KEY COMPONENTS EDUCATORS NEED IN A SINGLE LOGIN DATA AND INFORMATION SYSTEM

The undersigned, approved by the Department Chair of Graduate Studies in Education at Southwest Baptist University, have examined a dissertation entitled:

**KEY COMPONENTS EDUCATORS NEED IN A SINGLE LOGIN DATA AND INFORMATION SYSTEM**

Presented by Amy J. Sims, a candidate for the degree of Doctor of Education, and hereby certify that in their opinion it is worthy of acceptance.

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# KEY COMPONENTS EDUCATORS NEED IN A SINGLE LOGIN DATA AND INFORMATION SYSTEM

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Doctor of Education

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By

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When I think back over my life, I can't help but think of a decision I made when I graduated high school. I remember vividly telling my parents I did not want to go to college. I was scared they would disapprove and worried about their reaction. Much to my surprise they were not upset; instead, they said I would need to get a job. It took about one month of working when I approached my parents once again; however, this time I was telling them I wanted to look at some colleges. As I look back over that decision, I am not sure where my life would have led me if I had not changed my mind. I am so grateful for my parents and the continued support they give me even as a grown woman with my own family. Thank you, Mom and Dad, for always being there for me even when I don't make the decision you would like me to.

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this path. They were patient while I was learning, encouragers when I couldn't see the end, and they answered every question when I needed guidance. Dr. Brad Johnson has graciously served as my advisor on this journey. I remember the first time we met in his office. He was patient with me as I shared my study and then stretched my thinking about what it could become. He has been there to guide me, encourage me, and search out answers. Thank you, Dr. Johnson, for your continued support and encouragement. I want to also thank my additional committee members, Dr. Bill Duvall and Dr. Shane Medlin, for taking time out of your busy schedule to assist me in my journey.

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# ABSTRACT

School districts use data and information systems as a means to create efficiency in the organization. As the educational technology world continues to expand, the number of specialized systems leads to schools buying more software systems that function independently. These additional systems create difficulties for educators to curate the data in a way that makes gathering, storing, sharing, evaluating, and analyzing efficient. This study was designed to take the voices of stakeholders that have the job of input and output of data to determine the key components needed in a single login data and information system. The stakeholders surveyed were K-12 educators in Missouri including district administrators, building administrators, teachers, district administrative assistants, and building administrative assistants. Through the use of a researcher-generated survey, the Pearson's *r* coefficient for the 406 pairs of variables revealed a positive linear relationship between each potential component ratings according to the five stakeholder groups surveyed. The coefficient was significant at $p < .001$ and each pair of variables ranged from .245 to .949. The survey also revealed a statistically significant difference in the level of priority of each potential component being compared by the use of the Friedman Test expressed in Chi-square. According to $\chi^2$ of Friedman Test, the critical value was $p < 0.001$ and the results for this study were 56.892. The researcher ran the post-hoc analysis of the Friedman Test utilizing the Wilcoxon Signed-Rank Test to see where the differences lay between each potential component.

# Chapter One

## Introduction

In the world of K-12 public education, there is an ever-increasing call for accountability due to measures imposed by state and federal government (Aldarbesti & Saxena, 2014). To address this tremendous pressure, schools have sought technology applications in pursuit of improvement and efficiency. The fast growing educational software market has allowed schools to pick and choose different systems much like a buffet of applications. Unfortunately, the market is not meeting expectations of all the stakeholders, forcing schools to find workarounds to meet their requirements (Freeland & Hernandez, 2014).

Educators have an extensive amount of information and data to gather, store, share, and evaluate with multiple stakeholders. More often than not, this data and information is located within numerous systems, which makes it difficult to navigate and increases cost to the district. Additionally, as the number of systems increase, district costs' increase with system integration and training expenditures. Districts are often faced with the requirement to purchase an additional integration system that allows two technology applications to work together (Freeland & Hernandez, 2014). At the same time, each supplementary system means more professional training for staff at an additional cost.

During the school year, districts in Missouri are required to submit data and information to the Missouri Department of Elementary and Secondary Education (Missouri Department of Elementary and Secondary Education [MODESE], 2018). The housing of this mandatory data is done at the school site and uploaded

through the department's Web Application, a single login secure site. Non-assessment data are sent six times during the year and must be maintained by the district. This type of data includes, but is not limited to, attendance, courses, student demographics, student discipline, lunch status, employee names, etc. The local information system should have the features required by the government and is a major consideration when selecting an infrastructure (Aldarbesti & Saxena, 2014).

Freeland and Hernandez (2014) found educators have the option to look beyond their current student information system, but often they do not feel the luxury to do so. Instead, schools stay locked into a system that does not meet the needs of educators for the sake of keeping things the same. The problem is compounded as data and information systems are added, creating additional issues across the district. Although there are numerous platforms used in K-12 districts across the nation, none completely fill the need, which in turn requires districts to buy more systems to meet the needs of the institution (Dermaku, Bajrami, Demaku, Kikaj, Maloku, Gashi, Sina & Demolli, 2016). While this is a nationwide issue, this study will focus on Missouri public school educators in the K-12 setting to determine key components needed in a single login data and information system.

**Conceptual Framework**

Data and information systems are in infancy stages when it comes to establishing a theory based academic field (Watson, 2014). Watson (2014) explains information system research fields have failed to create a core set of principles in order to build a theoretical guide. Currently, information system studies borrow from other academic areas to support a theory for which research problems are approached. The development

in this area would advance the field by helping it become a recognizable academic field (Watston, 2014).

This study is based on the concept that educational data and information systems need to be conjoined, providing a comprehensive picture for all stakeholders (Dermaku et al., 2016; & Freeland & Hernandez, 2014). Many districts move from system to system because of the increased development of technology software (Dermaku et al., 2016). The software program utilized depends on the information or data sought. This requires the district to first identify the information or data and then determine which program or programs should be utilized. The educational technology market is growing quickly, and the demands are great. The increase in the number of systems makes one question why these systems are not working together to supply a single high quality product (Freeland & Hernandez, 2014).

Data and information systems allow institutions the ability to organize, store, and utilize data in a way that enhances the education experience (Dermaku et al., 2016; & Freeland & Hernandez, 2014). The need to evaluate the success of systems is what drove the work of DeLone and McLean (DeLone & McLean, 1992, 2003; Feng & Pan, 2016). DeLone and McLean developed a model to take the complexity of information systems and break it down into measurable dependent variables that are contained within or outside of the system (DeLone & McLean, 1992, 2003; Feng & Pan, 2016). The DeLone and McLean Model diagrams the interactions of six categories of an information system in attempt to identify factors adding to the success of the system (DeLone & McLean, 1992, 2003; Feng & Pan, 2016). The six categories are: system quality,

information quality, service quality, intention to use/use, user satisfaction, and net benefits (DeLone & McLean, 2003).

Educators are looking for a system that streamlines work and creates a workflow to increase efficiency. The educational community has moved past the days of a limited system that specializes in storage of demographic information into a world where the information and data work in tandem to impact all stakeholders. The U.S. Department of Education (2010b) recommends that district systems need to provide timely and pertinent data so decisions can be made that meet educational objectives. Software applications that work together in a cohesive structure would allow educators to gather data in a fast and convenient manner.

**Problem Statement**

Recordkeeping has made significant progress in today's world through the use of technology. The days of paper records, typewriters, and microfilm are fading in the past with the focus now on time-saving technologies that can help organizations make strategic decisions (Adeleye, Adu, & Olatunde, 2012; Cain, 1996; Cunningham, 2011). Often, when organizations are faced with a system not meeting their needs, a decision is made to pay for an additional system. Although this may seem reasonable, it can cause recordkeeping to become more difficult and cumbersome from the user's perspective (Cunningham, 2011). These types of decisions lead to a patchwork of data and information systems found across K-12 school districts (Freeland & Hernandez, 2014).

The lack of integration across software coupled with increasing new technologies taxes school districts with more managerial tasks and an inefficiency of time and money (Freeland & Hernandez, 2014). The objective for using these technologies is

to increase efficiency, and the level of efficiency is measured by the amount of input and output needed in order to achieve the desired results (Fried, Lovell, & Schmidt, 2008). Input is the amount or rate at which things are added to the system through typing, mouse clicks, etc. Output is what the computer provides after the data/information has been processed. When required to navigate these add-on systems, users find difficulty not only with the input, but also with the output (Fried, Lovell, & Schmidt, 2008).

School districts across the nation have spent millions of dollars on technologies to enhance teachers' abilities to teach students and run efficient organizations (Simplicio, 2002). According to Simplicio (2002), schools must realize technology is a tool, and it is their responsibility to allocate funds wisely. Each additional system the district adopts increases operational costs, thus decreasing the available funds for instructional needs for the district. In addition, these add-on systems create and increase opportunity for errors to occur which may result in inaccuracies in data (Cain, 1996; Cunningham, 2011).

A single login system with the desired components of district educators is needed. A student information system supports the core inner-workings of a school, and the desire of a single login system is ideal. This study identified key components K-12 educators in Missouri need in a single login data and information system with consideration of all stakeholders. By discovering what schools desire, users can aide in the decision making process when selecting software, which will increase the organization's efficiency.

**Purpose for the Study**

The purpose of this study was to determine key elements that K-12 educators in Missouri need in a single login data and information system. District "School systems

should proactively inform vendors about how they use software and hardware on a day-to-day basis" (Freeland & Hernandez, 2014, p. 33). Software developers need a clear comprehensive plan from the users that detail the requirements needed by the organization, and this plan should be solicited separately from the abilities and limitations of school's current technology platforms (McDonald, 2010). In order to meet the needs of the organization, it is essential to gather the needs of the users responsible for the daily utilization of the input and output operations of the system (Adeleye, Adu, & Olatunde, 2012; Cunningham, 2011; Feng & Pan, 2016; Fetaji, Fetaji, Jashari, Ebibi, Ljajie, Kamberovic, & Iseini, 2016; DeLone & McLean, 1992, 2003; McDonald, 2010; McLeod, Hare, & Johare, 2004). Determining what the user needs is key, as evidenced in the DeLone and McLean model, which has the user at the center for identifying the success of an information system (DeLone & McLean, 1992, 2003; Feng & Pan, 2016).

This study explored current usage of data and information systems by respondents in order to gain an understanding of current practices. The study also expanded beyond the district's current system(s) to identify what is needed, yet may not be currently available within the building/district data and information system(s). The study's findings provided school districts an opportunity to make informed decisions when selecting a comprehensive data and information system.

**Research Questions**

The intent of the study was to determine key components K-12 educators in Missouri desire in a single login data and information system to meet the needs of all members of the school setting. The five stakeholder groups in the study include district administrators (superintendents), building administrators (principals), classroom teachers

(regular education and special education teachers), district level administrative support staff, and building level administrative support staff. The following two questions guided the study:

1. What is the relationship of the common components of a single login data and information system and the five stakeholder groups?
2. What is the difference in the level of priority for each component of a single login data and information system and the five stakeholder groups?

These questions were designed to guide the study and create an understanding of what a desirable data and information system would entail. The researcher proposed the following null hypotheses:

$H_{01:}$ There will be no statistically significant relationship of the common components of a single login data and information system and the five stakeholder groups.

$H_{02:}$ There will be no statistically significant difference in the level of priority for each component of a single login data and information system and the five stakeholder groups.

**Limitations/Delimitations/Assumptions**

There are two identified limitations that cannot be controlled by the researcher that may affect the results of this study.

1. The first limitation is the nature of the respondent's perception. Completed survey responses were based on personal understanding of what data and information systems can include.

2. The second limitation is obtained from data accuracy and dependent on the number of completed responses for the researcher-generated survey.

The study took place November 2018 through December 2018. School districts were selected based on their geographical location. All public school districts in Missouri were asked to participate in the study. Those surveyed in this study consisted of K-12 district leaders, building leaders, classroom teachers, and administrative support staff. The delimitations of this study center around three key factors:

1. Time
2. Location
3. Sample of the study

The following three assumptions were made by the researcher when conducting the study:

1. Respondents answered questions openly and honestly.
2. The use of a quantitative research design provides a detailed view of the key components that are needed for educators in a single login data and information system.
3. The researcher assumes that it is possible to create a single login data and information system that can be robust enough to meet all the needs of the stakeholder groups.

**Design Controls**

A quantitative approach was utilized in this study to identify key components educators need in a single login data and information system. The researcher informed the participants that identifying information would be kept confidential and the results of

the study would be shared upon completion. The respondents of the survey included five groups of K-12 educators in Missouri schools. The following K-12 school district employees were sent a survey: district leaders, building leaders, classroom teachers, district level administrative support staff, and building level administrative support staff. School districts were identified through the use of the Missouri Department of Elementary and Secondary Education district and school information site. The leader of each district and building were personally contacted through email to participate in the survey and provided an electronic questionnaire to disseminate to classroom teachers and administrative support staff.

**Definition of Key Terms**

The terms listed below are key terms that are used throughout this study.

**Data Mining** – the process of taking large amounts of data and extracting patterns that assist in developing a strategic plan (Onan, Bal, & Bayam, 2016).

**Data System -** A software application used to gather, store, and generate data. (Freeland & Hernandez, 2014).

**Information Communications Technology (ICT) –** technologies that are used for collecting, storing, editing, and passing on information in various electronic forms (Adeleye, Adu, & Olatunde, 2012).

**Learning Management System (LMS) -** A Web-based software application for the learning process used to plan, implement, and assess a specific learning process (Kasim & Kahlid, 2016).

**Student Information Systems (SIS) -** A digital system used to gather and store student data for the use of different stakeholders (Freeland & Hernandez, 2014; Lange, A., & Breiter, A., 2009; U.S. Department of Education [USDE], 2010b).

## Summary

An overload of systems to gather, store, share, and evaluate data and information generated within a school district is in need of consolidation. Cunningham (2011) explained that organizations need the input and output process to be logical and innate within the system in order for it not to be laborious for the user. To create a clear data picture for making decisions, districts need a single system to house what is necessary for making strategic decisions to impact students and the organization as a whole (Freeland & Hernandez, 2014). The purpose of this study was to determine key components of a single login data and information system for K-12 educators. Through the findings of this study, school district leaders can select a single login system to the maximum number of key factors in order to cut costs, reduce professional training across systems, and increase efficiency.

Chapter Two contains the Review of Literature, in which the roles of data and information systems were explored and how they relate to the stakeholders in the district. The review of literature is organized thematically. It begins with identifying members of the school systems who interact with the district's data and information system and concludes with components of the system. Chapter Three is a description of the methodology involved in this study. Chapter Four is the analysis of the findings of the study. The conclusion of the findings and recommendations for further study are presented in Chapter Five.

# Chapter Two

## Review of Literature

### Introduction

The fragmentation of school districts' student data and information systems makes it difficult for administrators to make quality decisions (Harris, III, 2007). Harris found school principals struggled to consolidate the data together because data were housed in different systems. This required principals to system hop, navigate multiple informational platforms, to get the needed information to make meaningful decisions. Quick access to information would expedite decision making for stakeholders of the school system (Harris, III, 2007; USDE, 2010b).

Since the development of data systems, there has been a dramatic increase on the emphasis of school improvement (Passey, 2009; Visscher, 2009). Schools turn to these systems to provide an efficient workflow solution to support the needs of the school; however, they often have to turn to multiple vendors to meet these demands (Freeland & Hernandez, 2014). Visscher (2009) discusses a system that seeks to maintain and advance the quality of schools through the potential of feedback in order to produce change within the school setting. This type of system would be comprehensive and allow the school to self-evaluate based on the system findings.

A successful school management system has a strong platform integrated across the multiple users. Yampolskiy (2011) describes efficiency as the scope of the resources used to meet the desired outcome. The level of efficiency can be measured by the value of input and output required to achieve the desired results, where input includes items such as time, cost, and effort (Fried, Lovell, & Schmidt, 2008). The more inputs the

system requires, the lower the level of efficiency because of the amount of time and effort needed to produce the needed outcome (Fried, Lovell, & Schmidt, 2008; Yampolskiy, 2011). School districts utilizing multiple systems lower efficiency by requiring additional inputs when having to system hop, thus causing more recordkeeping work for users. The intended use of technologies for information and data is to reduce the laborious, old way of recordkeeping, but the system must meet the requirements of the user to truly aid in the efficiency of the organization (Adeleye, Adu, & Olatunde, 2012).

