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Exploring motivations and informal learning of school administrators adopting Google Apps for Education

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EXPLORING THE MOTIVATIONS AND INFORMAL LEARNING OF SCHOOL ADMINISTRATORS ADOPTING GOOGLE APPS FOR EDUCATION

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TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

DEDICATION

This dissertation is dedicated to all those who have supported me into and through this journey. Thank you for all your sacrifices and support.

To Missy, Brayden, Lila, Frosty, and Coco for your unending patience, understanding, motivation and tissues for the tears. To my parents for always challenging me to be my best. To my grandparents, aunts, uncles, cousins, and everyone else who continually encouraged me onward in the path. To the great spirits of all before us including the family and friends that started the journey with me, but now love and protect us from above. Grandma Carol, Grandpa Moe, Aunt Barbara, and Ted your guidance and love are felt every day.

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VITA

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ABSTRACT

As K-12 organizations continue to increase adoption of cloud-based information technology such as Google Apps for Education, there is a need to understand the factors that influence behaviors of school leaders in adopting and using these technologies. The purpose of this study was to explore the motivations and learning experiences of school site administrators related to adopting Google Apps for Education as a cloud-based knowledge management technology.

These administrators have used the software applications with varied purpose and success, and learning more from their lived experiences might assist in the development and implementation of effective professional learning activities to support successful technology adoption and use by school administrators.

This study utilized a qualitative phenomenological research design utilizing activity system theory and a self-directed learning schema to analyze collected data. The researcher interviewed six school site administrators in California. The interviews were conducted face-to-face using a semi-structured interview protocol comprising of 17 questions exploring the motivations and learning experiences of these school site administrators.

Three conclusions resulted from this study. First, school administrators learning and use of Google Apps for Education is strongly motivated by collaboration. Second, school administrators learn and use Google Apps for Education by transforming familiar objects also referred to as Production. Third, organizational environments impact school administrators' ability to understand and process of informal learning.

The researcher recommended two areas of practice organizations implementing a culture of informal learning while adopting new technology may consider. First, create a purposeful culture of self-directed learning. By deeply understanding various components of the current

learning experiences of administrators, organizations might be able to be purposeful in designing cultural norms that influence learning experiences. Organizations promoting embedded learning experiences, may benefit from providing training or resources related to effective practices within self-directed learning to increase learning application and effective sharing of skills through modeling. Second, organizations should align appropriate resources for systemic technological change. Organizations seeking an increased or differentiated use of technology may benefit from understanding the current organization culture. Activity system theory could provide metrics to better understand and measure organizational culture and monitor changes throughout an initiative.

Chapter 1: Introduction

Background of the Study

The globalization of the workforce and increase in technology adoption and implementation has drastically shifted workplace technology literacy and competency expectations and created a demand for skills in digital collaboration, information use and sharing. (Monge & Frisicaro-Pawlowski, 2013). Communities and organizations will need to demonstrate effective implementation and adoption of these technology skills to attract and retain high quality talent and maintain relevance in the new economy (Surry & Baker, 2016).

Society is experiencing an era of constant innovation, proliferation of digital access and collaborative technology and learning content, resulting in increased technology adoption rates, use and accessibility throughout daily life (Yu & Prince, 2016). This change has challenged school leaders with supporting the integration of technology in a time of educational reforms and redefined expectations of schools and their leaders. (Hines, Edmonson, & Moore, 2008; Yu & Prince, 2016).

> Technology can be a powerful tool for transforming learning. It can help affirm and advance relationships between educators and students, reinvent our approaches to learning and collaboration, shrink long-standing equity and accessibility gaps, and adapt learning experiences to meet the needs of all learners. To realize fully the benefits of technology in our education system and provide authentic learning experiences, educators need to use technology effectively in their practice. (Office of Educational Technology, 2017, p. 1)

Educational leaders are responsible for the support and implementation of technology and supporting rapid changes in schools to prepare staff to meet future community and educational

demands in preparing students for a global economy (Hines et al., 2008; Yu & Prince, 2016). Anderson and Dexter (2005) observed "technology leadership has greater leverage on desired outcomes than does technology infrastructure and expenditures" (p.73). With rapid changes in technology and information contexts, education leaders need to understand the impact information sharing technologies have on society, organizations, families, and individuals and use best practices to facilitate environments that support transformational learning utilizing these technologies (Anderson & Dexter, 2005; Hines et al., 2008). Technology plans in many states emphasize the role of school leaders in modeling and supporting technology to promote improvement of school efficiency, effectiveness, and productivity (Yu & Prince, 2016).

Research by Anderson and Dexter (2005) and Flanagan and Jacobsen (2003) suggests school administrators and their technology leadership are a key influencer a teacher's effective use of technology during instruction. Technological leadership is functional leadership practice emphasizing a leader's responsibility to "develop, guide, manage, and apply technology within various organizational operations so as to improve operational performance" (Chang, 2012, p. 328). Technology leadership also incorporates the shifting of culture to foster technology-rich learning environments throughout the school (Flanagan & Jacobsen, 2003). To effectively support teachers in using technology, school administrators should feel comfortable and knowledgeable about technology and understand when and how technology may be effective in enhancing student learning. (Holland & Moore-Steward, 2000; Yu & Prince, 2016). Fostering the use of, and learning through, digital tools requires "access to effective training and support and modeling by leadership to cultivate their skills, beliefs, and practices with technology will be essential practice" (Curwood, 2013, p. 89).

In a school leadership study, Davis, Darling-Hammond, LaPointe, and Meyerson (2005) suggest workplace learning opportunities should be, "well defined and coherent linking goals and learning activities around a set of shared values, beliefs and knowledge about effective administrative practices" (p. 9). These learning opportunities should be varied, providing participants with sufficient opportunities to apply curricular content in simulated and authentic settings, solving real-world problems, and collaborating in groups or cohorts (Davis et al., 2005). Goldrin, Preston, and Huff (2010), suggest job-embedded learning for school administrators should allow for implementation of learning within a school site context and recognize and address needs that may be different at various points during their careers. Scaffolded, sustained learning related to the conditions and activities encountered by the administrators with multiple learning opportunities and in various formats have resulted in a positive change in practice (Smith & Ueno, 2006; Goldring et al., 2010). However, many learning initiatives do not account for adults learning methods (Borko, 2004). Technology training is often ineffective and does not account for an adult learner's technology beliefs, personal practices, and individual sense-making processes (Curwood, 2011; Mouza, 2009). Most approaches to technology training ignore personal context, focusing on the tools and skills while neglecting the individual learner's personal beliefs, values, experiences, and ideas (Ertmer, 2005). Numerous studies cite use of traditional training techniques, often emphasizing "decontextualized skills, rote memorization, and disembodied learning" (Curwood, 2013 p. 94). Training for digital competency presented as isolated skills, may result in learners that are unable to effectively integrate them into practice (Curwood, 2013).

School leaders will continue to face challenges in using technology as role models with the accelerating pace of innovation, communication and larger amounts of data, redefining the

expectations and accountability at all levels of the organization in the digital age (Yu & Prince, 2016). Therefore, technology use should not be limited to formal teaching and learning processes, but should extend into daily organizational practices and management and aim to create support networks which facilitate exchanges of ideas and strategies and promote discussion and reflection of practice (Hamzah, Juraime, & Mansor, 2016; Goldring et al., 2010; Hines et al., 2008; Yu & Prince, 2016). If technology is to become a central part of professional practice, changes in educational policies, supports for digitally mediated learning, and learning design supports are needed to support leaders in positively affecting learning at all levels in schools. (Curwood, 2013)

Problem Statement

Cloud-computing has become the new paradigm in the education technology landscape (Syamsuddin & Al-Dabass, 2014). Currently, educational organizations are implementing cloud-based applications at rapid pace that provide users access to computing resources and associated workplace learning and training opportunities at any place and time (Paquette, Jaeger, & Wilson, 2010; Andriole, 2012; Shawish & Salama, 2014). Educational leaders are expected to use, and support staff in the use of cloud-based technologies that result in high levels of adoption and increases in staff collaboration and student achievement (Yu & Prince, 2016).

Anderson and Dexter (2005) found considerable variances in technological leadership capacities and organizational support systems. The Office of Educational Technology (OET) 2017 National Education Technology Plan (NETP) emphasizes a need for, “an education workforce with an ability to curate and share digital learning content as an important component of a robust infrastructure for learning” (OET, 2017, p. 7).

The same report suggests only a few schools utilize technology to improve daily learning and provide support for technology rich "informal learning experiences aligned with formal learning goals" (OET, 2017, p. 8).

In 2009, the Organization for Economic Cooperation and Development (OECD) reported significant numbers of educators expressed an increasing need for Information and communication technology (ICT) teaching skills. The report also concluded teaching staff transitioning into the classroom may be underprepared to utilize technology effectively (OECD, 2009).

Nevertheless, a gap exists in the literature available today in understanding the informal learning experiences and motivations of school administrators adopting cloud-based knowledge management technology. Even with increases in opportunities for training and professional development, support in the use of technology continues to be identified as a high level need, possible reflecting an ongoing challenge for schools to respond to the rapid pace of technological change and to fully utilize technology resources (OECD, 2009).

In the OECD (2009) report, a lack of satisfactory technology training offerings was cited as a barrier to engaging educators in more learning and development, thus possibly limiting technology use and adoption. This may also suggest a lack of capacity building in terms of how best to use digital technology in schools (OECD, 2009).

Therefore, a need exists to understand the motivations and experiences related to informal learning, to promote adoption of cloud-based knowledge management technology by school site administrators in order to create school environments that reflect the best practices and expectations of school leadership and instructional staff (OET, 2017).

Purpose

The purpose of this study was to explore the motivations and learning experiences of school site administrators related to adopting Google Apps for Education as a cloud-based knowledge management technology. In depth interviews were conducted with six school site administrators. Study participants were selected using purposeful sampling from administrators in across California. Participants were selected using a snowball sampling method initiated within the researcher's professional learning network, having adopted Google Apps for Education as a cloud-based knowledge management technology.

Importance of the Study

District and school site administrators may be able to use information and data from this study to guide the policies and training initiatives related to technology adoption at all levels within organizations resulting in staff prepared to be dynamic, adaptive, and collaborative learning community participants.

The OET (2017), states that any learner entering a classroom should encounter, "a teacher fully capable of taking advantage of technology to transform learning" (p. 40). Findings in this study may assist accrediting institutions, advocacy organizations, state policymakers, administrators, professional learning designers, and educators in designing a technology-enabled workplace with learning environments that are aligned with adult staff learning needs (OET, 2017).

Findings from this study may assist school systems, education preparation programs, and state and local policymakers, in transforming and expanding pre- and in-service learning to create informal learning experiences designed to integrate technology and content area learning reflecting the prevalence of connectivity and device access in schools (OET, 2017).

Findings from this study may support effective implementation of a vision or model for technology and assist in understanding how organizations can create technology-rich learning environments, modeling effective and appropriate uses of technology tools to support both students and staff in learning (OET, 2017). The findings may further support education leaders in creating informal workplace learning opportunities supportive of sustainable information sharing and peer learning efforts both within their institutions and beyond.

The findings of this study may provide contexts for leaders to examine and reflect on environmental variables related that may contribute or detract from establishing cohesive communities of practice utilizing cloud-based knowledge management technology. Understanding these contexts may assist in properly allocating resources and facilitating informal workplace learning opportunities supportive of cloud-based technology adoption (OET, 2017).

The findings of this study may support education leaders in ensuring the availability of ongoing, job-embedded, and relevant workplace learning with a vision aligned with Framework for 21st Century Learning (P21) (Framework for 21st Century Learning, 2015) and International Society of Technology Educations (ISTE) Administrator Standards (International Society for Technology Educators, 2009) with the teacher and student as a learner. Education leaders might use the findings in conducting collaborative inquiry related to planning informal workplace technology learning opportunities. This may facilitate administrators in build the capacity of the school as an organizational unit, learning in parallel with staff members, ensuring staff are supported by a wide variety of resources, tools, and collaboration opportunities (OET, 2017).

An increasing demand for technology initiatives are increasing the demands on school administrators to use and provide high quality technology training for cloud-based knowledge

management technology (Yu & Prince, 2016). This study may provide information relating to variables to be explored at the planning and implementation level of workplace learning and cloud-based knowledge management technology that may be transferable across organizations to promote increased adoption by education leaders and school staff.

Definition of Terms

Cloud-based computing. Cloud-based computing is, "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services)" (Mell & Grance, 2011, p. 2).

Digital competency: "The skills, knowledge, and attitudes that make learners able to use digital media for participation, work, and problem solving, independently and in collaboration with others in a critical, responsible, and creative manner" (Hatlevik, Guðmundsdóttir, & Loi, 2015, p. 124).

Informal workplace learning. Gu, Churchill, and Lu (2014) defines informal workplace learning as, "learning without formally organized content and learning that occurs outside of formally organized settings" (p. 1049). Ley et al. (2014) further clarify this definition to learning that is "informal, multi-episodic and happens on a just-in-time basis" (p. 1036), within the context of problem-based work processes.

Knowledge management. Farrell (2017) defined organizational knowledge management as "the active engagement of applying information with human expertise to facilitate decision making and to educate colleagues as to organizational practices and systems" (p. 675). A process that promotes sharing and using knowledge that employees have learned or gathered through experience, in formal organizational structures to achieve common goals (Farrell, 2017).

These organizational structures may provide uniform data distribution process to employees contributing in a decision making process, assist with sharing knowledge among employees (Farrell, 2017).

School administrator. As defined by Gürsel (as cited by Öznacar & Dericioğlu, 2017) "a school administrator is a person, who organizes and instructs school staff; and plans, coordinates and inspects work in order to achieve goals at the school" (p. 254).

Technology adoption. The diffusion, spreading of general use and application throughout a population, of a technology innovation at the individual level through social processes (Oguz, 2016).

Theoretical and Conceptual Framework

Activity Systems Theory. Activity Systems Theory (AST) was used as a framework to study activities within learning experiences. Exploring informal learning processes through the lens of a philosophical framework assisted in understanding and identification of potential relationships between the components within learning contexts to facilitate deeper understanding of school administrator's informal learning experiences (Jonassen & Rohrer-Murphy, 1999; Karakus, 2014). In this study, AST was be used for the purpose of exploring the learning context of technology, people, and activities.

Technology Acceptance Model. The Technology Acceptance Model (TAM) is widely utilized as a framework to explain the use of new technology suggesting numerous factors, primarily Perceived Usefulness and Perceived Ease of Use, may influence an individual's attitudes and intentions related to using the technology (Davis, 1989; Arpaci, 2017). Rogers (1962) began the research movement in technology acceptance with Theory of the Diffusion of Innovation. Fishbein and Ajzen, 1975 followed with the Theory of Reasoned Action (TRA).

Davis (1989) introduced connected TRA to technology with the TAM, leading to expanded theories including the TAM2, TAM3, and the Unified Theory of Acceptance and Use of Technology (UTAUT). Each of these theories has contributed to a deeper understanding of technology acceptance and integration. Technology Acceptance Model 3 (TAM3) is a revised model of TAM introducing additional variables and also suggests Experience and Voluntariness act as modifiers of Behavioral Intention defined as the individuals overall reaction when using a system and belief of continued personal use of the system (Davis, 2001; Venkatesh, Morris, Davis, & Davis, 2003). This study used AST as the lens to study informal learning experience within TAM3 to provide additional information for potential use in the advancement of technology acceptance theories.

Research Question

The following research question guided this research study: What are the motivations and lived informal learning experiences of public education administrators adopting Google Apps for Education?

Delimitations

There were two delimitations in this study: (a) sample, and (b) sampling criteria. First, study participants included only participants in a school site administrative role in an educational setting requiring a California Administrative Credential and who currently supervises at least one certificated employee. Second, study participants included only school administrators at a school site which has adopted a cloud-based knowledge management technology, specifically Google Apps for Education. This cloud-based service provides online applications for word processing, spreadsheets, and presentations.

Google Apps for Education is commonly used in education as an inexpensive tool, already in use by many students inside and outside of school. (Bennett & Pence, 2011; Bonham, 2011; Sultan, 2010).

Limitations

There were several limitations in this study: (a) the results and their implications came from individual employees employed as school administrators in California, (b) the results may not be generalizable to other organizations or settings, (c) the study relied on participants understanding the questions and reliably and truthfully responding, (d) organizations studied were at different stages of implementation of cloud-based technology, and (e) participants may have had varied confidence and knowledge related to cloud-based knowledge management.

Assumptions

The researcher recognized four assumptions in this study. These assumptions include that: (a) participants answered interview questions honesty (Wargo, 2015), (b) the sample inclusion criteria was appropriate and therefore, "assures that the participants have all experienced the same or similar phenomenon of the study" (Wargo, 2015, p. 1), (c) participants had a "sincere interest in participating in the research" (Wargo, 2015, p. 1), and (d) participants were able to accurately recall experiences with details.

Organization of the Study

This study is organized into five chapters. Chapter One includes the background of the study, problem statement, purpose statement, importance of the study, definition of terms, an overview of the theoretical and conceptual frameworks, research question, delimitations, limitations, and assumptions. Chapter Two presents a review of the literature, which includes

historical and present literature to support the context for study, a description of theoretical frameworks guiding the research. Chapter Three describes the research design and discusses the research methodology and rationale for the study. Chapter 4 presents findings from the data collected in the interviews. Finally, Chapter 5 offers a summary of the study, discussion of the findings, potential implications, limitations, proposed areas of further research, and conclusions.

Chapter 2: Literature Review

The literature review provides context for this qualitative phenomenological study exploring and describing the lived experiences and perspectives of school site administrators related to their informal learning in the workplace while adopting Google Apps for Education as a cloud-based knowledge management technology. A review of currently available literature establishes a background for exploring lived experiences through application of TAM3 and Activity Systems Theory (AST). Combining theories may assist in understanding experiences and perceptions of public school administrator's informal learning during adoption of cloud-based knowledge sharing technology. Narrowing the search to relevant key terms related to the central concept of the study generated a narrowly-focused, expansive representative amalgamation of literature discussing adult learning theories, social learning theories, professional development theories, and finally technology acceptance and activity theories (Leedy & Ormond, 2010).

Historical Background

Society and technology.

Social informatization. The process social informatization is described as the transitioning of social and economic structures from the physical realm to an information and knowledge realm (Huang, Chen, Yang, & Loewen, 2013). Social informatization is "the gradual coupling process of the digital world and the real world" (Huang et al., 2013, p. 5). As technology advances at a rapid rate, an ever expanding amount of information becomes accessible to an increasing number of people (Huang et al., 2013). This accelerating rate of increased access changes various fundamental aspects of our lives often resulting in greater efficiency and an increased challenge continually adapting to technological changes (Huang et

al., 2013). “Social informatization makes people aware of the convenience of accessing information, but in the face of a large volume of information, individuals will also feel overwhelmed and frustrated due to the abundance of irrelevant information” (Huang et al., 2013, p. 5).

In learning the social informatization process shifts learning designs from formal settings of information consumption and recall toward knowing how to utilize communication and information technology as tools for information processing, learning, and collaborating (Huang et al., 2013). These tools have the ability to stretch our interactions with information and each other, because “the internet provides transformational opportunities to work on authentic problems in collaboration with people and organizations worldwide” (Anderson-Inman, 2009, p. 136).

In *The World is Flat: a Brief History of the Twenty-First Century* (Friedman, 2005) the author describes a society and economy where computer, Internet, and software technologies make knowledge accessible to everyone, and speed up the pace of innovation. To meet the demands of this new environment, people are extending their cognitive processing, integrating technology as part of cognitive activity (Prensky, 2013). “Experiential learning, with participation in activities and problem solving in groups, combined with the virtual world will gradually become the mainstream way of learning” (Huang et al., 2013, p. 6). The use of technology and learning must now exist in symbiosis, as a lack of technology tools will result in learners with a deficient as informational thinkers (Prensky, 2013).

The educational technology landscape has experienced rapid changes across the country in fundamental aspects including availability of a variety of technology hardware to schools, students, and staff with continuous reduction in costs as well as high speed Internet connectivity

in most classrooms and communities (OET, 2017). To remain relevant and competitive in this new environment school leaders must be skilled in the use of new technologies (Prensky, 2013).

The paradigm of cloud computing. Both the program (application used such as a word processor) as well as the data (document content) remain in a data center, often called the "cloud" and are delivered to through networks to the user (Armbrust et al., 2009; Erenben, 2009). The location of these servers is irrelevant from the users point of view, as the services utilize the interconnectivity of the Internet to deliver services to users anywhere a connection is present (Nevin, 2009). Mell and Grance (2011) categorized cloud services into three three primary levels. The first two levels, Infrastructure as a Service and Platform as a Service, are concerned with providing physical computing resources including data storage, data processing, and data transfer, as well as programming resources including languages and environments and used for programming (Mell & Grance, 2011; Zhang, Cheng, & Boutaba, 2010). The third level, Software as a Service (SaaS) may be best known area of cloud computing which includes the applications hosted remotely and provided across networks to users. (Mell & Grance, 2011; Zhang et al., 2010). Resources found in this third level are generally accessed from a web browser and have a broad range of implementation that include web-based application services, multimedia services, and web services (Zhang et al., 2010). The IaaS and PaaS levels are utilized primarily in implementation by software developers and IT staff with most users only having passive contact with these levels (Zhang et al., 2010). Therefore the focus of this research will be limited to the third level, SaaS. Google Apps for Education (GAFE) is an example of SaaS.

GAFE provides several applications including cloud based software for word processing, spreadsheets and presentations (Nevin, 2009). These applications work across multiple types of computing devices that have access to the Internet regardless of operating systems (Nevin,

2009). GAFE takes advantage of the versatility of cloud-based SaaS to provide users a productivity suite where users have access to a collaborative environment regardless of location (Nevin, 2009). These cloud applications offer users a variety of additional tools to collaborate including email, shared document systems, shared calendaring systems, video conferencing, web page and multimedia sharing, and more (Nevin, 2009; Rowe, Bozalek & Frantz, 2013). Sharing documents in real time with others provides an easy method for group collaboration and continuous and instant feedback (Rowe et al., 2013). GAFE also reduces the concern of data loss as changes saved automatically and in real time (Nevin, 2009). The GAFE platform is secured with limited access granted by the educational organization, with all data residing within the registered domain and access requiring a user login (Nevin, 2009).

