborative and involved a reciprocal exchange of information. In addition, agents were in a proximal location and equally contributing to the feedback loop. Moreover, new ideas and innovation often emerged within the boundaries of interactions between human agents. While it was often the interactions between the human agents where emergence occurred, generally, challenges with the content and technology component of CABLS was the catalyst from which those interactions occurred.

Synchronous Interactions

An important aspect to the rural schools blended learning model was always having an adult in the same physical space as the students' in a co-teaching role. That might have been another teacher, or a teacher aid. The role of the co-teacher was an important contribution to the adaptations that led to emergence in the blended learning program. In addition, the relational transactions between the lead teacher, co-teachers, and students proved to be a multi-agent interaction where important feedback loops occurred. The synchronous interactions were a key element for emergence.

One teacher, who provided co-teacher support for courses, spoke about the relational interactions between the student, teacher, and co-teacher. The teacher T1 explained "by listening to the teacher on the other end give their lesson, I could help guide the students through their class. I could also relay information that I saw with the students to the lead teacher." These synchronous interactions between agents laid the groundwork for proximal problem solving and feedback loops which created emergence during collaborative moments.

The role that synchronous interactions played on emergence was also supported by teacher participant T4 and technology participant Tech2. According to the interview participant Tech2, one program adaptation came from reciprocal interactions between students, teachers, and the technology support team. Participant Tech2 stated "it was through collaboration where we learned one of the teachers was having a hard time seeing student questions, and answering them in a timely manner. So we came up with the idea to have a student watch the chat box on Blackboard, and tell the teacher when there was a question." According to Tech2 this became a common practice in virtual courses. This idea that emerged from the collaborative setting is also

an example of how emergent ideas can create lever points that have a lasting effect from the emergence of a new idea.

One of the most common elements of emergence was in the development and expansion of new courses. Ideas for new courses tended to emerge from collaborative moments between agents that were reciprocal in nature and where no clear lead role could be defined. What all of the instances had in common was the use of synchronous interactions, real time proximal problem solving, and collaborative sharing where reciprocal interactions were occurring.

Participants P5, A1, T13 all supported the finding of synchronous interactions and collaborative sharing with reciprocal feedback loops. Administrative participant A1 noted how, over time, reciprocal interactions between the students' and welding teacher about underwater welding led to taking courses in scuba diving. He indicated that discussions about underwater welding resulted from conversations about welding careers. In another instance, Participant T13 said "most of the students know that I fly and would ask me about flying. I brought it up in a professional development meeting. The next year we offered a flying course."

The emergence of course additions came up again when interviewing parent participant P5. The parent discussed the addition of a photography course that was implemented due to the apparent interest students had in taking pictures. The teacher-student interaction and reciprocal feedback between agents was a primary component in the creation of the photography course.

Collaborative Sharing with Reciprocal Feedback Loops

Through the data collection process, it became clear that the collaborative sharing of back and forth thoughts perpetuated a series of ideas that eventually funneled down to a singular idea. Generally, there was some type of scenario that spearheaded the start of those conversations. The data exposed some common trends during the collaborative sharing that led to the emergence of

new ideas and innovation. These key elements tended to be when people were engaged in live interactions with reciprocal feedback loops, and there was no clear lead role. Additionally, networking was an important element to the collaborative sharing process. When interviewing participants and collecting data from their lived experiences, different participants spoke to the various connections that led to unique learning experiences for students.

One of the most relevant pieces of data came from technology participant Tech1. He provided insight into a series of situations where emergence occurred within the program over an extended period of time. Not only did the data collected give an in depth look at how the blended learning program developed over time, but it also served as a centerpiece to support other elements of data. The richness of data from participant Tech1 brought to the forefront the lived experiences of other participants. Moreover, data gave meaning to emergence within the interactions that were continuously occurring between agents.

Participant Tech1 provided insight into what might have been the most significant lever point in the rural schools blended learning program. He indicated that a connection with an administrator from another country led to connecting students from the two different countries via virtual means. This initial connection was the lever point that led to a series of emergent ideas and innovation for the blended learning program. Participant Tech1 stated, “I think that connection between students from the two countries was kind of the turning point. For me I realized the power and potential of that connectivity, despite being in Alaska. It was incredible. That initial connection began an approach that started connections with a network of schools, organizations, and businesses. We began connecting with.”

Supporting this notion in the data was an interview with a current teacher, participant T7. Participant T7 stated, “Tech1 was able to connect hundreds of kids and educators all around the

state, including schools from the lower-48. It was his direct influence that led to a string of new ideas in the program. We began having regular discussions about things we wished were possible. Participant T7 attributed the support that staff received to participant A1, and the successful implementation of ideas to participant Tech1. This too was a testament of how collaborative sharing that involves reciprocal feedback can generate new ideas and have an impact on the creation of a lever point.

Real time Proximal Problem Solving

Another component of the blended learning program that played an important role in emergence was that of real time proximal problem solving. One example was provided by a technology support staff member. When interviewed, participant Tech3 discussed how she would go to the rural school sites to work with students and teachers on elements of the blended learning program. She indicated that the reason for going out to the rural schools could be hardware or software related, or to assist with technology related instructional practices. Participant Tech3 said specifically, "I would go out to the schools and see it from the student and teachers end. Being there to actually see it, and talk with them helped a lot because I could better understand it from their perspective. I would then go back and watch the classes from my end." Teacher participants' T2 and T5 echoed the same sentiment. In the words of teacher T2 "There were times tech support would actually come out and stay in the village for two to three days watching virtual class and monitor it from our point of view. Then they would go back and monitor it from their point of view. So they would observe from both sides of the classroom, and I think that was a big benefit."

One unique element of the blended learning program was the immediate availability of technology support during class. Technology support personnel could hear the teacher during

instruction. In one interview, teacher participant T11 stated "if I was in the middle of a lesson and thought of something I had not thought of during my lesson planning, I could just ask technology support to find a picture, a video, or whatever I was needing. They would then project it through my computer. It was great because I didn't have to stop teaching and it improved instruction." This instance was supported during an interview with participant Tech 3, when she recounted that same instance. However, she added in her interview "that became a common practice." In essence this was another example of emergence that became a lever point within the program.

Impact on Student Choices

For the second research question in this study the researcher wanted to know the impact that Kodiak, Alaska's blended learning program had on student choices after high school. The researcher found that the implementation of blended learning into the rural schools led to post-secondary education and careers that otherwise may not have been available. When analyzing the data, the findings indicated 3 different factors that contributed to why students made the choices they did after they graduated. Regardless of what impacted a student's decision, in all instances the implementation of the blended learning program was the contributing factor for the post-secondary education or career choice that students made. During the constant comparative data analysis, the researcher identified three themes that steered students toward the choices they made after high school. While participants expressed different reasons that impacted their choice, the overarching contributing factors of the identified themes were *extended access to resources, expanded social networks, and increased self-confidence.*

Prior to blended learning, education opportunities for the rural communities were very limited. An important piece of data that shed light on the role that blended learning program

played in rural Alaska came from Participant T1 when he said “blended learning enabled the kids to actually stay in the village. They didn't have to go into Kodiak and finish high school. When we first got there, nobody ever graduated from our village school.”

Extended Access to Resources

The extended access to resources that blended learning brought to students had a big influence on the choices they made after high school. As the researcher mined further into the data related to resource access two sub-themes emerged. The first sub theme that emerged was *access to job opportunities*. This sub-theme emerged as participants shared their experiences with career education classes such as welding and carpentry. The second sub-theme that emerged as students shared their experiences with the blended learning programs increased *pathways to college*. The blended learning program brought about increased course opportunities and learning experiences that guided students toward post-secondary education.

The introduction of the blended learning program led to the expansion of technical education. One of the most impactful technical education opportunities for students was with welding. Using the welding teacher from the Kodiak city school, students in the rural schools were able to participate in welding courses through a combination of synchronous and asynchronous lessons. As part of the program, students would fly into the city school to participate in welding academies where they would receive hands-on face-to-face welding instruction from the teacher.