This review of literature is summarized through a thematic structure for the purpose of determining key components K-12 school districts in Missouri require in a data and information system to meet the needs of educators. To address the many features of the digital infrastructure, several factors are reviewed to create a foundation for which the study is based. The review begins with identifying members of the entire school system who interact with the district's data and information system. The second portion of this review focuses on the different components of information/data systems and their role in the school setting as well as how they relate to the stakeholders' needs.

**User Centered Systems**

To select a system for an organization, it is important to partner with individuals who have the job of input as well as the users of the output data and information (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014; Fried, Lovell, & Schmidt, 2008; McLeod, Hare, & Johare, 2004; Yampolskiy, 2011). Often, program developers create a system they believe meets the needs of the organization, but without having the right people at the table, the program may not meet all the organization's needs (Cunningham, 2011; McDonald, 2010). The success of the

information systems has been studied from multiple angles over the last four decades (Feng & Pan, 2016).

Information system software assists the user in the management of resources available in the computer system. A factor of success in the development of information system software is the relationship between the developer and user of the systems (Hsu, Liang, Wu, Klein, & Jiang, 2011; Jiang, Klein, & Chen, 2006). Adopting the approach of strong relationships allows for the developer and user to reach a collaborative level, thus improving the quality of interaction and satisfaction at the user level along with an enhanced process for project management as compared to traditional practices of information system development (Stephens & Rosenberg, 2003). According to Stephens and Rosenberg (2003), developers who embrace the relationship with their users have a higher project success rate benefiting both invested parties.

Alignment between the information technology and the business partner reaches beyond the school walls and can be seen in the business world as well. The need to have this perfectly coordinated effort between the information technology developers and the organization opens the door to high levels of performance (Gbangou & Rusu, 2016; Luftman, 2000). Luftman (2000), stresses the importance of this relationship when trying to achieve and sustain this alignment. There is no single action to make the alignment happen; however, trust and effective communication can begin to open the doors to this much-needed partnership.

As these complex systems continue to expand, professionals lose sight of the key indicators of what makes an information system successful. No matter how deep or broad the systems become, the determining components of whether the system will

succeed is still based on the three areas of relevance, timeliness, and accuracy of information. (Petter, DeLone, & McLean, 2012). The development of information systems throughout the years has been unclear in its focus. Petter, DeLone, and McLean (2012), identified five eras of information systems through historical studies and their own insights. Era one (1950-1960) is defined by data processing; era two (1960-1980) is defined by management reporting and decision support; era three (1980-1990) is defined by strategic and personal computing; era four is defined by enterprise system and networking; and era five (2000 and beyond) is defined by its customer-focus. These divisions in eras help to identify how information system success has developed over time as these systems have been refined and advanced over the years.

Petter, DeLone, and McLean (2012) stated the customer-focused era demanded development organizations look beyond their perspective. Developers need to take a deep look at the broad spectrum of customers who utilize the system. It is necessary to build in the measures to determine the user experiences and perspectives on the information system in order to adapt or change according to those needs. This requires information systems to be ever expanding so the system is able to improve to meet the real-time demand of the given industry. Flexible systems help support this practice by adapting to the wants and desires of the organization. The information system industry has moved past focusing on the speed and accuracy of the system to a more subjective evaluation of the impacts of the system on the key stakeholders who utilize the data and information housed in the system.

**Stakeholders**

In school systems, vital members inside and outside of the school are important in the decision making process in the use of data and information systems. The design of the infrastructure chosen by a district should be tailored to the needs of the stakeholders (Aldarbesti & Saxena, 2014; Breiter & Light, 2006; Shah, 2014). Aldarbesti and Saxena (2014) identified government entities, administration, teachers, students, and parents as the primary members of the school district to consider when selecting an education management information system. Shah (2014) found that in addition to these stakeholders there are other members who utilize and manipulate the data in the management information systems such as business and operational managers. The work responsibilities of business and operational managers include items such as financial input, human resources, transportation operations, etc. These stakeholders have a vested interest in the information and data that is held within the system, and their needs should be considered when making decisions (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014).

The federal government calls for states and districts to be held accountable for student performance through the Elementary and Secondary Education Act (U.S. Department of Education [USDE], 2010a). Before buying a student information system, it is imperative for schools to ensure the structure fulfills the state and federal accountability specifications (Finkel, 2012). The linkage between district and state data should be easily accessible to aid in creating a digital collection for implementation of state standards (USDE, 2010b). This is achieved by states gathering data through the use of data and information systems. These systems are designed to help foster public

accountability of the results and targeted growth for school districts. The pubic data must include academic achievement in English language arts, math, and science. The high school level is required to have additional data, including graduation rates, college enrollment rates, and college enrollment rates. Each piece of the data is disaggregated according to demographic information such as race, gender, and free and reduced lunch status. The use of this data is not solely punitive, but it is used also to recognize schools performing at a high levels. Schools with consistent gaps in academic achievement are required to implement data-driven interventions. The housing of the data in a data system is essential to the process.

The Missouri Department of Elementary and Secondary Education utilizes two systems to collect and organize the data for compliance with various state and federal reporting requirements (Missouri Department of Elementary and Secondary Education [MODESE], 2018). School districts are mandated to report data to the state through Core Data and Missouri Student Information System (MOSIS). These two systems report data throughout the year on six standard data collection cycles. Across the state, millions of pieces of data must be collected during these time periods. The precise data required at each collection cycle are described for the district in the department's reference manual. For districts to be effective and efficient in the uploading of the local district data, it is necessary to have aligned systems to house the data to meet the state and federal requirement.

Data and information systems implemented with fidelity by leaders impact the effectiveness and culture of the school (Blau & Presser, 2013). Through the use of data systems, the administrator can help shape professional development based on findings

(Breiter & Light, 2006). District leaders, such as superintendents and school board members, can obtain information from technology software programs to see potential changes to enhance the structure or personnel decisions (Heath, Maghrabi, & Carr, 2015). Gathering the data from the infrastructure helps administrators hold crucial conversations with members of the entire system (Breiter & Light, 2006).

According to the U.S. Department of Education [USDE] (2007), forty-eight percent of teachers reported having an accessible electronic data system at the teacher level during the 2004-2005 school year. Teachers are the biggest users of a school management system, and their voices are crucial when evaluating the success and satisfaction of the system (Hassan, Rahmatullah, & Nordin, 2014; Wei, Piaw, Kannan, & Moulod, 2016). Today, schools are looking for more expansive systems that go beyond compliance for state and federal reporting (Freeland & Hernandez, 2014). The market has opened sophisticated systems to allow teachers to take advantage of the data to impact learners (Freeland & Hernandez, 2014). For data to be usable for teachers making instructional decisions, it is necessary for the data to be relevant and timely (USDE, 2010b). When teachers have the necessary information, they can make more accurate decisions, which will positively impact the success of their student (Stockhamer, 2013). Finkel (2012) stated school districts want to meet the classroom teachers' needs through systems that include demographic information, attendance, grades, student assignments, and beyond. A rich single-entry portal designed to support the vast needs of the teacher will have a positive impact on student achievement by allowing the teacher to make effective data driven decisions in a timely manner (Finkel, 2012; Freeland & Hernandez, 2014).

Apart from teachers, parents are identified as the most valuable stakeholders that directly impact the success of students (Stockhamer, 2013). Data and information systems help develop a teamwork approach between parents and teachers focused on the student's learning experience (Molden, 2016). The sharing of information between school and home is part of the professional teacher's role to help strengthen the collaboration for the child's education (USDE, 2010a). Breiter and Light (2006) found the use of information systems allows staff to have detailed conversations with parents and provide them access to their child's educational objectives throughout the school year. The uses of online parent portals help strengthen the parent involvement, which impacts the culture of the institute (Blau & Presser, 2013). According to Koch (2010), parents are supportive of districts using student information systems to identify how their child is progressing academically. This form of communication is convenient for staff and parents and helps keep the information fresh and meaningful.

Friedrich and Hron (2010) found it is fundamental to include the perspectives of students when selecting e-Learning (electronic learning) systems. By allowing students to have a voice in the usefulness of the system, the students' acceptance of the program was significant (Friedrich & Hron, 2010). The strong correlations between student and parent usage indicates when students are engaging in the system the more likely the parent is to use the system (Nasser, Cherif, & Romanowski, 2011). With the ever changing and growing world of technology, it is important to continue to work with students and other users of the system to create an environment where the system is a tool for doing what is necessary for the job instead of the tool requiring the organization to work in an insufficient way.

The need to secure suggestions from all stakeholders is key in building a system to meet the requirements of the organization as a whole (Aldarbesti & Saxena, 2014; Breiter & Light, 2006; Shah, 2014). Shah (2014) explains in order for the users of the data and information system to take ownership, they have to be a part of the decision-making process when selecting a system as well as have the necessary training to utilize it effectively. The need for program developers to listen to the diverse needs of the stakeholders is vital to the improvement of current data and information systems. (Cunningham, 2011; Freeland & Hernandez, 2014; McDonald, 2010).

**DeLone and McLean Model**

DeLone and McLean developed a model to measure the complex dependent variables present within an information system (DeLone & McLean, 1992, 2003; Feng & Pan, 2016). This model looks at the critical relationships between different variables and how they interact to create a successful information system. Through the identification of the multiple dependent variables that exist when utilizing an information system, the model analyzes the interrelationships through the lens of a multidimensional and interdependent framework. The creation of this model allows organizations to look beyond the factors contribute to the system to examine the expense and efficiency necessary to analyze the success of the information system.

The DeLone and McLean Information System Model utilized works from the mathematical theory of communication research conducted by Shannon and Weaver in 1949, Mason's study on measuring information output in 1978, and empirical data from 1981-87 on management information systems (DeLone & McLean, 1992, 2003). Through their research, they were able to synthesize the information to give a

deeper knowledge about what a successful information system contains. The technical, semantic, and effectiveness levels shared within the Shannon and Weaver research were foundational to the study. The technical level describes the system's accuracy and efficiency, the semantic level describes the accomplishment of the desired message being transferred; and effectiveness level analyzes the effect of the information on the recipient. DeLone and McLean used these levels in the development of their model as a framework to then align six categories that guided their study.

The Information System Model was originally designed in 1992 and then updated according to contributions from further studies in 2003 (DeLone & McLean, 2003). The first model, as well as the revised model, was organized in six categories. System quality, information quality, use, user satisfaction, individual impact, and organizational impact are present in the initial framework. It was refined in 2003 by adding service quality in the first dimension, adding "intention to use" in addition to use, and the replacement of individual impact and organizational impact with net benefit. Service quality was added to evaluate the support provided by system developers. Individual impacts and organizational impacts were replaced with net benefit for two reasons. The first reason was the word "impacts" could imply that negative impacts were the focus. Another reason was the division of the two categories was difficult to extract information when deciding where the large amounts of impacts should be placed.

The six categories of the 2003 DeLone and McLean Information System Model took into consideration e-commerce and the effect it has on measuring the success of an information system (DeLone & McLean, 2003). The components of these six categories include:

- System Quality - looks at the usability, availability, reliability, adaptability, and response time. This is relative in the world of e-commerce through items such as the time it takes to download or upload information when interacting with a system.
- Information Quality - views the personalization of the system, security of the information, information is easy to understand, information is complete, and data produced is relevant to the needs of the user.
- Service Quality - evaluates the support given by the system developer/provider, the response time of the system provider, the guarantee of the system, and the rapport between the user and the system developer/provider.
- Intention to Use/Use - this component goes beyond the frequency of use and reviews the navigation within the system and required sites outside of the system to retrieve needed information, the patterns of operation, and the amount of transactions carried out.
- User Satisfaction - gathers the opinions of the user on their satisfaction of the system by looking at all levels of the user interaction with the system through the use of a survey.
- Net Benefit - it is the most important success measure by taking into account the positive and negative impacts of the system. Net benefits view not only the organization impacts but the individual impacts on the users and customers that utilize the information system.

The DeLone and McLean Information System Model is driven by three dimensions that directly impact the intention of use/use and user (DeLone & McLean, 2003). System

quality, information quality, and service quality affect the intention to use/use and user satisfaction. The intention to use/use and user satisfaction is central because all variables must flow through the user to create an information system that organizations can find useful and successful for their outcomes. The final component of the diagram is net benefit, which continually loops back to the intention to use/use and user satisfaction. The net benefit can be negative or positive and, depending on the outcome, it will influence and reinforce following use of the system (DeLone & McLean, 2003).

**Business and Operation Systems**

Prior to development of computers, recordkeeping was a laborious and tedious task that lacked efficiency (Adeleye, Adu, & Olatunde, 2012; Aldarbesti & Saxena, 2014; Shah, 2014). Manual methods of keeping records generated more opportunity for human errors (Adeleye, Adu, & Olatunde, 2012; Cain, 1996). The days of paper recordkeeping created an extensive volume of paper records, which in turn made organizations search for storage (Cain, 1996). Cain (1996) explains the tracking of these files were inadequate and often hard to locate. The demand to use this information to optimize the desired outcome of the organization required data that was onerous to retrieve and to manually calculate (Adeleye, Adu, & Olatunde, 2012).

The introduction of computers rapidly changed the efficiency and effectiveness of business and operation systems (Adeleye, Adu, & Olatunde, 2012; Aldarbesti & Saxena, 2014; Cain, 1996; Shah, 2014). The use of these technologies produced a gateway for the collection, storage, manipulation, collaboration, and forwarding of data decreasing the time needed to obtain information and help solve complex issues through the use of the data system (Adeleye, Adu, & Olatunde, 2012; Aldarbesti & Saxena, 2014; Shah, 2014).

Adeleye, Adu, and Olatude (2012) shared advantages of an electronic database management system as decreasing the handling of bulk data, faster processing of the data, a lower the number of repetitive tasks, quicker access to needed information, as well as consistent and accurate information.

Historically, student information, business, and operation systems were tailored for use by administrators and clerical staff (Finkel, 2012; Freeland & Hernandez, 2014; Shah, 2014). Freeland and Hernandez (2014) maintain there is still a need for these systems in the school setting. They describe these systems as the inner workings of the school, which allow for storage of information to be accessed easily through a digital structure. Momino and Carrere (2016) contend information communication technology helps to build parental involvement through a digital medium that expands beyond the school doors. For this to be possible, a database of student and parental information is necessary.

The United States federal government regulates school districts to use a system to capture the necessary data. One of the requirements is centered on record keeping of employee wages and hours. The U.S. Department of Labor Wage and Hour Division (2008) requires employers to keep detailed records on the following items:

1. Employee's full name and social security number
2. Address, including zip code
3. Birth date, if younger than 19
4. Gender and occupation
5. Time and day of week when employee's work week begins
6. Hours worked each day

7. Total hours worked each work week
8. Basis on which employee's wages are paid
9. Regular hourly pay rate
10. Total daily or weekly straight-time earnings
11. Total overtime earnings for the work week
12. All additions to or deductions from the employee's wages
13. Total wages paid each pay period
14. Date of payment and the pay period covered by the payment

Student information systems have important components in the areas of business and operations within the school setting (Shah, 2014). These systems include modules such as finances, human resources, attendance, and demographics (Finkel, 2012; Freeland & Hernandez, 2014; Shah, 2014). The initial development of student information systems was based around these business and operation systems; however, the progression of technology and the call for school accountability has increased the need for an integrated system that includes academic and data structures (Finkel, 2012; Freeland & Hernandez, 2014; Shah, 2014).

**Academic Systems**

The educational world is saturated with academic software that claims to assist schools with technology tools in order to create a blended learning model (Freeland & Hernandez, 2014). The immense number of tools systems offer can be overwhelming, making it essential for schools to dedicate time for teachers to learn how to use the software in order to expand learning management systems within the school setting (Lochner, Conrad, & Graham, 2015). Lochner, Conrad, and Graham (2015) explained

that teachers need intense and ongoing support in the use of learning management systems within their classroom. The time that is dedicated to the learning process of the teacher should be focused on providing them with the opportunity to experience the positive impact the technologies can have on student learning.

In relation to learning management systems, Spencer (2013) stated, ”through these experiences, faculty and students were able to develop connectivity, interactivity, written and oral communication, reflection, voice, expression, and most importantly engagement” (p. 43). Learning management systems are versatile and offer a teacher and their students an anywhere, anytime approach to learning (Alonso, Lopez, Manrique, & Vines, 2005). Teaching and learning has been impacted by the adoption of such systems due to the increased speed of processing and efficiency provided to the teacher and learner (Mothibi, 2015). When used effectively, learning management systems can have a positive effect on the learning of students (Gecer & Dag, 2012; Mothibi, 2015). The meta-analysis conducted by Mothibi (2015) found e-learning systems are an effective tool in strengthening students’ overall academic achievement in higher education.