Technology implementation in K12 education. Technological changes in society redefine digital competence and require continuous learning of new skills for students, teachers, and school administrators (Hatlevik et al., 2015). Adequate training in using technology effectively, based on specific needs of each role must be provided (Ndahi, 2003). The increased adoption of technology within all parts of our society has resulted in an increased demand to move toward new techniques in the areas of technology integration within our education systems (Instefjord & Munthe, 2017).

Enhancing Education through Technology Act of 2001 (EETTA). Federal laws governing education policy within the United States contain language outlining expectations regarding adoption of technology within education (EETTA, 2005). The stated purposes of the EETTA highlights the need for constant access to training, up to date research related to teaching and learning using technology to develop the capacity of teachers and administrators to effectively integrate technology (EETTA, 2005).

EETTA (2005) defines its primary goal as "improving student academic achievement through the use of technology in elementary schools and secondary schools" (p. 1).

Every Student Succeeds Act of 2017 (ESSA). ESSA (2017) expands on this initial goal and includes language specific to technology use and support for effective use of technology to "discover, adapt, and share relevant high-quality educational resources," (p. 222) "support teacher collaboration, and personalize learning," (p. 223) and build technological capacity which may include providing teachers and instructional leaders training in effective uses of technology.

National Education Technology Plan. The NETP "supports a vision that all young children will have adults in their lives who are well-informed on how to use technology to support learning at various ages" (OET, 2017, p. 13) The OET states,

> "Technology can be a powerful tool for transforming learning. It can help affirm and advance relationships between educators and students, reinvent our approaches to learning and collaboration, shrink long-standing equity and accessibility gaps, and adapt learning experiences to meet the needs of all learners. To fully realize the benefits of technology in our education system and provide authentic learning experiences, educators need to use technology effectively in their practice." (ESSA, nd, p. 1)

Cloud computing in education. Globally, thousands of schools are registered for Google Apps for Edition (Nevin, 2009). Cloud computing continues to flourish within education, however, current research in the area of cloud computing adoption practices remains limited (Lim, Grönlund, & Andersson, 2015). Much of the current empirical literature of adoption of cloud computing in education is void of administrator perspective, examining adoption at the classroom level (Taylor & Hunsinger, 2011; Yuvaraj, 2013; Bhattacherjee & Park, 2014;

Oyeleye, Fagbola, & Daramola, 2014; Burda & Teuteberg, 2015). Earlier research has demonstrated leadership as a prominent catalyst in successful technology adoption initiatives (Anderson & Dexter, 2005; Flanagan & Jacobsen, 2003; Schiller, 2003; Wang & Rode, 2010). Success of cloud computing within the context of schools is the responsibility of the school administrator as an educational leader (McGarr & Kearney, 2009). Often adoption of new technologies within a school are limited based on the comfort and familiarity of the principal (McGarr & Kearney, 2009).

Cloud computing has various identified benefits leading to increased levels of use in education including easy access to data, software available anywhere, ability to share of learning material, peer-to-peer communication and collaboration, and the ability to independently learn at any location (Lim et al., 2015). In a study of 249 school principals, approximately 70% ranked cloud file storage and use highest for indication of current and future use, specifically identifying Google Drive as one of the most important cloud-based service (Lim et al., 2015). Yet, current literature lacks information about perceptions of school administrators related to adoption of cloud computing in educational contexts (Lim et al., 2015).

The changing role of the public school administrator. Surfacing research on technology use by students has changed the role of the school administrators creating new responsibilities to lead the implementation and adoption of technology and prepare teachers to use technology effectively (OET, 2017).

Public school administrator as a knowledge worker. The exponential growth and specialization of knowledge as a result of widespread use of ICT in the workplace has redefined the nature of work and the design of social relationships transforming the context of today's knowledge workforce to one of information sharing, teamwork, continuous innovation, and

decentralized decision making (Ledward & Hirata, 2011). Success of school communities now relies the ability to innovate in response to continuously changing circumstances and increasing demands (Ledward & Hirata, 2011). School administrators must have the ability to harness the potential of technology to collaborate, increase productivity, and to model problem-solving using effective strategies in communicating, sharing, and using information (Binkley et al., 2012).

Knowledge workers may often be unaware of learning occurring while working (Littlejohn, Milligan, & Margaryan, 2012). Exploring learning as a set of behaviors occurring within the context of work may assist in developing a richer understanding of how these behaviors related to and support adoption of technology (Milligan et al., 2014).

Technology standards for public school administrators. Standards and frameworks are used to inform educational practices and research in areas of technology adoption within learning environments and contexts. As one example, the ISTE developed the ISTE Standards-A to support educational leaders outlining the skills, knowledge and strategies needed to succeed in developing technology-rich school environments in support of digital age learning (ISTE, 2009). The ISTE Standards-A are comprised of five standards: "(a) visionary leadership, (b) digital age learning culture, (c) excellence in professional practice, (d) systemic improvement, and (e) digital citizenship" (Yu & Prince, 2016, p. 242).

Visionary leaders create and implement a shared vision for technology integration throughout an organization (ISTE, 2009). The vision should be designed to inspire purposeful change to maximize leadership performance and support of effective instructional practices using digital resources (ISTE, 2009). A digital age learning culture creates, promotes, and sustains a dynamic focused on innovating for continuous improvement of digital learning, with frequent modeling of effective technology use, and create environments that meet the diverse

requirements of each individual learner (ISTE, 2009). Educational administrators model excellence in professional practice by promoting and engaging in professional learning to empower educators in the use of contemporary technologies and digital resources. This might include allocating time and resources for professional learning, facilitating learning communities for all stakeholders, modeling effective collaboration using digital resources, and evaluation of new technologies (ISTE, 2009).

Systemic improvement focuses leadership on the improvement of the school through the effective allocation of resources to support technology use at all levels (ISTE, 2009). Systemic improvement relies on management of purposeful school wide change designed to increase appropriate use of technology resources through creation, sharing, and routine evaluation of key metrics, purposeful recruitment and retention of competent staff, and maintenance of robust technology infrastructures (ISTE, 2009). Finally, educational administrators promote digital citizenship through modeling an "understanding of social, ethical and legal issues and responsibilities related to an evolving digital culture" (ISTE, 2009, p. 2). These issues and responsibilities relate to ensuring equitable access to resources and legal, ethical, and safe use promoted through a shared culture of understanding at the school (ISTE, 2009).

ISTE and P21 both suggest learning activities should address standards and align with desired skill set (ISTE, 2009; P21, 2009) A key policy recommendation cited in 21st Century Skills Education and Competitiveness Guide is to increase implementation of 21st century skills and strategies within schools by increasing the capacity of education administrators and their school teams through continuous learning (P21, 2008). Three of the guiding recommendations for 21st Century Skill Professional Development focus on capacity and development of education leaders (P21, 2009). These three areas of focus include: creating differentiated

professional learning environments that facilitate, risk taking, and collaborative relationships; developing leadership teams trained and empowered to develop district-level strategies to infuse 21st century skills throughout the organization; and training administrators around modeling and leading 21st century skills initiatives (P21, 2009).

Technology in leadership. Administrators must model innovative practices in the adoption of technology to facilitate and support its use throughout the school (Chang, 2012). However, the continuously increasing rate of technological change has challenged educators with increased pressure to learn new ways to incorporate technology into their practices. (Mishra, Koehler, & Henriksen, 2011) The continuous advancement of technology has resulted in additional the responsibilities of technology support and leadership for school administrators (McLeod & Richardson, 2011). Additionally, administrator's assigned responsibilities in technology leadership may fail because of knowledge gaps, insufficient training, or lack of confidence (Afshari, Yusuff, & Derayatifar, 2012).

Technology proficiency of school administrators has become increasingly important and requires a willingness to change existing paradigms and shift behaviors (Chang, 2012; Richardson, Flora, & Bathon, 2013; McLeod & Richardson, 2011). School administrators should be mindful of the roles digital technology has within their work, understand the appropriate and innovative uses for new technologies, and develop proficiency in effective technology use and application (Schiller, 2003). Demonstrating this personal proficiency in technology promotes a school culture that values learning and fosters experimentation (Schiller, 2003).

Currently, the school administrators role in technology leadership has not been widely studied (Schiller, 2003; Reddish & Chan, 2007; Afshari et al., 2012). Although technology may significantly influence administrator performance as well as school effectiveness, the literature is

limited regarding the school administrators' use of technology, perceived competency, or preferences for technology learning (Afshari et al., 2012; Schiller, 2003).

Technology in instructional leadership. Computers and mobile devices increasingly play a critical role in mediating learning. These technology devices have become the primary tool for school administrators and teachers in their role as knowledge workers (Milligan et al., 2014). To fully realize the benefits of technology education providers should collaborate on effective practices and uses of technology to improve education (OET, 2017). As use of cloud-based networks increases and continues to blur boundaries and disrupt previously isolated roles in education, these efforts to infuse technology into authentic learning experiences must be supported at all levels by administrators, teachers, learners, and their families (OET, 2017; Milligan et al., 2014).

Learning networks result in more effective learning by holding and making available, the individual contributions of participating members as a collective resource (Littlejohn, Milligan, & Margaryan, 2011). As specific needs arise, these network connections become important resources for learners providing a variety of new resources and information allowing for the creation and augmentation of existing knowledge (Dron & Anderson, 2009).

A network participant may then practice reflective learning and generate and share new knowledge within the learning network such as problem-solving techniques or shared resources (Margaryan, Milligan, Littlejohn, Hendrix, & Graeb-Konneker, 2009).

Professional Learning

Professional learning designed for 21st century skills competency should use digital tools combined with practice of 21st century skills to prepare educational leaders to effectively integrate technology into schools and classrooms with competency and confidence (P21, 2009).

These practices should assist educators in integrating 21st century skills into daily practice through collaborative learning communities allowing participants to construct their own knowledge and harness existing and developing expertise within the organization. (P21, 2009) "Professional learning should support and develop educators as fluent users of technology; creative and collaborative problem solvers; and adaptive, socially aware experts throughout their careers" (OET, 2017, p. 37). Professional development should also be embedded with the context of an individual's work and address challenges of learning to use technology (OET, 2017).

Andragogy. In 1984, Knowles introduced andragogy as an adult learning theory emphasizing adult pedagogy to accommodate the self-directed, responsibility motivated nature of adults (Knowles, Holton III, & Swanson, 1998). Andragogy has applications in various forms of adult learning and has been extensively studied throughout current literature (Knowles et al., 1998). Andragogy assumes adults learn best when they recognize the immediate need and significance of the knowledge and can apply learning experientially to solve problems and learning throughout life as a continual process (Knowles et al., 1998; Lieb, 1991). However, adult learners commonly have more responsibilities at home and work and may be apprehensive in situations involving new learning (Lieb, 1991). Therefore, adults require incentive and relevance as factors for learning (Lieb, 1991). Instructors should participate as a facilitator using techniques such as self-evaluation, role playing, simulations, and case studies to focus on process rather than content.

Knowles et al. (1998) and Brookfield (1995) suggest andragogy has six principles:

- Adults need to understand: "how learning will be conducted, what learning will occur, and why learning is important" (Knowles et al., 1998, p. 133);

- Adults have the ability to control the learning style, purposes of learning, learning goals, explore appropriate resources, and self-evaluation progress;
- Prior experience serves as a valuable resource and impacts learning through individual differences, bias, and self-identity;
- Life situations and changes create a readiness to learn;
- Adults prefer to learn through problem solving in real-life context;
- Motivation to learn stems from the ability of new knowledge having the ability assist in solving important problems in their life.

Experiential learning. Rogers and Freiberg (1994), distinguished experiential learning as applied knowledge specifically addressing the goals and desired outcomes of the learner such as learning to use a computer in order to send an email. In experiential learning the participant should have an openness to change and be personally involved in self-initiated activities that will result in personal change and growth of the learners (Rogers & Freiberg, 1994). The role of the teacher in experiential learning is to facilitate the natural propensity to learn through: (a) creating a positive learning environment; (b) providing clarity of learning purpose and goals; (c) providing organized learning materials and resources;
(d) balancing the social-emotional and intellectual learning components; and (e) exploring thoughts and feelings with learners (Rogers & Freiberg, 1994).

The role of the learner is to: (a) fully participate and control direction of the learning process; (b) confront practical, social, and personal problems; and (c) self-assess progress and evaluate the method of success (Rogers & Freiberg, 1994).

For experiential learning to be significant, the learning should be self-initiated with a subject matter of personal interest to the learner, should minimize external threats to personal identity, attitudes, and perspectives (Rogers & Freiberg, 1994).

Characteristics of adults as learners. Cross (1981) attempted to integrate andragogy and experiential learning as learning frameworks in the Characteristics of Adults as Learners (CAL) model. This model is consists of four principles: (a) adult learning should take advantage of previous experience; (b) aging limitations should be accounted for in adapting learning experiences; (c) adults should progress through developmental stages motivated by appropriate levels of challenge; and (d) adults should have choice from a variety of available learning options (Cross, 1981).

The first three principles are affected by personal characteristic variables based on experience, lifespan, and development stages (Cross, 1981). Progression through lifespan results in deterioration of senses such as eyesight and hearing as well as motor abilities such as reaction time. However, the through the same lifespan progression a person's intellectual abilities such as reasoning and decision-making, and specialized vocabulary, tend to improve (Cross, 1981). Developmental stages are a series of plateaus and transitions sometimes related to age and other times related to major life events such as marriage, career transitions, and, retirement (Cross, 1981). The last principle is affected by situational variables of the learning context which may be affected by schedules, locations, and procedures as well as the motivational factors of voluntary versus compulsory learning and the nature of self-directed, problem-centered adult learning (Cross, 1981). The CAL model provides guidelines for adult learning, however a gap currently exists in the literature to support the model.

Transformative learning. In 1991, Jack Mezirow developed the transformational learning theory described as being "constructivist, an orientation which holds that the way learners interpret and reinterpret their sense experience is, central to making meaning and hence learning" (Mezirow, 1994, p. 222). The theory views learning as instrumental and communicative with the former focusing on discovery of relationships between cause and effect and problem solving, while the latter involves how learners communicate their needs and desires (Mezirow, 1994).

Learning involves a change to existing structures of perceptions, meanings and "predispositions resulting from psychocultural assumptions which determine the horizons of our expectations" (Mezirow, 1994, p. 223). These structures can be classified into three schemes of meaning or predispositions: sociolinguistic, epistemic, and psychological (Mezirow, 1994). These structures are developed through reflective processes that "involves a critique of assumptions to determine whether the belief, often acquired through cultural assimilation in childhood, remains functional for us as adults" (Mezirow, 1994, p. 223). The schemes are "the constellation of concept, belief, judgment, and feelings which shapes a particular interpretation" (Mezirow, 1994, p. 223). Mezirow suggests these schemes and structures shift as a result of reflection, similar to problem solving as both require the learner to "reflect on the content of the problem, the process of problem-solving, or the premise of the problem" (Mezirow, 1994, p. 223). It is through reflection the learner is able to understand personal thought processes and integrate new learning "by refining or elaborating our meaning schemes, learning new meaning schemes, transforming meaning schemes, and transforming meaning perspectives" (Mezirow, 1994, p. 224). The transformative learning process refines, elaborates, transforms, or generates new meaning schemes (Mezirow, 1991).

Situated learning. Lave and Wenger (1991) suggest learning is usually unintentional and situated as part of an activity occurring within culture and context. Knowledge should be transferred in authentic context in contrast to classroom learning where learning activities tend to be abstract (Lave & Wenger, 1991). Situated learning requires social interaction where learners collaborate within a "community of practice" or specific learning domain which share certain desired skills, behaviors and beliefs (Brown, Collins & Duguid, 1989; Lave & Wenger, 1991). As a beginner enters the community and progresses to its center, they continuously participate and define the culture gradually assuming an expert level role (Lave & Wenger, 1991). In an analysis across five unrelated group settings Lave and Wenger (1991) observed gradual transference of knowledge from group experts to group learners within a context of routine activities. Lave and Wenger (1991) coined this process 'legitimate peripheral participation.'

Practice-based theory of professional education. In 1999, Ball and Cohen suggested a theory of professional learning centered on practice, viewing role of educator as a skill learned while practicing suggesting, "to propose otherwise would be like expecting someone to learn to swim on a sidewalk" (p. 12). Ball and Cohen's approach to learning rests on three foundations: (a) the basis of learning must be "a conception of practice and what it takes to practice well" (p. 12); (b) learning should include information related to functional practice related to personal attributes, skills, and knowledge; and (c) professional education should build a foundation for ongoing learning using tools and analysis to facilitate personal inquiry (Gabriel, 2011).

Educational practices related to the continued change and discourse require continuous inquiry into the development of pedagogical structures. "Although, a good deal of money is spent on staff development in the United States, most is spent on sessions and workshops that are often intellectually superficial, disconnected from deep issues of curriculum and learning,

fragmented, and noncumulative" (Ball & Cohen, 1999, p. 3). Ball and Cohen describe professional education in the United States as "poorly equipped to produce deeper and more complex learning in students as well as teachers. Weak teacher education, inherited conservative traditions, and little professional capacity for learning and change combine to inhibit reform" (Ball & Cohen, 1999, p. 5)

Practice-based professional development depends on cultural shifts in learning, transitions from directed tasks to continuous solicitation of feedback and input related to the learner's perceptions of critical skills, knowledge, and resource needs to effectively implement change in schools (Gabriel, 2011).

Informal learning. Traditional concepts of learning tend to concentrate on formal learning contexts such as school and session-based trainings (Marsick, Watkins, Callahan, & Volpe, 2006). However, these are part of an individual's learning experience as most learning occurs outside of these formal contexts as either incidental or informal experiences (Marsick et al., 2006). Workplace learning is often informal and consists of combining intrapersonal and interpersonal experiences (Eraut, 2004). Informal learning may be used to describe learning taking place independent of a formal settings, often without organized content (Sefton-Green, 2004). Informal learning is often episodic in nature, occurs over time, and is typically triggered by an inconsistency between prior experiences and an unfamiliar experience which is unable to be controlled through automatic cognitive processes (Eraut, 2000; Sefton-Green, 2004). This inability to resolve a situation with a known routine creates an opportunity for constructing knowledge resulting in a learning experience (Sefton-Green, 2004).

Today's workplace provides a variety of problems and dilemmas creating opportunities for informal learning through critical reflection and experimentation (Smylie, 1995). Lohman

(2000) found educators associated informal learning with three primary activities: (a) independently collecting resources from sources outside the organization; (b) testing new techniques and ideas; and (c) sharing and reflecting on individual and group practices and experiences. However, Ley et al. (2014) note, school administrators generally work in environments with time and resource constraints that may prevent them from processing important experiences as they occur. This lack of reflection time may have a potentially negative influence on their ability to benefit from interactions as learning opportunities and share gained insights with others (Ley et al., 2014).

Davenport (2014) and Kop (2011) outlined types of activities knowledge workers might engage in which include, relating, aggregation, creation, application, packaging, and sharing. Milligan et al. (2014), defined four key learning behaviors used by both technical and non-technical knowledge workers while learning within informal networks: knowledge consumption, knowledge creation, knowledge linking, and knowledge contribution.

New knowledge may be created by connecting with other people within a learning network or through the searching, collection, and connecting of knowledge and information resources created by others (Milligan et al., 2014). This may include connecting with others both inside and outside an organization with shared interests or goals with the intention to achieve shared goals though collaborative idea development, experience sharing, or mutual support (Milligan et al., 2014).

Individuals may then connect the knowledge to current practice with a more focused view of a topic or practice or a new understanding about relationships between different topics or practices (Milligan et al., 2014). Sharing these connections and new understandings publicly increases the value to the individual and creates knowledge structures for the benefit of others.

This collaborative process may become cyclical, creating an evolving collective knowledge that changes through time and adapts to new innovations (Milligan et al., 2014).

Milligan et al. (2014), suggest these behaviors are foundational to the planning, management and reflection of an individual's self-regulated information learning processes referred to as 'charting'. Charting is defined as the individual's metacognitive process of planning, implementing and reflecting on learning and development (Milligan et al., 2014).

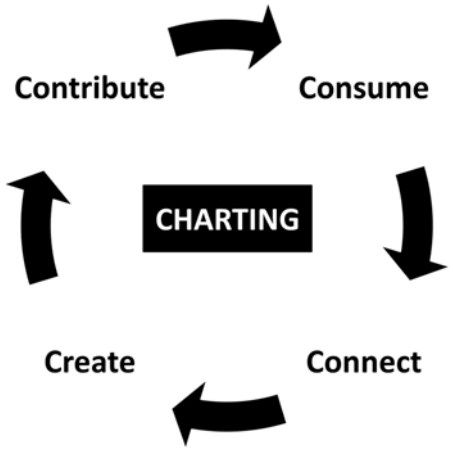

Figure 1. Charting learning pathways with 4c behaviours. Reprinted from "Workplace Learning in Informal Networks," by C. Milligan, A. Littlejohn, and A. Margaryan, 2014, *Journal of Interactive Media in Education, 1*, p. 6. Copyright 2014 by Journal of Interactive Media in Education. Reprinted with permission.

Goal setting is generally focused narrowly on organizational structures and subject to fixed topics and timelines (Milligan et al., 2014). Self-regulated learning requires personalized goal-setting as an instrument to articulate desired outcomes, design appropriate learning tasks, and observe growth (Milligan et al., 2014). As learning is an inherently social activity, sharing these goals may promote interactions between learners by creating a common "social object" (Engeström, 2005).

The prevalence and accessibility of cloud-based technology within all aspects of education now provides learners with dynamic tools that can mediate the goal setting and

learning and processes utilizing existing shared knowledge to create new interests and experiences (García-Peñalvo et al., 2013; Marsick et al., 2006) These cloud-based knowledge sharing technologies are embedded within the daily routines of most educators and learners which creates opportunities for engaging in learning regardless of setting or formal institutional structures (García-Peñalvo et al., 2013). When coupled with cloud-based technologies, informal learning offers opportunities for learners to discover and define their own learning goals and experiences (García-Peñalvo et al., 2013).