According to the data, welding opportunities made a significant contribution to the choices students made after high school. The impact welding had on students was supported by participants Tech3, T3, and T1. Participant T1 spoke about how the welding courses led to students getting good jobs after high school. He said “There aren’t a lot of jobs in the villages. So

before we had the virtual learning, students would have to leave their village for work. I know 4 or 5 students that got a welding certificate from the different villages. According to participant T3, welding was particularly important for the males. In an interview she said "What really helped the boys was welding. They were taking college level welding courses in high school. I know several of the boys in our village went on to get great jobs." When interviewing participant Tech3 about the impact blended learning might have had or not had on a student's life after high school she stated "I feel like it gave them more opportunities than they would've had." The participant went on to say about one rural school student "we had this one student, he got a welding job. He earned his certificate while in high school and had a job working on the North Slope waiting for him." Participant Tech3 then went on to again reiterate "blended learning made that possible. Without it he probably would have never learned to weld."

Other evidence that external influences and increased resources were a factor in the choices students made for life beyond high school came from former students themselves. When interviewing former students, the researcher asked how they felt the blended learning might have influenced their choices after high school. One former student, participant S12, talked about how she learned more about her culture and the history of her people. She said, "I got to make friends from other villages and in other parts of Alaska. I learned about other Alaska people." Participant S12 also spoke about how blended learning helped her learn more about other types of Alaskan culture. The power of her experience and the impact blended learning had on the student's choice after high school motivated her to want to work in a career that helped her people. When talking about her career after college she said "In my job here I am able to help kids, elders, and other Alaskans with a lot of different kinds of programs."

When interviewing former students, the resources made available for welding courses showed how blended learning impacted student choices after high school. There were 3 students who spoke about how they all have jobs working as welders, and that they got their initial welding certificates in high school. Speaking about their jobs after high school, Former students S10 and S6 both indicated that they got jobs as welders on the North Slope after high school. Participant S10 also stated "I have a different job now. I build helicopter pads in remote parts of Alaska." A third student, participant S4, said "after high school I moved to anchorage with my sister and friend. They went for college and I got a job welding at a machine company." When asked, 3 former students indicated that if not for welding they probably would have worked in their village. Carpentry was another career and technical education course that made its way into the blended learning program, and impacted student career choices after high school. Two former students indicated that taking the carpentry courses in school helped them after graduation. Participant S13 said "I took a carpentry class for a few years in school. Now I have my own business doing remodeling work in Kodiak." When interviewing student participant S15, he said "After high school I moved to Anchorage and got a job working construction."

In addition to the technical careers like welding and carpentry, two former students talked about how the blended learning program helped them in college. Participants S14 and S7 specifically talked about the benefit of the asynchronous portion of blended learning when referencing college. Both spoke to how the online learning platform used in high school made using blackboard in college easy. Participant S14, who went to college outside of Alaska, said "during my freshman year in college my roommate and a lot of my friends had never used Blackboard. So, I had to show them where to find due dates and quizzes. It was easy for me because I did it in high school, but a lot of the kids didn't." In addition, student participant S7

also indicated, that from her perspective, the students who used more technology in high school had an easier time with learning Blackboard in college.

Expanded Social Networks

The implementation of blended learning also played a key role in the expansion of social networks for students and their ability to connect with same age peers. These connections had an impact on their interpersonal skills and their development of community outside of their villages. According to one former teacher, when students were outside of their villages and in unfamiliar places they tended to be quiet, shy, and even nervous. Specifically, during the data collection process, participant T4 stated "I remember when we went with a group of students on a school trip to Anchorage. The students were a lot more quiet, and a lot less active than they were in their village. One of the kids said they were nervous. I remember thinking how in the village he was kind of the leader, but outside the village he was completely lost." The notion of students being uncomfortable when they left their community was supported again by former teacher T2 who said "whenever we would travel with kids for sports or school trips the kids were never a problem. They were always too nervous to act up or sneak out. A lot of the students were shy, and they weren't use to being outside the villages. Their community was their safe place."

Teacher participant T6 spoke about how the interaction between students in the blended learning program helped to open them up and make them less shy. She said, "It took some of the kids quite a while to start interacting over video. I mean, even a year or more to get used to communicating that way. After a couple years that went away. It was kind of hard at first." Additionally, participant Tech2 spoke to the limits students had when interacting with people outside of their community. She said, "Who you grow up with is very limited when you live in a village. So, I feel like blended learning opened some doors for them in that way. They were able

to make friends with kids in town and in other villages. Not just in the villages of Kodiak, but all over the state."

Further supporting how the development of community impacted students because of the blended learning program came in an interview with teacher T9. When speaking about the students he said "they were able to develop relationships with other students that they wouldn't have had the opportunity for before. They have gained more appreciation of their community and what their community can provide or not provide for them."

Blended learning did not just benefit the classroom environment. Blended learning also benefited the extracurricular activities. As students began to interact more through the virtual school setting a cooperative (COOP) sports programs emerged. Several participants felt that the COOP sports program played a major role in the building of community between students, and the increased interactions that occurred between them. The COOP sports program combined students to create one unified sports team from several different villages. In turn, doors were opened for students to begin traveling together, and to stay a few days in another community without missing class. According to teacher participant T5 said, "the blended learning eventually led to COOP sports. So, students would travel to other schools, and stay there to practice together a couple days before tournaments." In another interview, teacher participant T1 stated "I'll just say, seeing other kids from other school districts. I just think it brought the kids together closer. Almost as if you were in the same classroom together taking high school classes."

In addition to teacher participants, administrator participant A1 shared his perspective about how blended learning influenced the COOP sports program. Administrator participant A1 said "It brought students together. With the COOP sports, students from smaller villages could

participate. You could see the change with how students interacted with each other. The relationships the students ended up having lasted even after they graduated."

Kodiak's rural schools blended learning program was not just limited to district students, but it expanded beyond the borders of Kodiak. The program opened a number of different pathways for increased student interactions. When interviewing participant T7, the lived experience for one of her students was profound. Participant T7 said "I had one student in a writing club. I talked to her about this writing camp in Michigan, and we were able to get grants from the tribal association to pay for everything. She went to that writing camp and was invited back the next year as a counselor and presenter. She was like the star of the camp." Participant T7 went on to say, "she told me, I'm finally with my people. It took that experience in virtual learning, working with others, talking about themselves as writers that built her confidence up to see herself as a writer. She was like, this is the first time I've ever been in a place where I feel like I belong."

When interviewing former students, the data again showed how increased interactions on community building influenced the choices that students made after high school. When speaking to former student participants S2, S4, S5, S11, S12, and S14 all indicated that they met more people their age and made more friends. Student participants S1, S13, and S3 spoke about moving together to the main city of Kodiak after graduation, as roommates. Student S13 said specifically, "me and my two roommates graduated the same year. We began talking toward the end of our junior year about how it would be fun to all live in Kodiak together."

In addition to students who moved to the main city of Kodiak, or got jobs outside of their village communities, after graduation, students S2, S5, and S12 moved to Anchorage for school. Student participant S2 stated how getting to meet and know people in the virtual classes made

her want to move to Anchorage and attend college because that is where her friends who graduated before her went. The student said “My best friend and some of my other friends that graduated before me moved to Anchorage to go to college. School was so boring when they left. So, after I graduated I moved in with my best friend and went to college with her.”

Increased Self-Confidence

Increased self-confidence was another contributing factor for student choices after high school. The lived experience of some participants showed that the blended learning program helped instill confidence in students. Gaining self-confidence changed the way students viewed themselves, and what they felt they could do. During the data collection process one teacher spoke about how in some instances the rural schools would use teachers from Kodiak High School for classes. This allowed for even greater opportunities for students to take a variety of courses. When speaking to Participant T12 he said, “One time a town teacher asked the kids if they knew how to harvest a deer. None of the town kids knew. Well, just about every single one of the rural kids had been hunting and knew the answer. You could see the excitement in those kids that they knew the answer and the town kids didn’t. It gave them confidence.”

The role blended learning played in students gaining confidence was also noted by participant teacher T7. Speaking about a former student, Participant T7 spoke about one of her students that reached out to her after graduation. The student was taking college classes online from her village. Speaking about the students’ experience with online college classes she said “She wasn't scared. It enabled her. What I think is great about it is it then enabled someone to stay in their community, help develop their community and become a leader in their community. That is just huge. If you're looking at tiny communities that are slowly crumbling away, this is the revitalization. Her story demonstrates that it gave her the confidence to learn online.”