Electronic Learning systems have become more important as schools move into one-to-one computers for students. Labat (2013) shared student progress, grades, and homework can be housed in the learning management system, providing pivotal information to be communicated to parents and students. Stockhamer (2013) identified parents are an important stakeholder within the school setting, and they positively impact the success of the student academically. Up-to-date and pertinent information through an online academic system, allows parents and students to stay abreast of where the student

is academically in a timely and efficient way (Labat, 2013). However, the use of learning management systems in the school setting can be challenging when not integrated with the student information systems.

The majority of academic learning systems that are offered to schools are either adaptive or assignable software (Freeland & Hernandez, 2014). In adaptive software, the computer program identifies where the student is in their learning and adjusts according to the student's answers. Assignable software allows the teacher to assign specific learning tasks based on what they have identified as the area of need. Educators desire a more flexible structure that encompasses both types of software systems. Freeland and Hernandez (2014) contend academic software companies need to gather additional information from their educational consumers to better address what is desired by the members of the school setting.

**School Data Systems**

Choice in data systems was not thought of some 30 years ago (Passey, 2009). Schools at that time relied on teacher records and state and/or national tests to make decisions. The initial purpose of the data management systems was geared toward administration and management purposes; however, there has been a shift to focusing on teachers and students. With the plethora of data management systems today, data can be found in many areas of the education world from academics to business and operation management. The influx of student information systems has turned a spotlight on to school improvement. Passey (2009) states that the abundance of available programs has created data complexity and the need for smarter systems that are more effective and efficient.

Educational data mining in the field of research is relatively new and increasing in popularity because of the potential it offers to the world of education (Onan, Bal, & Bayam, 2016; Al-Twijri & Noama, 2015). Data mining is a way for organizations to extract mass volumes of data and discover different relationships in order to make beneficial decisions (Baradwai & Pal, 2011; Onan, Bal, & Bayam, 2016; Al-Twijri & Noama, 2015). The rich and complex data found across the different education applications can be vital in strategic management and has tremendous potential in aiding the success of teaching and learning (Onan, Bal, & Bayam, 2016; Al-Twijri & Noama, 2015).

School data management systems help improve management work methods, notably in the area of decision-making by developing conversations around data and improvement (Blau & Presser, 2013). In the decision-making process, it is essential to have the necessary data to generate information needed to make high quality decisions for the organization (Aldarbesti & Saxena, 2014). Aldarbesti and Saxena (2014) believe that management information systems for education should collect, process, and analyze the data in such a way as to make it easy to develop strategies and create plans effectively.

Halverson, Grigg, Prichett, and Thomas (2007) suggest it is the responsibility of the school to collect, store, and communicate data centered on meeting the goals set according to their findings. These sets of data points should be inclusive of the data across the educational setting such as behavioral information, surveys, financials, service records, and other types of rich data in order to establish a system-wide approach of goal setting and improvement. The acquisition of such data assists the district with

information about teaching and learning but needs to expand beyond just test results. Seeking out this information needs to be as succinct as possible in order to create an avenue for the user to extract the information in a timely and efficient manner (Halverson, Grigg, Prichett, & Thomas, 2007).

School leaders feel the pressure from the high-stakes accountability requirements placed upon them, thus challenging their leadership ability to utilize the data to improve teaching and learning within their district (Halverson, Grigg, Prichett, & Thomas, 2007). Halverson, Grigg, Prichett, and Thomas (2007) explain how educational leaders are being challenged to make data-driven decisions by using achievement data to adjust their current practices and transform the culture in their schools. The academic accountability requirements imposed on districts from the state and federal level have increased the need for electronic systems to be flexible and easily accessible for all types of data. The change in the culture of schools to make data rich decisions requires districts to seek new ways to make their current systems function together, which means putting additional systems in place (USDE, 2010b).

Since there is no "single solution" for a data system at this time, districts are forced to find ways to link multiple systems to gather data. The use of these multiple data systems can cause a problem when it comes to using the information in practice (USDE, 2010b). Freeland and Hernandez (2014) argue a challenge exists when working in multiple systems due to the lack of a centralized location for the storing and analyzing of data. The preserving of the data collected from these multiple systems can be difficult because each system has set requirements that may differ from other systems (Freeland & Hernandez, 2014). The development of a system that synthesizes the data

into manageable bites while assisting the school in making the right decision at the right time is an important step (Susnea, 2013). A numerous amount of available software products are designed to help manage and analyze data. These systems typically require an additional piece of software housed outside of the original system in order for the program to utilize the student information system (Freeland & Hernandez, 2014). Data systems integrated with student information systems allow for teachers to get detailed reports that can be disaggregated in a myriad of ways, making the instructional decisions more effective (Finkel, 2012).

The study of Halverson, Grigg, Prichett, and Thomas (2007) found principals depended primarily on low-tech items such as copies and notebooks to track the school data. According to Blau and Presser (2013), school districts' utilization of school management systems is an effective tool to use data to make decisions for leaders within the school setting. Harris III (2007) found digital systems with embedded instructional information would help meet the demands of the school administrators. School principals are able to make data-driven decisions, monitor student and teacher performance, and connect with staff, parents, and students through the use of data management systems (Blau & Presser, 2013). Prioritizing these structures is important when looking at ways to improve curriculum, assessment, and overall student achievement. School management systems have advanced beyond the times where only upper leadership was in the know. These systems now allow for each member of the organization to retrieve data according to their needs within the school setting (Blau & Presser, 2013).

Brieter and Light (2006) studied data pertaining to curriculum, test data, assessments, and grades in the arena of data systems. In a study conducted by the U.S. Department of Education, over sixty percent of districts reported they have included instructional resources and lesson planning in their data systems to aid in the implementation of instruction centered on data. These systems are combined in "data warehouses" to allow for an integrated infrastructure that reduces cost and upkeep. Through the use of the data system, teachers are given a wealth of information, which can then be synthesized into meaningful information for teachers in the classroom (Blau & Presser, 2013; Breiter & Light, 2006; Freeland & Hernandez, 2014). For teachers to accept data as an integral part of their practice, schools must prioritize the time needed in their schedule to allow for support, planning, and professional development (USDE, 2010b).

School management systems improve school effectiveness at the teacher level by allowing them to use the data they collect from students to make quality decisions on items such as curriculum development and student learning (Blau & Presser, 2013). For teachers to use data to inform their instructional practices, the data needs to be timely, readily available, and accurate (Blau & Presser, 2013; Breiter & Light, 2006; Finkel, 2012; Freeland & Hernandez, 2014; USDE, 2010b). Freeland and Hernandez (2014) suggest teachers should not have to manipulate the data in order to use it. Providing teachers with a data system available through an online forum helps to build a culture grounded in data-driven decisions (USDE, 2010b). Online systems can assist students and teachers through the ease of communications on such things as grades, student activity, and assessment data (Freeland & Hernandez, 2014). It would be

beneficial for districts to move to an online testing system designed similar to state assessments (Curtis, 2010). This would help students feel comfortable with the standardized achievement test and ease teacher frustration by reducing extra items such as bubble sheets.

Students and parents having access to the school management system help create teacher leaders through electronic measures (Blau & Presser, 2013). Koch (2010) found seventy-five percent of parents "sometimes" or "often" utilize the information provided by digital systems to check on their child's grades and homework. The findings from Koch's study also suggest when parent portals are available; parents will use them to access student grades and assignments. Parents desire to view information specific to their child (Molden, 2016). Data systems assist parents in assessing their child's progress, which increases their involvement in the education of their child. Blau and Presser (2013) found when teachers regularly update the system with pertinent data, student and parent involvement within the system is enhanced.

**Summary**

Blau and Presser (2013) concluded school data management systems provide stakeholders with current information that enhances school climate and increases the overall school effectiveness by creating transparency and connectedness throughout the school environment. Districts should commit to meeting the needs of educators by gathering information from members of the school setting to determine needs that exist in their relationship to data and information systems (Aldarbesti & Saxena, 2014; Breiter & Light, 2006; Freeland & Hernandez, 2014; Shah, 2014). Such a process would provide the district with a list of needs in which to help select an appropriate infrastructure. A

wide variety of educational software is available, and often they are single systems limited in function by addressing a certain targeted need (Freeland & Hernandez, 2014). According to the study by the U.S. Department of Education (2010b), a barrier is present in districts when the systems used do not function together in a timely and accurate manner. Informed school district leaders can make a decision based on what is required in a system to support their efforts in approaching a company with their demands (Freeland & Hernandez, 2014).

Chapter Two contained the Review of Literature, in which the roles of data and information systems were explored and about how they relate to the stakeholders in the district. Chapter Three is a description of the methodology involved in this study. Chapter Four is the analysis of the findings of the study. The conclusion of the findings and recommendations for further study are presented in Chapter Five.

# Chapter Three

# Methodology

## Introduction

The purpose of this quantitative study was to determine the key components K-12 public educators in Missouri need in a single login data and information system. The researcher used survey data collected from district administration, building administration, classroom teachers, district level administrative support staff, and building level administrative support staff in Missouri public school districts to determine the needs in a data and information system. The researcher-created survey used in this study was designed to align with the following research questions (see Appendix A):

1. What is the relationship of the common components of a single login data and information system and the five stakeholder groups?
2. What is the difference in the level of priority for each component of a single login data and information system and the five stakeholder groups?

These questions were designed to guide the study and create an understanding of what a desirable data and information system would entail. The researcher proposed the following null hypotheses:

$H_{01:}$ There will be no statistically significant relationship of the common components of a single login data and information system and the five stakeholder groups.

$H_{02:}$ There will be no statistically significant difference in the level of priority for each component of a single login data and information system and the five stakeholder groups.

**Participant Information**

The five stakeholder groups of this study were K-12 public school district administrators (superintendents), building administrators (principals), classroom teachers (regular education and special education teachers), district level administrative support staff, and building level administrative support staff from 518 Missouri public school districts across the state. Surveying all public school districts in Missouri provided a broad view of districts that range in student population from 20 to 25,670. The number of possible respondents for this study is 3,626 and the researcher hoped for a 50% return for a total of 1813 surveys complete. The researcher was able to obtain 706 survey responses with a return rate of 19%.

The superintendent and building principal in each K-12 public school district was contacted through email to introduce the study in late November 2018 (Appendices C and D). The introduction email was sent through QuestionPro, an online survey tool, to explain the study briefly, what their individual role would be, and a description of the incentive for completing the survey. The incentive for completing the survey within one week of the original email earned the participants of the survey a chance to win a $250 Amazon gift card. If respondents completed the survey within two weeks of receiving the questionnaire, their names were entered into a drawing for a $100 Amazon gift card. The district administrators were asked to complete the questionnaire and disperse it to one district level administrative support staff. The building administrators were asked to complete the questionnaire and disperse it to three classroom teachers (regular education and special education teachers) and one building level administrative support staff. A

follow-up email was sent two weeks after the original email to participants who had not completed the questionnaire as a reminder that the survey will close in one week.

Contact information for the superintendents and administrators was obtained from the Missouri Department of Elementary and Secondary Education Online School Directory. The researcher informed the participants through email that identifying information would be kept confidential and results of the study would be shared upon completion.

**Research Design**

The study was a quantitative design with a qualitative follow up question looking for common themes among public school educators across the state of Missouri. The limited amount of research on this topic required the researcher to create a survey based on the guiding research questions of this study. The study took place November 2018 through December 2018. School districts were selected based on their geographical location. All public school districts in Missouri were asked to participate in the study. Those surveyed in this study consisted of K-12 district leaders, building leaders, classroom teachers, and administrative support staff at the district and building level.

The study used a cross-sectional survey research method to determine the key components K-12 educators need in a single login data and information system. Survey research was used to determine the current state of the topic being studied (Gay, Mills, & Airasian, 2009). A qualitative method was not utilized due to the bias of the researcher's vested interest in the topic.

## Human Participants, Ethics Precautions, and Consent

In accordance with the guidelines of Southwest Baptist University regarding the protection of human participants, a request for review was submitted to the Research Review Board for approval to conduct this study. There was no perceived risk to the participants or districts that responded to the survey. Although email addresses were utilized to send out the survey and used for selecting names to receive the incentive, the identifying information of the participants was kept confidential. Before transferring information into IBM Statistical Package for the Social Sciences (SPSS), email addresses were deleted. After receiving Research Review Board approval, participant recruitment and data collection was conducted. Conflict of interest and personal bias on the part of the researcher was minimized through the use of a pilot survey and the QuestionPro online survey software.

## Instrumentation

A questionnaire was distributed through district and building leaders in 518 public school districts in Missouri (Appendix A). The data from the questionnaire were gathered through the QuestionPro online survey. The data were then transferred into a statistical analysis program called IBM Statistical Package for the Social Sciences Version 26 (SPSS). The researcher based the survey on the research questions and review of literature. The survey was reviewed by a panel of experts, piloted by a school district, analyzed, and evaluated prior to the dissemination of the survey used in this study.

The quantitative data was gathered by a researcher-created questionnaire with 29 potential components of a single login data and information system divided into two

sections of questions. The respondents will answer a dichotomous question (section 1) and then a five-point Likert scale item (section 2). The survey then led to one open-ended question, one multiple-choice item, and two demographic questions. The open-ended question and multiple-choice item will be looked at for common themes in the final answers. The two demographic questions will be reported in chart form.

Section two (Likert scale) of the 29 potential components answers research question one by identifying the relationship of how the five stakeholder groups rated each individual component. Research question two is answered by identifying the differences of the rating by the five stakeholder groups across all 29 components. Through this survey, the researcher sought to determine what educators perceive should be included in a single login data and information system.

**Panel.** The researcher selected a group of six experts on the topic to review the survey questions and measure content validity to ensure that the questions align with the research questions. The individuals on the panel did not participate in the final survey. The panel consisted of two college professors, one district administrator, one building administrator, and two classroom teachers. The first expert was selected given her years as a public school district administrator and experience as a college professor. The second expert was selected due to her diverse background in education with 17 years as an elementary teacher, 10 years as elementary principal, and 5 years as a college professor. The third expert was selected based on her years as an elementary teacher, librarian, and elementary building administrator. The fourth expert was selected based on her experiences with 15 years as an elementary teacher and 4 years as assistant principal. The fifth expert was selected based on her 15 years as a middle school teachers and

having a Masters degree in education administration. The last expert was selected given her 3 years in special services in a middle school setting.

Using the Rovinelli and Hambelton's Index of Item-Objective Congruence (1977), the panel experts rated the efficacy of each question using a +1 (item clearly aligns), 0 (unsure/unclear), -1 (item clearly does not align) scale (Appendix E). Questions scored 0.6 or higher were kept on the survey as the experts agreed that the question aligns with the research questions. The results of the experts are shown in Table 1.