Organizational structures for informal learning. Knowledge-intensive organizations are increasingly recognizing embedded, unscheduled informal learning as key locus of learning (Harteis & Billet, 2008). Research by Brown and Duguid (1991) suggest historically, organizations have used canonical and noncanonical practices to facilitate informal learning activities, asserting that outcomes resulting from each approach will be distinctly different.

The canonical approach formalizes activities with sanctioned practices, activities or structures. Learning networks in these types of organizations may be privately available with controlled access within the organization (Milligan et al., 2014). Learning in a canonical environment occurs only with others in the same organization with shared permissions, potentially limiting the benefit of acquisition of new knowledge through interactions outside of organizational boundaries knowledge sharing technologies provide. (Tapscott & Williams, 2006)

The second, noncanonical approach, structures the organizational environment to promote new and existing naturally occurring communities of practices which may result in self-regulated learning activities (Brown & Duguid, 1991). Within noncanonical structures "learners can in one way or another be seen to construct their understanding out of a wide range of materials that include ambient social and physical circumstances and the histories and social

relations of the people involved" (Brown & Duguid, 1991, p. 47). In a noncanonical environment, individuals structure their learning interactions by developing internal and external trusted networks that can be called upon as needed to provide the knowledge and resources to support their current need (Milligan et al., 2014).

Processing informal learning experiences. The processing of learning experiences is the cognitive categorization and connecting of prior knowledge and experiences to current experiences to influence responses to future experiences (Eraut, 2004). Schugurensky (2000) classified informal learning into three distinct forms using awareness and intentionality as key differentiators: (a) tacit (without awareness or intent); (b) incidental (with awareness but lacking intent); and (c) self-directed (with awareness and intent). Tacit learning implies the learner has no conscience intent to learn and no awareness of having acquired knowledge or skills (Schugurensky, 2000). Incidental learning is not purposeful, but the learner becomes aware at an undefined point in time (Schugurensky, 2000). Self-directed learning refers to activities executed by learners with intention and awareness (Schugurensky, 2000).

Research by Ley et al. (2014) suggests informal learning may be fluid within these categories and occur within knowledge cycles with specific types of learning triggers. For example, individuals performing a task may be operating from tacit knowledge with well-developed schemas without the need for a defined reflective activities, when an unexpected learning moment may trigger reflection and examination of the developed schemas (Ley et al., 2014). Shifting to a self-directed form of learning by recording these experiences in context for sense making and reflection, reinforced by collective knowledge, and at a later time may enhance long term tacit knowledge (Ley et al., 2014).

Both incidental and tacit learning occur without intention or awareness, therefore these learning outcomes may not be fully known or understood by study participants. As the self-directed learning experience occurs as an activity with intention and awareness of the learning, this study will focus on the reflections and recall of this informal learning type. To assist in analysis and understanding of the lived experiences of school administrators, the informal learning process will be framed as activities occurring within an Activity System.

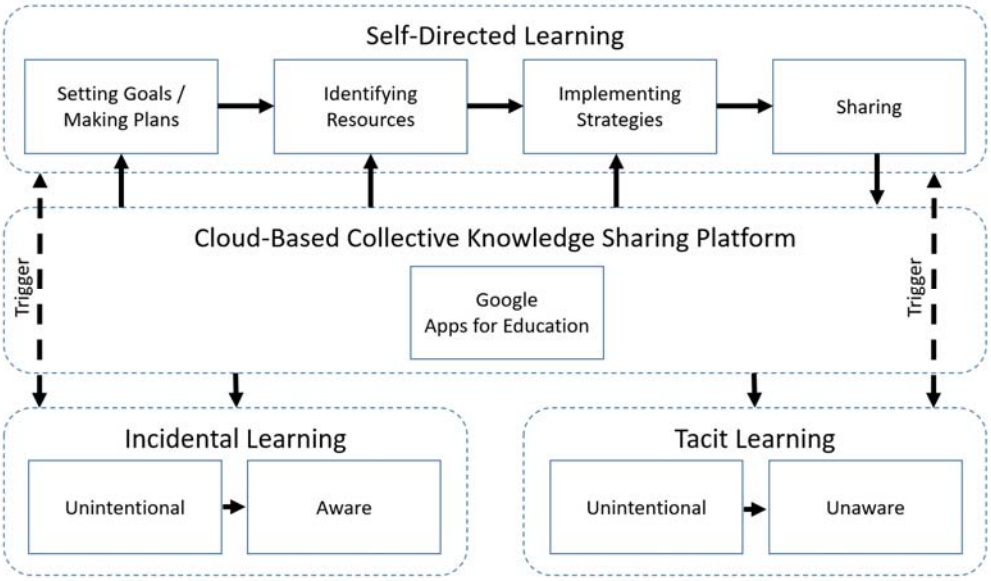

Figure 2. Informal learning schema.

Theoretical Framework

Activity system theory.

Activity theory. Activity theory (AT) in its simplest form suggests that activity serves as the foundational investigative unit in social science research (Kaptelinin & Nardi, 1996). Activity theory studies an individual actor working toward an outcome through action on an object (Engeström, 1999). According to Petrovsky, Yarochevski, and Korenko (as cited in Bedny & Harris, 2005) "activity is defined as consisting of internal (cognitive) and external (behavioral)

processes, which are regulated by conscious goals" (p. 130). Activity includes various actions or sets of actions motivated by an objective or purpose (Engeström , 1999).

As a framework, activity theory provides structure for analysis of both collective and individual activities (Engeström, 1999; Kaptelinin & Nardi, 2006). Engeström (1999) notes, the classic model of activity did not account for the context of an activity, and extended the model to include socio-technical context such a rules, communities, and division of labor. Kaptelinin and Nardi (2006) slightly redefined the model to examine the influence of competing needs on object-driven activities.

Activity mediators. Humans respond to information and stimulation through various indirect connections beyond the stimulus-response reflex (Cole, 1976). Therefore, analysis of an activity requires consideration the type of activity as well as the actor engaged in the activity, the actor's intentions, motives, and goals (Bedny & Harris, 2005). Engeström (2001) expressed Vygotsky's model of mediated action a triad connecting the subject, object, and mediating tools (Figure 3).

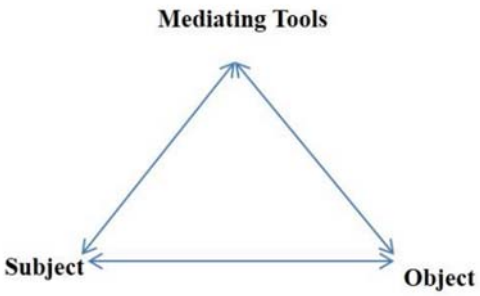

Figure 3. Vygotsky's reformulated model of mediated action. Adapted from "Expansive Learning at Work: Toward an activity theoretical reconceptualization," by Y. Engeström, 2001, *Journal of Education and Work, 14*(1), p. 134. Copyright 2001 by Taylor & Francis. Reprinted with permission.

Within this triad, the subject such as a person or group of people are interlinked with an object defined as a goal or objective through a tool mediating action (Engeström, 2001). In

object-oriented activities, the subject (an individual or group of individuals) is an actor utilizing tools on a material object (Bedny & Harris, 2005). A subject-oriented activity involves more than one subject and consists of social interactions or an exchange of information (Bedny & Harris, 2005). Social interactions develop within context of physical objects, and interactions with objects have a foundation in social norms and standards (Bedny & Harris, 2005). Therefore, any analysis of object oriented activity should always consider subject-subject as well as subject-object relationships (Bedny & Karwowski, 2004). Leont'ev (1978) expanded on Vygotsky's (1978) theory generating a second generation of AT to defining three levels of activity that work simultaneously with motives, goals and actions, as well as conditions and outcomes.

Motive and goal. The motive, viewed as the desire to satisfy an unmet need, is considered the catalyst of activity, while a goal is the cognitive representation of a future desired result achieved through conscious actions or activities (Bedny & Harris, 2005). Motive drives the activity, while a goal guides and directs actions (Bedny & Harris, 2005). Motive emerges when both long-term and situational connections form between needs and objects (Bedny & Harris, 2005). The amount of effort a subject will expend to achieve a goal is related to the intensity the desire to satisfy the motivational need (Bedny & Harris, 2005). As a cognitive function, the goal may vary in level of clarity and detail through an activity possibly starting as a vague concept and becoming more precise with increasing object clarity (Bedny & Harris, 2005). Goals may be formulated and accepted in advance or formed, modified or completely transformed throughout the course of an activity (Bedny & Harris, 2005).

In self-regulated activity, goal-formation can be associated with the subject's level of aspiration when attempting to problem-solve, and may be influenced through the subject's evaluation of the actual result of actions (Bedny & Harris, 2005). As actions are performed by

the subject, a trial-and-error analysis results in the formation of a hypothesis about the situation, followed by the construction or reconstruction of a goal (Bedny & Harris, 2005). This constructed goal reflects the subject's level of aspiration, resulting from an assessment of task difficulty by combining elements of self-evaluation and objective characteristics of a task (Bedny & Harris, 2005).

Action. An action is a discrete act, either cognitive or physical, performed by an individual in an attempt to attain a consciously desired goal or result. (Engeström, 1999; Bedny & Harris, 2005). Actions are accomplished through logically organized motor and mental actions driven by goals (Bedny & Harris, 2005). Actions may be unconscious operations, determined by the conditions in which the activity is occurring, these unconscious operations may transform into conscious actions with changes in conditions (Engeström, 1999; Bedny & Harris, 2005). The same goal may have multiple associated actions (Bedny & Harris, 2005). Similarly, multiple goals may share one action (Bedny & Harris, 2005).

In activity theory, cognition is the mental organization of action carried out in conjunction with the storage of images, ideas, and propositions. All actions have an elements of temporal measurement, beginning with development of a conscious goal (goal formulation and acceptance) and concluding with evaluation of actual results relative to the conscious goal (Bedny & Harris, 2005). This temporal nature of activity can be expressed as a continual activity flow containing individual units (Bedny & Harris, 2005). Bedny and Harris (2005) described this expressed this flow in an interconnected recursive loop. Figure 4 presents Bedny and Harris' (2005) one-loop action system.

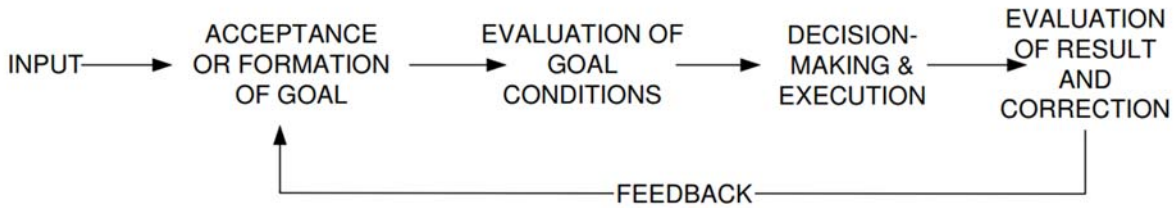

Figure 4. Action as a one-loop system. Reprinted from "The Systemic-Structural theory of activity: Applications to the study of human work," by G. Z. Bedny & S. R. Harris, 2005, *Mind, Culture, and Activity*, *12*(2), p. 132. Copyright 2005 by Taylor & Francis. Reprinted with permission.

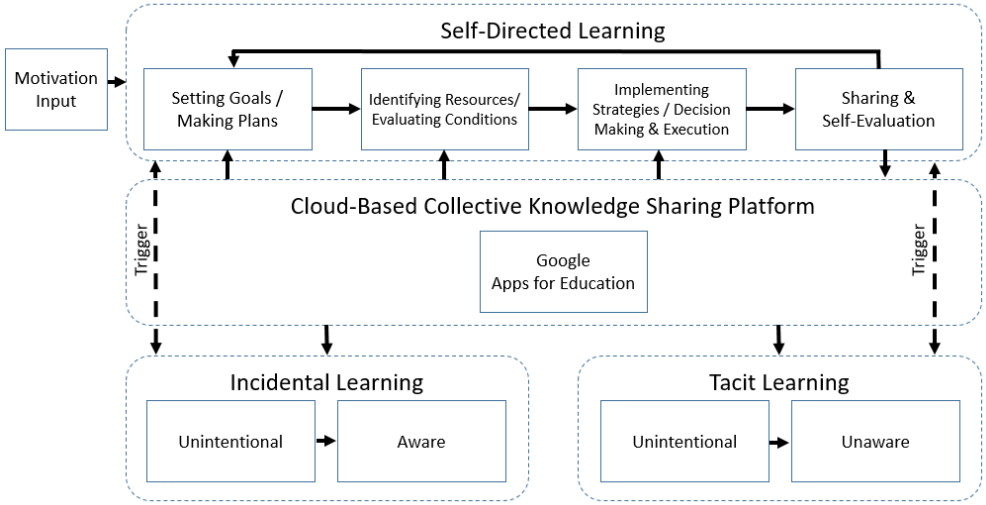

Figure 5. Self-directed informal learning schema as a one loop action system.

Objects. The object of activity is that which is modified and examined by the subject according to the constructed goal (Bedny & Harris, 2005). Objects are defined by the goal and task of an activity and may be tangible or abstract such as signs, symbols or images, in whole or partial units formed by the subject in to align with goals (Bedny & Harris, 2005). An object has distinguishable states during an activity including the initial, intermediate, and final state which corresponds to the goal of the action or activity (Bedny & Harris, 2005). Modification or examination of an object to achieve a goal may include physical alteration of an object, the grouping of objects, and the discovery of the objects features (Bedny & Harris, 2005).

One representation of activity theory is the triadic schema elaborated by (Bedny & Harris, 2005). In Bedny and Harris' (2005) schema, the object and goal are treated as distinct components and not only the subject-object relationship, but also intersubjective relations are illustrated

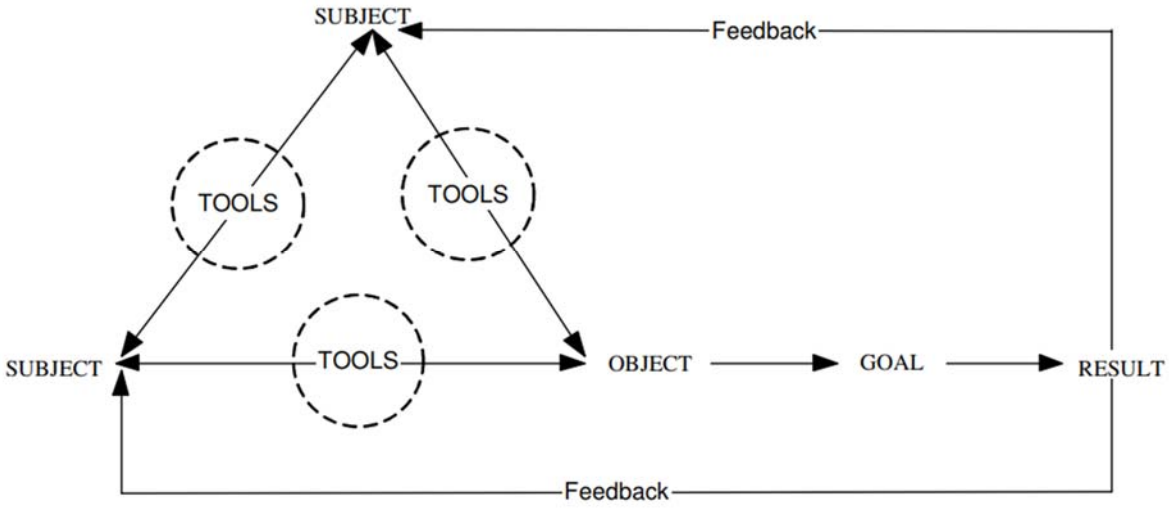

Figure 6. Triadic schema of activity. Reprinted from "The Systemic-Structural theory of activity: Applications to the study of human work," by G. Z. Bedny & S. R. Harris, 2005, *Mind, Culture, and Activity, 12*(2), p. 132. Copyright 2005 by Taylor & Francis. Reprinted with permission.

In Bedny and Harris', 2005 schema, the object and goal are treated as distinct components and not only the subject-object relationship, but also intersubjective relations are illustrated (Bedny & Harris, 2005). This emphasizes that any notion of 'objectives' must relate to the goal, rather than the object of activity (Bedny & Harris, 2005). The broken circles in the figure indicate that subject-object interaction may be either direct, or through the use of external mediating instruments (Bedny & Harris, 2005). By the same token, intersubjective interaction may be direct (speech, gesture), or instrumentally mediated (e.g. telephone, email) (Bedny & Harris, 2005). In both object-and subject-oriented actions, direct interaction should not be taken as implying an absence of mediating instruments; rather, in such cases the subject employs "internal" tools.

In activity theory, the subject is always understood as a socially constituted individual, in possession of internal, psychological tools acquired during ontogeny (Bedny & Harris, 2005). Such internal tools are assumed as a precondition of subjectivity (Bedny & Harris, 2005). Unlike Engeström's triadic schema, Figure 1 also distinguishes between the concepts of goal and result (Bedny & Harris, 2005). Whereas the goal is a primarily cognitive mental representation of the desired future state of the object, the result is the actual outcome of activity (Bedny & Harris, 2005). The result of an activity may coincide with the goal, or it may not. It follows that subjects' attempts to reach a desired result align with their established goal; if the actual result of an activity does not coincide with the subject's goal, then she or he must reformulate their strategy for goal achievement, or reformulate the goal itself (Bedny & Harris, 2005). This process of continual adjustment requires the presence of feedback influences, and implies that activity is organized according to principles of self-regulation (Bedny & Harris, 2005). These feedback influences are also presented on the schema, represented by arrows connecting the result with the subject (Bedny & Harris, 2005).

Activity systems. An expanded third generation of AT known as the activity system included additional elements of community, rules, and division of labor (Issroff & Scanlon, 2002; Mwanza & Engeström, 2003). Mwanza and Engeström (2003) developed the activity systems triangle model focusing on a mediation-type relationship between six interacting components: subjects, objects, tools, rules, division of labor and community.

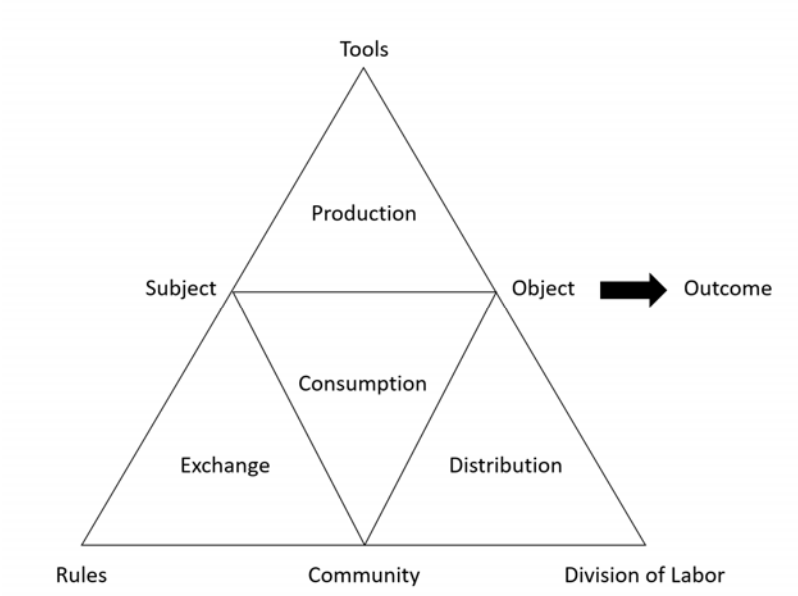

Figure 7. Triangular model of human activity. Reprinted from *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research,* by Y. Engeström, 2014, p. 63. Copyright 2014 by Cambridge University Press. Reprinted with permission.

As with activity theory, subjects are individuals or groups involved in an activity, objects are tactile materials or cognitive constructs transformed or modified by the subjects of an activity (Huang, 2002). Tools are all things that may be utilized to assist in object transformation and include digital networks, computers, and writing utensils, psychological constructs, models, or past experiences (Kaptelinin & Nardi, 2006). Rules promote shared community behaviors and can include the traditions, relationships, and processes of a group (Kaptelinin & Nardi, 2006). Division of labor is the recognized roles, responsibilities, and authority of individuals in a group (Kaptelinin & Nardi, 2006). Community is defined as a group of individuals with regular interactions that share common objects, expectations, and norms (Kaptelinin & Nardi, 2006; Ng & Hung, 2003; Huang, 2002).

Prior studies have utilized the activity systems model as a theoretical framework to incorporate elements of intentionality, irregularities of subjects and objects, and the influences of social structures on activity, to explore learning experiences in educational settings (Issroff &

Scanlon, 2002; Jonassen, 1991; Jonassen & Rohrer-Murphy, 1999; Kaptelinin & Nardi, 2006; Nardi, 1996).

The activity system model posits that systems interact as a method to accomplish functional goals actively one or more subsystems (Engeström, 1987; Jonassen, 2000). The model defines four subsystems using the six components, production (how the subject transforms the object), exchange (how rules control interactions between the subject and the community), distribution (how division of labor within a community enable the subject to accomplish the object) and consumption (how the collaboration between the subject and the community benefit from and are used to accomplish the object) (Engeström, 1987; Jonassen, 2000). Each subsystem describes the utility, connection and association in relation the other subsystems. (Engeström, 1987; Jonassen, 2000).

Identifying contradictions. Engeström (2001) suggests the "dialogue, multiple perspectives, and networks of interacting activity systems" (p. 135) may assist in clarifying the contradictions within the subsystems as well as in the outcomes. Contradiction describes specific "structural tensions," that develop within or among activity systems (Engeström, 2001). These tensions may exist between any components of the activity system (Engeström, 2001). For example tension can occur between the object of different subjects with varied motives or tension may occur between a subject and rules if the rules are difficult to understand or apply in relation to the subject's motive (Engeström, 2001). The value of activity theory is the ability to classify the tensions among the various components within an activity system creating visiblility and tractability. (Engeström, 2001). Activity systems often cycle between periods of relative stability and disruptive changes that result from the buildup of one or more contradictions within the system (Engeström, 2005).

Introducing new technology into an activity system creates a potential for tension between new methods and current rituals (Engeström, 2005). New technology does not always achieve the desired outcome of an activity, often resolving contractions in some areas and developing contradictions in others (Engeström, 2005). These cycles of contradiction can result in transformative change and innovation over time (Engeström, 2005).