Interview Participant T9 spoke about a different student who took online college classes and said “one of my former students did online college. She was able to stay and work in her village while also doing online college. She said people in her classes were saying it was hard, but she was like, online college is easy. She said, it’s amazing and I can stay here in my super tiny community, get my education and work and support my community.” Participant T9 then added, “It was awesome, and those are all words she was using. It was because of her online experience.”

Conclusion

Kodiak’s Rural School’s blended learning program was more than just some novel idea with digital bells and whistles in an attempt to meet the minimal requirements of public education. The district’s vision was authentic, and the transformative leadership led with intentional purpose. That vision was to provide the indigenous students in rural Alaska with a quality of education equivalent to their peers in larger communities. In this study the researcher sought to understand more from the perspective and lived experiences of those who were directly involved in the blended learning program. Specifically, the researcher set out to discover what emergences occurred with the implementation of Kodiak’s blended learning program. Additionally, the researcher wanted to know what impact Kodiak Alaska’s blended learning program had on student choices for life after high school. The researcher discovered that when there was an environment in which synchronous interactions were happening during real time proximal problem-solving instances, and the collaborative sharing included reciprocal feedback loops, the conditions were primed for emergence to occur. When these three themes intersect simultaneously unique and dynamic ideas surfaced. In addition, these innovative moments created lever points, permanently adding a new element to the program. Furthermore, the

emergent moments provided educational opportunities to students that were not available before blended learning. Moreover, the new-found opportunities afforded students new possibilities in their choices for life after high school. The extended access to resources resulted in increased job opportunities and pathways to college. In addition, students were able to expand social networks and gain self-confidence, both of which contributed to the choices students made after graduation. Kodiak's blended learning program was not a novel idea at all, it was transformative. The program did not just provide new opportunities for learning, but for the first time ever, students were provided the opportunity to graduate from their rural schools.

Discussion

Before blended learning many students in rural Alaska were limited in their educational experiences and opportunities for social interaction. This was in large part due to their isolated environments. The implementation of blended learning increased the opportunities for more types of courses, access to highly qualified teachers, and instances for social interactions (Wang et al., 2015). The addition of the blended learning program made it possible for the school district to remove the walls of isolation and expand the experiences for students through a dynamic and innovative approach to teaching and learning.

Utilizing a transformational leadership approach the rural school administration gave autonomy to teachers, encouraged risk taking, and developed a collaborative culture from which many unique and innovative new ideas emerged (Bolman & Deal, 2013; Keshavaraz et al., 2010; Kouzes & Posner, 2007; Levi, 2014; Lichtenstein et al., 2006; Northouse, 2016; Rogers et al., 2005). The relationship between all of the agents within the systems was key. The data from this study showed that input and feedback was welcomed from anyone, whether teachers, district leaders, support staff, students, or parents. Everyone had a voice, and in some cases the simplest

of conversations could lead to a change or adaptation in the program (Keshavaraz et al., 2010; Levin, 2002; Lichtenstein et al., 2006; Rogers et al., 2005; Shantakumari & Sajith, 2015). The collaborative mindset created a community of learners where everyone took ownership. This was evidenced several times within the data as the finding exposed how several course additions came about, how proximity in problem solving was critical, and how it influenced the choices that many students made in their life after high school.

Most research studies on blended learning look at just one component, often giving insight into how each element works in isolation, like that of a linear system rather than a complex adaptive system (Florea & Purcaru, 2016; Lichtenstein et al., 2006; Wang, et al., 2015). Complex adaptive systems tend to exhibit autonomy within the agents, allowing for enhanced outcomes (Levin, 2002). When analyzing the conditions of complex adaptive systems, including CABLS, patterns arise from the interactions between individual agents, and give insight into possible evolutions of the system. These interactions are where emergence occurs (Dooley, 1997; Lichtenstein et al., 2006). Unlike linear systems where only the dependent and independent variables are affected, multiple elements tend to be affected in complex adaptive systems (Keshavaraz et al., 2010). When considering the properties in a complex adaptive system it is important to recognize that there are lever points. These lever points are the areas in which a simple intervention can have a direct and lasting effect on the system (Holland, 2006).

This study used the CABLS framework, as defined by Wang et al., (2015) to look at how the six components of blended learning interact and function as a whole. In particular, the researcher looked at the interactions that occurred between all of the individual components in the Kodiak's rural schools blended learning program and how they worked together, constantly evolving, and creating opportunities for change and adaptations (Dooley, 1997; Holland, 2006;

Keshavaraz et al., 2010; Levin, 2002; Wang et al., 2015). The design of the study and collection of data was constructed to understand the perspective and lived experience of participants who had first-hand knowledge of Kodiak's blended learning program, and could answer the two research questions for this study (Wang et al., 2015).

The first research question looked at what emergence occurred in Kodiak, Alaska's blended learning program. While most studies have looked at how various agents within a blended system work by themselves, this study looked at the interactions between multiple agents and how the system functions as a whole. Emergence does not happen instantly, but rather over time, as a result of the interactions between individual agents, causing them to adapt and evolve. (Levin, 2002; Lichtenstein et al., 2006; Rogers et al., 2005). The researcher found this to be the case in Kodiak's Rural School blended learning program. In this study emergence was not a single cause and effect like that of a linear system. Instead emergence resulted from a series of events in which synchronous interactions, real time proximal problem-solving, and collaborative sharing with reciprocal feedback loops occurred over time (Florea & Purcaru, 2016; Wang, et al., 2015).

The blended learning program in Kodiak's rural schools experienced several emergent moments as a result of the interactions between agents. While there were several factors to the program that gave rise to emergence over time, the relational transactions were the bedrock for the elements from which emergence occurred. A critical dynamic within the program was the collaborative interaction of multiple agents. Within the collaborative processes there were continuous feedback loops between the agents, and the interactions were organic and free flowing. (Dooley, 1997; Levin, 2002; Lichtenstein et al., 2006; O'Connor et al.,2011; Rogers et al., 2005; Wang, et al., 2015).

Emergence in Kodiaks blended learning system did not occur from a single event. Instead, most often occurring where three themes from the finding intersected after a series of interactions happened over time (Levin, 2002; Lichtenstein et al., 2006; Rogers et al., 2005). First synchronous interactions occurred between agents. Blended learning consists of both synchronous and asynchronous interactions (Garrison, et al., 2000; Heinerichs et al., 2016; Kuo et al., 2014; Nanclares & Rodriguez, 2016; O'Byrne & Pytash, 2015; Shantakumari & Sajith, 2015; Wang et al., 2015) The researcher found that scenarios where synchronous interactions were occurring lending themselves opportunities for emergence to occur. There was no evidence collected in the study that indicated emergence occurred from asynchronous interactions. Second, interactions were generally collaborative in nature where participants were sharing thoughts and ideas. Moreover, reciprocal feedback loops were occurring, and there was no clearly defined lead role during the collaborative interactions (Lichtenstein et al., 2006). The third key factor in emergence was that of proximity. In conjunction with collaborative sharing that consisted of reciprocal feedback loops, the interactions were synchronous in nature, problem solving was happening when agents were proximal to one another, and interactions were occurring in real time. (Keshavaraz et al., 2010; Rogers et al., 2005). In and of themselves, none of these themes seemed to spark emergence. However, when emergence did occur it came from situations where all three of these themes were present around new or innovative ideas that transpired.

The second research question of this study examined how the blended learning program in rural Alaska impacted a student's choice after high school. Students in the rural communities lacked many opportunities that were available to students in larger communities. In fact, findings in the research brought to light that, for some students, blended learning made it possible for

them to be the first students to ever graduate from the rural school in their community. Before blended learning students in the smaller communities had to leave their village if they wanted to graduate.

O'Connor et al. (2011) and Shantakumari & Sajith (2015) noted that blended learning can provide innovative instruction that meets the needs of students by facilitating social interaction. In Kodiak, the isolation of the rural communities created limitations to the opportunities students had for social interactions. This was particularly true with peer-to-peer interactions. In addition, students were limited in the diversity of learning experiences available to them and the variety of courses from which to choose from. The implementation of blended learning opened the world up to students in the rural schools, and expanded the possibilities for career and technical education courses such as welding and construction. The skills and knowledge gained from these courses provided the stepping stones for several students and the choices they made after high school. Several participants throughout the study provided context around their lived experiences with the technical courses that became available. In fact, several students went on to become welders or have careers in some aspect of the construction industry. Their testimonies, and the testimonies of other participant groups stated in multiple interviews that it was the opportunities provided to students through blended learning that made discovering and pursuing their careers of choice after high school possible.