Table 1

*Index of Item Objective Congruence*

| Subset Scale: Is this part of your main single login school data and information system? ("main" meaning – where your student demographics are housed) Yes, No or Unsure go to Section 2 | |
|---|---|
| Potential components of a single login data and information system | Results Average |
| Student demographic information | 1.0 |
| Attendance module | 1.0 |
| Discipline module | 1.0 |
| Health module | .83 |
| Finance module | 1.0 |
| Food service module | 1.0 |
| Library management module | 1.0 |
| Transportation/Bus Routing module | 1.0 |
| Field/Activity trip request | 1.0 |
| Employee time clock | 1.0 |
| Maintenance/Technology work order module | 1.0 |
| Athletics management module | 1.0 |
| School notification system for phone calls, emails, and text. | 1.0 |
| Staff attendance module | 1.0 |
| Student registration module | 1.0 |
| Class scheduling | 1.0 |
| Intervention scheduling | 1.0 |
| Special Education module | 1.0 |
| Curriculum module | 1.0 |
| Lesson planning module | 1.0 |
| Learning Management System (LMS) | 1.0 |

| | |
|---|---|
| Traditional gradebook | 1.0 |

Table 1 (continued)

*Index of Item Objective Congruence*

| Subset Scale: Is this part of your main single login school data and information system? ("main" meaning – where your student demographics are housed) Yes, No or Unsure go to Section 2 | |
|---|---|
| Potential components of a single login data and information system | Results Average |
| Standards-based gradebook | 1.0 |
| Employee evaluation module | 1.0 |
| Human resource module (job posting/hiring/employee leave, etc.) | 1.0 |
| Mobile app capability | 1.0 |
| Online student portal | 1.0 |
| Online parent portal | 1.0 |
| Data analytics module | 1.0 |

Table 1 (continued)

*Index of Item Objective Congruence*

| Subset Scale: I believe the following is a priority to have in a single login school data and information system. Consider all stakeholders when making your selection. 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree | |
|---|---|
| Potential components of a single login data and information system | Results Average |
| Student demographic information | 1.0 |
| Attendance module | 1.0 |
| Discipline module | 1.0 |
| Health module | .83 |
| Finance module | 1.0 |
| Food service module | 1.0 |
| Library management module | 1.0 |
| Transportation/Bus Routing module | 1.0 |
| Field/Activity trip request | 1.0 |
| Employee time clock | 1.0 |
| Maintenance/Technology work order module | 1.0 |
| Athletics management module | 1.0 |
| School notification system for phone calls, emails, and text. | 1.0 |
| Staff attendance module | 1.0 |
| Student registration module | 1.0 |
| Class scheduling | 1.0 |
| Intervention scheduling | 1.0 |

| | |
|---|---|
| Special Education module | 1.0 |
| Curriculum module | 1.0 |
| Lesson planning module | 1.0 |

Table 1 (continued)

*Index of Item Objective Congruence*

| Subset Scale: I believe the following is a priority to have in a single login school data and information system. Consider all stakeholders when making your selection. 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree | |
|---|---|
| Potential components of a single login data and information system | Results Average |
| Learning Management System (LMS) | 1.0 |
| Traditional gradebook | 1.0 |
| Standards-based gradebook | 1.0 |
| Employee evaluation module | 1.0 |
| Human resource module (job posting/hiring/employee leave, etc.) | 1.0 |
| Mobile app capability | 1.0 |
| Online student portal | 1.0 |
| Online parent portal | 1.0 |
| Data analytics module | 1.0 |

Table 1 (continued)

*Index of Item Objective Congruence*

| Subset Scale: Additional/Demographic Questions/ | |
|---|---|
| Survey Item | Results Average |
| Are there other components that should be included in a data and information system for schools? | 1.0 |
| How many data and information systems do you currently use in your position? | 1.0 |
| Position in the school district | 1.0 |
| How many years have you been in education? | .83 |

**Pilot.** A superintendent, building administrators, classroom teachers, and district and building level administrative support staff at a public school district in Missouri piloted the survey. A letter was sent to the superintendent in order to gain permission for the district participating in the pilot (Appendix B). The district utilized in the pilot test

did not participate in the final survey. The participants were given two weeks to take the pilot survey. There were 91 respondents with 258 viewing the survey and 202 starting the survey. From the 91 respondents, 1 district administrator, 2 building administrators, 71 teachers, 11 building administrative support staff, and 6 district administrative support staff completed the survey.

The researcher calculated Cronbach's Alpha to measure the reliability while piloting the researcher-created survey. Cronbach's Alpha was used to measure the internal consistency of the survey questions to ensure that questions were considered reliable. A reliability coefficient of .70 or higher was acceptable for internal consistency. The reliability output for the set of survey questions resulted in an acceptable coefficient of 0.979 as shown in Table 2.

Table 2

*Summary of Reliability*

| Cronboach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.979 | 0.979 | 29 |

**Data Analysis**

This quantitative study was directed to identify key components educators need in a single login data and information system. The questionnaire was emailed to 518 public school district leaders and a building leader within the district to complete and disseminate to classroom teachers and administrative support staff. Through the use of a cross-sectional survey, the data were analyzed by finding the mean and standard deviation for each item on the Likert scale. To investigate comparisons of the data by different stakeholder groups, Cross Tabulation was utilized for research question

one. Crosstabs allowed the researcher to analyze and summarize relationships between the five stakeholder groups and the potential components. The Friedman Test and post-hoc Wilcoxon Signed-Rank Test was utilized for research question two in order to determine if there is a difference in the level of priority of the potential components and to identify where the differences are according to the five stakeholder groups.

**Summary**

The purpose of this study was to identify key components educators need in a single login data and information system. Chapter Three outlined the methodology and process for this quantitative study. An initial questionnaire was sent to district and building leaders to complete and disperse to classroom teachers and administrative support staff. The findings of the data are presented in Chapter Four. The conclusion and recommendations of further studies are found in Chapter Five.

# Chapter Four

## Analysis of the Data

### Introduction

Educational software is available in a wide variety of formats; however, it is often limited by targeting a certain function the district might find useful (Freeland & Hernandez, 2014). When school districts base their decision on what users need, it allows them to approach companies with their demands instead of being constricted by what the company believes is important (Freeland & Hernandez, 2014). In light of this concept, this study sought to determine the key components K-12 public educators in Missouri need in a single login data and information system.

In Chapter Three, the researcher described the methodology of the study including the participant information, research design, instrumentation, panel, pilot, and data analysis. The final results of the survey were uploaded to Statistical Package for the Social Sciences (SPSS) program to analyze relationships between the stakeholder groups and compare the ranking of components of a single login data and information system. Descriptive statistics were used to summarize the data in a meaningful way and present the findings in an easy to understand format. The following research questions were addressed in this study:

1. What is the relationship of the common components of a single login data and information system and the five stakeholder groups?
2. What is the difference in the level of priority for each component of a single login data and information system and the five stakeholder groups?

These questions were designed to guide the study and create an understanding of what a desirable data and information system would entail. The researcher proposed the following null hypotheses:

$H_{01:}$ There will be no statistically significant relationship of the common components of a single login data and information system and the five stakeholder groups.

$H_{02:}$ There will be no statistically significant difference in the level of priority for each component of a single login data and information system and the five stakeholder groups.

Chapter Four will provide an overview of the findings including demographics, descriptive data of open ended questions, the mean and standard deviation for each component, findings for each null hypothesis, detailed information of the data collected, and a conclusion.

**Data Analysis and Findings**

The scope of this study was to determine any statistical relationship between the common components public educators want in a single login data and information system. Also, the study was designed to determine any statistical differences in the level of priority for each component the five stakeholder groups identified in a single login data and information system.

**Participants.** Public schools across the state of Missouri were asked to participate in the survey. A total of 518 school districts in Missouri were contacted through email to participate in the survey. The five stakeholder groups per district surveyed included one K-12 district leader, one building leader, three classroom teachers,

and one administrative support staff at the district and building level. The superintendent was asked to complete the survey and send to one district administrative support staff. The principal was asked to complete the survey and send to three teachers, including one special services teacher, and one building administrative support staff. There was a potential of 3,626 respondents to the survey for the state of Missouri and 706 responses were collected. The survey was viewed by 1,392 persons, 950 of whom started the survey with 706 completing the survey, which equates to a 19% participation rate.

**Demographics.** Table 1 shows participants' responses to the position currently held within the school setting. The total number of participants to answer the question was 706. Building administrator represented the highest number with 325 (46%) participants. The second highest group to respond was teachers with 172 (24.4%) participants. The group with the smallest respondents was district administrative support staff with 30 (4.2%) participants.

Table 3

*Position of the Survey Respondents*

| Stakeholder | *N* | Percent |
|---|---|---|
| District Administrator | 119 | 16.9 |
| Building Administrator | 325 | 46 |
| Teacher | 172 | 24.4 |
| Building Administrative Support Staff | 60 | 8.5 |
| District Administrative Support Staff | 30 | 4.2 |
| Total | 706 | 100 |

Table 4 shows participants' responses to the number of years in the field of education. The total number of participants to answer the questions was 706. Respondents with 16 or more years were the highest respondents to the survey with 445 (63%) participants. The second highest group of respondents had 11-15 years in the

education field with 124 (17.6%) participants. The group with the lowest number of respondents had 1-5 years with 64 (9.1%) participants.

Table 4

*Number of Years in the Education Field*

| Number of Years | *N* | Percent |
|---|---|---|
| 1 – 5 years | 64 | 9.1 |
| 6 – 10 years | 73 | 10.3 |
| 11 – 15 years | 124 | 17.6 |
| 16 or more years | 445 | 63 |
| Total | 706 | 100 |

**Additional questions and findings.** Participants of the survey were asked two additional questions to determine how many data and information systems the respondents use in their current positions and other components they feel should be included in a data and information system for schools. The number of data and information systems the 706 respondents utilize in their current positions varied from 361 using 1-3 systems, 272 using 4-6 systems, 46 using 7-9 systems, and 27 using 10 or more systems. Several preferred components surfaced among the survey participants. The five common components participants shared that should be included in a data and information system for schools were a parent communication log/capability, assessment tracking, calendaring systems, clean design to allow for ease of use, and the ability to compare data from prior years.

**Results.** A total of 706 respondents completed section two of the survey using a five-point Likert scale. Each potential component of a single login data and information system was rated on the following scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree or disagree*, 4 = *agree*, and 5 = *strongly agree*. The descriptive statistics were

analyzed by comparing the components through Crosstab with Pearson's *r* coefficient, Friedman Test, and post-hoc analysis of the Friedman Test utilizing the Wilcoxon Signed-Rank Test.

The first findings were focused on determining the correlation coefficient for each component comparison. The Pearson's *r* coefficient is express by running Crosstab in the study with an additional option of mean and standard deviation. This correlation addressed RQ1: What is the relationship of the common components of a single login data and information system and the five stakeholder groups? Null Hypothesis: There will be no statistically significant relationship of the common components of a single login data and information system and the five stakeholder groups.

Table 5 outlines the mean and standard deviation for each potential component as selected by the participants. All 29 components had a mean higher than, 3 with 14 of the components having a mean of more than 4. The level of the mean drops and the standard deviation rises as the components become more specialized to certain groups of stakeholders. An example of this is seen in the finance module ($M = 3.63$, $SD = 1.171$), which is a component that would be used in administrative and administrative assistant positions; however, it would likely not be used in a teacher's position. Another example is the transportation/bus routing module ($M = 4.03$, $SD = 1.144$), which is utilized by stakeholders that complete the routing or need to find student bus numbers on a regular basis. The attendance module ($M = 4.61$, $SD = .957$) had the highest mean with the lowest standard deviation, making it the component participants most agree should be part of a single login and data information system. This could indicate that more stakeholders use this component as part of their position regularly.

Table 5

*Mean and Standard Deviation of the Five Stakeholder Responses for Each Potential Component of a Single Login Data and Information System.*

| Potential components of a single login data and information system | Mean | Std. Deviation | *N* |
|---|---|---|---|
| Attendance module | 4.61 | 0.957 | 706 |
| Student demographic information | 4.53 | 0.996 | 706 |
| Discipline module | 4.50 | 1.015 | 706 |
| Online student portal | 4.41 | 0.995 | 706 |
| Online parent portal | 4.41 | 1.019 | 706 |
| Class scheduling | 4.35 | 1.042 | 706 |
| Health module | 4.34 | 1.041 | 706 |
| Traditional gradebook | 4.34 | 1.028 | 706 |
| Student registration module | 4.26 | 1.060 | 706 |
| Standards-based gradebook | 4.16 | 1.075 | 706 |
| School notification system for phone calls, emails, and text | 4.12 | 1.119 | 706 |
| Mobile app capability | 4.08 | 1.113 | 706 |
| Transportation/Bus Routing module | 4.03 | 1.144 | 706 |
| Special Education module | 4.03 | 1.128 | 706 |
| Intervention scheduling | 3.94 | 1.084 | 706 |
| Food service module | 3.90 | 1.091 | 706 |
| Data analytics module | 3.89 | 1.058 | 706 |
| Staff attendance module | 3.57 | 1.159 | 706 |
| Curriculum module | 3.55 | 1.065 | 706 |
| Library management module | 3.53 | 1.071 | 706 |
| Learning Management System (LMS) | 3.49 | 1.007 | 706 |
| Finance module | 3.43 | 1.171 | 706 |
| Field/Activity trip request | 3.43 | 1.083 | 706 |
| Lesson planning module | 3.42 | 1.081 | 706 |
| Maintenance/Technology work order module | 3.34 | 1.051 | 706 |
| Athletics management module | 3.27 | 1.019 | 706 |
| Human resources module (job posting/hiring/employee leave, etc.) | 3.19 | 1.085 | 706 |
| Employee time clock | 3.18 | 1.135 | 706 |
| Employee evaluation module | 3.13 | 1.122 | 706 |

The Crosstab was run to generate Pearson's *r* coefficient in order to assess the relationship between each of the 29 potential components of a single login and data information system. The bivariate measure indicates the strength of the relationship

between two variables at a time. According to Pelham (2013), the correlation coefficients vary from 0 (no relationship) to 1 (perfect linear relationship) or -1 (perfect negative linear relationship). The positive coefficients indicate there is a direct relationship between the two variables, meaning as one variable increases the other increases. The negative coefficients indicate the relationship is indirect, meaning as one variable increases the other variable decreases.

Table 6 represents the first eight components as compared to the 29 potential components.

Table 6

*Pearson's r Correlation Matrix for Continuous Variables 1 through 8 (n = 706)*

| Potential Components | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Student demographic information | - | | | | | | | |
| 2. Attendance module | .902** | - | | | | | | |
| 3. Discipline module | .852** | .895** | - | | | | | |
| 4. Health module | .755** | .802** | .786** | - | | | | |
| 5. Finance module | .373** | .362** | .419** | .413** | - | | | |
| 6. Food service module | .560** | .579** | .567** | .604** | .567** | - | | |
| 7. Library management module | .390** | .410** | .418** | .429** | .493** | .603** | - | |
| 8. Transportation/Bus Routing module | .584** | .605** | .579** | .608** | .468** | .551** | .552** | - |
| 9. Field/Activity trip request | .385** | .398** | .414** | .413** | .504** | .501** | .641** | .545** |
| 10. Employee time clock | .312** | .336** | .358** | .346** | .488** | .432** | .526** | .441** |
| 11. Maintenance Technology work order module | .267** | .317** | .327** | .287** | .342** | .304** | .478** | .386** |
| 12. Athletics management module | .299** | .330** | .333** | .335** | .451** | .442** | .537** | .432** |
| 13. School notification system for phone calls, emails, and text | .627** | .659** | .624** | .588** | .422** | .538** | .467** | .570** |

Table 6 (continued)

*Pearson's r Correlation Matrix for Continuous Variables 1 through 8 (n = 706)*

| Potential Components | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 14. Staff attendance module | .453** | .470** | .484** | .454** | .467** | .460** | .487** | .457** |
| 15. Student registration module | .741** | .772** | .757** | .702** | .401** | .599** | .457** | .596** |
| 16. Class scheduling | .756** | .793** | .772** | .733** | .406** | .616** | .449** | .590** |
| 17. Intervention scheduling | .561** | .592** | .595** | .593** | .406** | .477** | .464** | .535** |
| 18. Special Education module | .587** | .624** | .622** | .621** | .408** | .492** | .416** | .538** |
| 19. Curriculum module | .391** | .426** | .417** | .419** | .415** | .445** | .525** | .463** |
| 20. Lesson planning module | .346** | .379** | .379** | .383** | .399** | .427** | .492** | .432** |
| 21. Learning Management System (LMS) | .395** | .416** | .414** | .412** | .410** | .412** | .477** | .478** |
| 22. Traditional gradebook | .708** | .783** | .748** | .654** | .375** | .568** | .399** | .490** |
| 23. Standards-based gradebook | .628** | .677** | .662** | .615** | .338** | .491** | .381** | .485** |
| 24. Employee evaluation module | .246** | .277** | .283** | .312** | .410** | .326** | .396** | .349** |
| 25. Human resources module (job posting/hiring/employee leave, etc.) | .296** | .297** | .292** | .302** | .415** | .371** | .414** | .360** |
| 26. Mobile app capability | .625** | .653** | .628** | .584** | .384** | .525** | .408** | .503** |
| 27. Online student portal | .755** | .819** | .768** | .694** | .370** | .587** | .439** | .553** |
| 28. Online parent portal | .741** | .810** | .775** | .699** | .376** | .604** | .440** | .535** |
| 29. Data analytics module | .529** | .543** | .561** | .521** | .428** | .487** | .451** | .492** |

**Correlation is significant at the 0.01 level (2-tailed).

Student demographic information had four weak correlations, eight moderate correlations, and 16 strong correlations. There was a statistically significant positive correlation between student demographic and attendance module, $r(704) = .902$, $p < .001$, with student demographic explaining 81% of the variation in the attendance module. The weakest statistically positive correlation for student demographic information was

employee evaluation module, $r(704) = .246$, $p < .001$, with student demographic explaining 6% of the variation in the employee evaluation module.