Overcoming contradiction is the motivating factor innovation and development within activity systems (Engeström, 2001). Activity systems have been used in learning contexts to examine learning processes and identify contradictions (Choi & Kang, 2009; Kaptelinin & Nardi, 2006). Using activity theory as the lens, technology adoption research may be used "for answering questions about how digital learning systems are being used in different contexts and how implementation variations relate to differences in outcomes" (Office of Education Technology, 2013, p. 20)

Activity systems to examine learning processes. Researchers have utilized activity systems in examining learning processes. Hung, Tan, and Koh (2006) examined transformation of learning communities within a school context. The research provided a framework for identifying key changes resulting in activity system transformations including school structure and policy, evolution in learning activity design and student and teacher belief systems (Hung, Tan, & Koh, 2006).

Hung and Chen (2001) utilized activity systems in distinguishing negotiation and appropriation of knowledge in online learning. The study suggested that without clarity between the two objectives of negotiating and appropriating, discrete instructional approaches for each learning goal may applied inappropriately (Hung & Chen, 2001). The study differentiated the negotiating of knowledge as information that has yet to be constructed or established, while

appropriating knowledge is consumption of information the community has accepted (Hung & Chen, 2001). Through analysis using activity systems, the researchers identified the processes unique to each objective (Hung & Chen, 2001). The processes of appropriating knowledge was found to include actions such as scaffolding, modeling and coaching while the process of negotiating knowledge included queries, clarification, visualization, elaboration and synthesis (Hung & Chen, 2001).

If school administrators as knowledge workers, rely on informal learning activities as an aspect of their professional development and model these behaviors, and if the nature of the activity systems might influence the effectiveness of organizational change and adoption, then more should be understood about activity system factors and contradictions influencing informal learning. This information might contribute to the reconsideration of traditional or unintentional approaches to implementation of informal learning for public school administrators.

The interview questions for the current study were designed utilizing the eight-step activity system model suggested by Mwanza and Engeström's (2003) to elicit school administrator's perspectives on their informal learning experiences while adopting GAFE.

Table 1

The Eight Step Model (Modified)

Steps	Elements	Questions to ask
1	Define an Activity	Describe how you use Google Apps for Education?
2	Objective	Why did you need to learn and use Google Apps for Education?
3	Subject	While learning Google Apps for Education, who have you asked for assistance and what was the outcome?

(continued)

Steps	Elements	Questions to ask
4	Tools	What tools, materials, or resources did you use while learning to use Google Apps for Education?
5	Rules and Regulations	What encourages you to learn and use Google Apps for Education? What impedes your learning and use of Google Apps for Education?
6	Division of Labor	While learning Google Apps for Education, who has offered assistance and what was the outcome?
7	Community	Do formal or informal Professional Learning Communities support your learning about Google Apps for Education?
8	Outcome	What specific features, tools, or use examples made you want to learn about Google Apps for Education?

Note: Adapted from "Pedagogical adeptness in the design of e-learning environments: Experiences from Lab@Future project," by D. Mwanza and Y. Engeström, 2003, *paper presented at the E-Learn 2003 International Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education*, p. 3. Copyright 2003 by Association for the Advancement of Computing in Education. Adapted with permission.

Technology Diffusion

Steinmueller (2001) asserts the rapid development of portable knowledge management systems has accelerated the diffusion of technology creating new challenges such as: increased skills and training required for efficient use, adaptation of technology meet organizational individual needs, and increased support infrastructure and costs. Lack of knowledge and proficiency leading to attainment of technology benefits may contribute to failed adoption (Moens, Broerse, Gast, & Bunders, 2010). Research by Hyunju, Longhurst, and Campbell (2017) suggests, proficiency of technology skills can occur within one year of training, while changes in beliefs and behavior may take longer and be dependent on reinforcing experiences. Weng and Tang (2014) suggest school administrators with strong beliefs and understanding in technology

usefulness, may be more likely to perform actions or strategies related to technology leadership leading to improved innovation diffusion resulting in increased overall administrative effectiveness. However, a lack of knowledge and proficiency leading to attainment of technology benefits may contribute to failed technology diffusion (Moens et al., 2010).

Innovation diffusion generally emphasizes social and economic context, however when viewed as a multidimensional process involving a different rates of adoption, there may be epistemological variances beyond those attributed to these contextual factors (Avgerou, 2010; Guan & Liao, 2014). Innovation diffusion and adoption eventual success rates may vary based on existing social and cultural norms and conditions but may also be dependent on support systems willingly provided by an organization (Herbig & Dunphy, 1998; Sabia, Uzoka, Langmiac, & Njeh, 2016).

Innovation diffusion theory derivatives including TAM and Theory of Planned Behavior have been applied in many studies examining adoption behavior of cloud-based computing (Behren, Sharek, Meade, &Wiebe, 2011; Bhattacherjee & Park, 2014; Burda & Teuteberg, 2015; Oyeleye et al., 2014; Tan & Kim, 2011; Taylor & Hunsinger, 2011; Yuvaraj, 2013).

Technology Acceptance Model

The TAM is a widely applied framework to explain user acceptance and use of a technology or system. However, it has limited explanatory power in explaining the acceptance and use of various systems. TAM was introduced in 1989 is used to describe how an individual accepts and uses of technology (Davis, 1989; Arpaci, 2017). The model is widely utilized as a framework to explain the use of new technology suggesting numerous factors, primarily Perceived Usefulness and Perceived Ease of Use, may influence an individual's attitudes and intentions related to using the technology (Davis, 1989; Arpaci, 2017). The construction of TAM

over time has increased the models usefulness, with later models such as TAM2, Unified Theory of Acceptance and Use of Technology (UTAUT) and TAM3 introducing determinants and interactions between the factors (Arpaci, 2017). Venkatesh and Bala's (2008) TAM3 extends the number of determinants affecting the two factors of Perceived Usefulness and Perceived Ease of Use of an innovation (Venkatesh & Bala, 2008). TAM3 also expands the behavior component to separate Behavioral Intention from actual Use Behavior. The TAM model and the extensions have been broadly utilized in a variety of available literature, with Google Scholar reporting a combined 53,643 citations of Davis' original 1989 article introducing TAM, Venkatesh and Davis' 2000 article extending TAM (TAM2), and Venkatesh and Bala (2008) research introducing TAM3 as of January, 2018.

Venkatesh et al. (2003) demonstrated that 70% of the variance in usage intention to adopt new technology can be explained by constructs derived from eight usage models including DOI and TAM. Several recent studies have also utilized TAM to However, using Davis' 1989 TAM model on its own may be insufficient for the study of cloud-based computing as it may not address the modern features and social dynamics of technology diffusion and acceptance introduced since the theory was initially proposed. The TAM3 model contains five determinants that influence Perceived Usefulness are Subjective Norm, Image, Job Relevance, Output Quality, and Result Demonstrability. The model also proposes Perceived Ease of Use is influences from four anchor variables (Computer Self-Efficacy, Perceptions of External Control, Computer Anxiety, and Computer Playfulness) and two adjustment variables (Perceived Enjoyment and Objective Usability). TAM3 also suggests Experience and Voluntariness act as modifiers of Behavioral Intention defined as the individuals overall reaction when using a system and belief of continued personal use of the system (Davis, 1989; Venkatesh et al., 2003).

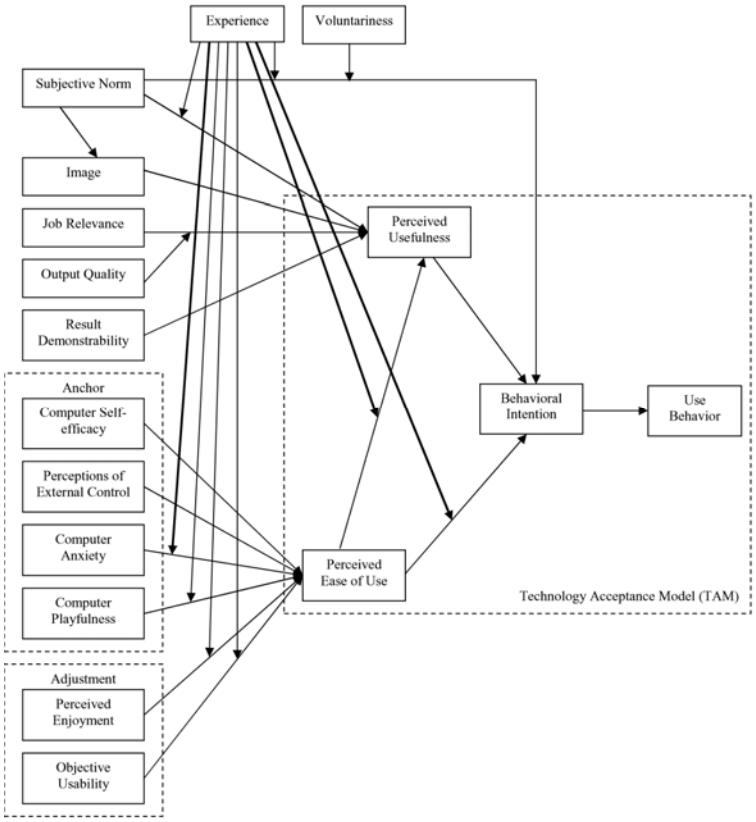

Figure 8. Technology Acceptance Model 3. Reprinted from "Technology Acceptance Model 3 and a research agenda on interventions," by V. Venkatesh & H. Bala, 2008, *Decision Sciences, 39*(2), p. 280. Copyright 2008 by John Wiley and Sons. Reprinted with permission.

TAM 3 has specifically integrated experience as an acting modifier for behavior intent within adoption and use of computer innovations, which includes cloud-based knowledge sharing platforms. Using the experiences of informal learning processes as the modifier for behavioral intention satisfies the explorative purpose of this study and assisted in answering the research question.

Conclusion

The expertise of how to use technology effectively does not come through the completion of one educational technology course separate from other methods courses but through the inclusion of practice and experience, as well as modeling by others (OET, 2017). Administrators should be prepared to model how to select and use the most appropriate apps and tools to support

learning and evaluate these tools against basic privacy and security standards (OET, 2017). The nature of this study is to explore the technology adoption of school administrators using TAM3, specifically using the components of the activity systems theory the framework for examining the informal learning process as a mediating experience within the TAM3.

Chapter 3: Methodology

This chapter reviews the purpose and research question of this phenomenological study, then describes the design used for this study and how the study was conducted. This description includes methodology, the setting, population, sample, and sampling procedures. Next, the chapter describes human subject considerations, the instrumentation used, the data collected, management of the data, as well as the process for analysis of the data. Finally, the chapter concludes with the positionality of the researcher.

Study Purpose

The purpose of this study was to explore the motivations and learning experiences of school site administrators related to adopting Google Apps for Education as a cloud-based knowledge management technology.

Research Question

The following central research question guided this research study: What are the motivations and lived informal learning experiences of public education administrators adopting Google Apps for Education?

Research Methodology and Rationale

This study utilized a qualitative approach and phenomenological design. Phenomenological studies depend on lengthy interviews to develop an understanding of the phenomenon, and this study's intent is to conduct and examine in-depth interviews with public school administrators at various levels of adoption from different organizations, who are current members of the researchers Professional Learning Network or referred to the researcher as a qualified candidate meeting the sample criteria, and are employed in a district utilizing Google Apps for Education as a cloud-based knowledge management technology (Shank, 2006). The

interviews were be conducted face-to-face using a semi-structured interview protocol consisting of seventeen questions designed to learn more about the participant's informal workplace learning experiences.

Qualitative research is effective in describing and understanding a new phenomenon, addressing a problem in which the variables are unknown and may need further exploration (Creswell, 2013). Phenomenology is described as "both a branch of qualitative research and a mode of philosophical inquiry, which seeks to describe the phenomenon in question with as much richness of detail as possible, with the unique goal of describing the 'essences' of the phenomenon that contribute to an understanding of meaning" (as cited in Randles, 2012, p. 11). By looking at diverse perspectives of the experiences, common themes may emerge from the analysis of data assisting the researcher in understanding the larger picture of the topic of study with each participant providing a different perspective (Neuman, 2006). Since the objective of this study was to investigate the phenomenon of participants who have gone through the shared lived experience of informal learning as a public school site administrator adopting Google Apps for Education as a knowledge management technology, a qualitative approach with phenomenological methodology was selected (Groenewald, 2004).

A qualitative research method offered many advantages over quantitative research for this study. Quantitative research was not a suitable choice for this study as quantitative research involves studying relationships between dependent and independent variables (Leedy & Ormrod, 2010). Because there was not a complete understanding of informal learning experiences of education administrators adopting cloud-based knowledge-sharing technology during literature review, no credible variables could be identified.

Other qualitative research designs may have include (a) narrative study, (b) grounded theory study, (c) ethnographic study, and (d) case study (Creswell, 2013). The next few paragraphs explain the reasons why the phenomenological design was chosen over others.

Narrative studies involve examination of stories through collection and examination of various forms of data including documents and communications such as e-mails, video tapes, and publications (Creswell, 2013). Due to confidentiality nature of the study, the participants were not required to provide documents or materials. Therefore, content analysis was not appropriate because of the limited materials available for review. Grounded theory research design focuses on development of a new theory to explain the described phenomenon (Creswell, 2013). The purpose of this study was not to explore a new theory, therefore this this design is not appropriate.

Ethnography research design focuses shared patterns and behaviors of entire culture-sharing group or similar community studied through immersion and observation (Creswell, 2013). Ethnography research design was not appropriate for this study because the participants will come from different organizations and cultures.

Case study research design is about researching a particular project, activity or program (Creswell, 2013). Case study was not appropriate for this study as the researcher seeks to investigate a diverse range of activities and learning experiences across a several organizations.

Credibility/Trustworthiness for Study Design

Lincoln and Guba (1985) discuss trustworthiness of qualitative data as the four aspects of credibility, confirmability, dependability, and transferability.

Credibility of data in this study was based on using data from multiple participants for coding of themes. The appearance of the same themes across data from different participants

provided credibility for the data analysis (Lincoln & Guba, 1985). Confirmability of data deals with the conclusions of the researcher being based on the actual data (Lincoln & Guba, 1985). The researcher collected and analyzed the data while acknowledging and recording his own subjective thoughts.

Dependability of data is achieved when the researcher provides the audience with a description of how the research developed (Lincoln & Guba, 1985). Data was collected and analyzed as described by the researcher. Transferability is achieved through description of the participants, settings, and data collected within the study in such a way that a reader can determine if the findings of one study would be transferable to another setting based on these descriptions (Lincoln & Guba, 1985). This study included as much demographic data as possible while still attempting to protect participants.

Setting

The participants were selected from school sites with grades ranging from transitional kindergarten through twelfth grade. Administrators interviewed had between three and twenty years of experience. The interviews were held as face-to-face interviews in closed-door meeting places.

Population, Sample, and Sampling Procedures

Population. Active public school administrators currently using Google Apps for Education to complete their assigned duties, serving in the role of Principal or Assistant Principal with at least one year of experience supervising at least one teacher, at a school site that has adopted Google Apps for Education as a cloud-based knowledge management technology.

Sample. Qualitative researchers use a small sample size, and the questions are open-ended (Shank, 2006). The effort to collect data via a qualitative approach is time-consuming, so

only a small sample size was used (Leedy & Ormrod, 2010). In phenomenology, the number of participants has ranged from 1 up to 325 (Creswell, 2013). Dukes (as cited in Creswell, 2013) "recommends studying 3 to 10 subjects" (p. 157).

The sample for this study consisted of six school administrators who met the following criteria:

- Supervising a school site serving one or more grades K-12;
- Supervising at least one teacher;
- holding a supervisory position for one or more years; and
- using Google Apps for Education while performing work duties.

Sampling procedures. Lunenburg and Irby (2008) describe the purpose of qualitative research "is to obtain an in-depth understanding of purposively selected participants from their perspective" (p. 177) utilizing techniques that produce samples that are, "predominantly small and nonrandom with an emphasis on in-depth description of participants' perspectives and context" (p. 177).

Purposive sampling was used by "selecting a sample based on the researcher's experience or knowledge of the group to be sampled" (Lunenburg & Irby, 2008, p. 175). Purposeful sampling was used to recruit school site administrators at organizations that use Google Apps for Education as a knowledge management technology. The researcher also used criterion and snowball sampling to select participants. Criterion sampling identified those who met specific criterion of school site administrators with informal learning experiences while adopting Google Apps for Education (Lunenburg & Irby, 2008). Snowball sampling was used to allow participants to identify other people who met the defined criterion and were good participants for a study (Lunenburg & Irby, 2008).

The researcher obtained e-mail addresses of potential participants from the researchers Personal Learning Network address book. The participants were e-mailed individual invitations, which included details about the study, asking them to participate in this research study (See Appendix B).

Human subject considerations. The primary goal of human subject considerations is to, "protect the welfare and dignity of human subjects." (Institutional Review Board, n.d., para. 4). To ensure ethical practice during this research study, many steps were taken. First, as an Institutional Review Board (IRB) requirement, the researcher completed the online training for human subject research (see Appendix A). Next, approval to conduct this study was obtained through Pepperdine University's Graduate Professional Schools (GPS) Institutional Review Board (IRB).

Using a recruitment script template (see Appendix B), provided by the university, the researcher e-mailed potential participants to elicit interest to participate in the study. A follow up e-mail was sent one week after the original recruitment script to elicit an increase in response rate (see Appendix C). Upon successful recruitment and scheduling of the participants, the researcher e-mailed each of the participants a consent form prior to the interview date (see Appendix D). The consent form provided an overview of the purpose of the study, potential risks, potential benefits of the study, describe how the data will be used, and request that the interview be audio recorded. In addition to the consent form, the participants were emailed the participant's interview guide (see Appendix E) that included the interview questions to be discussed during the interviews. Providing the interview guide in advance allowed the participants an opportunity to prepare for the interview.

All participants consented to participate in a one-hour face-to-face, audio-recorded, interview. At no time during the interviews did the researcher observes that the participants were uncomfortable for any reason. During two interviews, the participant requested a break and the researcher paused the interview and resumed when prompted.

While seeking participants, only volunteers were included and in no way were obligated to the study. Due to the voluntary and confidential nature of this study, there was minimal risk involved in participating; however, some participants may have experienced mental fatigue or the loss of personal time for the length of the interview session. In attempting to avoid any risk of fatigue during the interviews, the researcher reminded the participants that breaks could be taken as necessary. Additionally, participants could have chosen to not answer questions or to stop the interview at any point within the session. As this study collected data, there was also a risk for breach of confidentiality.

The researcher reminded the participants that, per the consent form, they could follow up with the researcher, the dissertation chair, or the IRB chairperson should they have any questions or concerns after the interview. Participants were reminded prior to all interviews that a participant has the right to leave the study at any time without penalty. The participants could have chosen to opt out of the study at any point during the study. The benefits of this study likely exceeded the minimal risks.

The benefits of this study may be of importance to education leaders in creating informal workplace learning opportunities supportive of sustainable information sharing and peer learning efforts both within their institutions and beyond. The impact of this study may inform school systems, education preparation programs, and state and local policymakers, in the area of informal learning experiences designed to integrate technology and content area learning

reflective of the increased connectivity of and access to devices in schools. Finally, a deeper understanding of cohesive communities of practice utilizing cloud-based knowledge management technology might result in a better understanding of how to properly allocate resources and facilitate informal workplace learning opportunities supportive of cloud-based technology adoption.

Several steps were taken by the researcher to minimize the potential risk to the participants. To maintain confidentiality, the participants were given the informed consent form, but not asked to sign it. Additionally, in order to ensure confidentiality, protect the real identities of the participants, and secure data, participants were randomly assigned a pseudonym designation (Stuart, Jeff, Brook, Shannon, Charlie, and Frank) and a master list of participants and pseudonyms was stored securely and separately from study data in a locked file cabinet with access only by researcher. The participant's names and their school names were not listed in the data. Lastly, the audio recordings and transcripts were kept separate from the master list of participant identities and pseudonyms and study data will be properly deleted a minimum of three years upon completion of this study.

The interviews were transcribed by a commercial transcription provider Rev using an audio segmenting process to ensure confidentiality by preventing any one transcriptionist from having full access recordings with full recordings only made available to Quality Assurance staff who have signed Non-Disclosure Agreements. All data was kept confidential with access to raw data limited to the researcher and dissertation chair. Data included audio recordings, transcripts, and anecdotal notes and will be stored electronically on two encrypted flash drives locked in a fireproof safe in the researcher's home of residence. Lastly, findings are presented in overall

themes when sharing outcomes. The researcher remained sensitive and respectful to all of the participants, balancing the research and content, and interconnecting parts during this study.

Instrumentation

Interviews. The researcher conducted one-on-one semi-structured interviews with school administrators who met the outlined criteria for this study. The interview questions were designed around information gained from the in-depth literature review and the following the guiding research question: What are the motivations and lived informal learning experiences of public school site administrators adopting Google Apps for Education?

There are seventeen interview questions that will guide this study (see Appendix F).

Content validity. Lunenburg and Irby (2008) describe content validity as "the degree to which an instrument measures an intended content area" (p. 181) which is "determined by expert judgement" (p. 181). Content validity for this interview instrument was addressed through (a) literature support and (b) expert review.

Literature support. Table 2 represents the alignment between literature support and the interview questions.

Table 2

Alignment of Interview Questions

Literature Support	Interview Question
Demographic Questions	1. How many years of experience do you have as a school administrator? 2. Would you describe your school as urban, suburban, or rural? 3. What grades does your school serve?