Blended learning also opened the door for students to attend college. Several participants in the student group stated how the blended learning program gave them the confidence to attend college, and the skills to be successful. Several participants stated that they believed the increase in social interactions, improved confidence, and exposure to a variety of educational experiences outside of their rural communities were key factors that guided them to college after high school.

At the conclusion of this study, when data collection had reached the point of saturation and the findings were made evident, blended learning was a major contributor to the choices students made after graduation. As participants shared their lived experiences with the blended learning program it became clear that the different rural schools had a one-school system feel. As a result of the blended learning program, students made more friends, had increased human interactions, established a broader sense of community, and gained new experiences on their educational journey. Moreover, through the development of self-confidence, discovery of new skills, and expansion of community, students were able to find their identity and pursue college and career paths after high school that were not as available to the students who came before them.

Limitations

The environment of rural Alaska is unique, compared to many other rural areas. Additionally, the study on blended learning in rural Alaska has limitations in that it is a cross-sectional bounded case study,exclusive to a specific setting at a single point in time (Creswell, 2014; Field, 2013). With the setting located in rural Alaska, there may be some concerns as to whether or not the findings can be generalized (Merriam & Tisdell, 2016). However, despite some generalizable limits, the research is designed to capture processes, perspectives, and implications of the blended learning instructional methodology across multiple blended learning agents as defined by Wang, et al (2015). These processes and the perspectives of the participants is something that can be beneficial to educational practices in a variety of learning environments.

Merriam & Tisdell (2016) caution researchers on their own personal biases because it can create limitations to a research study. As a result, researchers should self-reflect and discuss their own biases that could influence the qualitative portion of a study. Therefore, the researcher discloses that a past history with the organization as a virtual teacher exists. However,

throughout the research process the researcher maintained continuous awareness of prior relationships to cast aside any preconceived assumptions and beliefs from the time spent with the organization (Krueger, 2009). In order to help limit assumptions and reflexive bias, the researcher conducted a pilot test with the interview questions to ensure questions were objective, clear, and friendly (Creswell, 2014; Fink, 2016; Merriam & Tisdell, 2016). Furthermore, careful thought and consideration was put into the interview questions as to not lead the participants in their answers (Merriam & Tisdell, 2016).

The small number of people in each of the participant groups could also create potential limits to the study. To minimize those limitations and remove any selective bias all persons currently connected to the blended learning program had an opportunity to participate in the study.

Additionally, the small size of the rural communities, in connection with their isolation create the potential for groupthink. To minimize this, the researcher ensured that all of the rural schools were represented in the data collection process through interviews. Having representation from all villages helped to provide a better overall perspective of the participants' lived experiences, thus increasing the validity and accuracy of the findings (Creswell, 2014).

Future Research

The research findings indicate that the blended learning program provides students with new opportunities for career choices and pathways for attending college. However, many of the opportunities for the students take them away from their rural communities. As students move away from their villages for these new-found opportunities, some never move back. Therefore, while the blended learning program has increased the education and career opportunities for students, it could potentially reduce the population within the rural communities. Therefore,

future research regarding blended learning in rural communities should look at the impact that blended learning has on the populations in rural communities. Additionally, as students graduate, and take advantage of new career and college opportunities, how are the rural communities economically impacted? In the rural communities, people tend to work in their local tribal or city offices within the villages. In some cases, people will also work in the fishing industry, or even the logging industry. The money that people make from these jobs gets funneled back into their local communities. This study indicated that while some of the opportunities available to students allowed them to stay in their community and attend college or travel for work, other students did not go back to their villages. Therefore, future research should look at how the types of choices students make impacts the economic environment within the rural indigenous communities.

References

Bolman, L.G., & Deal, T.E. (2013). *Reframing Organizations* (5th ed.). San Francisco, CA: Jossey-Bass.

Creswell, J. W. (2014). *Research design: Quantitative, qualitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.

Dang, Y., Zhang, Y., Ravindran, S., & Osmonbekov, T. (2016). Examining student satisfaction and gender differences in technology-supported, blended learning. *Journal of Information Systems Education, 27*(2), 119-130.

Dooley, K.J. (1997). A complex adaptive system model of organization change. *Nonlinear Dynamics,Psychology, and Life Sciences*, *1*(1), 69-97.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Thousand Oaks, CA: Sage.

Fink, A. (2016). *How to conduct surveys: A step-by-step guide* (6th ed.). Thousand Oaks, CA: Sage.

Florea, O., Purcaru M.A.P. (2016). Teaching CBT For Students: Good Practice Example. *Bulletin of transilvania university for Brasov*, *9*(58), 129-136.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2), 87-105.

Gunn, T. M., Hollingsworth, M. (2013). The implementation and assessment of a shared 21st century learning vision: A district-based approach. *Journal of Research and Technology*, *45*(3), 201-228.

Heinerichs, S., Pazzaglia, G., & Gilboy, M. B. (2016). Using flipped classroom

components in blended courses to maximize student learning. *Athletic Training Educational Journal*, *11*(1), 54-57.

Holland, H.J. (2006). Studying complex adaptive systems. *Journal of System Science and Complexity*, *19*, 1-8.

Keshavaraz, N., Nutbeam, D., Rowling, L., Khavarpour, F. (2010). Schools as social complex adaptive systems: A new way to understand the challenges of introducing the health promoting schools concept. *Social Science and Medicine*, *70*, 1467-1474.

Kouzes, J.M., & Posner, B.Z. (2007). *The Leadership Challenge* (4th ed.). San Francisco, CA: Jossey-Bass.

Krueger, R. A., & Casey, M. A. (2009). *Focus groups: A practical guide for applied research* (4th ed.). Thousand Oaks, CA: Sage.

Kuo, Y., Belland, B. R., Shroder, K. E. E., Walker, A. E. (2014). K-12 teachers' perceptions of and their satisfaction with interaction type in blended learning environments, *Distance Education*, *35*(3), 360-381.

Kwak, D. W., Menezes, F. M., & Sherwood, C. (2015). Assessing the impact of blended learning on student performance. *Economic Record*, *91*(292), 91-106.

Levi, D. (2014). *Group Dynamic for Teams* (4th ed.). Thousand Oaks, CA: Sage.

Levin, S.A (2002). Complex adaptive systems: Exploring the known, the unknown and the unknowable. *Bulletin of the American Mathematical Society*, *40*(1), 3-19. Doi:10.1.1.129.7968

Lichtenstein, B.B., Ul-Bien, M., Marion, R., Seers, A., & Orton, J.D. (2006). Complexity leadership theory: An interactive perspective on leading in complex adaptive systems. *Emergence: Complexity and Organizations*, *8*(4), 2-12.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative Research: A Guide to Design and Implementation* (4th ed.). San Francisco, CA: Jossey-Bass.

Mishra, P., Cain, W., Sawaya, S., Henriksen, D. & The Deep-Play Research Group (2013). Rethinking technology & creativity in the 21st century: A room of their own. *TechTrends*, *57*(4), 5-9.

Nanclares, N. H., Rodriguez, M. P. (2016). Students' Satisfaction With a Blended Instructional Design: The Potential of "Flipped Classroom" in Higher Education. *Journal of Interactive Media in Education*, *4*(1), 1-12.

Northouse, P.G. (2016). *Leadership: Theory and Practice*. Thousand Oaks, CA: Sage.

O'Byrne, I. W., & Pytash, K. E. (2015). Modifying pedagogy across path, pace, time, and place. *Journal of Adolescent & Adult Literacy*, *59*(2). 137-140.

O'Connor, E., McDonald, F., & Ruggiero, M. (2015). Scaffolding complex learning: Integrating 21st century thinking, emerging technologies, and dynamic design and assessment to expand learning and communication opportunities. *Journal of Educational Technology Systems*, *43*(2), 199-226.

O'Connor, C., Mortimer, D., Bond, S. (2011). Blended Learning: Issues, Benefits and Challenges. *International Journal of Exercise Science, 19*(2), 62-82.