The attendance module had two weak correlations, 10 moderate correlations, and 15 strong correlations. There was a statistically significant positive correlation between attendance module and discipline module, $r(704) = .895$, $p < .001$, with attendance module explaining 80% of the variation in the discipline module. The weakest statistically positive correlation for attendance module was employee evaluation module, $r(704) = .277$, $p < .001$, with attendance module explaining 8% of the variation in the employee evaluation module.

Discipline module had two weak correlations, 10 moderate correlations, and 14 strong correlations. There was a statistically significant positive correlation between discipline module and health module, $r(704) = .786$, $p < .001$, with discipline module explaining 62% of the variation in the health module. The weakest statistically positive correlation for discipline module was employee evaluation, $r(704) = .283$, $p < .001$, with discipline module explaining 8% of the variation in the employee evaluation.

Health module had one weak correlation, 11 moderate correlations, and 13 strong correlations. There was a statistically significant positive correlation between health module and class scheduling, $r(704) = .733$, $p < .001$, with health module explaining 54% of the variation in the class scheduling. The weakest statistically positive correlation for health module was maintenance/technology work order module, $r(704) = .287$, $p < .001$, with health module explaining 8% of the variation in the maintenance/technology work order module.

Finance module had 22 moderate correlations and two strong correlations. There was a statistically significant positive correlation between finance module and food service module, $r(704) = .567$, $p < .001$, with finance module explaining 32% of the variation in the food service module. The weakest statistically positive correlation for finance module was standards-based gradebook, $r(704) = .338$, $p < .001$, with finance module explaining 11% of the variation in the standards-based gradebook.

Food service module had 13 moderate correlations and 10 strong correlations. There was a statistically significant positive correlation between food service module and class scheduling, $r(704) = .616$, $p < .001$, with food service module explaining 38% of the variation in the class scheduling. The weakest statistically positive correlation for food service module was maintenance/technology work order module, $r(704) = .304$, $p < .001$, with food service module explaining 9% of the variation in the maintenance/technology work order module.

Library management module had 17 moderate correlations and five strong correlations. There was a statistically significant positive correlation between library management module and field/activity trip request, $r(704) = .641$, $p < .001$, with library management module explaining 41% of the variation in the field/activity trip request. The weakest statistically positive correlation for library management module was standards-based gradebook, $r(704) = .381$, $p < .001$, with library management module explaining 15% of the variation in the standards-based gradebook.

Transportation/Bus routing module had 12 moderate correlations and nine strong correlations. There was a statistically significant positive correlation between transportation/bus routing module and student registration module, $r(704) = .596$, $p <$

.001, with transportation/bus routing module explaining 36% of the variation in the student registration module. The weakest statistically positive correlation for transportation/bus routing module was employee evaluation module, $r(704) = .349$, $p < .001$, with transportation/bus routing module explaining 12% of the variation in the employee evaluation module.

Table 7 represents components nine through 16 as compared to the remainder twenty-one potential components.

Table 7

*Pearson's r Correlation Matrix for Continuous Variables 9 through 16 (n = 706)*

| Potential Components | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| 9. Field/Activity trip request | - | | | | | | | |
| 10. Employee time clock | .592** | - | | | | | | |
| 11. Maintenance Technology work order module | .585** | .532** | - | | | | | |
| 12. Athletics management module | .567** | .507** | .616** | - | | | | |
| 13. School notification system for phone calls, emails, and text | .471** | .382** | .386** | .464** | - | | | |
| 14. Staff attendance module | .552** | .618** | .578** | .519** | .482** | - | | |
| 15. Student registration module | .415** | .354** | .288** | .408** | .638** | .482** | - | |
| 16. Class scheduling | .407** | .340** | .276** | .405** | .642** | .473** | .852** | - |
| 17. Intervention scheduling | .469** | .385** | .365** | .471** | .555** | .474** | .663** | .710** |
| 18. Special Education module | .428** | .374** | .332** | .388** | .521** | .461** | .646** | .674** |
| 19. Curriculum module | .556** | .471** | .497** | .504** | .505** | .504** | .435** | .462** |
| 20. Lesson planning module | .538** | .456** | .507** | .501** | .439** | .492** | .398** | .415** |
| 21. Learning Management System (LMS) | .474** | .434** | .434** | .486** | .455** | .432** | .439** | .433** |
| 22. Traditional gradebook | .399** | .323** | .312** | .379** | .585** | .438** | .686** | .723** |

Table 7 (continued)

*Pearson's r Correlation Matrix for Continuous Variables 9 through 16 (n = 706)*

| Potential Components | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| 23. Standards-based gradebook | .401** | .322** | .274** | .367** | .533** | .418** | .633** | .651** |
| 24. Employee evaluation module | .420** | .511** | .528** | .484** | .376** | .519** | .245** | .261** |
| 25. Human resources module (job posting/hiring/employee leave, etc.) | .477** | .538** | .615** | .514** | .405** | .573** | .322** | .289** |
| 26. Mobile app capability | .424** | .362** | .322** | .378** | .585** | .438** | .634** | .647** |
| 27. Online student portal | .424** | .350** | .328** | .386** | .634** | .457** | .788** | .780** |
| 28. Online parent portal | .421** | .349** | .309** | .377** | .626** | .473** | .772** | .776** |
| 29. Data analytics module | .460** | .462** | .368** | .470** | .520** | .494** | .581** | .585** |

**Correlation is significant at the 0.01 level (2-tailed).

Field/Activity trip request had 14 moderate correlations and six strong correlations. There was a statistically significant positive correlation between field/activity trip request and employee time clock, $r(704) = .592$, $p < .001$, with field/activity trip request explaining 35% of the variation in the employee time clock. The weakest statistically positive correlation for field/trip activity trip request was traditional gradebook, $r(704) = .399$, $p < .001$, with field/trip activity trip request explaining 16% of the variation in the traditional gradebook.

Employee time clock had 14 moderate correlations and five strong correlations. There was a statistically significant positive correlation between employee time clock and staff attendance module, $r(704) = .618$, $p < .001$, with employee time clock explaining 38% of the variation in the staff attendance module. The weakest statistically positive correlation for employee time clock was standards-based gradebook, $r(704) = .322$, $p <$

.001, with employee time clock explaining 10% of the variation in the standards-based gradebook.

Maintenance/technology work order module had three weak correlations, 10 moderate correlations, and five strong correlations. There was a statistically significant positive correlation between maintenance/technology work order module and athletics management module, $r(704) = .616$, $p < .001$, with maintenance/technology work order module explaining 38% of the variation in the athletics management module. The weakest statistically positive correlation for maintenance/technology work order module was standards-based gradebook, $r(704) = .274$, $p < .001$, with maintenance/technology work order module explaining 8% of the variation in the standards-based gradebook.

Athletics management module had 13 moderate correlations and four strong correlations. There was a statistically significant positive correlation between athletics management module and staff attendance module, $r(704) = .519$, $p < .001$, with athletics management module explaining 27% of the variation in the staff attendance module. The weakest statistically positive correlation for athletics management module was standards-based gradebook, $r(704) = .367$, $p < .001$, with athletics management module explaining 13% of the variation in the standards-based gradebook.

School notification system had five moderate correlations and 11 strong correlations. There was a statistically significant positive correlation between school notification system and class scheduling, $r(704) = .642$, $p < .001$, with school notification system explaining 41% of the variation in the class scheduling. The weakest statistically positive correlation for school notification system was employee evaluation module,

$r(704) = .376$, $p < .001$, with school notification system explaining 14% of the variation in the employee evaluation module.

Staff attendance module had 12 moderate correlations and three strong correlations. There was a statistically significant positive correlation between staff attendance module and human resources module, $r(704) = .573$, $p < .001$, with staff attendance module explaining 33% of the variation in the human resources module. The weakest statistically positive correlation for staff attendance module was standards-based gradebook, $r(704) = .418$, $p < .001$, with staff attendance module explaining 17% of the variation in the standards-based gradebook.

Student registration module had one weak correlation, four moderate correlations, and nine strong correlations. There was a statistically significant positive correlation between student registration module and class scheduling, $r(704) = .852$, $p < .001$, with student registration module explaining 73% of the variation in the class scheduling. The weakest statistically positive correlation for student registration module was employee evaluation module, $r(704) = .245$, $p < .001$, with student registration module explaining 6% of the variation in the employee evaluation module.

Class scheduling had two weak correlations, three moderate correlations, and eight strong correlations. There was a statistically significant positive correlation between class scheduling and online student portal, $r(704) = .780$, $p < .001$, with class scheduling explaining 61% of the variation in the online student portal. The weakest statistically positive correlation for class scheduling was employee evaluation module, $r(704) = .261$, $p < .001$, with class scheduling explaining 7% of the variation in the employee evaluation module.

Table 8 represents components 17 through 24 as compared to the remainder 13 potential components.

Table 8

*Pearson's r Correlation Matrix for Continuous Variables 17 through 24 (n = 706)*

| Potential Components | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|
| 17. Intervention scheduling | - | | | | | | | |
| 18. Special Education module | .660** | - | | | | | | |
| 19. Curriculum module | .596** | .560** | - | | | | | |
| 20. Lesson planning module | .552** | .489** | .865** | - | | | | |
| 21. Learning Management System (LMS) | .483** | .453** | .582** | .557** | - | | | |
| 22. Traditional gradebook | .585** | .565** | .424** | .395** | .455** | - | | |
| 23. Standards-based gradebook | .570** | .559** | .444** | .417** | .448** | .733** | - | |
| 24. Employee evaluation module | .392** | .392** | .576** | .553** | .465** | .296** | .340** | - |
| 25. Human resources module (job posting/hiring/employee leave, etc.) | .413** | .404** | .576** | .559** | .468** | .310** | .346** | .758** |
| 26. Mobile app capability | .552** | .539** | .451** | .417** | .457** | .634** | .619** | .366** |
| 27. Online student portal | .611** | .613** | .455** | .404** | .445** | .783** | .676** | .287** |
| 28. Online parent portal | .592** | .610** | .446** | .391** | .420** | .763** | .665** | .298** |
| 29. Data analytics module | .600** | .550** | .513** | .476** | .510** | .560** | .554** | .425** |

**Correlation is significant at the 0.01 level (2-tailed).

Intervention scheduling had three moderate correlations and nine strong correlations. There was a statistically significant positive correlation between intervention scheduling and special education module, $r(704) = .660$, $p < .001$, with intervention scheduling explaining 44% of the variation in the special education module. The weakest statistically positive correlation for intervention scheduling was employee

evaluation module, $r(704) = .392$, $p < .001$, with intervention scheduling explaining 15% of the variation in the employee evaluation module.

Special education module had four moderate correlations and seven strong correlations. There was a statistically significant positive correlation between special education module and online student portal, $r(704) = .613$, $p < .001$, with special education module explaining 38% of the variation in the online student portal. The weakest statistically positive correlation for special education module was employee evaluation module, $r(704) = .392$, $p < .001$, with special education module explaining 15% of the variation in the employee evaluation module.

Curriculum module had five moderate correlations and five strong correlations. There was a statistically significant positive correlation between curriculum module and lesson planning module, $r(704) = .865$, $p < .001$, with curriculum module explaining 75% of the variation in the lesson planning module. The weakest statistically positive correlation for curriculum module was traditional gradebook, $r(704) = .424$, $p < .001$, with curriculum module explaining 18% of the variation in the traditional gradebook.

Lesson planning module had six moderate correlations with three strong correlations. There was a statistically significant positive correlation between lesson planning module and human resource module, $r(704) = .559$, $p < .001$, with lesson planning module explaining 31% of the variation in the human resource module. The weakest statistically positive correlation for lesson planning module was online parent portal, $r(704) = .391$, $p < .001$, with lesson planning module explaining 15% of the variation in the online parent portal.

Learning management systems (LMS) had seven moderate correlations and one strong correlation. There was a statistically significant positive correlation between learning management systems and data analytics module, $r(704) = .510$, $p < .001$, with learning management systems explaining 26% of the variation in the data analytics module. The weakest statistically positive correlation for learning management systems was online parent portal, $r(704) = .420$, $p < .001$, with learning management systems explaining 18% of the variation in the online parent portal.

Traditional gradebook had one weak correlation, one moderate correlation, and five strong correlations. There was a statistically significant positive correlation between traditional gradebook and online student portal, $r(704) = .783$, $p < .001$, with traditional gradebook explaining 61% of the variation in the online student portal. The weakest statistically positive correlation for traditional gradebook was employee evaluation module, $r(704) = .296$, $p < .001$, with traditional gradebook explaining 9% of the variation in the employee evaluation module.

Standards-based gradebook had two moderate correlations and four strong correlations. There was a statistically significant positive correlation between standards-based gradebook and online student portal, $r(704) = .676$, $p < .001$, with standards-based gradebook explaining 46% of the variation in the online student portal. The weakest statistically positive correlation for standards-based gradebook was employee evaluation module, $r(704) = .340$, $p < .001$, with standards-based gradebook explaining 12% of the variation in the employee evaluation module.

Employee evaluation module had two weak correlations, two moderate correlations, and one strong correlation. There was a statistically significant positive

correlation between employee evaluation module and human resources module, $r(704) = .758$, $p < .001$, with employee evaluation module explaining 57% of the variation in the human resources module. The weakest statistically positive correlation for employee evaluation module was online student portal, $r(704) = .287$, $p < .001$, with employee evaluation module explaining 8% of the variation in the online student portal.

Table 9 represents components 25 through 29 as compared to the remaining five potential components. The data in this table indicates there was a statistically significant positive correlation between online student portal and online parent portal, $r(704) = .949$, $p < .001$, with online student portal explaining 90% of the variation in the online parent portal. The weakest statistically positive correlation for human resources and online parent portal, $r(704) = .334$, $p < .001$, with human resources explaining 11% of the variation in the online parent portal.

Table 9

*Pearson's r Correlation Matrix for Continuous Variables 25 through 29 (n = 706)*

| Potential Components | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|
| 25. Human resources module (job posting/hiring/employee leave, etc.) | - | | | | |
| 26. Mobile app capability | .398** | - | | | |
| 27. Online student portal | .344** | .726** | - | | |
| 28. Online parent portal | .334** | .731** | .949** | - | |
| 29. Data analytics module | .417** | .583** | .625** | .623** | - |

**Correlation is significant at the 0.01 level (2-tailed).

Based on the results, the null hypothesis was rejected for RQ1: What is the relationship of the common components of a single login data and information system and the five stakeholder groups? Null Hypothesis: There will be no statistically significant relationship of the common components of a single login data and information

system and the five stakeholder groups. The Pearson's *r* coefficient for each pair of components in Tables 6 – 9 indicates a positive linear relationship between each potential component. There were 406 pairs of variables for the data set of 29 potential components. The *r* value ranged from .245 to .949 on the data collected and was grouped in three groups .00 to .29 weak correlation, .30 to .49 moderate correlation, and .50 and larger represents a strong correlation between the variables. The data had 18 pairs of components that had an *r* value with a weak correlation with a range of .245 to .299. Moderate correlation was indicated among 212 pairs of components with a range of .310 to .497. There was a strong correlation between 176 pairs of components with a range of .501 to .949.

The data set as a whole indicated that two variables had the highest number of strong correlations, and one variable had the highest number of weak correlations. Attendance module was strongly correlated with student demographics, discipline module, health module, and school notification system for phone calls, emails, and texts. The second variable with the highest number of strong correlations was class scheduling with food service module, student registration module, intervention scheduling, and special education module. The highest number of weak correlations was employee evaluation module with student demographic information; attendance module; discipline module; transportation/bus routing module; school notification system for phone calls, emails, and texts; student registration module; class scheduling; traditional gradebook; online student portal; and online parent portal.

The second focus was on determining if there was a significant difference between each of the 29 components. The mean rank and Chi-square were expressed by

running the Friedman Test in this study. This correlation addressed RQ2: What is the difference in the level of priority for each component of a single login data and information system and the five stakeholder groups? Null Hypothesis: There will be no statistically significant difference in the level of priority for each component of a single login data and information system and the five stakeholder groups.

Table 10 outlines the mean rank for each potential component for a single login data and information system. The mean ranks displayed in the table indicate 16 components have mean ranks of 15.00 or higher; whereas, 13 have mean ranks of 14.99 or lower. There were four outliers in the mean rank data with scores lower than 10.00, indicating these components are not highly prioritized by the survey participants. These components include employee time clock, athletics management module, employee evaluation module, and human resources module. The same four components had the lowest means as seen in Table 5. The mean data were utilized to figure the Chi-square in the Friedman Test to establish if there was a difference in the level of priority of the components among the five stakeholder groups.