(continued)

Literature Support	Interview Question
	4. How many years has your school been using Google Apps for Education?
	5. How many years have you been using Google Apps for Education?
Activity Theory Subject (Mwanza & Engeström, 2003)	6. Describe how you use Google Apps for Education?
Activity Theory Subject (Mwanza & Engeström, 2003)	7. Why did you need to learn and use Google Apps for Education?
Activity Theory Division of Labor (Mwanza & Engeström, 2003)	8. While you learn and use Google Apps for Education, who has offered assistance and what was the outcome?
Activity Theory Division of Labor (Mwanza & Engeström, 2003)	9. While you learn and use Google Apps for Education, who have you asked for assistance and what was the outcome?
Activity Theory Tools (Mwanza & Engeström, 2003)	10. What tools, materials, or resources did you use while learning about Google Apps for Education?
Activity Theory Rules (Mwanza & Engeström, 2003)	11. What encourages you to learn and use Google Apps for Education?
Activity Theory Rules (Mwanza & Engeström, 2003)	12. What impedes your learning or use of Google Apps for Education?
Activity Theory Community (Mwanza & Engeström, 2003)	13. Do formal or informal Professional Learning Communities support your learning about Google Apps for Education?
Activity Theory Objects (Mwanza & Engeström, 2003)	14. What specific features, tools, or use examples made you want to learn about Google Apps for Education?
Self-Directed Learning (Ley et al., 2014)	15. Do you communicate your learning desires or goals about Google Apps for Education? If so, how?
Self-Directed Learning (Ley et al., 2014)	16. Do you reflect on, evaluate, or share the success of your learning about Google Apps for education? If so, how?

(continued)

Literature Support	Interview Question
Self-Directed Learning (Ley et al., 2014)	17. What changes in your professional practice do you associate with learning about Google Apps for Education?

Expert review. The researcher utilized the assistance of one like subject reviewer and two experts in the field of school administration and professional learning by requesting feedback on the interview questions. The like subject reviewer was a school principal with eight years of administrative experience and four years of experience using Google Apps for Education. The first expert reviewer was retired Deputy Superintendent for a County Office of Education in Northern California holding a Doctorate degree in Education. The second expert reviewer was be a retired Superintendent of a secondary high school district in Northern California holding a Doctorate degree in Education. The three reviewers were requested to provide specific feedback on the nature of the questions, the number of the questions, the clarity of the question language, as well as the appropriateness of the data collection procedures (see Appendix I).

Data Collection Procedures

Unlike quantitative research, qualitative researchers may not have data on a new phenomenon and must collect this new data (Shank, 2006). Appropriate data collection techniques in qualitative research include face-to-face and telephone interviews (Leedy & Ormrod, 2010). Face-to-face interviewing was the preferred interview method for this study this provided a more purposeful and non-distracted interview (Willis, Jost, & Nilakanta, 2009).

The researcher audio-recorded the interviews so that full attention could be given to the participants, allowing the researcher to ask clarifying questions and note observations throughout the interview process. The audio-recording also ensured that the transcribed interviews accurately reflected the participant's experience. Upon completion of the interview, the

researcher de-identified the audio-recording before providing the recordings to an external transcriber. The transcriber was asked to maintain confidentiality and immediately transcribe the audio-recording. Time was allotted to re-listen and compare the audio-recording to the transcribed document to check for accuracy and remove potentially identifiable information. Edits were be made as necessary. Each participant received a copy of their interview transcript to review of accuracy. See (Appendix H) for the interview protocol that the researcher utilized. The following procedures were followed while conducting this study:

- Obtain IRB approval
- Identification of potential participants from the researchers professional learning network with a school site administrative role
- Obtained potential participant email contact information from professional learning network members, personal address book, or publicly available information
- Recruited possible participants via an email invitation to participate in the study (see Appendix B)
- Sent a follow up reminder via e-mail one week later (see Appendix C)
- Provided informed consent form, not requiring participates signature for identity protection, and schedule face-to-face or virtual interviews with the participants who agree to consent (See Appendix D)
- Upon confirmation, e-mailed participant's interview guide (see Appendix E) to assist participants with preparation
- Confirmed the interview day, time, and format via email with the participants two days prior to the interview

- On the day of the interview, provided informed consent form, not requiring participates signature for identity protection, then utilize the interview protocol on day of interview (see Appendix H)
- Audio-recorded the interviews
- Recorded observations via observation log (see Appendix I)
- Transcribed interview sessions, made edits, and stored on two encrypted USB drives locked in a secure safe
- Notified participants of mailed transcripts for accuracy review
- Mailed the de-identified interview transcriptions to participants for review
- Uploaded transcribed interviews to nVivo
- Used nVivo to code the data with at one other experienced coder
- Write a description of the participants' experiences in chapter 4 of this study

Data Management

The researcher took precautionary steps to ensure that the data was securely stored for the participants' protection. First, the participants were provided an informed consent form for their records, but not asked to sign and return the form. Second, a list of randomized pseudonyms was used with the researcher keeping a master list of participants' real names and the pseudonyms separate from the data to protect the participants' identities. Third, the audio-recording, the list of pseudonyms, and the observation logs were be kept on two separate encrypted USB drives. Fourth, access to the raw collected data was limited to the researcher and the dissertation chair. Fifth, a summary of each participant's story was included along with overall themes. Finally, the data collected in this study will be destroyed after three years.

Data Analysis

Shank (2006) suggests a qualitative researcher could use the idea of a four step process in qualitative data analysis: "1. Deciding what type of analysis to use. 2. Classify data already collected. 3. Develop relationships between the different types of data. 4. Present the results of analysis" (p. 146).

To aid in qualitative data analysis, researchers often use thematic analysis which is the "process of understanding qualitative data analysis is to explore the art and practice of coding and analyzing from a more traditionally scientific perspective" (Shank, 2006, p. 148). The researcher imported the transcribed document into nVivo software to facilitate the coding process. Coding and categorizing the data are essential, so the researcher is not overwhelmed with information that contained no relationship of meaning (Willis, Jost, & Nilakanta, 2009). This researcher can keep analyzing until saturation or no new themes are discovered (Shank, 2006). The researcher collaborated with another experienced coder to create a codebook for further analysis. The transcribed data was analyzed using what Moustakas (as cited in Creswell, 2013) referred to as horizonalization. This process recommends the researcher "highlight significant statements, sentences, or quotes that provide an understanding of how the participants experienced the phenomenon," (p. 82)

Once all the interviews had been coded, the researcher examined the document looking for themes to emerge. Van Manen (1984) suggests themes in the data are "like knots in the webs of our experiences, around which certain lived experiences are spun and thus experienced as meaningful wholes" (p. 20). This researcher identified key words and phrases and grouped the similarities together in a matrix. The researcher then provided the code book and the overall themes to the experienced coder used in creating the code book for further analysis.

"These significant statements and themes will be used to write a description of what the participants experienced" (Creswell, 2013, p. 82).

Positionality

The researcher in this study holds a Bachelor's Degree in Media and Communication and a Master's Degree in Educational Administration. The researcher currently holds or has held certification as a Microsoft Certified Teacher, Cisco Certified Instructor, Google Certified Trainer, Microsoft Technology Expert, Microsoft Certified Technology Associate, Microsoft Office Specialist, and CompTIA A+ Technician Certification. The researcher also holds a Clear California Designated Subjects Teaching Credential as well as a Clear California Administrative Credential. The majority of the researcher's work experience has been in the secondary education environment, specifically in Career Technical Education. The past five years has been serving the role of Career Technical Education Principal and Coordinator at a County Office of Education. Technology has played a large role in the researcher's life from a very early age. The researcher learned programming languages, database management, and application interface linking at a young age. The researcher's personal journey began as a computer support and network technician for a school district while enrolled as a student. This led to employment within the E-Commerce industry, eventually leading to teaching computer science in secondary schools, followed by the transition into school site and county-level department administration.

Qualitative research has a key disadvantage of potential bias in design of study and data collection process when the researcher possess the same qualifications of the participants (Elo & Kyngas, 2008). The importance of writing this phenomenology through the lens of the participants is the focus of the researcher. The researcher kept an open mind when interviewing participants and attempted not to establish any correlation with prior knowledge and experience

with technology and learning experiences. Additionally, the researcher bracketed feelings, knowledge, and perceptions so to only focus on those of the participants. The researcher kept an observation log to record ideas and thoughts that occurred during the interviews (Bednall, 2006). After each interview session, the researcher wrote write down notes on the key takeaways of that interview. The observation log will not be shared with the participants, and was used as a reminder to the researcher to be wary of preconceived thoughts and to keep an open mind while reviewing and reporting the data (Bednall, 2006).

Research strategies were purposefully selected to handle potential bias. The researcher was intentional in seeking feedback from various perspectives of those with knowledge related to technology in education. For example, the composition of the Dissertation Committee and expert reviewers consisting of members with experience and knowledge of, professional development, technology, and education research. The researcher was be mindful in asking probing questions, participating with careful listening, and thoughtful reflection. Additionally, the researcher relied on the use of thick and rich description and instrument review.

Finally, the transcripts of interviews were sent to each participant in order to ensure accuracy of the recorded message. Each participant was given the opportunity to review their own transcribed interviews for any misrepresentation or falsifications to avoid misrepresenting of their lived experience.

Chapter 4: Data Analysis

The purpose of this chapter is to present the findings of this research study. The chapter starts by restating the purpose, research question, the study design, and summaries statements and data collected from participant interviews.

Study Purpose

The purpose of this study was to explore the motivations and learning experiences of school site administrators related to adopting Google Apps for Education as a cloud-based knowledge management technology.

Research Question

The following research question guided this research study: What are the motivations and lived informal learning experiences of public education administrators adopting Google Apps for Education?

Research Design Overview

This study utilized a qualitative approach and phenomenological design. The researcher conducted and examined in-depth interviews with public school administrators at various levels of adoption from different organizations, who are employed in a district utilizing Google Apps for Education as a cloud-based knowledge management technology (Shank, 2006). The interviews were conducted face-to-face using a semi-structured interview protocol consisting of seventeen questions designed to learn more about the participant's informal workplace learning experiences. To validate this study, the researcher utilized two experts and one like-subject review in the education field to provide feedback on the interview questions. The one- hour interviews were audio- recorded and transcribed by external transcribers. For further analysis, the

researcher utilized existing literature and collaborated with an experienced coder to create a codebook and determine emerging themes.

Member checks. Each participant was provided the transcript of their interview and allowed to verify the contents, review the document for any corrections. This provided confirmation of the data collected to eliminate potential misinterpretations (Miles & Huberman, 1994).

Analytical Framework

The TAM is a widely applied framework to explain user acceptance and use of a technology or system. TAM3 has specifically integrated experience as an acting modifier for behavior intent within adoption and use of computer innovations, which includes cloud-based knowledge sharing platforms. Using Activity theory (AT) to explore the experiences and motivations of informal learning processes as the modifier for behavioral intention satisfies the explorative purpose of this study and assisted in answering the research question.

Activity theory in its simplest form suggests that activity serves as the foundational investigative unit in social science research (Kaptelinin, 1996; Nardi, 1996). As a framework, activity theory provides structure for analysis of both collective and individual activities (Engeström, 1999; Kaptelinin & Nardi, 2006). Engeström (1999) notes, the classic model of activity did not account for the context of an activity, and extended the model to include socio-technical context such a rules, communities, and division of labor. An expanded third generation of AT known as the activity system included additional elements of community, rules, and division of labor. (Fretwell, 2003; Issroff & Scanlon, 2002; Mwanza & Engeström, 2003).

Mwanza and Engeström (2003) refined the activity systems model focusing on a mediation-type relationship between six interacting components: subjects, objects, tools, rules, division of labor, and community.

Activity systems model has been used in prior studies as it is used in this study as a theoretical framework to incorporate elements of intentionality, irregularities of subjects and objects, and the influences of social structures on activity, to explore learning experiences in educational settings (Issroff & Scanlon, 2002; Jonassen, 1991; Jonassen & Rohrer-Murphy, 1999; Kaptelinin & Nardi, 2006; Nardi, 1996).

Participants' Demographic Information

Each of the six participants were asked five demographic questions that provided background information on their year of experience as a school administrator and with using Google Apps for Education, the grade span and geographic population of their school, and the number of years the school has had Google Apps for Education accessible. These questions ensured that participants met the criteria of the study. Table depicts a summary of participant demographic information from interview questions one through five.

1. How many years of experience do you have as a school administrator?
2. Would you describe your school as urban, suburban, or rural?
3. What grades does your school serve?
4. How many years has your school been using Google Apps for Education?
5. How many years have you been using Google Apps for Education?

Table 3

Participants' Demographic Information

Participants	Grade Span	Geographic Population	Years Google Apps for Education has been accessible
P1: Stuart	TK-12	Suburban	3
P2: Jeff	9-12	Rural	8
P3: Brook	TK-6	Suburban	2
P4: Shannon	TK-6	Suburban	5
P5: Charlie	9-12	Suburban	6
P6: Frank	9-12	Suburban	5

Participants	Years of Administrative Experience	Years of Google Apps for Education Experience
P1: Stuart	4	10
P2: Jeff	10	6
P3: Brook	20	2
P4: Shannon	8	5
P5: Charlie	8	10
P6: Frank	3	6

Note. TK = Transitional pre-kindergarten grade level.

Five of the participants serve in the role of Principal, one serves in the role of Assistant Principal. Although this study did not include any participants from urban school sites, the consistency in responses from the rural and suburban geographies may suggest that the

conclusions of this study would not change significantly if conducted in urban school environments.

Motivating Factors within an Activity System

The study found that all six participants described motivating experiences within all six of the interacting components within the Activity System suggested by Mwanza and Engeström (2003): subjects, objects, tools, rules, division of labor, and community.

Community. Community is defined as a group of individuals with regular interactions that share common objects, expectations, and norms (Huang, 2002; Kaptelinin & Nardi, 2006; Ng & Hung, 2003). The interview question specifically related to Community was "Do formal or informal Professional Learning Communities support your learning about Google Apps for Education?" All six participants cited a theme related to community as a motivating factor. Table describes the five themes that emerged as motivators in the participants learning.

Table 4

Community as a Motivator

Theme	Number of Participants Referencing Theme
Google Certified Educators	3
Learning Groups	6
Other Educators	6
Relatives/Family Members	2
Students	4

Google Certified Educators emerged as a theme describing as a group of users that have completed level one or two certification processes sponsored by Google. These users were

described as, “helpful elbow partners” and people who “have worked with the tools to explore possibilities of how to do different things.”

All six participants described a group who “had a skill and were teaching you how to do things.” This theme was coded as Learning Groups and were described as both informal ad-hoc type groups as well as formal groups with routine meetings. Participants credited the learning groups as a key support for organizational technology adoption efforts, building collaboration, facilitating “explorers and pioneers” of technology. Benefits of interacting with these groups were described as feeling “like you were able to actually access [technology] and understand how to implement [technology] in your position.”

All six participants referenced Other Educators as a motivator for their learning. Examples of interactions with this group included peer to peer sharing of learning or projects and collaboration with my other colleague while working on a project. Two participant described these Other Educators as, “people in like positions in different schools.” An example of the benefits of like positions was detailed by one participant as, “working with another principal on a presentation and she knew how to do it and she said, ‘Let me show you how to do this’. I was like, okay, and I was like, ‘This is so cool!’”

Whereas, other participants described the experience of seeing, “how other people were using Google, other colleagues such as an assistant principal, secretaries, even other colleagues who were teachers,” “anybody who I see in education that I think has a pulse on what's new with Google. It could be a technology coordinator, or anybody who deals with technology in the district that actually has hands on with Google stuff,” as well as “some people here on campus who are really, really, good with Google Apps.” A “collaboration of different people playing with different things. Of, hey did you see this?”

Two participants referenced Relatives including spouse and children as motivators for learning Google Apps for Education. One participant described the interaction as an observing family member advising the participant on a more efficient way to use Google Apps for Education to generate a work product. Both participants cited that family could help keep them up to date on recent changes in Google Apps for Education and offer ideas to use various tools in Google Apps for Education in new ways.

Four participants cited examples of Students as a community serving as a positive motivator for learning Google Apps for Education. Two participants described student adoption of Google Apps for Education stating, "this is what our kids were going to be using," and "I needed to make sure that I could help my students." Three participants had a desire to share information with students in online environment to communicate and provide students with, "more access to information 24/7." Two participants cited use of Google Apps for Education to keep track of individual student items such as behavior incentive coupons and tracking of students with special needs. One participant describe Google Apps as a necessary tool to learn and use for tracking, assessing, observing, and increasing student achievement.

Three of the six participants in the study used negative descriptive language when referring to two community groups implying presence of a negative motivational factor. The first group was described as users who are "still entrenched in Microsoft Office." The group was described as creating "two different worlds" which creates challenges when working together. The second community group was described as "PLC's (Professional Learning Communities)." The two participants both stated that these groups are not helpful when learning Google Apps for Education.

Division of labor. Division of labor is the recognized roles, responsibilities, and authority of individuals in a group (Kaptelinin & Nardi, 2006). The interview questions aligned with this activity systems component were, "While you learn and use Google Apps for Education, who has offered assistance and what was the outcome?" and "While you learn and use Google Apps for Education, who have you asked for assistance and what was the outcome?" All six participants described Division of Labor as a motivating factor in their learning with six thematic groups emerging as described in Table 5.

Table 5

Division of Labor as a Motivator

Theme	Number of Participants Citing Theme
Administrators	6
Counselors	4
Technology Education Staff	5
Instructional Staff (Faculty)	6
Support (Clerical) Staff	6

All six participants referenced others in an Administrative role as a motivator for learning Google Apps for Education. Specific examples cited of administrative influences include other administrators at various levels collaborating through Google Apps for Education for resource management and planning purposes, distribution of information for meetings as well meeting preparation, and sharing information for administrative functions at the school site level, district level, and School Board level. Participants also provided examples of administrative related functions that were migrated to Google Apps for Education for accessibility, convenience, and features that are not available without use of tool which required adaptation of staff. These

examples include real-time emergency reporting documentation, team-based generation of accreditation reports, and compiling and sharing of information for processes and procedures such as student due process.

The Instructional Staff was also referenced by all six participants as a motivator for learning Google Apps for Education. Examples mentioned included the need to, "help support my students," "understand the curriculum, but also the technology behind what they were doing." A benefit described by participants was the ability to sharing information, resources, and collaborate with instructional staff without their presence in the same room and at various times throughout a workday. Participants also described the Instructional Staff as active participants in designing the expectations and learning for Google Apps for Education as a campus-wide initiative. Participants also described the Instructional Staff as forming workgroups or Professional Learning Communities and using Google Apps for Education as a tool for sharing. One participant stated, "Each of the groups has their own agenda that they add to, and they report out every week."

All six participants mentioned use by the Support (Clerical) Staff as a motivator for learning Google Apps for Education. All six participants provided examples related to Support Staff creating and sharing documents including routine reports, digital meeting agendas, flyers and information items, tracking sheets for the School Attendance Review Board, budgets, and evaluations. One participant describe how Google Apps for Education makes it, "easier for me to collaborate with my secretary on things that we need to do." Three administrators described the ability for group editing and feedback on these items as a significant change. One participant described a collaborative process, "without having papers being thrown back and forth, because

I'm able to just go and revise it myself, and then I shoot it back to the secretary and she does part of it and we're done."

Five participants provided examples of Technology Education Staff as a motivator for learning Google Apps for Education. Examples cited from all five participants related to planning Professional Development and training activities for staff by exploring Google Apps for Education and potential connections to local educational initiatives and priorities as well as staff needs for education related to technology.

Four participants referenced the need to interact with Counselors using the tool to manage student files, review master scheduling resources, student lists, create and manage student progress reports, and student Individualized Education Plan management.

Three of the six participants referenced Division of Labor as a negative factor toward motivation. One participant explained, "I think [tech people] know how to run the systems, but… when a tech person does the training, I often don't get a whole lot out of it." Two participants explained, district staff and school site support staff may not be as highly motivated to adopt Google Apps for Education as other groups.

Object. The object of an activity is that which is modified and examined by the subject according to the constructed goal (Bedny & Harris, 2005). Objects are defined by the goal and task of an activity and may be tangible or abstract such as signs, symbols or images, in whole or partial units formed by the subject in to align with goals (Bedny & Harris, 2005). An object has distinguishable states during an activity including the initial, intermediate, and final state which corresponds to the goal of the action or activity (Bedny & Harris, 2005). The question to understand the participant's objectives was, "What specific features, tools, or use examples made

you want to learn about Google Apps for Education?" All six participants described objects as a motivating factor with eight themes emerging.

Table 6

Objects as Motivators

Theme	Number of Participants Referencing Theme
Communication	4
Datasets	6
Distance Learning	2
Evaluations and Assessments	2
Meeting Documents	6
Presentations	3
Reports	5
Scheduling	3

Four of the six participants referenced communication items as an object. This theme described an item with primary goal of one-way communication information from the subject to a recipient or a group of recipients. Examples cited by participants included community flyers, daily and weekly bulletins, contact information, and emergency information and letters to the community.

All six participants cited the Datasets as an Object motivating their learning of Google Apps for Education. All of the participants referenced the ability to quickly build datasets for analysis using Google Forms and Google Sheets. Participants described the contents of these datasets as: "metrics that can measure advancements in education," "data supporting goals," "input from staff," and "feedback."

Two participants described Distance Learning as motivational Object. The participants described exploring the ability to use Google Apps for Education to create “virtual trainings” and “classes for staff and students.”

Two participants described Evaluations and Assessments as an Object. These objects included “staff evaluations,” “school progress assessments,” and “student progress assessments.”

All six participants references meeting documents as an Object. Participants references Google Apps for Education enabling the ability to have real-time collaborative meeting documents. Meeting documents referenced by participants included agendas, student information sheets, background information items, data items, brainstorming items, and checklists. One participant described an advantage cited as a motivator related to meeting documents in Google Apps for Education is the ability to share a “team agenda as a running document about what's talked about each week.”

Three participants described collaborative interactive presentations as an Object. Participants liked “having those opportunities to enhance my presentation skills or sharing information, or collaborating” and “getting feedback on a presentation, that didn't happen in the Microsoft world.” Participants described learning and using the ability to use live data from Google Sheets within Google Slides to, “support what we're talking about” when presenting as a motivator to learn Google Apps for Education.

Five participants referenced reports as an Object when learning Google Apps for Education. These reports were described as accreditation reports, truancy and attendance reports, student achievement reports, special education compliance reports, behavior intervention reports, budget reports, resource reports, and safety reports. An advantage cited by participants is the

ability to collaborate on the same report in real-time with Google Apps for Education reducing multiple versions, providing the ability to revert to old versions, and see who made changes time.