Pace, J. R., & Mellard, D. F. (2016). Reading achievement and reading efficacy changes for middle school students with disabilities through blended learning instruction. *Journal of Special Education Technology*, *31*(3), 156-169.

Rogers, E.M, Medina, U.E., Rivera, M.A., & Wiley, C.J. (2005). Complex adaptive

systems and the diffusion of innovations. *The Innovation Journal: The Public Sector Innovation Journal*, *10*(3), 1-25.

Seidman, I. (2012). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (4th ed.). New York, NY: Teachers College Press.

Shantakumari, N. Sajith, P. (2015). Blended Learning: The student viewpoint. *Annals of medical and health sciences research*, *5*(5), 323-328.

Tseng, H., Walsh, E. J. (2016). Blended versus traditional course delivery: Comparing students' motivation, learning outcomes, and preferences. *The Quarterly Review of Distance Education*, *17*(1), 43-52.

Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of 21st century. *Journal of Computer Assisted Learning*, *29*, 403-413.

Wang, Y., Han, X., Yang, J. (2015). Revisiting the blended learning literature: Using a complex adaptive systems framework. *Educational Technology & Society, 18*(2) 380-393.

Wheatley M.J. (1999). *Leadership and the New Science: Discovering order in a chaotic world.* San Francisco, CA: Berrett-Koehler Publisher, Inc.

SECTION SIX

SCHOLARLY PRACTITIONER REFLECTION

Reflection

Introduction

The dissertation process has been an integral part of reinforcing much of what I learned throughout my doctoral program. My dissertation was certainly a journey, but the process brought to the forefront many of the things that were learned throughout the courses of the doctoral program. It helped to put into context many of the things I learned in coursework, and experience firsthand how research procedures are put into practice through application. Before the doctoral program and the dissertation, I knew nothing about writing in APA format, or how to cite sources. In addition, I had not paid a lot of attention to academic journals or knew the term peer reviewed was even a thing. Not only did conducting the study help me find value in journals and see the benefits that literature reviews provide, but it helped me to understand and realize what aspect of a particular topic may or may not be more generalizable to a given scenario (Creswell, 2014)

In my role as coordinator of accountability with the Springfield School District, my lens as a practitioner and that of a scholar are linked in many ways, and often co-exist in the same space. I frequently work with leaders in the education field where, in general, an emphasis is continuously placed on implementing research-based practices. Whether it is at the academic level, social and emotional level, or behavior-based, leadership pushes for practitioners to use methods that are data driven and supported by research.

Creswell (2014) discussed that the first steps in research are creating plans and procedures for the research. Part of that is considering the research problem, and determining the research design and research methods. This component of the dissertation process was one of the most beneficial parts of the study for me. In large part it was due to me starting the dissertation

process with a plan for using mixed methods, but then realizing that the quantitative aspects of my study would not be sufficient for gathering evidence that would lead to valid or reliable results (Creswell, 2014; Field, 2017). Nevertheless, the time I invested in the beginning of the research, focusing on a mixed method approach, benefitted me in some of the quantitative aspects of research, despite pivoting completely to a qualitative study.

Scholarly Reflection

Prior to the learning of content through the doctoral program, and the application of that knowledge in the dissertation process my understanding through the lens of a scholar was limited. As a scholar my dissertation helped me to become a better professional writer. In addition, it helped me to recognize what components go into a good research study, thus making it reliable and giving it validity (Creswell, 2014; Field, 2013; Fink, 2013; Merriam & Tisdell, 2016; Seidman, 2013).

There were different stages within the dissertation process itself that benefited me as a scholar. In a more broad and general sense, the beginning part was for sure one of the biggest benefits of the dissertation process. As indicated previously, I initially looked into using a mixed methods approach, which led me on a path of discovery in both quantitative and qualitative methods. However, once I decided on using the qualitative research method, most of what benefited me from the perspective of a scholar centered on qualitative research practices. Research practices regarding interviews were especially impactful. Particularly, in my dissertation, the stories and experiences that participants had with Kodiak's blended learning program were best captured through interviews to glean the meaning behind those experiences from start to finish (Seidman, 2013).

I think that the biggest benefit from a qualitative standpoint was evoking an ability to think critically about what is being said by participants, and listening to their message, meaning, and experience. When initially drilling down into the data, I assessed different messages from individuals. It was challenging to find common themes between the participants. However, what I eventually discovered, and took away from the dissertation, was that by drilling into the data over and over multiple times, patterns started to emerge (Creswell, 2014; Merriam & Tisdell, 2016). At times staying focused on what the research questions were asking was difficult. I would find myself drifting into areas that were not really specific to what I was looking for. However, as the study went on I got better at finding the important and relevant pieces of information, thus keeping myself on track with what data that was relevant to the study.

Understanding the importance of writing good research questions that are clear, and do not lead participants to a specific answer was more difficult than I anticipated. Seidman (2013), emphasized that researchers are part of the interview process and need to pay attention to whose meaning is being captured and reported in the interview. There were several instances, prior to starting the interviews, where I rewrote questions several times to make sure that my own bias was not reflected in the questions. In addition, during the actual interviews I was careful to try and not input too much of my experiences. Nevertheless, there were times where I connected to what was being said, and had minimal dialog with participants trying to draw out further responses from their perspective. There were some interviews in which I knew some of the participants pretty well. However, I was mindful of how my bias could potentially affect the data and waited until the formal interview concluded before discussing things that did not pertain to the study or the research questions themselves.

One thing that I realized about interviews that I was not expecting was how different an interview can be from how I envisioned it in my head. It may seem like a small thing, but in the first few interviews I found myself adjusting questions, or asking the same question in different ways. Restating questions was necessary because at times, when I asked questions, some of the responses were not aligned to the questions being asked. In certain cases, participants would talk about something completely different. However, after I got a few interviews in, I was able to ask questions with more clarity, and get responses that were in line with what I was asking. It is important to note that throughout the interview, including the rewording and re-asking of questions, I was careful not to steer the respondents to a specific answer. One example of this type of scenario was when I asked questions about a time where the participant might have witnessed an instance of innovation. A few participants would talk about a strategy they frequently used, or something they thought was good, but already existed. In those situations, I would re-ask the question focusing on the term innovation. Then, in later interviews when I asked about innovation I would emphasize an instance where something was new, and had never happened before. The benefit of this was that it helped me realize the importance of anticipating the multiple ways participants might interpret a question. There was the complete opposite side of interviewing participants as well. There were instances where I might ask just a few questions and the participant would get on a roll and cover most of what I was going to ask.

According to Creswell (2014), in qualitative research the process is emergent. One area the dissertation benefitted me was understanding that it was okay for some aspects of the study to shift as it went. I noticed that during the interview processes people would just start conversing. Initially, I felt I had to hit every question, but as the processes went on over time, I became more comfortable just letting the conversations be organic, and of looking over the questions

throughout the interview, noting when they were covered, or when it might take the conversation off track and disrupt the flow of conversation. During interviews, I remember thinking I had to cover every facet of the study with the interview questions. I can even remember at one point during the pre-proposal process, Dr. Cornelius having me reduce the number of questions because I had way too many. Trying to combine and condense questions, and choose from the original list was nerve racking. However, now having been through the interview process I realize that good interviewing is more of a free-flowing process, rather than a specific question and answer format.

After all interviews were concluded, the volume of data I had was pretty extensive. Creswell (2014) discussed that an important element in qualitative research is the need to be able to sift through dense sets of information and process what is relevant to the study, while at the same time be able to disregard data to help reduce the information. This was most definitely a daunting task. If I were to conduct further qualitative research, one thing I would make sure to do is use a computer software program designed for qualitative studies rather than hand coding it all (Merriam & Tisdell, 2016). Doing the data digging by hand was very challenging; however, I do feel that hand coding the data was useful for my first qualitative study. Hand coding helped me get a better grasp of the data that I collected and extract very rich and meaningful information. It allowed me to really get to know the data and construct deep and rich meaning of the research participant's experiences. However, it was also very time consuming, and at times difficult to maintain organization, which computer software programs can help with (Merriam & Tisdell, 2016). Therefore, in future research, should I utilize a qualitative approach, I will look at using programs designed for analyzing qualitative data rather than going through the time-consuming process of doing it all by hand.