Table 10

*Friedman Test Mean Ranks of Potential Data and Information System Components*

| Potential data and information system components | Mean Rank |
|---|---|
| 1. Student demographic information | 20.47 |
| 2. Attendance module | 21.14 |
| 3. Discipline module | 20.19 |
| 4. Health module | 18.83 |
| 5. Finance module | 11.53 |
| 6. Food service module | 15.03 |
| 7. Library management module | 11.93 |
| 8. Transportation/Bus Routing module | 16.30 |
| 9. Field/Activity trip request | 11.18 |
| 10. Employee time clock | 9.51 |

Table 10 (continued)

*Friedman Test Mean Ranks of Potential Data and Information System Components*

| Potential data and information system components | Mean Rank |
|---|---|
| 11. Maintenance/Technology work order module | 10.65 |
| 12. Athletics management module | 9.91 |
| 13. School notification system for phone calls, emails, and text | 16.93 |
| 14. Staff attendance module | 12.61 |
| 15. Student registration module | 17.99 |
| 16. Class scheduling | 18.82 |
| 17. Intervention scheduling | 15.21 |
| 18. Special Education module | 16.30 |
| 19. Curriculum module | 12.27 |
| 20. Lesson planning module | 11.22 |
| 21. Learning Management System (LMS) | 11.53 |
| 22. Traditional gradebook | 18.81 |
| 23. Standards-based gradebook | 17.29 |
| 24. Employee evaluation module | 9.53 |
| 25. Human resources module (job posting/hiring/employee leave, etc.) | 9.67 |
| 26. Mobile app capability | 16.49 |
| 27. Online student portal | 19.36 |
| 28. Online parent portal | 19.44 |
| 29. Data analytics module | 14.80 |

Table 11 outlines the results of the Friedman Test expressed in Chi-square. The critical value for this test of the Chi-square at the $p < 0.001$ level is 56.892. The researcher rejected the null hypothesis for research question two based on the results: $\chi^2(28) = 5805.990$, $p < .001$. These results confirmed there is a statistically significant difference in the level of priority of the potential components among the five stakeholder groups.

Table 11

*Friedman Test for Significant Difference Between Mean Ranks of Potential Data and Information System Components*

| N | 706 |
|---|---|
| Chi-Square | 5805.990 |
| df | 28.000 |
| Asymp. Sig | .000 |

The post-hoc analysis of the Friedman Test was completed utilizing the Wilcoxon Signed-Rank Test. The Wilcoxon Signed-Rank Test was conducted with a Bonferroni correction applied, resulting in a significance level of $p > .05$. This test makes it easy to identify the statistical difference between each potential component compared. In Table 12, the data are displayed using the asymptotic significance level. All data with $p < .05$ indicates a difference between the ranks of the two components being compared.

Table 12 represents the first eight components as compared to the 29 potential components.

Table 12

*Post-hoc Analysis with Wilcoxon Signed-Rank Test Components 1 through 8 (n = 706)*

| Potential Components | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Student demographic information | - | | | | | | | |
| 2. Attendance module | 1.000 | - | | | | | | |
| 3. Discipline module | 1.000 | 1.000 | - | | | | | |
| 4. Health module | 1.000 | .000 | 1.000 | - | | | | |
| 5. Finance module | .000 | .000 | .000 | .000 | - | | | |
| 6. Food service module | .000 | .000 | .000 | .000 | .000 | - | | |
| 7. Library management module | .000 | .000 | .000 | .000 | 1.000 | .000 | - | |
| 8. Transportation/Bus Routing module | .000 | .000 | .000 | .000 | .000 | 1.000 | .000 | - |
| 9. Field/Activity trip request | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 | .000 |
| 10. Employee time clock | .000 | .000 | .000 | .000 | .004 | .000 | .000 | .000 |
| 11. Maintenance/Technology work order module | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 | .000 |

Table 12 (continued)

*Post-hoc Analysis with Wilcoxon Signed-Rank Test Components 1 through 8 (n = 706)*

| Potential Components | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 12. Athletics management module | .000 | .000 | .000 | .000 | .102 | .000 | .003 | .000 |
| 13. School notification system for phone calls, emails, and text | .000 | .000 | .000 | .015 | .000 | .007 | .000 | 1.000 |
| 14. Staff attendance module | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 | .000 |
| 15. Student registration module | .000 | .000 | .001 | 1.000 | .000 | .000 | .000 | .082 |
| 16. Class scheduling | .118 | .000 | 1.000 | 1.000 | .000 | .000 | .000 | .000 |
| 17. Intervention scheduling | .000 | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 |
| 18. Special Education module | .000 | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 |
| 19. Curriculum module | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 | .000 |
| 20. Lesson planning module | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 | .000 |
| 21. Learning Management System (LMS) | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 | .000 |
| 22. Traditional gradebook | .101 | .000 | .928 | 1.000 | .000 | .000 | .000 | .000 |
| 23. Standards-based gradebook | .000 | .000 | .000 | .294 | .000 | .000 | .000 | 1.000 |
| 24. Employee evaluation module | .000 | .000 | .000 | .000 | .005 | .000 | .000 | .000 |
| 25. Human resources module (job posting/hiring/employee leave, etc.) | .000 | .000 | .000 | .000 | .021 | .000 | .000 | .000 |
| 26. Mobile app capability | .000 | .000 | .000 | .000 | .000 | .533 | .000 | 1.000 |
| 27. Online student portal | 1.000 | .037 | 1.000 | 1.000 | .000 | .000 | .000 | .000 |
| 28. Online parent portal | 1.000 | .072 | 1.000 | 1.000 | .000 | .000 | .000 | .000 |
| 29. Data analytics module | .000 | .000 | .000 | .000 | .000 | 1.000 | .000 | .306 |

*Note.* Asymptotic significances are displayed. The significance level is .05.

Student demographic information and 21 potential components were statistically different. There were no statistically significant differences between student demographic information and seven potential components.

Attendance module and 25 potential components were statistically different. There were no statistically significant differences between attendance module and two potential components.

Discipline module and 21 potential components were statistically different. There were no statistically significant differences between discipline module and five potential components.

Health module and 19 potential components were statistically different. There were no statistically significant differences between health module and six potential components.

Finance module and 16 potential components were statistically different. There were no statistically significant differences between finance module and eight potential components.

Food service module and 18 potential components were statistically different. There were no statistically significant differences between food service module and five potential components.

Library management module and 16 potential components were statistically different. There were no statistically significant differences between library management module and six potential components.

Transportation/bus routing module and 14 potential components were statistically different. There were no statistically significant differences between transportation/bus routing module and seven potential components.

Table 13 represents components nine through 16 as compared to the remainder 21 potential components.

Table 13

*Post-hoc Analysis with Wilcoxon Signed-Rank Test Components 9 through 16 (n = 706)*

| Potential Components | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| 9. Field/Activity trip request | - | | | | | | | |
| 10. Employee time clock | .079 | - | | | | | | |
| 11. Maintenance/Technology work order module | 1.000 | 1.000 | - | | | | | |
| 12. Athletics management module | 1.000 | 1.000 | 1.000 | - | | | | |
| 13. School notification system for phone calls, emails, and text | .000 | .000 | .000 | .000 | - | | | |
| 14. Staff attendance module | .768 | .000 | .004 | .000 | .000 | - | | |
| 15. Student registration module | .000 | .000 | .000 | .000 | 1.000 | .000 | - | |
| 16. Class scheduling | .000 | .000 | .000 | .000 | .018 | .000 | 1.000 | - |
| 17. Intervention scheduling | .000 | .000 | .000 | .000 | .085 | .000 | .000 | .000 |
| 18. Special Education module | .000 | .000 | .000 | .000 | 1.000 | .000 | .092 | .000 |
| 19. Curriculum module | 1.000 | .000 | .117 | .000 | .000 | 1.000 | .000 | .000 |
| 20. Lesson planning module | 1.000 | .073 | 1.000 | 1.000 | .000 | .810 | .000 | .000 |
| 21. Learning Management System (LMS) | 1.000 | .004 | 1.000 | .123 | .000 | 1.000 | .000 | .000 |
| 22. Traditional gradebook | .000 | .000 | .000 | .021 | .000 | .000 | 1.000 | 1.000 |
| 23. Standards-based gradebook | .000 | .000 | .000 | .000 | 1.000 | .000 | 1.000 | .331 |
| 24. Employee evaluation module | .098 | 1.000 | 1.000 | 1.000 | .000 | .000 | .000 | .000 |
| 25. Human resources module (job posting/hiring/employee leave, etc.) | .348 | 1.000 | 1.000 | 1.000 | .000 | .000 | .000 | .000 |
| 26. Mobile app capability | .000 | .000 | .000 | .000 | 1.000 | .000 | .296 | .000 |
| 27. Online student portal | .000 | .000 | .000 | .000 | .000 | .000 | 1.000 | 1.000 |
| 28. Online parent portal | .000 | .000 | .000 | .000 | .000 | .000 | .685 | 1.000 |
| 29. Data analytics module | .000 | .000 | .000 | .000 | .001 | .001 | .000 | .000 |

*Note.* Asymptotic significances are displayed. The significance level is .05.

Field/activity trip request and 11 potential components were statistically different. There were no statistically significant differences between field/activity trip request and nine potential components.

Employee time clock and 14 potential components were statistically different. There were no statistically significant differences between employee time clock and five potential components.

Maintenance/technology work order module and 12 potential components were statistically different. There were no statistically significant differences between maintenance/technology work order module and six potential components.

Athletics management module and 13 potential components were statistically different. There were no statistically significant differences between athletics management module and four potential components.

School notification system for phone calls, emails, and text and 10 potential components were statistically different. There were no statistically significant differences between school notification system for phone calls, emails, and text and six potential components.

Staff attendance module and 12 potential components were statistically different. There were no statistically significant differences between staff attendance module and three potential components.

Student registration module and seven potential components were statistically different. There were no statistically significant differences between student registration module and seven potential components.

Class scheduling and nine potential components were statistically different. There were no statistically significant differences between class scheduling and four potential components.

Table 14 represents components 17 through 24 as compared to the remainder 13 potential components.

Table 14

*Post-hoc Analysis with Wilcoxon Signed-Rank Test Components 17 through 24 (n = 706)*

| Potential Components | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|
| 17. Intervention scheduling | - | | | | | | | |
| 18. Special Education module | 1.000 | - | | | | | | |
| 19. Curriculum module | .000 | .000 | - | | | | | |
| 20. Lesson planning module | .000 | .000 | 1.000 | - | | | | |
| 21. Learning Management System (LMS) | .000 | .000 | 1.000 | 1.000 | - | | | |
| 22. Traditional gradebook | .000 | .000 | .000 | .000 | .000 | - | | |
| 23. Standards-based gradebook | .003 | 1.000 | .000 | .000 | .000 | .381 | - | |
| 24. Employee evaluation module | .000 | .000 | .000 | .092 | .006 | .000 | .000 | - |
| 25. Human resources module (job posting/hiring/employee leave, etc.) | .000 | .000 | .000 | .329 | .025 | .000 | .000 | 1.000 |
| 26. Mobile app capability | 1.000 | 1.000 | .000 | .000 | .000 | .000 | 1.000 | .000 |
| 27. Online student portal | .000 | .000 | .000 | .000 | .000 | 1.000 | .002 | .000 |
| 28. Online parent portal | .000 | .000 | .000 | .000 | .000 | 1.000 | .001 | .000 |
| 29. Data analytics module | 1.000 | .273 | .000 | .000 | .000 | .000 | .000 | .000 |

*Note.* Asymptotic significances are displayed. The significance level is .05.

Intervention scheduling and nine potential components were statistically different. There were no statistically significant differences between intervention scheduling and three potential components.

Special Education module and eight potential components were statistically different. There were no statistically significant differences between special education module and three potential components.

Curriculum module and eight potential components were statistically different. There were no statistically significant differences between curriculum module and two potential components.

Lesson planning module and six potential components were statistically different. There were no statistically significant differences between lesson planning module and three potential components.

Learning management system (LMS) and eight potential components were statistically different. There were no statistically significant differences between learning management system (LMS) and any of the remaining potential components.

Traditional gradebook and four potential components were statistically different. There were no statistically significant differences between traditional gradebook and three potential components.

Standards-based gradebook and five potential components were statistically different. There were no statistically significant difference between standards-based gradebook and one potential component.

Employee evaluation module and four potential components were statistically different. There were no statistically significant difference between employee evaluation module and one potential component.

Table 15 represents components 25 through 29 as compared to the remaining five potential components. The data in this table indicates there was a statistical difference in eight of the 10 potential component comparisons. There were no statistically significant differences in two of the 10 potential components within this set of data.

Table 15

*Post-hoc Analysis with Wilcoxon Signed-Rank Test Components 25 through 29 (n = 706)*

| Potential Components | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|
| 25. Human resources module (job posting/hiring/employee leave, etc.) | - | | | | |
| 26. Mobile app capability | .000 | - | | | |
| 27. Online student portal | .000 | .000 | - | | |
| 28. Online parent portal | .000 | .000 | 1.000 | - | |
| 29. Data analytics module | .000 | .085 | .000 | .000 | - |

*Note.* Asymptotic significances are displayed. The significance level is .05.

The Wilcoxon Signed-Rank Test post-hoc analysis of the Friedman Test was completed to determine where the differences lie between each potential component pairing. The Wilcoxon Signed-Rank Test was conducted with a Bonferroni correction applied, resulting in a significance level of $p > .05$. All data in Tables 12-15 with $p < .05$ indicate a difference between the ranks of the two components being compared. There were 406 pairs of variables for the data set of 29 potential components. The data results indicated 108 component pairings had a level of $p > .05$, which means there was not a statistical significant difference in the ranking between the two components being compared. The remaining 298 component pairings fell below the significance level of $p < .05$, indicating there was statistical significant difference in the ranking between the two components being compared.

**Conclusion**

Chapter Four provided the survey findings of 706 respondents to this study. Quantitative analysis of the answers was conducted through Crosstabs, Friedman Test, and the post-hoc analysis Wilcoxon Signed-Rank Test in order to answer the two research questions. The use of SPSS data analysis software allowed the researcher to identify the significant relationships between each pair of potential components of a

single login data and information system, thus rejecting null $H_{01}$. A positive linear relationship was found in each of the component pairings indicating there is a direct relationship between the two components compared, meaning as one component rating increases the other component rating increases. According to $\chi^2$ of Friedman Test and the post-hoc analysis Wilcoxon Signed-Rank Test, there is a difference in priority of the components rejecting null $H_{02}$. In Chapter Five, the researcher presents the conclusions of the research study, discusses the implementation of the results, and provides recommendations for further research in the area of single login data and information systems.

# Chapter Five

## Conclusions and Recommendations

### Introduction

Chapter Five includes findings as related to the literature on single login data and information systems and what implications may be important for K-12 school district to consider when selecting a system for their district. Additional data points the researcher gathered through the study are expanded on in this chapter. Also included, are recommendations for further research and a brief summary of the study. The sections of this chapter are Introduction, Research Questions, Summary of Methods, Summary of Findings, Implications, Recommendations for Future Reserach, and Summary.

The focus of the study was to determine key components educators desire in a single login data and information system. This study is based on the concept that educational data and information systems need to be conjoined into a single login system (Dermaku et al., 2016; Freeland & Hernandez, 2014). A single login system would allow educators to gather the necessary data needed to make decisions to positively impact the members and organization. Systems that work independently of one another cause educators to use multiple systems to complete the necessary work, thus missing the mark when it comes to efficiency. According to Harris (2007), school districts' data and information systems are fragmented, making it difficult to make quality decision. In order for the concept of a single login system to happen, it is imperative to gather input from those that have the job of input and output (Adeleye, Adu, & Olatunde, 2012; Cunningham, 2011; Feng & Pan, 2016; Fetaji, Fetaji, Jashari, Ebibi, Ljajie, Kamberovic, & Iseini, 2016; DeLone & McLean, 1992, 2003; McDonald, 2010; McLeod, Hare, &

Johare, 2004). The voices of those using the system are essential when building a program that has the components desired by the users. To create a clear data picture, districts need input on what should be included in a single system to house what is necessary for making strategic decisions to impact students and the organization as a whole (Freeland & Hernandez, 2014).