Three participants cited using Google Apps for Education for schedules and resource control. These participants all referenced Google Calendar for scheduling of their work day as well as use by staff for scheduling resources such as classrooms, conferences rooms, and athletic fields. One participant described the benefits to learning and using Google Apps for Education for schedules stating, "everybody wants to use [the fields] and the calendar's in this binder on one person's desk, and they're only there from seven to three. So if you're not in that window you can't really say, it's available or it's not." The participants described the sharing of calendars with staff as increase access to resources while decreasing secretarial workload. One participant also described advantages of learning Google Apps for Education to assist with planning the Master Calendar of classes through the ability to have live data shared in one place with all available resources and enrollment continually up-to-date.

There were no observed references to Objects as a negative motivating factor.

Rules. Rules promote shared community behaviors and can include the traditions, relationships, and processes of a group (Kaptelinin & Nardi, 2006). The interview questions related to Rules was, "What encourages you to learn and use Google Apps for Education," and "What impedes your learning and use of Google Apps for Education?" All six participants referenced rules as a motivating factor for learning Google Apps for Education. The references formed three significant themes.

Table 7

Rules as Motivators

Theme	Number of Participants Referencing Theme
Common Software Adoption	6
Leading By Example	3
Requirements	4

Two participants described the common software adoption of Google Apps for Education software as a passive process with statements such as: “I'd say the fact that it's so widely used now. That it's almost a part of what you have to do,” “Use of Google apps has become so entrenched in our everyday use that we're not even thinking about it anymore,” and “Most teachers have embraced it and are using it, so I felt like I needed to embrace it too and learn it and use it.”

Four of the participants described common software adoption as a more active process with statements such as: “I recognized that that's just where we were heading as not only a state, our district was really heading that direction and using Chromebooks and Google apps. They had us using Google apps, so I kind of had to learn,” “There was goals that everybody would use apps in some capacity,” “There were group goals the team had established that this is what we would like the staff to know and be aware of and practice and utilize,” “I shifted over, there wasn't a choice. Our district switched over to [Google Apps for Education],” and “We were one to web in our district, that really pushed us.”

Three of the six participants cited they needed to learn and use Google Apps for education to lead by example and “set the tone” for their staff modeling, “how it could be beneficial to the teachers, like how it can make our lives a little easier, and having the staff just

organically just see the value in Google apps." Two participants cited state or locally required student learning evaluations and assessments as a motivation.

Three of the six participants expressed one common negative theme related to rules. The difficulty with the use of multiple software platforms (Google Apps for Education and Microsoft Office) within the same organization.

One participants described the frustrations, "you may encounter several users throughout your line of work that are in a different ecosystem that forces you to use two ecosystems." "It slows you down. I have to rethink things sometimes or jump over to the other platform to work on it." Another expressed, "for a long time, we had a bunch of people using Google Apps, a lot of people using Microsoft suite and it was just crazy in our district to try to be using both." The third explained, "I've always wanted to be simple and I've always struggled with, 'Why do we have two systems? Why are we operating in two different worlds?' I can never be sure that when I send something, they have access and can really get to it on the other end."

Subject. Subjects are individuals or groups involved in an activity (Huang, 2002). In activity theory, the subject is always understood as a socially constituted individual, in possession of internal, psychological tools acquired during ontogeny (Bedny & Harris, 2005). The interview questions related to Subject were, "Describe how you use Google Apps for Education?" and "Why did you need to learn and use Google Apps for Education?" All six participants had references to their personal involvement in an activity as motivating factors with eight significant themes.

Table 8

Subject as a Motivator

Theme	Number of Participants Referencing Theme
Convenience	5
Desire to Collaborate	6
Efficiency	6
Expanding Skillset	6
Personal Experience	6
Interest in Technology	2
Organizing Resources	4
Teaching Others	6

Convenience as a motivating factor was references by five participants. Three participants detailed collaborative conveniences of Google Apps for Education related to, "working on a project with colleagues in school and not necessarily be in the same room." Two participants described the conveniences of Google calendar for real time scheduling with others while in the field. Four participants expanded on descriptions of conveniences related to Google Apps for Education being, "web based, so you could access it anywhere," providing participants, "portability and accessibility to the data and materials." One participant highlighted the ability to "just walk onto campus and use your cellphone, or Chromebook, or computer to jump in and go to work on something real important." Three participants described the conveniences similar to, "traveling around with a lot less technology."

All six participants described ideas similar to, "collaboration with my other colleagues." Sharing was another term the researcher used to group others statements into the collaboration

theme including ideas similar to: “Primarily my working with other members to communicate ideas and/or collaborate on ideas. Sharing data,” and “I use it to make information accessible to staff through team drives, and sharing documents with people.” The idea of group editing was also included in these theme reflecting thoughts related to: “being able to work with other individuals, and not have multiple versions of the same document,” and “everybody has editing rights to a document that we're looking at to edit or comment on. The commenting piece about the Google docs has been really powerful too, because we can ju’t get the feedback from staff.”

All six participants used the word efficient or efficiency. These words were used in conjunction with describing ideas related to saving time on tasks and automating tasks. The statements of one participant paraphrased the ideas of expressed by all participants, “I've always tried to find, not necessarily an easier way, but maybe a smarter way to get things done” and “On a professional leve’, it's just being efficient, having times I can be with my students and my staff and not being bogged down with a lot of the task wh’ch hopefully can be automated or done in a more efficient manner.”

All six participants referenced ideas related to expanding personal technology skillset as a motivator for using Google Apps for Education. Two participants described learning to support student and teacher use of technology. Four participants shared the ideas related to setting personal goals for advancing use and learning related to Google Apps for Education. These participants related this idea with statements such as, “I would identify the things that are important for me that's embedded and something I need to accomplish and something I need to do,” and “Exploring and figuring out how the programs wor’ed, and then you try a new program or two, okay, I didn't really use that so you push that one aside and you figure out which ones you really need. For me it was trial and error.”

All’six participants referenced personal experiences as a motivator for learning Google Apps for Education. Experiences included training experiences, comfortable and intuitive experiences while using Google Apps for Education, and novel experiences with others while using Google Apps for Education within an activity. Two of the six participants expressed personal interest and excitement related to learning technology as a motivating factor with statements similar to, “There's just an interest area. I like technology.”

Four of the six participants shared statements describing the desire to organize r’sources as a motivator for learning. Within this theme participants expressed ideas such as the use of team drives to organize shared information, ease of finding shared documents through searches, and storing various items including documents, lists, and communications in a central location.

All six participants described the ability to teach others as a motivator for learning. One participants feelings are summarized with the statement, “You have to have somebody who actually has some interest and maybe a little bit can understand what you're trying to do, and can appreciate it.” A different participant summarized references from all six participants with the state’ent, “I feel quite accomplished at [using linked documents] and I actually I'm now teaching other people how to do it, which is like a miracle because like I said, it's a hard thing for me, but I really l’ked it. I guess it really feels good when I have learned something new in Google Apps, an’ that I could possibly help somebody else with it. I mean that feels really good, that's motivating and I like doing that. ”

Five of the six participants referenced themselves as a subject as a negative factor tow’rd motivation. Four of the participants referenced a lack of time to learn and experiment as challenge to increased use and effectiveness with the tools. One participants expressed concern about the blending of personal and professional time as a concern as use and accessibility of

Google Apps of Education increases. Two of the participants cited isolation of their position and location as a concern when attempting to learn Google Apps for Education, specifically related to unavailability of learning communities and groups. Three participants referenced non-relevent trainings and a limitation to their personal learning providing examples of mixed learning group content being to basic or not applicable to their job functions. Finally, three participants cited personal confusion and frustration with organization of information and setting correct permissions as a hindrance to their learning.

Tools. Tools are all things that may be utilized to assist in object transformation and include digital networks, computers, and writing utensils, psychological constructs, models, or past experiences (Kaptelinin & Nardi, 2006). The interview question related to Tools was, "What tools, materials, or resources did you use while learning about Google Apps for Education?" All six participants had references to tools as a motivating factor in their learning and use of Google Apps for Education. Seven significant themes emerged from the participants descriptions as detailed in Table 9.

Table 9

Tools as Motivators

Theme	Number of Participants Referencing Theme
Blog	2
Device	3
Google Apps	6
Google Search	5
Hyperlinks	4

(continued)

Theme	Number of Participants Referencing Theme
Organized Training	5
YouTube	6

For this study, tools within the Google Apps for Education collection of software included Calendar, Classroom, Docs, Drive, Email, Forms, Hangouts, Keep, Photos, Sheets, Sites, and Slides. These tools were referred to as examples by study participants as those they considered to be a part of the Google Apps for Education collection of software and were themed as Google Apps. All six participants cited the use of the Google Apps for Education tools during their learning. Docs was the only Google Apps for Education tool cited as used by all six participants with a total of 41 references. Sheets, Slides, Drive, Forms, and Email were cited as tools used by five of the participants during their learning with a range of 9 to 25 references. Calendar was cited by four participants during their learning of Google Apps for Education referenced 12 times by participants during their descriptions. Classroom, Keep, Photos, Hangouts, and Sites were referenced by one to two participants with a range of references of one to six times within the descriptions.

Blogs, described as websites with articles or tutorials with specific instructions or use cases for a specific tool or technology, were cited by two participants as a learning tool. Three participants cited devices as a tool for learning Google Apps for Education. Devices were described by participants to include: Smartphones, Chromebooks, and Computers. Five participants described using the Google Search product as a learning tool with citing examples of, “Googling it,” “Searching Keywords,” and “I just literally type in what I want [the Google App] to do.”

Four participants cited the use and availability of Hyperlinks as a tool motivating learning and use of Google Apps for Education. Hyperlinks were described by participants as an embedded link tying resources or documents together. Participants described using Hyperlinks in Google Docs, Google Sheets, Google Slides, and Google Email (Gmail) directing the user to a different Internet based resource to provide further information related to the linked text.

Five participants cited organized training as a tool supporting their learning and use of Google Apps for Education. Four participants described small regional conferences specifically designed for training related to Google Apps for Education with attendees from multiple local organizations. Three participants referenced district developed Professional Development learning activities specifically targeting Google Apps for Education. One participant cited a specific example of attending a school administrator focused workshop on technology titled, "Innovative Educators" provided by the Association of California School Administrators.

All six participants referenced using YouTube, an online video service, as a resource during their learning of Google Apps for Education. Specific uses included watching general application overview tutorials and follow-along tutorials related to learning or accomplishing specific tasks within Google Apps for Education.

The use of add-ons as a tool was cited by one participant. Add-ons were described as extensions to manage and perform actions within Google Forms. Specific examples of add-ons used included FormMule and Doctopus.

All six participants referenced tools in the context of a negative motivator. Age restrictions were mentioned as reducing the usefulness of Google Apps for education in lower grades. Internet and hardware connections were referenced as a concern, specifically unreliable Internet connection and inconsistent support for printer connectivity. Conversion of documents

between platforms was cited as a concern, specifically loss of document formatting when switching between Microsoft and Google software. Two participants described frustrations in organizing and finding shared documents as the amount sharing between with others increases. One participant mentioned personal and organizational “resistance” to using Google Apps for Education related to lack of trust in Google’s privacy and security of stored data.

Four participants expressed frustrations at Google Apps for Educations continuous unannounced software updates describing feelings as “Chasing something that's changing.” Four participants also expressed dissatisfaction with various limitations within the Google Apps for Education applications. Two descriptions of these frustrations summarize the dissatisfaction express by the four participants, “I think there's some things that Google can't do. Google has its limitations.” and “There's just some features that you just can't do, that you can do in Microsoft. That makes it a little bit challenging.”

Self-Directed Learning

Communicating goals during self-directed learning. Self-directed learning requires personalized goal-setting as an instrument to articulate desired outcomes, design appropriate learning tasks, and observed growth (Milligan et al., 2014). Goal setting is generally focused narrowly on organizational structures and subject to fixed topics and timelines (Milligan et al., 2014). As learning is an inherently social activity, sharing these goals may promote interactions between learners by creating a common "social object” (Engeström, 2005). To understand how school site administrators engage in social goal-setting they were asked, “*Do you communicate your learning desires or goals about Google Apps for Education? If so, how?”*

No significant themes emerged related to communicating learning desires and goals. Brook describes her communication of goals as a modeling. “I don't know that I communicate

my goals, but I do communicate that I'm learning." An example she cited is, "I don't say, 'my goal this year is to become more proficient in using Sheets,' but I will talk about when I am learning something, and sharing it out because I want to model that risk-taking."

Shannon describes starting her learning of Google Apps for Education, with an informally communicated group goal established by a team, "that everybody would use apps in some capacity. Whether it was creating their own documents or attempting a Google form"

Three participants stated they did not communicate learning goals. Stuart stated he does not communicate learning goals as a result of, "a that lack of time. Being able to really spend the time I need in order to learn something and then be able to complete it." Jeff stated he does not communication learning goals. He described his work within Google Apps for Education as, "subtle work that we do."

Jeff mentioned much of the learning occurs through inspiration from what others bring back verse setting a specific goal. "people bring stuff back to us, as kind of like, "Oh okay I might use that one." Similarly, Charlie described a lack of "any formal way to do it, I don't. If I find something new I don't run around and tell everybody about it, I guess. It's more kind of comes back to informal discussions." Frank also stated, "I don't really go up to any of my colleagues and say, 'Hey, here's my goal, I'm going to learn how to do this.'"

Evaluating and sharing self-directed learning outcomes. The processing of learning experiences is the cognitive categorization and connecting of prior knowledge and experiences to current experiences to influence responses to future experiences (Eraut, 2004). Sharing these connections and new understandings publicly increases the value to the individual and creates knowledge structures for the benefit of others. This collaborative process may become cyclical, creating an evolving collective knowledge that changes through time and adapts to new

innovations (Milligan et al., 2014). Two interview questions focused on gaining an understanding of the participant's self-reflection and evaluative practices during self-directed learning, "Do you reflect on, evaluate, or share the success of your learning about Google Apps for Education? If so, how?" and "What changes in your professional practice do you associate with learning about Google Apps for Education?" Six significant themes emerged through data analysis as described in Figure 9.

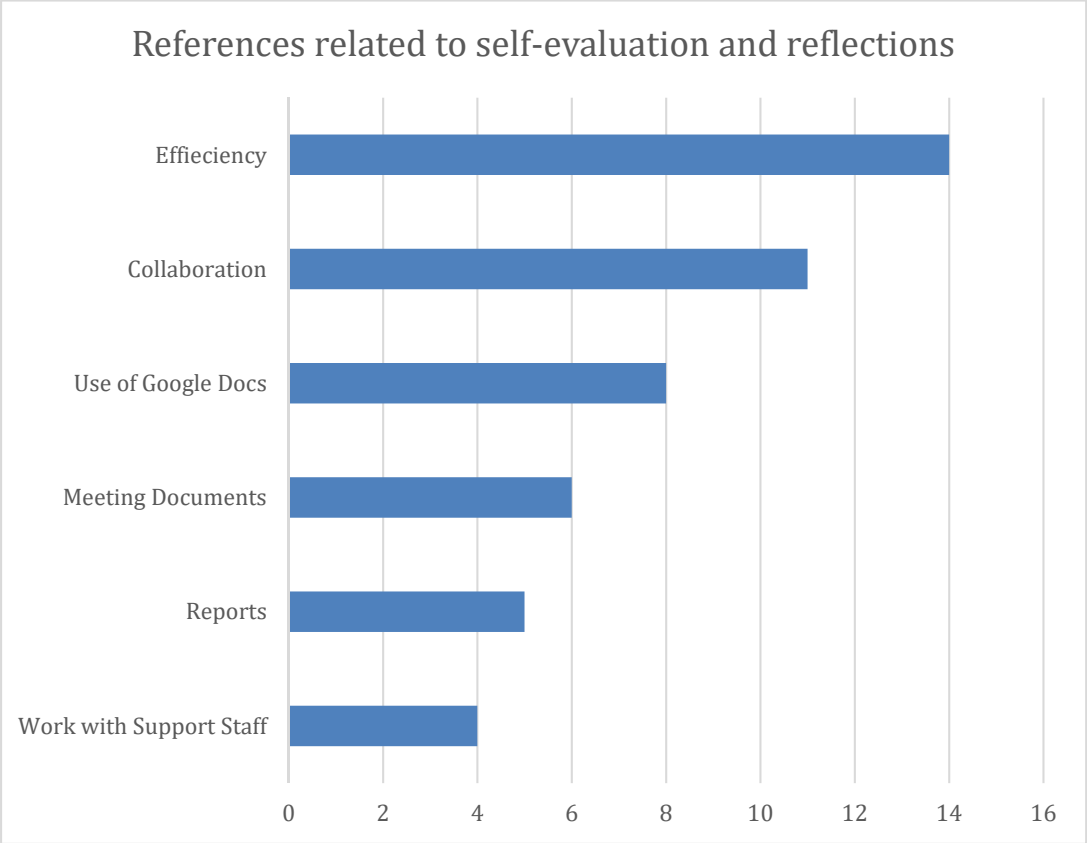

Figure 9. Significant themes related to self-evaluation and reflections of professional practice associated with using and learning Google Apps for Education.

Four participants referred to efficiency within their descriptions. Stuart describe looking for ways to be efficient and looking for ways to collaborate as an activity allowing for more time in the classroom, "spending time with kids, and coaching teachers." Jeff considered his day's to be more efficient with the ability to, "prevent something from taking up more time, by taking

care of it at the moment." Shannon described efficiency as an improvement to her practice related to, "finding it to be easy to use the apps, and even just sharing the documents." Frank cited efficiency as a change in practice and described a comparative example of an accreditation report process.

> "I put together a WASC Report in 2012, and we did it again here in 2018. So much different with the ability to have shared documents. In 2012 we'd have to have a shared folder for each team to share, shared folder in our hard drive, through the school. And we'd have to send attachments on everything. In 2018 we did it on a Google Doc, everybody working at the same time. We saved a lot of paper too. Previously we had to print out, people would write, somebody would type it in later on. Now we're all typing at the same time. That made a huge difference."

Frank also cited that Google Apps for Education has "changed the way that we're able to interact with our colleagues." Charlie described collaboration as having the largest change in his professional practice, providing examples related to the ability to share with people and "to not have to have everybody in the same room at the same time." Brook described collaboration as "more seamless" resulting in increased input from staff. Stuart describe a noticeable change in language of colleagues citing examples such as, "I'll share that with you" and "Why don't you give me some feedback on that?"

Jeff cited changes in the portability of technology and data. Jeff described, "Traveling around with a lot less technology. Instead of carrying my USB drives around with me, and having to, actually, having to even carry a computer around with me, I can still access information with my cellphone."

Three participants, referred to changes in behavior related specifically to modern use of meeting documents. Shannon, Jeff, and Brook described "online agendas." There's no paper anymore. Frank, Brook, and Shannon describe using Google Docs to stay organized and to, "get

a bigger picture of the things that are going on at one time" and to reducing the amount of manual paperwork.

Stuart mentioned only informal reflection on his learning. Stuart also mentioned a limitation to sharing stating, "If you just were to share, 'I use this add-on in order to do this and it pushed this and it did this,' probably most people would be like, 'I don't understand anything you just said.' You have to have somebody who actually has some interest and maybe a little bit can understand what you're trying to do, and can appreciate it."

Shannon specifically stated she reflects rather than evaluates her learning. However, the reflection is a long term general view of progress over time verse reflective learning related to specific activates. She stated, "I reflect and recognize that we have come a long way. But, no, nothing that I share out or celebrate or anything like that, no." Frank mention a few specific methods administrators might use to share learning, however, he does not actively share learnings or use the methods described. "I wouldn't say I have a blog, I don't send out an email to everybody and say 'Hey! Guess what I just found out!'"

Jeff cited his use of Google apps has become so entrenched in our everyday use that he is "not even thinking about it anymore." Jeff describes noticing his progress in learning and using Google Apps of Education when, "running into district office personnel that are still entrenched in Microsoft Office side of it." Brook describes feeling good when having learned something new in Google Apps for Education, but has no specific activities she engages in for reflection or sharing.

Jeff, described the blending of personal materials and time with his professional duties as a growing concern. "As hard as I try to separate, there's always things that cross over, whether it's through the email process or whether it's just information kind of stuff that you want

portable." Jeff also stated, "I have no personal time anymore. It's 24/7. It really is, but still, I have that choice. But I do tend to work a lot. I have more contact than I would've 15 years ago."

Unintentional Learning

Incidental learning. Incidental learning is not purposeful, but the learner becomes aware at an undefined point in time (Schugurensky, 2000). All six participants' interviews contained descriptions of incidental learning as a motivating factor with learning or using learning Google Apps for Education with three significant themes emerging from the interviews.

Table 10

Incidental Learning Motivators

Theme	Number of Participants Referencing Theme
Experimentation	6
Unexpected Discovery	2
Unexpected Fostering	5

Incidental learning occurrences were identified with participants describing a learning event which occurred and was an unexpected discovery, unexpectedly fostering by a third party, and had no specific desired outcome. Participants had various descriptions of their experimentation experiences. General phrases emerging in this theme included, "Looking for new ways to do things," "stumbling through a lot of stuff," "just kind of hacking my way through it basically," and "continuously rethinking the work." Two participants provided descriptions of experimenting to understand potential use of programs while solving programs, "I try to figure out if there a way that we can streamline a process with one of those apps" and "It was just me exploring and figuring out how the programs worked. Trying a new program or two, figuring out which ones you really need."

Two participants described unexpected discoveries while working within Google Apps for Education. One example cited was, “I excited to learn that those edits were saved” while the other described discovery of a new feature, “I all of a sudden look over and I'm like, ‘Oh. What are Team Drives? Well, maybe I'll look at this.’”

Five participants described unexpected learning while using Google Apps for Education fostered by a third party such as a co-worker or relative. These experiences were described as, “someone showing me a tip or a trick along the way” or a relative showing alternative options within the applications. Three participants described learning by observing others using tools in new ways during interactions or meetings.

Tacit learning. Tacit learning implies the learner has no intent to learn and no awareness of having acquired knowledge or skills (Schugurensky, 2000). All six participants used terms describing tacit learning motivations when learning and using Google Apps for Education with 12 references observed within their described experiences. Four significant themes of tacit learning emerged.