Practitioner Reflection

When contemplating the use of a mixed method approach for my study I gave consideration to applying descriptive statistics and looking for correlations with student performance in Math and English. I considered comparing the impact that the blended learning program had on student achievement prior to its implementation with that of its implementation (Creswell, 2014; Fink, 2017). However, after looking over the type of quantitative data that would have been available, I realized that there would be several complications which would have made it difficult to have reliable and valid results. This was primarily due to the small population and sample size, as well as getting access to the data needed for the study. Despite not using any quantitative data in my study, the process of starting in that direction had a great deal of benefit to me; especially as a practitioner.

Part of my work as a practitioner is related to research practices. In fact, three of my primary job duties are to analyze school performance data, build and conduct surveys, and approve external research requests that come into the district. The dissertation process benefitted me in all of those areas. The beginning approach to the dissertation helped me become more familiar with different types of statistical analysis. This became something that was very beneficial to me in my current job. My role as coordinator of accountability began to take on a lot of the data analytics, and explaining the meaning of assessment outcomes with the district and state assessments. In particular, my role as accountability coordinator put me in the position as a practitioner to help others understand how accountability points are earned in the yearly Annual Performance Report (APR) from the state. Understanding the elements of descriptive statistics such as mean and median played an important role in helping others understand how the calculations are figured by the state department of education (Fink, 2017). In addition, I have had

to provide insight and professional development around cross-section analysis, longitudinal analysis, Normal Curve Equivalent, and the use of the Z-score (Fink, 2017). These are all things that factor into the APR calculations. There have also been instances where the board of directors have insisted on viewing some form of predictable data outcomes through correlation, in which I have had to help others understand why that is not always possible. Depending on the various district and state assessments the statistical analysis varies as to whether they are one-tailed or two-tailed tests, consist of confounding variables, or use a multiple regression analysis (Fink, 2017).

By having gained a deeper understanding of quantitative research practices, and the different types of statistical analysis that can occur, I now look deeper into the findings of data outcomes that impact my work. I pay closer attention to the types of analysis, the different possibilities of variables, and what the implications of significant findings really mean. The dissertation process has also helped me recognize the importance of understanding what real research findings are and the meaning behind them. As a practitioner I often hear people talk about using correlation data to predict future outcomes, or the implementation of research-based practices. Conducting my dissertation has really helped shed light on how many people in the education field really do not understand what quality research practices are. Often, it seems like it is just a series of words and phrases thrown around by people. For instance, the assessment department of our district often tells stakeholders that outcomes between the district assessment and the state assessment correlate. This narrative will be distributed to stakeholders, despite there only being p-values of 0.80 or 0.85, at best. Nobody questions it, and they take it as a positive outcome. However, I have learned to question the extent of these types of data narratives, and better determine whether the findings are actually significant or not.

In my current job, I am responsible for vetting and approving all external research requests that come through the school district. I am also responsible for creating processes, structures, and developing the research request submission protocols. The dissertation process was a huge benefit in regards to understanding the various research methods, tools for data collection, and the appropriate protocols and practices as it relates to permissions from participants, protecting confidentiality, and the IRB process. Having this knowledge plays an important role in my everyday work as a practitioner because I can better determine which external requests should be approved, denied, or given conditional approval. In addition, I am able to better answer questions, and guide people in making adjustments to their requests (Creswell, 2014; Fink, 2017; Meriman & Tisdell, 2016; Seidman, 2013).

One example where my knowledge about research permissions and confidentiality factored in was when a researcher whose request I approved violated confidentiality. She had been given permission to conduct her study on the condition that the district name remain confidential. In the researcher's excitement for approval she disclosed that she received permission to conduct her research at Springfield School District on social media. The researcher's advisor saw it, contacted her, and she got it pulled down from social media within the day. The researcher contacted me, explained the situation, and I assessed to what degree of impact this would have on the confidentiality of participants. After speaking with her and assessing the breach, I was able to quickly determine that the error in judgment would not expose anything relevant to participant confidentiality. As a result of my own dissertation process I recognized the situation at hand, and sent a letter to the researcher and her advisor indicating that she still had permission to continue with her study.

Conclusion

As a learner, I think it was more beneficial to me that I landed on applying qualitative methodology for my dissertation. This is primarily due to the fact that my work as a practitioner leans heavily on quantitative data analysis and applications. As a result, there are more opportunities to apply the knowledge regarding quantitative research practices as a practitioner. Therefore, by selecting a qualitative dissertation I had the opportunity to apply qualitative research practices that I would not use on a regular basis. I believe this helped me grow as an all-around scholar.

Specifically, the qualitative approach for this study reinforced my prior perception that there is more to research than just quantitative representation to data outcomes. In a world where systems are complex, whether in social systems, the world of technology, or the natural sciences, there are stories, experiences, perceptions and many other unknown factors that play a part in quantitative outcomes (Creswell, 2014; Meriman & Tisdell, 2016; Seidman, 2013).

References

Bennis, W. (2009). *On Becoming a Leader: The leadership classic*. New York City, NY: Basic Books.

Benton-Borghi, B. H. (2013). A universally designed for learning (UDL) infused technological pedagogical content knowledge (TPACK) practitioners' model essential for teacher preparation in the 21st century.*Journal Educational Computing Research*, *48*(2), 245-265.

Bolman, L.G., & Deal, T.E. (2013). *Reframing Organizations* (5th ed.). San Francisco, CA: Jossey-Bass.

Cook, L. A., Bell, M. L, Nugent, J., Smith, W. S. (2016). Global collaboration enhances technology literacy. *Technology and Engineering Teacher*, 20-25.

Creswell, J. W. (2014). *Research design: Quantitative, qualitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.

Dang, Y., Zhang, Y., Ravindran, S., & Osmonbekov, T. (2016). Examining student satisfaction and gender differences in technology-supported, blended learning. *Journal of Information Systems Education, 27*(2), 119-130.

Donovan, L. A., Green, T. D., & Mason, C. (2014). Examining the 21st century classroom: Developing an innovation configuration map. *Journal of Educational Computing Research*, *50*(2), 161-178.

Dooley, K.J. (1997). A complex adaptive system model of organization change. *Nonlinear Dynamics,Psychology, and Life Sciences*, *1*(1), 69-97.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Thousand Oaks, CA: Sage.

Fink, A. (2016). *How to conduct surveys: A step-by-step guide* (6th ed.). Thousand Oaks, CA: Sage.

Florea, O., Purcaru M.A.P. (2016). Teaching CBT For Students: Good Practice Example. *Bulletin of transilvania university for Brasov*, *9*(58), 129-136.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2), 87-105.

Gunn, T. M., Hollingsworth, M. (2013). The implementation and assessment of a shared 21st century learning vision: A district-based approach. *Journal of Research and Technology*, *45*(3), 201-228.

Heinerichs, S., Pazzaglia, G., & Gilboy, M. B. (2016). Using flipped classroom components in blended courses to maximize student learning. *Athletic Training Educational Journal*, *11*(1), 54-57.

Holland, H.J. (2006). Studying complex adaptive systems. *Journal of System Science and Complexity*, *19*, 1-8.

Johnson, S. D. & Aragon, S. R. (2003). An instructional strategy framework for online learning environments. *New Directions for Adult and Continuing Education,* 100, 31-43.

Keshavaraz, N., Nutbeam, D., Rowling, L., Khavarpour, F. (2010). Schools as social complex adaptive systems: A new way to understand the challenges of introducing the health promoting schools concept. *Social Science and Medicine*, *70*, 1467-1474.

Kouzes, J.M., & Posner, B.Z. (2007). *The Leadership Challenge* (4th ed.). San Francisco, CA: Jossey-Bass.

Krueger, R. A., & Casey, M. A. (2009). *Focus groups: A practical guide for applied*

research (4th ed.). Thousand Oaks, CA: Sage.

Kuo, Y., Belland, B. R., Shroder, K. E. E., Walker, A. E. (2014). K-12 teachers' perceptions of and their satisfaction with interaction type in blended learning environments, *Distance Education*, *35*(3), 360-38.

Kwak, D. W., Menezes, F. M., & Sherwood, C. (2015). Assessing the impact of blended learning on student performance. *Economic Record*, *91*(292), 91-106.

Levi, D. (2014). *Group Dynamic for Teams* (4th ed.). Thousand Oaks, CA: Sage.