Data for this study was collected from five stakeholders groups to analyze the relationship and difference of each potential component of a single login data and information system. In accordance to the literature, the researcher sought to find what educators want in a single login system. When selecting a system for an organization, it is important to partner with individuals who have the job of input as well as the users of the output data and information (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014; Fried, Lovell, & Schmidt, 2008; McLeod, Hare, & Johare, 2004; Yampolskiy, 2011). As supported by the literature review, it is essential to have the voice of the system users when making decisions (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014). The stakeholders identified in this study allowed the researcher to gain perspective of multiple users of the system to gain a broader view of what is needed for the organization. These stakeholders have a vested interest in the information and data that is held within the system, and their needs should be considered when making decisions (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014).

**Research Questions**

The following research questions were addressed in this study:

1. What is the relationship of the common components of a single login data and information system and the five stakeholder groups?
2. What is the difference in the level of priority for each component of a single login data and information system and the five stakeholder groups?

These questions were designed to guide the study and create an understanding of what a desirable data and information system would entail. The researcher proposed the following null hypotheses:

$H_{01:}$ There will be no statistically significant relationship of the common components of a single login data and information system and the five stakeholder groups.

$H_{02:}$ There will be no statistically significant difference in the level of priority for each component of a single login data and information system and the five stakeholder groups.

**Summary of Methods**

The researcher used a quantitative method approach in data collection and analysis through a research generated survey. The survey was measured for content validity by a panel of six experts. The data were analyzed using Rovinelli and Hambelton's Index of Item-Objective Congruence (1977). The validity test resulted in no changes in the original survey. A district, not part of the final study, took part in the pilot test to measure the reliability of the researcher-generated survey. The researcher calculated Cronbach's alpha resulting in a reliability output with an acceptable coefficient of 0.979. A total of 518 school districts in Missouri were contacted through email to participate in the survey. The five stakeholder groups per district surveyed included one

K-12 district leader, one building leader, three classroom teachers, and one administrative support staff at the district and building level. There was a potential of 3626 respondents to the survey for the state of Missouri and 706 responses, resulting in a completion percentage of 19%. The quantitative data were analyzed through the use of IBM Statistical Package for the Social Sciences (SPSS). The researcher conducted the Pearson's *r* coefficient expressed by running Crosstab in the study with an additional option of the mean and standard deviation to determine any statistical relationship between the common components public educators want in a single login data and information system. Also, the researcher conducted the Friedman Test and post-hoc analysis Wilcoxon Signed-Rank Test expressed in mean rank, Chi-square, and asymptotic significance value to determine any statistical differences in the level of priority for each component the five stakeholder groups identified in a single login data and information system. These survey methods allowed the researcher to determine the relationships and differences in each of the components.

**Summary of Findings**

A thorough review of the literature found that a theoretical framework had not been established in the area of data and information systems. Watson (2104) explains that data and information systems are in the infancy stage when it comes to establishing a theory based academic field. Currently, information system studies borrow from other academic areas to support a theory for which research problems are approached.

Understanding that a formal theoretical framework has not been established in the area of educational data and information systems, the researcher established the idea of a Single Login concept to more aptly conceptualize the challenges and opportunities that

exist within educational information systems. A single login system allows the user to input and retrieve data and information within one system. This type of system allows the user to sign into one system to access all the necessary software to complete the requirements of their job. Several benefits of a single login system include time management, efficiency of data collection and reporting, continual flow of information among all the system components, and common technology warehouse to benefit all stakeholders.

The review of literature is thematic in structure focusing on two areas of research. The first part of the review of literature begins with why user voices need to be an essential part of selecting a system and who the stakeholders are in the school setting. The second portion of the review focuses on the different components of data and information system and the role of those systems in the school setting. The researcher found through the literature it was imperative to find out what users need in a system so they can work alongside technology developers and to have the ability to select desired components in order to have a system that meets their needs. According to the literature review, it is important when selecting a system to get all voices from individuals who have the job of input as well as output data and information. (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014; Fried, Lovell, & Schmidt, 2008; McLeod, Hare, & Johare, 2004; Yampolskiy, 2011). The literature also provided a foundation of what potential components could be part of a system in order to develop a meaningful system for users.

This study is based on the Single Login concept for educational data and information systems from the perspective of the user, in order to provide a

comprehensive picture for all stakeholders (Dermaku et al., 2016; & Freeland & Hernandez, 2014). The findings of this study identify relationships and differences of priority for each of the components and the stakeholder groups. As supported by the literature review, it is essential to have the voice of the system users when making decisions (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014). The thorough review of literature identified the need to collect user input on what educators need in a data and information system. The researcher generated survey was developed to collect what the literature stated was essential, the user voice.

The quantitative data collected corresponds with the review of literature identifying the need for user voice (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014). Correspondence is evident when looking at the relationships that exist between each component and the ranking of priority according the stakeholder groups. The positive linear relationships of the component pairings show that the users have similar needs when it comes to a single login data and information system and this corresponds with the DeLone and McLean model that puts the user at the center for identifying the success of a system (DeLone & McLean, 1992, 2003; Feng & Pan, 2016). Of the 406 component pairs, there were 298 with a significant difference in the rating of the components. This indicates the ratings of the components across all the stakeholder groups are significantly different depending on the component being rated. This data corresponds with the literature indicating that depending on the component pair being rank the user may rank one component higher than another; thus, putting the user voice as an essential part of what must be taken into account when developing a single login system. For stakeholders groups this means, the voice of the user should be the

primary focus for technology developers when creating a system that will support the needs of the organization within a single login data and information system.

In developing the Single Login concept, the researcher anticipated that the data analysis would show strong positive relationships between component pairs. The strong relationship indicated, as one component was rated high the other component was also rated high. Attendance module had the highest number of strong correlations and the researcher anticipated this component having strong positive linear relationships due to the number of users that utilize this component on a daily basis. The researcher also anticipated there would not be a statistically significant difference between the three following components student demographics, attendance module, and discipline module. Data analyses, however, also demonstrated unanticipated findings such as the statistically significant difference in the level of priority between the components school notification system and online parent portal. Since both of the systems are similar, the researcher anticipated the components would be similar in the level of priority.

Research Question 1: What is the relationship of the common components of a single login data and information system and the five stakeholder groups? Participants rated the 29 potential components on a five-point Likert scale based on their determination that each component should be part of a single login data and information system. Crosstab was used to compare each pair of components. In a Crosstab, the results are expressed in as Pearson's *r* coefficient to describe the relationship between two components. Upon the results, the researcher was able to reject the null hypothesis $H_{01}$ because of a positive linear relationship between each potential component pairing. The review of literature focused on the need to have the user voice when developing or

selecting a system and the positive linear relationships corresponds to the literature by indicate the rank users place on the components is similar when looking at the components they need in a single login data and information system (Aldarbesti & Saxena, 2014; Blau & Presser, 2013; Finkel, 2012; Freeland & Hernandez, 2014).

Across the 406 pairs of variables for the data set tested, all of the pairs had a positive linear relationship. Based on the results, the researcher concluded the five stakeholder groups rated the components similarly, indicating there was a relationship among the 29 pairs of the potential components of a single login data and information system. The 13 components that had strong correlations with 16 or more component pairings were attendance module, class scheduling, data analysis module, discipline module, health module, intervention scheduling, mobile app capability, online parent portal, online student portal, school notification system, special education module, student demographic information, and student registration module. The six components with 20 or more moderate positive linear relationships were employee time clock, finance module, learning management system, lesson planning module, library management module, and staff attendance module. The four components with three or more weak positive linear correlations were employee evaluation module, human resources module, maintenance/technology work order module, and student demographics information.

Research Question 2: What is the difference in the level of priority for each component of a single login data and information system and the five stakeholder groups? Each component was rated by the participants on a five-point Likert scale to indicate if they agree or disagree the component should be part of a single login student data and information system. The Friedman Test results are expressed in Chi-square to

determine the level of priority for each potential component. The post-hoc analysis Wilcoxon Signed-Rank Test was run to identify where the differences were for each component pairing. The Chi-square results allowed the researcher to reject the null hypothesis $H_{02}$ thus corresponding to the review of literature by showing that depending on the need of the user the priority they place on a component is different thus user voice is an essential part of selecting or creating a system that will meet the needs of the user.

The Wilcoxon Signed-Rank Test allowed the researcher to see where the differences lay between each potential component. Across the 29 components the differences of each pairing varied slightly. The components with 23 or more differences in the level of priority were attendance module, data analytics module, and food service module, indicating that these components were ranked higher or lower in the level of priority than the other 28 components they were compared against. The components with 10 or more similar level of priority were field trip/activity trip request, lesson planning module, maintenance/technology work order module, and student registration module. These components had a similar level of priority when compared to the other 28 components.

Table 16 provides additional data points the researcher gathered through the survey results. The survey included a question asking respondents to identify the component as being part of their main single login data and information system. Respondents had the selections of yes, no, or unsure. Table 16 displays the response percentage of all stakeholders to the question. When compared to the mean rank in Table 5, the data show that the higher the percentage of yes, the higher the mean rank for the component. An example is attendance module with 97% of stakeholders selecting yes,

indicating that the component was part of their single login data and information system; the mean rank was the highest ranked component at 4.61. When compared to the mean rank in Table 5, the data show that the lower the percentage of yes, the lower the mean rank for the component. An example was employee evaluation module with 6% of stakeholders selecting yes, indicating that the component was part of their single login data and information system; the component had a low mean rank of 3.13.

Table 16

*Percentage of Stakeholders that Currently have Each Component as Part of Their Single Login Data and Information System. (n = 706)*

| Potential Components | Yes | No | Unsure |
|---|---|---|---|
| Athletics management module | 7% | 76% | 16% |
| Attendance module | 97% | 2% | 1% |
| Class scheduling | 83% | 11% | 6% |
| Curriculum module | 14% | 76% | 10% |
| Data analytics module | 25% | 43% | 31% |
| Discipline module | 91% | 7% | 2% |
| Employee evaluation module | 6% | 86% | 8% |
| Employee time clock | 7% | 82% | 11% |
| Field/Activity trip request | 10% | 75% | 14% |
| Finance module | 32% | 47% | 21% |
| Food service module | 60% | 28% | 12% |
| Health module | 84% | 11% | 4% |
| Human resources module (job posting/hiring/employee leave, etc.) | 7% | 83% | 10% |
| Intervention scheduling | 23% | 61% | 16% |
| Learning Management System (LMS) | 13% | 62% | 25% |
| Lesson planning module | 9% | 82% | 9% |
| Library management module | 17% | 62% | 20% |
| Maintenance/Technology work order module | 10% | 83% | 7% |
| Mobile app capability | 43% | 44% | 13% |
| Online parent portal | 89% | 8% | 3% |
| Online student portal | 83% | 12% | 5% |
| School notification system for phone calls, emails, and texts | 44% | 49% | 7% |
| Special Education module | 44% | 46% | 10% |

Table 16 (continued)

*Percentage of Stakeholders that Currently have Each Component as Part of Their Single Login Data and Information System. (n = 706)*

| Potential Components | Yes | No | Unsure |
|---|---|---|---|
| Staff attendance module | 19% | 69% | 12% |
| Standards-based gradebook | 50% | 40% | 10% |
| Student demographic information | 96% | 2% | 2% |
| Student registration module | 70% | 21% | 9% |
| Traditional gradebook | 88% | 9% | 3% |
| Transportation/Bus Routing module | 48% | 41% | 12% |

**Interpretation of Findings**

There was an additional option ran during the Crosstab to identify the mean and standard deviation for each component. The results identified 14 components with a strongly agree or agree mean, indicating these components should be part of a single login data and information system. These components are: attendance module, student demographic information, discipline module, online parent portal, traditional gradebook, health module, class scheduling, online student portal, student registration module, standards-based gradebook, transportation/bus routing module, school notification system for phone calls, emails, and text, special education module, and mobile app capability. The 14 components could be used by a district to select a single login system or could be used to work with technology developers to create a system. In looking at these components, there are similarities to what is currently offered in a single login system in the educational technology industry. These are common elements found in systems and could be the reason why they rise to the top of the mean rank. The components also directly relate to the students either by housing the information needed such as

demographics or sharing of student information such as online student portal. This could be another reason why these 14 components are at the strongly agree or agree mean.

The Pearson's *r* coefficient correlation was used to address RQ1: What is the relationship of the common components of a single login data and information system and the five stakeholder groups? When looking at the Pearson's *r* coefficient for each component pairing and the mean rank for each component, there is a common theme that starts to appear. Of the 14 components with a high mean rank, nine of those components have strong correlations with these same components. The strong correlations include the 14 components with a high mean rank: attendance module, student demographic information, discipline module, online parent portal, traditional gradebook, health module, class scheduling, online student portal, student registration module, standards-based gradebook, transportation/bus routing module, school notification system for phone calls, emails, and text, special education module, and mobile app capability. Also, a strong correlation can be seen with three additional components: intervention scheduling ($M = 3.94$), food service module ($M = 3.9$), and data analytics module ($M = 3.89$). The three additional components fell just below the mean of four, however, they still have a strong relationship with the other 14 components. This additional information would indicate these three additional components should be added to the list for districts to look for when selecting a single login in system or working with a technology developer to create a system. Food service is often part of current single login system available to schools and this could be the reason it has a strong relationship with the 14 components with a high mean rank. The other two components are indicative of where the education world is focusing efforts. Data analytics and intervention scheduling would meet the

needs of schools as they focus on moving students not only as a district but looking at students as individuals. This type of information would help districts as they move into data teams and work to find ways to meet the needs of individual students through intervention scheduling. The education world is flooded with these topics and it was not a surprise to see this rise to the top of needs for stakeholders.

The Friedman Test and post-hoc Wilcoxon Signed-Rank Test was utilized for research question two in order to determine if there is a difference in the level of priority of the potential components. The Wilcoxon Signed-Rank Test allowed for the researcher to identify where the differences are according to the five stakeholder groups surveyed. In looking at specifically the 14 components that have a high mean rank and Pearson's *r* coefficient, along with the three additional components identified with a strong correlation, the difference varies in the components being compared. The thought would be the 17 components would have no difference when compared to each other, however, this did not hold true. The researcher suggests one reason could be due to the level of need according to the stakeholder job roles. An example is online parent portal, it could be ranked higher among teachers then other stakeholder groups because it would directly impact the teacher. Teachers are traditionally the first line of communication when it comes to sharing academic student information with parents and could cause them to rank the online parent portal higher as compared to other components. The difference could be dependent on the role of the stakeholder; thus, it is essential to hear all voices when making decisions about the components that should or should not be included in a single login data and information system.

The survey included a question asking respondents to identify the component as being part of their main single login data and information system. Respondents had the selections of yes, no, or unsure. When comparing the 17 components identified through the mean rank and Pearson's *r,* as components that are desired by stakeholders, and if the components are part of their current system there was a common theme. All of the components with the higher percentage of being part of the stakeholders current system, ranked in the top 18 of the highest percentage of yes. The reason could be the stakeholders use this component within their current system and place high value on its capabilities as being a part of a single login data and information system.

The information from this study was intended to gather the voice of stakeholders and what they need in a single login data and information system. In the interpretation of the findings, the researcher identifies the following 17 components are needed in an information system: attendance module, student demographic information, discipline module, online parent portal, traditional gradebook, health module, class scheduling, online student portal, student registration module, standards-based gradebook, transportation/bus routing module, school notification system for phone calls, emails, and text, special education module, mobile app capability, intervention scheduling, food service module, and data analytics module. These components could be part of checklist when selecting a single login data and information system to help ensure that the system is meeting the needs of the user or it could be utilized as part of a co-created system with technology developers and educators. There is still more research needed in this area of study and specifically in the area of how each stakeholder group rates the components. This was evident to the researcher when looking at the data from the Wilcoxon Signed-

Rank Test as compared to the Pearson's *r*, mean and standard deviation, and if the component was part of the stakeholder's current system. There are many differences in the level of priority for the components being compared and this could be due to the different job roles of the stakeholders. By studying this information, it could give insight to what different components need to be part of the main system and which could possibly be add-ons that are available to certain stakeholders based on need.

**Implications**

The literature review and the lack of a theoretical framework reveals there is a limited amount of research in the area of what educators need in a single login data and information system. This study is based on the conceptual framework that educational data and information systems should be housed in a single login system to provide a clear picture for educators. The findings of this study allow K-12 educators to gain insight on what the five stakeholders surveyed desire in a single login data and information system. The implication of this research begins to open the doors to build a foundation for further study in this area. There are additional groups that need to be surveyed in future studies to allow for a broader view of key components needed in a single login system.