Table 11

Tacit Learning as a Motivator

Theme	Number of Participants Referencing Theme
Generalizations	2
Intuitive	2
Play	3

Two participants described their learning as intuitive or unnecessary based on feeling of program simplicity. Intuition is defined as, “the power or faculty of attaining to direct knowledge or cognition without evident rational thought and inference” (“Intuition”, n.d.). Two participants

described their learning experiences stating, “I kind of feel like it's more intuitive than what I thought it would be” and “I think the programs I use are fairly simple. They're not super complicated, and I think that's a plus.”

Three participants described their learning using the term play. Play is defined as “to toy or fiddle around with something” (“Play”, n.d.). Participants descriptions were all similar, “It really just took my sitting down and playing with it,” “I don't recall using it, just playing with it,” and, “we just go play with it and figure out what we discover.”

Two participants inferred generalizations from their recall of learning. The two participants had similar descriptions of their generalized use experiences, “Use of Google apps has become so entrenched in our everyday use that we're not even thinking about it anymore” and “It really it comes down to using it day to day, not even thinking about it.”

Summary

This phenomenological study explored the lived experiences and motivations of six California public school administrators. Three of the participants were administrators at schools serving grades 9 through 12. Two of the participants were administrators at schools serving Transitional Kindergarten through 6. The remaining participant served as an administrator in a school serving Transitional Kindergarten through 12. Participants were asked five demographic questions. Five of the participants described their school as suburban and one described their school as rural. Five participants described their job title as a Principal, with one as an Assistant Principal. Participants in this study reported a range of 3 to 20 years’ experience as a school administrator, and a range of 2 to 10 years of experience using Google Apps for Education.

Twelve semi-structured interview questions were used to develop rich descriptions of user experiences relating to the research question. In response to the interviews, all participants

reported motivational experiences in all areas described within the six components of Activity System Theory related to the research question. Within each component, significant themes emerged through analysis of responses from participants.

Interview question six and seven related to the Subject component of activity system theory revealing eight significant themes: Convenience, Desire to Collaborate, Efficiency, Expanding Skillset, Personal Experience, Interest in Technology, Organization Resources, and Teaching Others. Interview questions eight and nine related to the Division of Labor component of activity system theory revealing five significant themes: Administrators, Counselors, Technology Education Staff, Instructional Staff (Faculty), Support (Clerical) Staff. Interview question ten related to the Tool component of activity system theory revealing seven significant themes Blog, Device, Google Apps, Google Search, Hyperlinks, Organized Training, and YouTube. Interview questions 11 and 12 related to the Rules component of activity system theory revealed three significant themes: Common Software Adoption, Leading by Example, and Requirements. Interview question 13 focused on the community component of activity system theory revealing five significant themes: Google Certified Educators, Learning Groups, Other Educators, Relatives/Family Members, and Students. Interview question 14 related to the Objects component of activity system theory revealing eight significant themes: Communication, Datasets, Distance Learning, Evaluation and Assessments, Meeting Documents, Presentations, Reports, and Scheduling.

Interview questions 15, 16, and 17 explored described self-directed learning processes of shared goal-setting and reflective self-evaluation. Data analysis related to goal-setting did not reveal significant themes. Data analysis related to reflection and self-evaluation revealed six

significant themes: Efficiency, Collaboration, Use of Google Docs, Meeting Documents, Reports, and Work with Support (Clerical Staff).

Data analysis related to exploring unintentional learning within responses to all interview questions revealed all six participants experienced incidental and tacit learning. Analysis of incidental learning within the participants descriptions resulted in three significant themes: Experimentation, Unexpected Discovery, and Unexpected Fostering. Analysis of tacit learning within the participants descriptions resulted in three significant themes: Generalization, Intuitive, and Play. Chapter 5 will discuss how these findings relate to the literature and analytical framework. Additionally, conclusions, implications, limitations, and recommendations for further research will also be addressed.

Chapter 5: Discussion

The purpose of this chapter is to present the findings of this research study. In this chapter, the purpose of the study is reviewed. An interpretation of findings will connect the research question, and study design with the data presented in Chapter 4. Next, three conclusions are presented connecting the data collected to prior literature and knowledge from Chapter 2. This is followed by a discussion of research implications, study limitations, and recommendations for future research. Finally, the chapter ends with final thoughts regarding the study.

Study Purpose

The purpose of this study was to explore the motivations and learning experiences of school site administrators related to adopting Google Apps for Education as a cloud-based knowledge management technology.

Interpretations of Findings

Using TAM is a widely applied framework to explain user acceptance and use of a technology or system. TAM3 has specifically integrated experience as an acting modifier for behavior intent within adoption and use of computer innovations, which includes cloud-based knowledge sharing platforms. Using Activity theory (AT) to explore the experiences and motivations of informal learning processes as the modifier for behavioral intention satisfies the explorative purpose of this study and assisted in answering the research questions.

The following research question guided this research study: What are the motivations and lived informal learning experiences of public education administrators adopting Google Apps for Education?

To answer the research question, the researcher designed a 12 question semi-structured interview based on the Activity System Theory and components of a Self-Directed Learning process related to informal learning. During face-to-face interviews, participants provided details and examples to assist the researcher in developing a deeper understanding of motivations and informal learning of school administrators adopting and using Google Apps for Education.

Activity system. The examples and descriptions provided by participants identified a variety of significant thematic motivating factors resulting in eight motivational factor categories, each containing significant themes and positive references identified by data analysis as described in Table 12.

Table 12

Motivators, Significant Themes, and Positive References Identified Within the Data

Motivational Factor	Significant Themes	Number of Positive References within Interviews
Community Groups	5	55
Division of Labor	5	181
Object of an Activity	8	66
Rules	3	27
Subject	8	178
Tools	7	181
Incidental Learning	3	19
Tacit Learning	3	9

Exploring learning as a set of behaviors occurring within the context of work may assist in developing a richer understanding of how these behaviors are related to and support adoption of technology (Milligan, et al., 2014).

Activity theory in its simplest form suggests that activity serves as the foundational investigative unit in social science research (Kaptelinin, 1996; Nardi, 1996).

As a framework, activity theory provides structure for analysis of both collective and individual activities (Engeström, 1999; Kaptelinin & Nardi, 2006). Activity systems model has been used in prior studies as it is used in this study as a theoretical framework to incorporate elements of intentionality, irregularities of subjects and objects, and the influences of social structures on activity, to explore learning experiences in educational settings (Issroff & Scanlon, 2002; Jonassen, 1991; Jonassen & Rohrer-Murphy, 1999; Kaptelinin & Nardi, 2006; Nardi, 1996).

Engeström (2001) suggests the "dialogue, multiple perspectives, and networks of interacting activity systems" (p. 135) may assist in clarifying the contradictions within the subsystems as well as in the outcomes. Contradiction describes specific "structural tensions," that develop within or among activity systems (Engeström, 2001). These tensions may exist between any components of the activity system (Engeström, 2001). Figure 10 expresses the research data in relation to activity system components and sub-systems.

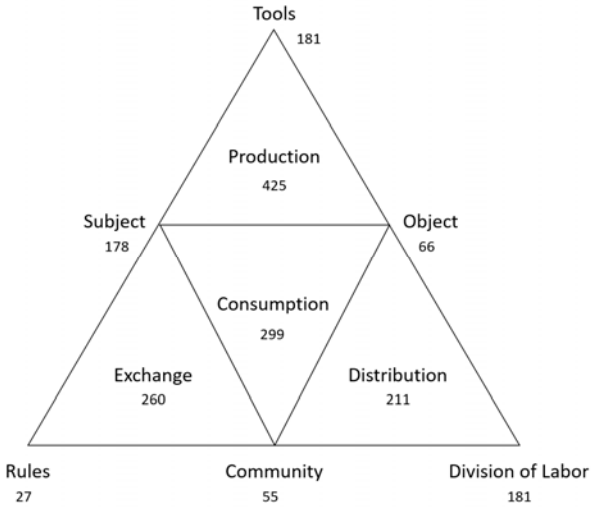

Figure 10. Number of references within data by component.

The activity system model posits that systems interact as a method to accomplish functional goals actively one or more subsystems (Engeström, 1987; Jonassen, 2000). The model defines four subsystems using the six components, production (how the subject transforms the object), exchange (how rules control interactions between the subject and the community), distribution (how division of labor within a community enable the subject to accomplish the object) and consumption (how the collaboration between the subject and the community benefit from and are used to accomplish the object) (Engeström, 1987; Jonassen, 2000). Each subsystem describes the utility, connection and association in relation the other subsystems. (Engeström, 1987; Jonassen, 2000).

The value of activity theory is the ability to classify the tensions among the various components within an activity system creating visibility and tractability (Engeström, 2001). Activity systems often cycle between periods of relative stability and disruptive changes that result from the buildup of one or more contradictions within the system (Engeström, 2005).

Figure 10 shows three components, Subject, Tools, and Division of Labor with the highest number of positive references. Each of these activity system components had at least four significant themes cited as motivators by at least five participants. Figure 10 visually shows the three activity system sub-systems of Exchange, Consumption, and Distribution having a lower number of positive references when compared to the highest sub-system of Production. This may confirm that participants adopting Google Apps for Education may be adopting new technologies based on the comfort and familiarity as suggested by McGarr and Kearney (2009).

Figure 10 also shows the contrast in positive references to individual activity system components contributing to each activity system subsystem. The activity system components of

Rules, Community, and Objects each had significantly less positive references in the data than did Division of Labor, Subject, and Tools.

Rules as a component of activity system had three significant themes with only one shared by all six participants as a motivator. The theme of Leading by Example was cited by three participants and Requirements was cited by four participants. This suggests cultural tensions may be present in this activity subsystem within this study of technology adoption.

The data within the Community component of activity system reflected five significant themes, learning groups and other educators both referenced by all six participants. Google Certified Educators was positively referenced by three participants. Relatives and family members was positively referenced by two participants. Finally, students was positively referenced by four participants. This suggests tensions may be present within this study in the subsystems related to Community groups supporting technology adoption.

The data within the Objects component reflected eight significant themes. Three of the themes, datasets, meeting documents, and reports, with positive references by at least five of the participants. Communication was positively referenced by four of the participants. The remaining four themes, distance learning, evaluations and assessments, presentations, and scheduling were positively referenced by two or three of the participants. This suggests limited understanding or awareness of uses of Google Apps for Education may be contributing to tension within this study in the subsystems related to Objects supporting technology adoption.

Self-directed learning. Schugurensky (2000) notes self-directed learning refers to activities executed by learners with intention and awareness. Ley et al. (2014), notes learning may be fluid and occur within knowledge cycles with specific types of learning triggers. The examples provided by participants focusing on “informal discussions” suggests goal setting may

be triggered by incidental and tacit learning experiences. This data supports the Self-Directed Informal Learning Schema as described in Figure 11.

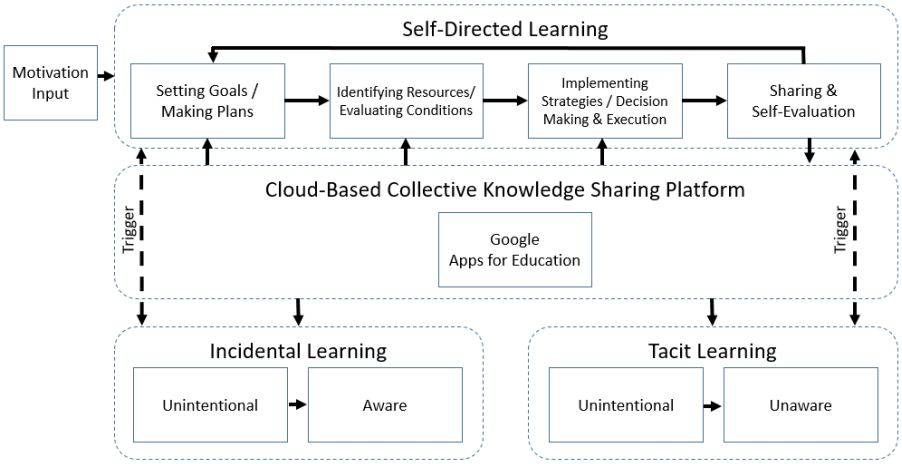

Figure 11. Self-Directed Informal Learning Schema as a one loop action system.

The data from the participants related to self-directed learning was limited. Participants were able to recount and describe changes in behavior related using and learning Google Apps for education. However, only informal reflection of learning was referenced within the data. One significant theme to emerge from self-directed learning was collaboration. Examples for the data included shared collaborative documents and data. This may indicate that Google Apps for Education was identified as a resource during self-directed learning, with participants then sharing information back through Google Apps for Education. This would also support the self-directed learning Schema described in Figure 11.

Unintentional learning. Three themes emerged describing incidental learning: Experimentation, Unexpected Discovery, and Unexpected Fostering. Three themes emerging for tacit learning included: Generalizations, Play, and Intuition. While data related to understanding of incidental and tacit learning motivations was limited, the themes and examples of experimentation, unexpected fostering and generalizations within the data may support research

by Brown, Collins, and Duguid (1989) and Lave and Wenger (1991) suggesting, unintentional learning is generally situated as part of an activity occurring within culture and context requiring social interaction where learners collaborate within a "community of practice," sharing skills, behaviors and beliefs.

Conclusions

There are three conclusions that were made in this study supported by existing literature and the participants' experiences.

Conclusion one. School administrators learning and use of Google Apps for Education is strongly motivated by collaboration. All 12 questions related to motivations and self-directed learning experiences contained direct references to collaboration with others as a motivating factor for use of Google Apps for Education.

This conclusion supports prior research from Lim et al. (2015) finding cloud computing has various identified benefits leading to increased levels of use in education including easy access to data, software available anywhere, ability to share materials, and peer-to-peer communication and collaboration. Additionally, the 2017 NETP stated, suggested collaboration on effective practices and uses of technology is needed to fully realize the benefits of technology in education.

Interview question six and seven related to the Subject component of activity system theory revealed desire to collaborate as a significant theme. Interview questions eight and nine related to the Division of Labor component of activity system theory had five significant themes related to operational roles that interact with the participants learning and use: Administrators, Counselors, Technology Education Staff, Instructional Staff (Faculty), Support (Clerical) Staff. The data supports prior research by Milligan et al. (2014) suggesting use of cloud-based software

increases and continues to blur boundaries and disrupt previously isolated roles in education, these efforts to infuse technology into authentic learning experiences must be supported at all levels by administrators, teachers, learners, and their families.

Interview question ten related to the Tool component of activity system theory had two themes with significant references to collaboration: Google Apps and Hyperlinks. This data is congruent with research by Lim et al. (2015) in their study of 342 school principals, where approximately 70% ranked cloud file storage and use highest for indication of current and future use.

Interview questions 11 and 12 related to the Rules component of activity system theory had one significant theme, Common Software Adoption, containing references and descriptions of collaboration. Interview question 13 focused on the community groups within an activity system revealing five significant themes; Google Certified Educators, Learning Groups, Other Educators, Relatives/Family Members, and Students, each having examples related to collaboration. Interview question 14 related to the Objects component of activity system theory had six of eight significant themes with references to collaboration: Communication, Distance Learning, Meeting Documents, Presentations, Reports, and Scheduling. Collaboration emerged as a significant theme during data analysis of Interview questions 15, 16, and 17 exploring described self-directed learning processes. This data supports research by Dron and Anderson (2009) suggesting as specific needs arise, collaboration and connections become important resources for learners providing a variety of new resources and information allowing for the creation and augmentation of existing knowledge.

Conclusion two. School administrators learn and use Google Apps for Education by transforming familiar objects also referred to as Production. This conclusion may confirm

research by McGarr and Kearney (2009) finding adoption of new technologies within a school is often limited based on the comfort and familiarity of the principal. Participants in this study referenced use of twelve software applications as a tool within the Google Apps for Education package on 130 occasions as described in Table 13.

Table 13

References to Google Apps for Education

Google App Software	Number of References
Calendar	12
Classroom	1
Docs	41
Drive	10
Email	9
Forms	10
Hangouts	1
Keep	3
Photos	1
Sheets	25
Sites	6
Slides	11

Six of the twelve had less than 10 references from participants and four of the twelve had between 10 and 20 references. Just two of the applications mentioned, Google Docs and Google Sheets, had more than 20 references. These two applications accounted for 51% of the references to Google Apps within the data.

Eight significant themes emerged within the Object component of the activity system with 66 references contributing to the theme as described in Table 14.

Table 14

References to Objects

Object	Number of References
Communication	9
Datasets	11
Distance Learning	2
Evaluations and Assessments	2
Meeting Documents	16
Presentations	5
Reports	13
Scheduling	8

Five of the eight objects had less than ten references in the data. The remaining three Datasets, Meeting Documents, and Reports all had greater than ten references and accounted for 61% of the objects referenced by participants.

Combining Google Docs and Google Sheets accounting for 51% of referenced tools and Datasets, Meeting Documents, and Reports accounting for 61% of referenced objects, supporting the conclusion of school administrators adopting technology within areas of comfort related to existing roles and uses.

This conclusion contrasts the literature supporting research demonstrating school leadership as a prominent catalyst in successful technology adoption initiatives suggesting school administrators should be mindful of the roles digital technology has within their work,

understand the appropriate and innovative uses for new technologies, and develop proficiency in effective technology use and application (Anderson & Dexter, 2005; Flanagan & Jacobsen, 2003; Schiller, 2003; Wang & Rode, 2010).

Conclusion three. Organizational environments and cultures impact school administrators' ability to understand and process informal learning. No significant themes emerged related to communicating learning desires and goals. The participants cited lack of time and a culture of informal discussions when responding to the question exploring communication of goals. This may confirm research by Ley et al. (2014), school administrators generally work in environments with time and resource constraints that may prevent them from processing important experiences as they occur. This lack of reflection time may have a potentially negative influence on their ability to benefit from interactions as learning opportunities.

Participant's descriptions reveal six significant themes related to evaluation and reflection of self-directed learning described by Eraut, (2004) as the processing of learning experiences is the cognitive categorization and connecting of prior knowledge and experiences to current experiences to influence responses to future experiences. These themes included: efficiency, collaboration, use of Google Docs, meeting documents, reports, and work with staff. These themes and the participant's descriptions relate to modified objects and changes in practice, suggesting that administrators do engage making connections with their learning to outcomes through reflection and self-evaluation.

However, missing from the themes as well as the participants descriptions was references to sharing learning processes and achievements with others. Research by Milligan et al. (2014) suggests sharing these connections and new understandings publicly increases the value to the individual and creates knowledge structures for the benefit of others. This may suggest

administrators may not have the tools or understanding related to the personal and public benefit of sharing personal reflections of self-directed learning experiences. Figure 12 also suggests organizations may promote a culture of focused primarily on production with learning resources centered on the learner, the tools being learned, and specific uses within particular job functions. A limited support in the areas of community and rules may contribute to learning isolation and lack of social norms supporting the sharing and exchange of learning.

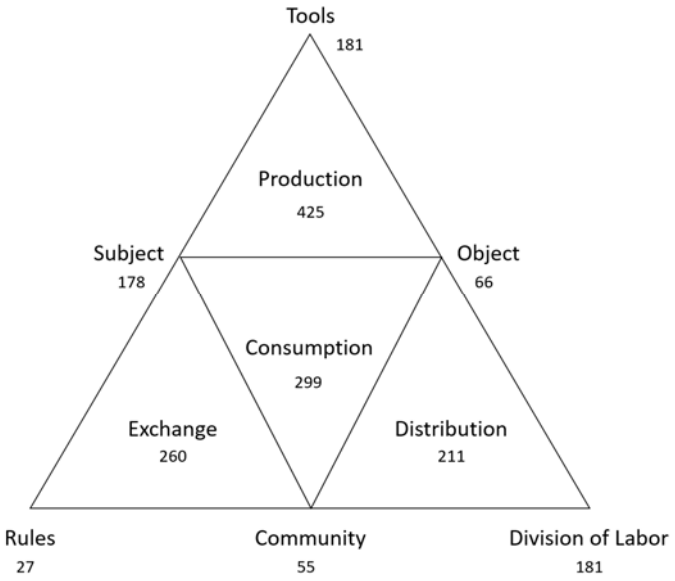

Figure 12. Number of references within data by component.

Implications of Findings

Creating a purposeful culture of self-directed learning. A digital age learning culture creates, promotes, and sustains a dynamic focused on innovating for continuous improvement of digital learning, with frequent modeling of effective technology use, and create environments that meet the diverse requirements of each individual learner (ISTE, 2009).

Organizations change technology use behavior to reflect a this learning culture suggested by ISTE (2009) standards may choose to utilize the TAM3 model, represented in Figure 13, to

relating desired use behavior to the determining factors of Behavior Intention and Perceived Usefulness both of which have experience as a determining factor.

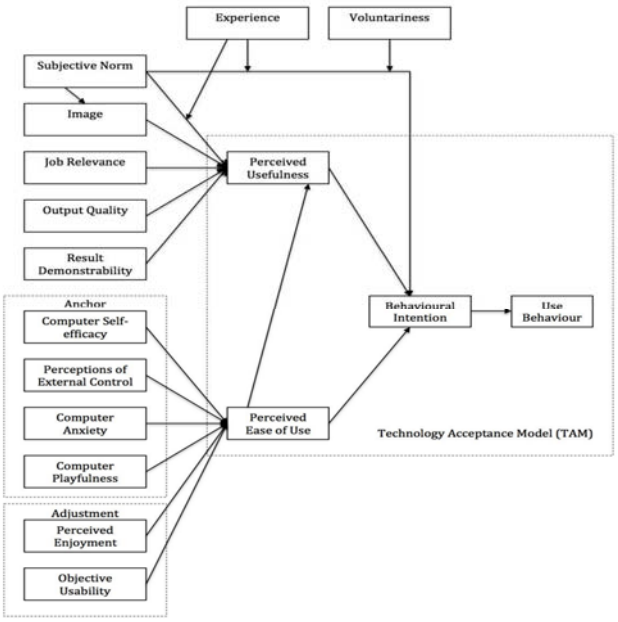

Figure 13. Technology Acceptance Model 3 (TAM3).

By deeply understanding various components of the current learning experiences of administrators, organizations might be able to be purposeful in designing cultural norms that influence learning experiences.

Research by Brown and Duguid (1991) suggest historically, organizations have used canonical and noncanonical practices to facilitate informal learning activities. Canonical methods structure and formalize learning experiences, whereas the noncanonical approach, structures the organizational environment to promote new and existing naturally occurring communities of practices which may result in self-regulated learning activities (Brown & Duguid, 1991).