Levin, S.A. (1998). Ecosystems and the biosphere as complex adaptive systems. *Ecosystems*, *1*, 431-436.

Levin, S.A (2002). Complex adaptive systems: Exploring the known, the unknown and the unknowable. *Bulletin of the American Mathematical Society*, *40*(1), 3-19. Doi:10.1.1.129.7968

Lichtenstein, B.B., Ul-Bien, M., Marion, R., Seers, A., & Orton, J.D. (2006). Complexity leadership theory: An interactive perspective on leading in complex adaptive systems. *Emergence: Complexity and Organizations*, *8*(4), 2-12.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative Research: A Guide to Design and Implementation* (4th ed.). San Francisco, CA: Jossey-Bass.

Mishra, P., Cain, W., Sawaya, S., Henriksen, D. & The Deep-Play Research Group (2013). Rethinking technology & creativity in the 21st century: A room of their own. *TechTrends*, *57*(4), 5-9.

Moore, J.L., Dickson-Deane, C., & Galyen, K. (2011). E-Learning, online learning, and distance learning environments: Are they the same?. *Internet & Higher Education, 14*(2), 129-135. Doi:10.1016/j.iheduc.2010.10.001.

Nanclares, N. H., Rodriguez, M. P. (2016). Students' Satisfaction With a Blended Instructional Design: The Potential of "Flipped Classroom" in Higher Education. *Journal of Interactive Media in Education*, *4*(1), 1-12.

Northouse, P.G. (2016). *Leadership: Theory and Practice*. Thousand Oaks, CA: Sage.

O'Byrne, I. W., & Pytash, K. E. (2015). Modifying pedagogy across path, pace, time, and place. *Journal of Adolescent & Adult Literacy*, *59*(2). 137-140.

O'Connor, E., McDonald, F., & Ruggiero, M. (2015). Scaffolding complex learning: Integrating 21st century thinking, emerging technologies, and dynamic design and assessment to expand learning and communication opportunities. *Journal of Educational Technology Systems*, *43*(2), 199-226.

O'Connor, C., Mortimer, D., Bond, S. (2011). Blended Learning: Issues, Benefits and Challenges. *International Journal of Exercise Science, 19*(2), 62-82.

Osgerby, J. (2013). Students' Perceptions of the Introduction of a Blended Learning Environment: An Exploratory Case Study. *Accounting Education: and international journal*, *22*(1), 85-99. Doi:10.1080/09639284.2012.729341

Pace, J. R., & Mellard, D. F. (2016). Reading achievement and reading efficacy changes for middle school students with disabilities through blended learning instruction. *Journal of Special Education Technology*, *31*(3), 156-169.

Rogers, E.M, Medina, U.E., Rivera, M.A., & Wiley, C.J. (2005). Complex adaptive systems and the diffusion of innovations. *The Innovation Journal: The Public Sector Innovation Journal*, *10*(3), 1-25.

Seidman, I. (2012). *Interviewing as qualitative research: A guide for researchers in*

education and the social sciences (4th ed.). New York, NY: Teachers College Press.

Shantakumari, N. Sajith, P. (2015). Blended Learning: The student viewpoint. *Annals of medical and health sciences research*, *5*(5), 323-328.

Tselios, N., Daskalakis, D., & Papadopoulou, M. (2011). Assessing the acceptance of a blended learning university course. *Educational Technology & Society, 14*(2), 224-235.

Tseng, H., Walsh, E. J. (2016). Blended versus traditional course delivery: Comparing students' motivation, learning outcomes, and preferences. *The Quarterly Review of Distance Education*, *17*(1), 43-52.

Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of 21st century. *Journal of Computer Assisted Learning*, *29*, 403-413.

Wang, Y., Han, X., Yang, J. (2015). Revisiting the blended learning literature: Using a complex adaptive systems framework. *Educaitional Technology & Society, 18*(2) 380-393.

Wheatley M.J. (1999). *Leadership and the New Science: Discovering order in a chaotic world.* San Francisco, CA: Berrett-Koehler Publisher, Inc.

Appendix 1

Interview Questions: Current Teacher

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	Tell me about yourself, and how you got involved in education.
3	Demographic	How long have you been in education?
4	Demographic	How long have you been teaching for the district?
5	Demographic	How long have you been teaching in a blended learning system?
6	Demographic	What classes do you teach using blended learning?
7	Research Question 1	How does the teaching and learning process occur within the blended learning system?
8	Research Question 1	How do you feel blended learning has changed the teaching-learning experience for teachers and students?
9	Research Question 1	How have you gone about adapting to the challenges of delivering online curriculum in the blended learning process?
10	Research Question 1	What have you found to be the most important areas of support in blended learning?
11	Research Question 1	What were some circumstances / situations that led to learning and innovation with the program?
12	Research Question 1	Throughout your time with the Kodiak blended learning program, what have been some crucial moments, intentional or unintentional, that had a direct and lasting effect on the program?
13	Research Question 1	What are some problem-solving approaches that have occurred during instances where things did not go the way they were planned?
14	Research Question 1	What are some examples of something new that came about from an unexpected situation or event?
15	Research Question 2	What is your perception of the impact blended learning has on a students' interpersonal skills?
16	Research Question 2	How has the interaction between students changed both within their community and outside of their community since the implementation of blended learning?
17	Research Question 2	From your perspective, have you seen blended learning play a factor in the decision students make in their life after high school?
18	Research Question 2	How have you seen technology impact peer learning interactions?
	Open Ended	Is there anything else you would like to share about your experience with blended learning program?

Interview Questions: Former Teacher

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	Tell me about yourself, and how you got involved in education?
3	Demographic	How long were in in education prior to starting with Kodiaks blended learning program?
4	Demographic	How long did you teach for the district?
5	Demographic	How long did you teach in the blended learning system?
6	Demographic	What classes did you teach using blended learning?
7	Research Question 1	How did the teaching and learning process occur within the blended learning system?
8	Research Question 1	How do you feel blended learning changed the teaching-learning experience for teachers and students?
9	Research Question 1	How did you go about adapting to the challenges of delivering online curriculum in the blended learning process?
10	Research Question 1	What did you find to be the most important areas of support in blended learning?
11	Research Question 1	What were some circumstances / situations that led to learning and innovation with the program?
12	Research Question 1	Throughout your time with the Kodiak blended learning program what were some crucial moments, intentional or unintentional, that had a direct and lasting effect on the program?
13	Research Question 1	What were some problem-solving approaches that occurred during instances where things did not go the way they were planned?
14	Research Question 1	What is an examples of something new that resulted from an unexpected situation or event?
15	Research Question 2	What is your perception of the impact blended learning had on the students' interpersonal skills?
16	Research Question 2	How did the interaction between students change both within their community and outside of their community with the implementation of blended learning?
17	Research Question 2	From your perspective, did you see blended learning play a factor in the decision students made in their life after high school?
18	Research Question 2	How did you see technology impact peer learning interactions?
	Open Ended	Is there anything else you would like to share about your experience with blended learning program?

Interview Questions: Current Administrator

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	How long have you been in education?
3	Demographic	How long have you been an administrator for the district?
4	Demographic	How long have you been involved with Kodiaks blended learning?
5	Research Question 1	Can you recall any instances that were not expected, which led to polices and supports being put into place?
6	Research Question 1	Can you recall any instances where elements of the blended learning program had to adapt due to unexpected or unanticipated situations?
7	Research Question 1	How has the blended learning program evolved over time, and what were some critical things that led to that evolution?
8	Research Question 1	Have there been any crucial moments, intentional or unintentional, that had a direct and lasting effect on the program?
9	Research Question 1	How has collaboration between the various stakeholders led to new and innovative ideas and strategies?
10	Research Question 2	What is your perception of the impact blended learning has on a students' interpersonal skills?
11	Research Question 2	How has the interaction between students changed both within their community and outside of their community with the implementation of blended learning?
12	Research Question 2	From your perspective, have you seen blended learning play a factor in the decision students make in their life after high school?
13	Research Question 2	How have you seen technology impact peer learning interactions?
	Open Ended	Is there anything else you would like to share about your experience with blended learning program?