Districts can use this research to aid in selecting a data and information system that best meets the needs of stakeholders in their district. A list could be created as a way to evaluate if a system has the needed components in order to make a quality decision when selecting a single login data and information system. The list of these components can be used when working with companies to make sure that the system sought has essential components desired for efficiency of the system and if it does not meet the needs this could open the door for collaboration with technology developers.

A factor of success in the development of information system software is the relationship between the developer and user of the systems (Hsu, Liang, Wu, Klein, & Jiang, 2011; Jiang, Klein, & Chen, 2006). The data from this research can be utilized to partner with technology developers in order to create systems that include the needs of the stakeholders that have the job of input and output of the data and information. Often, program developers create a system they believe meets the needs of the organization, but without having the right people at the table, the program may not meet all the organization's needs (Cunningham, 2011; McDonald, 2010). There is no single action to make the alignment happen; however, trust and effective communication can begin to open the doors to this much-needed partnership. Utilizing this data could allow schools to get the type of system they need in order to do their job with a high rate of efficiency and accuracy when it comes to data and information systems. According to Stephens and Rosenberg (2003), this type of relationship can benefit both invested parties. As more research in this area is done, it will become a powerful tool and leverage point when working with technology developers and the selection of a high quality system for districts to ensure the systems are reflective of what educators need.

**Recommendations for Further Research**

This research offers a starting point of key components educators need in a single login data and information system. The following recommendations will add to the body of research.

1. A study should be conducted to determine the difference between the component rank and each individual stakeholder group.

2. A study should be conducted to determine the relationship between the component and each individual stakeholder group.
3. Further research should be conducted to include other school stakeholders, such as counselors, librarians, and transportation directors, to gain a clear view of what all stakeholders need in a data and information system.
4. A study should be conducted to include what districts are spending on the systems they are currently using in the area of data and information systems.
5. A study should be conducted to determine the amount of time spent navigating between systems and the cost in labor, lost instruction or productivity navigating between systems.
6. A study should be conducted to include students and parents to allow for a broader view of key components needed in school data and information systems.
7. A study should be conducted to identify the relationship between teachers' satisfaction with the district technology and the number of systems the district uses in the area of data and information systems.
8. A study should be conducted to determine if a robust system could be created to support the needs of a school district would benefit the body of research.
9. A qualitative study should be conducted to determine the reasons why stakeholders rate components differently.

**Summary**

The focus of this study was to determine key components educators want in a single login data and information system. The literature review and a lack of a theoretical framework in the area of information technology revealed the level of research in this

area is limited; however, the need to get input from stakeholders on what should be included in a single login system is essential. The conceptual framework of the study focuses on the concept that data and information systems need to be housed in a single login system to allow for a clear data and information picture for stakeholders. Although there are numerous platforms used in K-12 districts across the nation, none completely fill the need, which in turn requires districts to buy more systems to meet the needs of the institution (Dermaku, Bajrami, Demaku, Kikaj, Maloku, Gashi, Sina, & Demolli, 2016). Without a thorough assessment of stakeholder needs, a significant gap will remain between the technology available and the needs of K-12 educators.

As previously stated in the literature review, a factor of success in the development of information system software is the relationship between the developer and user of the systems (Hsu, Liang, Wu, Klein, & Jiang, 2011; Jiang, Klein, & Chen, 2006). This study utilized educators to provide input on the key components they need in a single login system. The data provides a comprehensive view of the relationships and differences in priority of the potential components according to the five stakeholder groups. This data allows for a relationship to begin forging between developers and user in the educational software arena. The DeLone and McLean Information System Model was an example of how the user, intention of use, and the use of an information system is at the center of how the system will benefit the organization (DeLone & McLean, 2003). This study puts the user at the center by gathering the voices of stakeholders and allowing them to share what they need in a single login system.

The findings of this study serve as a starting point for further research in this area, a starting point to help bridge a gap that exists today where systems are built

independently to fill a specific need instead of incorporating the specific need into the system to aide in efficiency and increasing the user satisfaction. The data showed positive linear relationships between the components according to the rating of the stakeholders and differences in the ratings when comparing two components. The Pearson's *r* coefficient was significant at $p < .001$ and each pair of variables ranged from .245 to .949. The survey also revealed a statistically significant difference in the level of priority of each potential component being compared by the use of the Friedman Test expressed in Chi-square. According to $\chi^2$ of the Friedman Test, the difference between the median of each potential component pair was statistically significant, $\chi^2(28) = 5805.990$, $p < .001$. It may be beneficial for future research to pair the quantitative research questions with a qualitative survey to identify reasons for the relationships and differences in the component pairs. A mixed-method approach to research would allow for a deeper understanding and produce a clear picture so technology developers know the key components educators need in a single login data and information system.

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# Appendix A

## Survey for Key Components of a School Data and Information System

| Component | Section 1 | Section 2 |
|---|---|---|
| Potential components of a single login data and information system. | Is this part of your main single login school data and information system?<br><br>("main" meaning – where your student demographics are housed)<br><br>Yes, No, Unsure go to Section 2 | I believe the following is a priority to have in a single login school data and information system. Consider all stakeholders when making your selection.<br>1 = strongly disagree<br>2 = disagree<br>3 = neither agree nor disagree<br>4 = agree<br>5 = strongly agree |
| 1. Student demographic information | Yes No Unsure | 1 2 3 4 5 |
| 2. Attendance module | Yes No Unsure | 1 2 3 4 5 |
| 3. Discipline module | Yes No Unsure | 1 2 3 4 5 |
| 4. Health module | Yes No Unsure | 1 2 3 4 5 |
| 5. Finance module | Yes No Unsure | 1 2 3 4 5 |
| 6. Food service module | Yes No Unsure | 1 2 3 4 5 |
| 7. Library management module | Yes No Unsure | 1 2 3 4 5 |
| 8. Transportation/Bus Routing module | Yes No Unsure | 1 2 3 4 5 |
| 9. Field/Activity trip request | Yes No Unsure | 1 2 3 4 5 |
| 10. Employee time clock | Yes No Unsure | 1 2 3 4 5 |
| 11. Maintenance/Technology work order module | Yes No Unsure | 1 2 3 4 5 |
| 12. Athletics management module | Yes No Unsure | 1 2 3 4 5 |
| 13. School notification system for phone calls, emails, and text. | Yes No Unsure | 1 2 3 4 5 |
| 14. Staff attendance module | Yes No Unsure | 1 2 3 4 5 |
| 15. Student registration module | Yes No Unsure | 1 2 3 4 5 |
| 16. Class scheduling | Yes No Unsure | 1 2 3 4 5 |
| 17. Intervention scheduling | Yes No Unsure | 1 2 3 4 5 |
| 18. Special Education module | Yes No Unsure | 1 2 3 4 5 |

| | | |
|---|---|---|
| 19. Curriculum module | Yes No Unsure | 1 2 3 4 5 |
| 20. Lesson planning module | Yes No Unsure | 1 2 3 4 5 |
| 21. Learning Management System (LMS) | Yes No Unsure | 1 2 3 4 5 |
| 22. Traditional gradebook | Yes No Unsure | 1 2 3 4 5 |
| 23. Standards-based gradebook | Yes No Unsure | 1 2 3 4 5 |
| 24. Employee evaluation module | Yes No Unsure | 1 2 3 4 5 |
| 25. Human resource module (job posting/hiring/employee leave, etc.) | Yes No Unsure | 1 2 3 4 5 |
| 26. Mobile app capability | Yes No Unsure | 1 2 3 4 5 |
| 27. Online student portal | Yes No Unsure | 1 2 3 4 5 |
| 28. Online parent portal | Yes No Unsure | 1 2 3 4 5 |
| 29. Data analytics module | Yes No Unsure | 1 2 3 4 5 |

**Additional Questions**

30. Are there other components that should be included in a data and information system for schools?

31. How many data and information systems do you currently use in your position?
    a. 1-3 systems
    b. 4-6 systems
    c. 7-9 systems
    d. 10 or more systems

**Demographics**

32. Position in the school district
    a. Building Level Administrative Support Staff
    b. District Level Administrative Support Staff
    c. Teacher
    d. Building Administrator
    e. District Administrator

34. How many years have you been in education?
    a. 1-5 years
    b. 6-10 years
    c. 11-15 years
    d. 16 or more years

Appendix B

Letter for permission to complete Pilot

Dear Superintendent,

I am writing to request your participation in a pilot study of a survey instrument to identify key components educators need in a single login data and information system. I am a Doctoral student at Southwest Baptist University in Bolivar, Missouri and a practicing educator. Completing the survey should take approximately 5 minutes.

The survey is anonymous and no identifying information is collected. The completed survey serves as your implied consent to be surveyed. Your participation is voluntary. Should you choose to participate, you are not required to respond to all survey items and may discontinue the survey at any time. Your survey responses will be strictly confidential. The data from this research will be reported in aggregate form and will be used to determine the validity and reliability of the survey instrument. There are no foreseeable risks associated with participation in this study.

This project has been reviewed by the Southwest Baptist University Research Review Board for research and research-related activities involving human subjects. I would be glad to share the completed study with you upon request.

If you consent to participation, I request that the message be forwarded to each building principal in the district, all teachers in the district, and administrative support staff at the building and district level. To begin the brief survey, click on the following link: pilot survey.

Thank you in advance for your time and consideration.

Sincerely,

Amy Sims

Willard Middle School Principal

205 Miller Road, Willard, MO 65781

417-848-1798

amysims@willardschools.net

Appendix C

Letter to Superintendent

Dear Superintendent,

I am a doctoral student from Southwest Baptist University and I am conducting a research study as part of my doctoral degree requirements. My study is entitled, Key Components Educators need in a Single Login Data and Information System. I am writing to request your participation in this study. Completing the survey should take approximately 3-5 minutes. An incentive for completing the survey by the end of the day on December 2, 2018 will earn you a chance to win a **$250 Amazon gift card**.

If you consent to participation, I request that you **complete the survey and forward this message to one administrative support staff at the district level**. They will also earn a chance to win the gift card if completed by the date listed above. To begin the brief survey, click on the following link: https://dataandinformaitonsystems.questionpro.com.

The survey is anonymous and no identifying information is collected. The completed survey serves as your implied consent to be surveyed. Your participation is voluntary. Should you choose to participate, you are not required to respond to all survey items and may discontinue the survey at any time. Your survey responses will be strictly confidential. The data from this research will be reported in aggregate form and will be used to determine the validity and reliability of the survey instrument. There are no foreseeable risks associated with participation in this study.

The Southwest Baptist University Research Review Board for research and research-related activities involving human subjects has reviewed this project. I would be glad to share the completed study with you upon request.

Thank you in advance for your time and consideration.

Sincerely,
Amy Sims
Willard Middle School Principal
205 Miller Road, Willard, MO 65781
417-848-1798
asims.willard@gmail.com

Appendix D

Letter to building principal

Dear Building Principal,

I am a doctoral student from Southwest Baptist University and I am conducting a research study as part of my doctoral degree requirements. My study is entitled, Key Components Educators need in a Single Login Data and Information System. I am writing to request your participation in this study. Completing the survey should take approximately 3-5 minutes. An incentive for completing the survey by the end of the day on December 2, 2018 will earn you a chance to win a **$250 Amazon gift card**.

If you consent to participation, I request that you **complete the survey and forward this message to three teachers (including special services) and one administrative support staff at the building level**. They will also earn a chance to win the gift card if completed by the date listed above. To begin the brief survey, click on the following link: https://dataandinformaitonsystems.questionpro.com

The survey is anonymous and no identifying information is collected. The completed survey serves as your implied consent to be surveyed. Your participation is voluntary. Should you choose to participate, you are not required to respond to all survey items and may discontinue the survey at any time. Your survey responses will be strictly confidential. The data from this research will be reported in aggregate form and will be used to determine the validity and reliability of the survey instrument. There are no foreseeable risks associated with participation in this study.

The Southwest Baptist University Research Review Board for research and research-related activities involving human subjects has reviewed this project. I would be glad to share the completed study with you upon request.

Thank you in advance for your time and consideration.

Sincerely,
Amy Sims
Willard Middle School Principal
205 Miller Road, Willard, MO 65781
417-848-1798
asims.willard@gmail.com

# Appendix E

## Panel Rating Survey

**RESEARCH QUESTION 1:** What is the relationship of the common components of a single login data and information system and the five stakeholder groups?

**RESEARCH QUESTION 2:** What is the difference in the level of priority for each component of a single login data and information system and the five stakeholder groups?

| Component | Section 1 | Section 2 | Panel Rating |
|---|---|---|---|
| Potential components of a single login data and information system. | Is this part of your main single login school data and information system?<br><br>("main" meaning – where your student demographics are housed)<br><br>Yes, No, Unsure go to Section 2 | I believe the following is a priority to have in a single login school data and information system. Consider all stakeholders when making your selection.<br>1 = strongly disagree<br>2 = disagree<br>3 = neither agree nor disagree<br>4 = agree<br>5 = strongly agree | Scale<br><br>+1 (item clearly aligns)<br>0 (unsure/unclear)<br>-1 (item clearly does not align) |
| 1. Student demographic information | Yes No Unsure | 1 2 3 4 5 | |
| 2. Attendance module | Yes No Unsure | 1 2 3 4 5 | |
| 3. Discipline module | Yes No Unsure | 1 2 3 4 5 | |
| 4. Health module | Yes No Unsure | 1 2 3 4 5 | |
| 5. Finance module | Yes No Unsure | 1 2 3 4 5 | |
| 6. Food service module | Yes No Unsure | 1 2 3 4 5 | |
| 7. Library management module | Yes No Unsure | 1 2 3 4 5 | |
| 8. Transportation/Bus Routing module | Yes No Unsure | 1 2 3 4 5 | |
| 9. Field/Activity trip request | Yes No Unsure | 1 2 3 4 5 | |
| 10. Employee time clock | Yes No Unsure | 1 2 3 4 5 | |
| 11. Maintenance/Technology work order module | Yes No Unsure | 1 2 3 4 5 | |
| 12. Athletics management module | Yes No Unsure | 1 2 3 4 5 | |
| 13. School notification system for phone calls, emails, and text. | Yes No Unsure | 1 2 3 4 5 | |

| | | | |
|---|---|---|---|
| 14. Staff attendance module | Yes No Unsure | 1 2 3 4 5 | |
| 15. Student registration module | Yes No Unsure | 1 2 3 4 5 | |
| 16. Class scheduling | Yes No Unsure | 1 2 3 4 5 | |
| 17. Intervention scheduling | Yes No Unsure | 1 2 3 4 5 | |
| 18. Special Education module | Yes No Unsure | 1 2 3 4 5 | |
| 19. Curriculum module | Yes No Unsure | 1 2 3 4 5 | |
| 20. Lesson planning module | Yes No Unsure | 1 2 3 4 5 | |
| 21. Learning Management System (LMS) | Yes No Unsure | 1 2 3 4 5 | |
| 22. Traditional gradebook | Yes No Unsure | 1 2 3 4 5 | |
| 23. Standards-based gradebook | Yes No Unsure | 1 2 3 4 5 | |
| 24. Employee evaluation module | Yes No Unsure | 1 2 3 4 5 | |
| 25. Human resource module (job posting/hiring/employee leave, etc.) | Yes No Unsure | 1 2 3 4 5 | |
| 26. Mobile app capability | Yes No Unsure | 1 2 3 4 5 | |
| 27. Online student portal | Yes No Unsure | 1 2 3 4 5 | |
| 28. Online parent portal | Yes No Unsure | 1 2 3 4 5 | |
| 29. Data analytics module | Yes No Unsure | 1 2 3 4 5 | |

**Additional Questions**

| | |
|---|---|
| 30. Are there other components that should be included in a data and information system for schools? | |
| 31. How many data and information systems do you currently use in your position?<br>a. 1-3 systems<br>b. 4-6 systems<br>c. 7-9 systems<br>d. 10 or more systems | |

**Demographics**

| | |
|---|---|
| 32. Position in the school district<br>a. Building Level Administrative Support Staff<br>b. District Level Administrative Support Staff<br>c. Teacher<br>d. Building Administrator<br>e. District Administrator | |
| 33. How many years have you been in education?<br>a. 1-5 years<br>b. 6-10 years<br>c. 11-15 years<br>d. 16 or more years | |