Knowledge-intensive organizations, such as schools, are increasingly recognizing embedded, unscheduled informal learning as key locus of learning (Harteis & Billet, 2008).

The themes emerging within this research related to evaluation and reflection of self-directed learning as well as themes within incidental and tacit learning suggests these administrators are in organizations that are supportive of non-canonical environments for learning. However, with no significant findings related to the goal-setting component of self-directed learning, these organizations may not facilitate a deep understanding of the self-directed learning components, and their benefits to cognitive learning processes. Research by Binkley et al. (2012) suggests, school administrators must have the ability to harness the potential of technology to collaborate, increase productivity, and to model problem-solving using effective strategies in communicating, sharing, and using information. Organizations facilitating a noncanonical environment promoting embedded learning experiences, may benefit from providing training or resources related to effective practices within self-directed learning to increase learning application and effective modeling.

Aligning appropriate resources for systemic technological change. Cloud computing has various identified benefits leading to increased levels of use in education including easy access to data, software available anywhere, ability to share of learning material, peer-to-peer communication and collaboration, and the ability to independently learn at any location (Lim et al., 2015). Systemic improvement relies on management of purposeful school wide change designed to increase appropriate use of technology resources through creation, sharing, and routine evaluation of key metrics, purposeful recruitment and retention of competent staff, and maintenance of robust technology infrastructures (ISTE, 2009).

Organizations seeking to adopt new technology and gain and understanding of experiences could use activity system as a metric tool to understand and measure organizational culture and monitor changes.

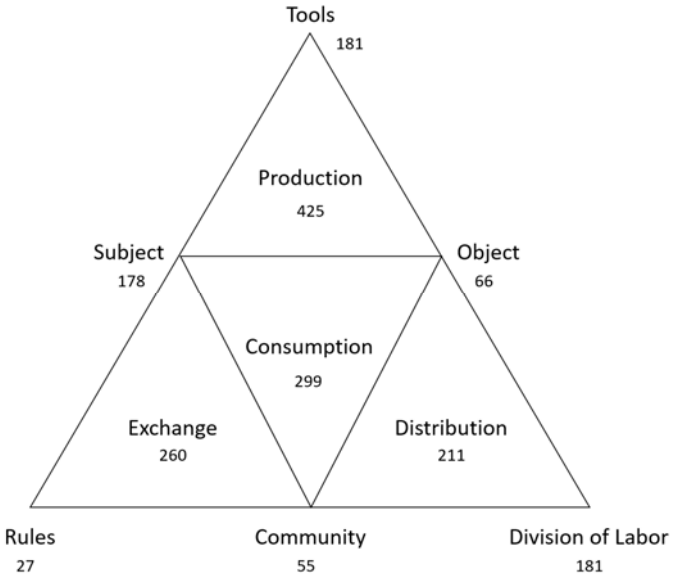

Figure 14. Number of references within data by component.

Figure 14 shows the data from this research revealing dominant sub-systems within the environment of the participants. This suggest organizations might use the dominant sub-system or components of a community or group of educational administrators to attract resistant learners, and likewise, use less dominant sub-systems or components to challenge administrators who are more advanced.

This research demonstrates organizations may be able to easily leverage the Rules component of the activity system through understanding current environment of common expectations, and social norms related to technology use and learning.
Promoting development and understanding in this area may increase Perceived Usefulness resulting in greater usage of technology.

Organizations adopting or transitioning between software systems or seeking an increased or differentiated use of technology may benefit from understanding the current organization culture in relation to the activity system sub-system areas of Distribution,

Exchange, and Consumption. These areas may have greatest potential for leverage through training and understanding contradictions causing negative experiences resulting is reduced acceptance behavior.

Understanding and supporting informal professional learning. Research by Hyunju, Longhurst, and Campbell (2017) suggests changes in beliefs and behavior be dependent on reinforcing experiences. The data from this research revealed the Community component of the Activity system had five significant themes related to learning Google Apps for Education. However, the theme of Google Certified Educators was only cited by three participants and the theme of Relatives and Family Members was only cited by two participants. Organizational leaders responsible for implementation of technology that changes fundamental practices and culture of an organization should consider the various communities school leaders interact with, both publicly and privately, to maximize the potential for new learning opportunities as well as those that reinforce current learnings and change beliefs.

Innovation diffusion and adoption eventual success rates may vary based on existing social and cultural norms and conditions but may also be dependent on support systems willingly provided by an organization (Herbig & Dunphy, 1998; Sabia, Uzoka, Langmiac, & Njeh, 2016). Creating focused learning communities as well as supporting a variety of existing social communities with the tools needed to understand, reflect upon, and share informal learning experiences. These communities may promote greater engagement of educational leaders in the contribution and exchange of information leading to a culture of sustained informal learning to support rapid innovation change and adoption.

Discussions of Study Limitations

This study was based on rich descriptions recalled from past experiences of the participants. The interviews relied on the participants' ability to describe past events accurately and in detail. Participants could have unknowingly omitted useful information or may could have unintentionally exaggerated details about events related to their learning and motivations.

Sample size and population for this study was narrow which may limit the transferability of the results and recommendations outside of the specific population sampled. Participants were from rural and suburban public schools in California. This sample limits the ability to understand potential learning differences between public and private organizations. The sample population for this study excluded new administrators. Administrators new to the role may have a fresh or unique perception of technology uses, applications, and learning opportunities.

Administrators may have been limited in their understanding of their informal learning. Informal learning is an activity that occurs in an unaware state of mind. Detection of unintentional learning may also be limited by the participant's abilities to detect and describe unconscious cognitive learning processes. Therefore, without specifically recognizing or being informed of the learning that has occurred, the participant may be unaware of the effects and personal processes related to this type of learning.

Studying learning and use across various participants and organizations resulted in varied social norms. Within TAM3, Social Norms are a determining factor related to experience in understanding Perceptions of Use.

Recommendations for Future Research

Although findings of this study may have identified motivational components perceived to be important for school administrators while learning and using Google Apps for Education,

more research is needed. The following areas of further research may provide further understanding and insights into the motivations and informal learning processes of administrators using cloud-based knowledge information sharing systems:

- Replicate this qualitative study using school administrators from various states or and districts that might have populations of students and staff with varied administrative experience, technology experience and access to technology.
- Work collaboratively with administrative training and induction programs across the state to conduct a longitudinal study aimed at better understand the needs of new school administrators by studying the motivations and informal learning elements of school administrators in new positions.
- Activity systems often cycle between periods of relative stability and disruptive changes that result from the buildup of one or more contradictions within the system (Engeström, 2005). Using the themes found in this research as variables in longitudinal study to explore shifts in tensions within an activity system.
- Case studies of administrators across organizations with various levels of Google Apps for Education experience may provide deeper understanding of incidental and tacit learning and the activities that motivated each.
- Research focused on tensions between components of the activity system may provide a deeper understanding of a subject's prioritization of components in the activity system and the value each component has as a motivator compared to the other.

Final Thoughts

Leaders in the U.S. education system were educated and taught to learn in an age that has come and gone. Increased technological change and the continuing increase of global competition for skilled workforce has resulted in new and emerging standards and expectations for school administrators as technology leaders. To create a student body ready for a workforce that values the ability to continuously learn and adapt, teachers and leaders must understand, model, and be comfortable with changes in technology and their best uses. For administrators to be effective at promoting a school environment prepared to deliver students ready for the 21st century standards, school administrators must understand how to recognize and reinforce their learning processes and promote the same in their staff.

This research makes the case for the importance of understanding administrators' motivations for learning and using technology. Both existing and aspiring school administrators need to recognize their learning related to technology and examine how the understanding of their motivations, and those of others, can assist them in working with their faculties to better meet the needs of the students.

Administrators must embrace technological change and create a campus culture where technology learning processes are used by everyone in the school to effectively consume information to support learning, evaluate and exchange ideas, produce creative results, and distribute meaningful information for the benefit of a global community. Demonstrating this personal proficiency and diversity in technology use promotes a school culture that values learning and fosters experimentation (Schiller, 2003).

Zucker (2008) summarizes these new demands of school administrators proclaiming, “for decades there will be a pressing need to make schools better, and for decades, educational technology is going to provide essential tools for improving them” (p. 26).

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APPENDIX A

Certificate of Completion Human Subjects Research (CITI)

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Justin Locketz (ID: 5554690)
- **Institution Affiliation:** Pepperdine University (ID: 1729)
- **Institution Email:** justin.locketz@pepperdine.edu
- **Institution Unit:** GSEP

- **Curriculum Group:** GSEP Education Division
- **Course Learner Group:** GSEP Education Division - Social-Behavioral-Educational (SBE)
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 19531346
- **Completion Date:** 13-May-2016
- **Expiration Date:** 12-May-2021
- **Minimum Passing:** 80
- **Reported Score*:** 82

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	13-May-2016	3/3 (100%)
History and Ethical Principles - SBE (ID: 490)	13-May-2016	3/5 (60%)
Defining Research with Human Subjects - SBE (ID: 491)	13-May-2016	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	13-May-2016	4/5 (80%)
Assessing Risk - SBE (ID: 503)	13-May-2016	3/5 (60%)
Informed Consent - SBE (ID: 504)	13-May-2016	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	13-May-2016	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kb81651df-fd67-46eb-b7b6-1559ea2ffc16-19531346

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Justin Locketz (ID: 5554690)
- **Institution Affiliation:** Pepperdine University (ID: 1729)
- **Institution Email:** justin.locketz@pepperdine.edu
- **Institution Unit:** GSEP

- **Curriculum Group:** GSEP Education Division
- **Course Learner Group:** GSEP Education Division - Social-Behavioral-Educational (SBE)
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 19531346
- **Report Date:** 12-Feb-2018
- **Current Score**:** 82

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
History and Ethical Principles - SBE (ID: 490)	13-May-2016	3/5 (60%)
Defining Research with Human Subjects - SBE (ID: 491)	13-May-2016	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	13-May-2016	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	13-May-2016	4/5 (80%)
Assessing Risk - SBE (ID: 503)	13-May-2016	3/5 (60%)
Informed Consent - SBE (ID: 504)	13-May-2016	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	13-May-2016	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kb81651df-fd67-46eb-b7b6-1559ea2ffc16-19531346

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

APPENDIX B

Participant Recruitment E-mail

Dear [Name],

My name is Justin Locketz and I am a doctoral student in the Graduate School of Education and Psychology at Pepperdine University. I am conducting a research study examining the lived experiences and perspectives of school site administrators related to their adoption of Google Apps for Education. If you agree to participate in this study, you are invited to participate in a one-on-one semi-structured interview and a brief post-interview follow-up to ensure the accuracy of your collected interview responses. The interview is anticipated to take no more than 60-90 minutes and the interview will be audio-recorded. Participation in this study is voluntary. Your identity as a participant will remain confidential during and after the study. Your identity will be protected by assignment of an alias. The audio-recording and any written notes from the interview will be destroyed three years after the dissertation is completed. If you have questions or would like to participate, please contact me at: justin.locketz@pepperdine.edu

Thank you for your consideration,

Justin Locketz, Doctoral Candidate

Pepperdine University Graduate School of Education and Psychology

APPENDIX C

Participant Follow-Up E-mail

Dear [Name],

I am writing to follow- up on the email I sent you last week to see if you are interested in participating in my research study on examining the lived experiences and perspectives of school site administrators related to their adoption of Google Apps for Education. You are one of a select group of administrators asked to participate in a 60 minute semi-structured interview. If you are available to participate in this study, please contact me at your earliest convenience so we can schedule an interview session.

Sincerely,

Justin Locketz, Doctoral Candidate

Pepperdine University Graduate School of Education and Psychology

APPENDIX D

Informed Consent for Participation

PEPPERDINE UNIVERSITY

Graduate School of Education and Psychology

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

"EXPLORING THE MOTIVATIONS AND INFORMAL LEARNING OF SCHOOL ADMINISTRATORS ADOPTING GOOGLE APPS FOR EDUCATION"

You are invited to participate in a research study conducted by Justin Locketz, Doctoral Candidate of Education in Educational Leadership, Administration, and Policy with Dr. Linda Purrington, Committee Chair, at Pepperdine University, because you are a school-site administrator and you have experience using Google Apps for Education. Your participation is voluntary. You should read the information below, and ask questions about anything that you do not understand, before deciding whether to participate. Please take as much time as you need to read the consent form. You may also decide to discuss participation with your family or friends. You will also be given a copy of this form for your records.

PURPOSE OF THE STUDY

The purpose of this qualitative phenomenological research study will be to explore and describe the motivations and lived experiences of school site administrators related to their informal learning in the workplace while adopting Google Apps for Education as a cloud-based knowledge management technology. This study proposes to conduct individual semi-structured

interviews of at least six school site administrators who supervise at least one teacher and use Google Apps for Education.

STUDY PROCEDURES

If you volunteer to participate in this study, you will be asked to participate in a one-hour face to-face or virtual interview with Justin Locketz. During your participation in this study, you will be asked 18 interview questions that relate to your motivations and informal learning experiences while adopting Google Apps for Education. The interview will be audio-recorded and later transcribed by an external transcriber. The transcriber will be asked to maintain confidentiality and the audio recording will be de-identified before being provided to transcriber. If you chose not to be recorded, the researcher will ask to take written notes.

POTENTIAL RISKS AND DISCOMFORTS

The potential and foreseeable risks associated with participation in this study include mental fatigue or a loss of personal time for the length of the interview session.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

While there are no direct benefits to the study participants, there are several anticipated benefits to society which include: *(a)* information and data to guide the policies and training initiatives related to technology adoption at all levels within organizations resulting in staff prepared to be dynamic, adaptive, and collaborative learning community participants.*; (b)* increased awareness of accrediting institutions, advocacy organizations, state policymakers, administrators, professional learning designers, and educators in designing a technology-enabled workplace with learning environments that are aligned with adult staff learning needs*; (c)* increased understanding of informal workplace learning opportunities supportive of sustainable information sharing and peer learning.

CONFIDENTIALITY

The records collected for this study will be confidential as far as permitted by law. However, if required to do so by law, it may be necessary to disclose information collected about you. Examples of the types of issues that would require me to break confidentiality are if disclosed any instances of child abuse and elder abuse. Pepperdine's University's Human Subjects Protection Program (HSPP) may also access the data collected. The HSPP occasionally reviews and monitors research studies to protect the rights and welfare of research subjects. The data will be stored on an encrypted disk drive in the researcher's place of residence. The data will be stored for a minimum of three years. The data collected will be de-identified, transcribed by an external transcriber, and coded. Any identifiable information obtained in connection with this study will remain confidential. Your responses will be coded with a pseudonym and transcript data will be maintained separately. The audio-recordings will be destroyed once they have been transcribed.

SUSPECTED NEGLECT OR ABUSE OF CHILDREN

Under California law, the researcher(s) who may also be a mandated reporter will not maintain as confidential, information about known or reasonably suspected incidents of abuse or neglect of a child, dependent adult or elder, including, but not limited to, physical, sexual, emotional, and financial abuse or neglect. If any researcher has or is given such information, he or she is required to report this abuse to the proper authorities.

PARTICIPATION AND WITHDRAWAL

Your participation is voluntary. Your refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may withdraw your consent at any time and

discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study.

ALTERNATIVES TO FULL PARTICIPATION

The alternative to participation in the study is not participating or only completing the items for which you feel comfortable. Participating in this study will not in any way, shape or form infringe upon the relationship between you and your employer.

EMERGENCY CARE AND COMPENSATION FOR INJURY

If you are injured as a direct result of research procedures you will receive medical treatment; however, you or your insurance will be responsible for the cost. Pepperdine University does not provide any monetary compensation for injury.

INVESTIGATOR'S CONTACT INFORMATION

You understand that the investigator is willing to answer any inquiries you may have concerning the research herein described. You understand that you may contact: Justin Locketz (Researcher) at XXX-XXX-XXXX or email XXX@pepperdine.edu; or Dr. Linda Purrington (Committee Chair) at (XXX) XXX-XXXX or email XXX@pepperdine.edu; if you have any other questions or concerns about this research.

RIGHTS OF RESEARCH PARTICIPANT – IRB CONTACT INFORMATION

If you have questions, concerns or complaints about your rights as a research participant or research in general please contact Dr. Judy Ho, Chairperson of the Graduate & Professional Schools Institutional Review Board at Pepperdine University 6100 Center Drive Suite 500 Los Angeles, CA 90045, 310-568-5753 or gpsirb@pepperdine.edu.

APPENDIX E

Participant Interview Guide

1. How many years of experience do you have as a school administrator?
2. Would you describe your school as urban, suburban, or rural?
3. What grades does your school serve?
4. How many years has your school been using Google Apps for Education?
5. How many years have you been using Google Apps for Education?
6. Describe how you use Google Apps for Education?
7. Why did you need to learn and use Google Apps for Education?
8. While you learn and use Google Apps for Education, who has offered assistance and what was the outcome?
9. While you learn and use Google Apps for Education, who have you asked for assistance and what was the outcome?
10. What tools, materials, or resources did you use while learning about Google Apps for Education?
11. What encourages you to learn and use Google Apps for Education?
12. What impedes your learning or use of Google Apps for Education?
13. Do formal or informal Professional Learning Communities support your learning about Google Apps for Education? If so, how?
14. What specific features, tools, or use examples made you want to learn about Google Apps for Education?
15. Do you communicate your learning desires or goals about Google Apps for Education? If so, how?

16. Do you reflect on, evaluate, or share the success of your learning about Google Apps for Education? If so, how?

17. What changes in your professional practice do you associate with learning about Google Apps for Education?

APPENDIX F

Interview Instrument

1. How many years of experience do you have as a school administrator?
2. Would you describe your school as urban, suburban, or rural?
3. What grades does your school serve?
4. How many years has your school been using Google Apps for Education?
5. How many years have you been using Google Apps for Education?
6. Describe how you use Google Apps for Education?
7. Why did you need to learn and use Google Apps for Education?
8. While you learn and use Google Apps for Education, who has offered assistance and what was the outcome?
9. While you learn and use Google Apps for Education, who have you asked for assistance and what was the outcome?
10. What tools, materials, or resources did you use while learning about Google Apps for Education?
11. What encourages you to learn and use Google Apps for Education?
12. What impedes your learning or use of Google Apps for Education?
13. Do formal or informal Professional Learning Communities support your learning about Google Apps for Education? If so, how?
14. What specific features, tools, or use examples made you want to learn about Google Apps for Education?
15. Do you communicate your learning desires or goals about Google Apps for Education? If so, how?

16. Do you reflect on, evaluate, or share the success of your learning about Google Apps for Education? If so, how?

17. What changes in your professional practice do you associate with learning about Google Apps for Education?

APPENDIX G

Instrumentation Validity Questionnaire

Dear Reviewer,

Thank you for agreeing to review my interview instrument. I plan to interview more than six public school administrators who are members of my Professional Learning Network or who are referred to me as participants that meet the study sample criteria. The 60-minute interviews will be conducted face-to-face and virtually using a semi-structured interview protocol.

Purpose Statement: The purpose of this qualitative phenomenological research study will be to explore and describe the motivations and lived experiences of school site administrators related to their informal learning in the workplace while adopting Google Apps for Education.

Research Question: What are the motivations and lived informal learning experiences of public school site administrators adopting Google Apps for Education?

As you review the questions below, will you please focus on the following:

1. Am I asking questions that will generate responses that are aligned with my research questions?
2. Based on the interview protocol, am I asking the right number of questions?
3. Is the language phrased in an understandable manner?

Demographic Questions

1. How many years of experience do you have as a school administrator?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

2. Would you describe your school as urban, suburban, or rural?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

3. What grades does your school serve?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

4. How many years has your school been using Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

Activity Systems Theory

5. Describe how you use Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

6. Why do you need to learn and use Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

7. While you were learning and using Google Apps for Education, who has offered assistance and what was the outcome?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

8. While you were learning and using Google Apps for Education, who have you asked for assistance and what was the outcome?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

9. What tools, materials, or resources do you use while learning about Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

10. What influences you to learn about Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

11. What impedes your learning about Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

12. Who supports your learning about Google Apps for Education at your school?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

13. What professional learning communities support your learning about Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

14. What have you sought to learn in the past about Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

Informal Learning Motivations

15. What specific uses made you want to learn about Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

16. Do you communicate your learning desires or goals about Google Apps for Education? If so, how?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

17. How do you evaluate the success of your learning about Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

18. What changes in professional practice do you associate with learning about Google Apps for Education?

_____Keep _____Do not keep _____Clear _____Unclear

Suggestions: _____

APPENDIX H

Interview Protocol

Pseudonym for participant: _____

School-site: _____

Location:_____

Interview Date/Time:_____

Thank the participant for their time and remind them of the details outlined in the consent form. Remind participant that the interview will be audio-recorded and she can take breaks or stop the interview, if needed.

1. How many years of experience do you have as a school administrator?
2. Would you describe your school as urban, suburban, or rural?
3. What grades does your school serve?
4. How many years has your school been using Google Apps for Education?
5. How many years have you been using Google Apps for Education?
6. Describe how you use Google Apps for Education?
7. Why did you need to learn and use Google Apps for Education?
8. While you learn and use Google Apps for Education, who has offered assistance and what was the outcome?
9. While you learn and use Google Apps for Education, who have you asked for assistance and what was the outcome?
10. What tools, materials, or resources did you use while learning about Google Apps for Education?

11. What encourages you to learn and use Google Apps for Education?

12. What impedes your learning or use of Google Apps for Education?

13. Do formal or informal Professional Learning Communities support your learning about Google Apps for Education? If so, how?

14. What specific features, tools, or use examples made you want to learn about Google Apps for Education?

15. Do you communicate your learning desires or goals about Google Apps for Education? If so, how?

16. Do you reflect on, evaluate, or share the success of your learning about Google Apps for Education? If so, how?

17. What changes in your professional practice do you associate with learning about Google Apps for Education?

Thank participants for their time. Remind them that the interview is confidential and follow up contact information is provided in the consent form should they have additional questions or thoughts upon the conclusion of the interview.

APPENDIX I

Interview Observation Log

Pseudonym for participant: _____

Location: _____

Interview Date/Time: _____

Notable Experiences	Personal Thoughts