Interview Questions: Former Administrator

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	How long have you been in education?
3	Demographic	How long were you an administrator for the district?
4	Demographic	How long were you involved with Kodiaks blended learning?
5	Research Question 1	Can you recall any instances that were not expected, which led to polices and supports being put into place?
6	Research Question 1	Can you recall any instances where elements of the blended learning program had to adapt due to unexpected or unanticipated situations?
7	Research Question 1	How did you see the blended learning program evolve over time, and what were some critical things that led to that evolution?
8	Research Question 1	Were there any crucial moments, intentional or unintentional, that had a direct and lasting effect on the program?
9	Research Question 1	How did collaboration between the various stakeholders lead to new and innovative ideas and strategies?
10	Research Question 2	What is your perception of the impact blended learning had on a students' interpersonal skills?
11	Research Question 2	How do you feel the interaction between students changed both within the students' community and outside of their community with the implementation of blended learning?
12	Research Question 2	From your perspective, did you see blended learning play a factor in the decision students made in their life after high school?
13	Research Question 2	How have you seen technology impact peer learning interactions?
	Open Ended	Is there anything else you would like to share about your experience with blended learning program?

Interview Questions: Former Student

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	Were you born in Alaska?
3	Demographic	How long did you go to school in the school district?
4	Demographic	When did you take your first blended learning course?
5	Demographic	How many of your courses were done through blended learning?
6	Demographic	How many of your classes were taken solely through face-to-face instruction in your physical classroom?
7	Research Question 1	Do you feel that student conversations with staff members led to changes in the blended learning program?
8	Research Question 1	When learning through the blended learning program what were some circumstances that you had to adapt to?
9	Research Question 1	How did you see the blended learning program evolve over time, and what were some critical things that led to that evolution?
10	Research Question 1	How do you feel blended learning changed your learning experience as a student?
11	Research Question 1	How did you adapt to the challenges of the curriculum in a blended learning program?
12	Research Question 1	What do you think might have been some reasons that the school district began using a blended learning program?
13	Research Question 2	How do you feel blended learning helped students interact with others outside of their community?
14	Research Question 2	How do you feel blended learning helped prepare you for challenges that you faced outside of your community.
15	Research Question 2	How do you feel blended learning courses helped you with your after high school?
16	Research Question 2	How do you feel blended learning might have influenced your choices for life after high school?
17	Open Ended	Is there anything else you would like to share about your experience with blended learning as a student?

Interview Questions: Current Technology

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	How long have you been in the technology field?
3	Demographic	How long have you been working with technology in a school system?
4	Demographic	How long have you been working with technology for the district?
5	Demographic	How long have you been working with technology integration in a blended learning system?
6	Research Question 1	What were some unexpected things, if any, that have occurred during your time working with a blended learning setting that required problem solving with someone outside of your department?
7	Research Question 1	Are there any differences with the integration of technology into a blended learning classroom verses how technology is used in a traditional face-to-face learning environment?
8	Research Question 1	What changes and adaptations have you personally had to make when working with technology in the blended learning environment?
9	Research Question 1	What are some circumstances/situations where collaboration led to learning and innovation with the program?
10	Research Question 1	Have there been any crucial moments, intentional or unintentional, that had a direct and lasting effect on the program?
11	Research Question 1	How do you feel that teachers, students, administrators, and the technology department affect one another's role?
12	Research Question 1	How have you seen collaboration between the various stakeholders lead to new and innovative ideas and strategies?
13	Research Question 2	What is your perception of the impact blended learning has had on a students' interpersonal skills?
14	Research Question 2	How do you feel the interaction between students has changed both within the student's community and outside of their community since the implementation of blended learning?
15	Research Question 2	From your perspective, have you see blended learning play a factor in the decisions students make in their life after high school?
16	Research Question 2	How have you seen technology impact peer learning interactions?

17	Open Ended	Is there anything else you would like to share about your experience with blended learning program?

Interview Questions: Former Technology

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	How long were you in the technology field prior to working for the district?
3	Demographic	How long had you been working with technology in a school system prior to working for the district?
4	Demographic	How long did you work with the technology department for the district?
5	Demographic	How long did you work with technology integration in a blended learning system?
6	Research Question 1	What were some unexpected things, if any, that occurred during your time working with the blended learning setting that required problem solving with someone outside of your department?
7	Research Question 1	Were there any differences with the integration of technology into the blended learning classroom verses how technology is used in a traditional face-to-face learning environment?
8	Research Question 1	What changes and adaptations did you personally have to make when working with technology in the blended learning environment?
9	Research Question 1	What were some circumstances/situations where collaboration led to learning and innovation with the program?
10	Research Question 1	Were there any crucial moments, intentional or unintentional, that had a direct and lasting effect on the program?
11	Research Question 1	How did you feel that teachers, students, administrators, and the technology department affected one another's roles?
12	Research Question 1	How did collaboration between the various stakeholders lead to new and innovative ideas and strategies?
13	Research Question 2	What is your perception of the impact blended learning had on a students' interpersonal skills?
14	Research Question 2	How do you feel the interactions between students changed both within the student's community and outside of their community with the implementation of blended learning?
15	Research Question 2	From your perspective, to what extent did you see blended learning play a factor in the decision students made in their life after high school?

16	Research Question 2	During your time with the Kodiak School District, to what extent do you feel you saw technology impact peer learning interactions?
17	Open Ended	Is there anything else you would like to share about your experience with blended learning program?

Interview Questions: Current Parent

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	How long have you been living in Kodiak Alaska?
3	Demographic	How many of your children have been in or gone through the Kodiak rural school system?
4	Demographic	How is the current learning system different from the school district that you attended?
5	Research Question 1	What kind of conversations take/took place between the parents/community regarding the implementation of technology into the learning system of the schools?
6	Research Question 1	As a parent, how have you seen learning change for your student with the implementation of technology?
7	Research Question 1	How do you feel blended learning has changed the learning experience for your student?
8	Research Question 1	Why do you think the school district decided to begin using a blended learning program?
9	Research Question 1	How do you feel about your student learning through an approach that blends technology with face-to-face instruction?
10	Research Question 2	How have you seen the technology in the school impact the way students interact with people outside of their community?
11	Research Question 2	In what ways do you feel that technology in the schools impacts how students overcome challenges that they may encounter when they are outside of their region/community?
12	Research Question 2	How do you feel blended leaning may influence your student in life after high school?

Interview Questions: Former Parent

Question Number	Research Category	Research Question
1	Warm-up	Introduce self, and purpose of the study.
2	Demographic	How long have you been living in Kodiak Alaska?
3	Demographic	How many of your children have been in or gone through the Kodiak rural school system?
4	Demographic	How was your students learning system different from the school district that you attended?
5	Research Question 1	What kind of conversations took place between the parents/community regarding the implementation of technology into the learning system of the schools?
6	Research Question 1	As a parent, how did you see learning change for your student with the implementation of technology?
7	Research Question 1	How do you feel blended learning changed the learning experience for your student?
8	Research Question 1	Why do you think the school district decided to begin using a blended learning program?
9	Research Question 1	How did you feel about your student learning through an approach that blended technology with face-to-face instruction?
10	Research Question 2	How did you see the technology in the school impact the way your student interact with people outside of their community?
11	Research Question 2	In what ways did you feel that technology in the schools impact how students overcame challenges that they may have encountered when they were outside of their community?
12	Research Question 2	How do you feel blended leaning influenced your students in life after high school?

VITA

Brian Olivera was born in Miami, Florida. Spending most of his life in South Florida, he graduated from Western High School, located in Davie, Florida. Brian earned a bachelor degree in Biology in Education from Pittsburg State University, in Pittsburg, Kansas. Brain also earned a master degree in Special Education from Pittsburg State University, master degree in Educational Leadership, K-12, from the University of Alaska, and an Ed.D. in Educational Leadership and Policy Analysis from the University of Missouri .

After earning his bachelor degree, Brian spent the first 10-years of his career in education teaching in Missouri and Kansas. In 2011, Brian's career path took him to Alaska where he taught in the remote villages of Kodiak, Alaska. His time working with indigenous students in rural Alaska was the inspiration for his dissertation research study. He spent two and a half years working in rural Alaska before returning to Missouri. Since leaving Alaska, he has been a teacher, assistant principal, and principal. Additionally, Brian has worked in the administrative offices overseeing state accountability measure for student's performance for is current school district in the state of Missouri. Last, Brian plans to continue his career in education and use his experiences to continue having positive effects on students.