ABSTRACT

Geoffrey B. Hawthorne, USING A FRAMEWORK TO REVIEW AND EVALUATE EDUCATIONAL TECHNOLOGY RESOURCES (Under the direction of Dr. Daniel Novey). Department of Educational Leadership, May 2021.

School districts have an enormous number of resources available to them as they seek to grow student success and achievement. A review of the web-based educational technology resources a district is using, their effect, and the equitable distribution of these resources defines this problem of practice. This mixed-method approach addresses a district's use of educational technology product resources to supplement classroom instruction. Many of the resources in use were purchased without a program review, cost analysis, or even district knowledge. The collection of current district usage data, the intervention of district curriculum leadership, and the identification of an actionable rubric for measuring educational technology product resources were among the first action steps. Following a four-week review of product resources in use and the amount of instructional time spent, work began on a review of selected products to determine overall product quality. During the product resource review stage of work by the scholarly practitioner and district instructional coaches, a rubric was used to evaluate current educational technology products. Stage three of the work was to evaluate the effectiveness of each educational technology product. Effectiveness data were compiled and submitted to the district's Curriculum and Instruction department so financial priorities and product resource recommendations could be made for the following academic year.

USING A FRAMEWORK TO REVIEW AND EVALUATE EDUCATIONAL TECHNOLOGY RESOURCES

A Dissertation

Presented to

The Faculty of the Department of Educational Leadership

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by

Geoffrey B. Hawthorne

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USING A FRAMEWORK TO REVIEW AND EVALUATE EDUCATIONAL TECHNOLOGY RESOURCES

by

Geoffrey B. Hawthorne

APPROVED BY:

DIRECTOR OF DISSERTATION:_____
Daniel Novey, EdD

COMMITTEE MEMBER:_____
Travis Lewis, EdD

COMMITTEE MEMBER:_____
Karen Jones, PhD

COMMITTEE MEMBER:_____
Rhonda Schuhler, EdD

CHAIR OF THE DEPARTMENT OF EDUCATIONAL LEADERSHIP:

_____
Marjorie Ringler, EdD

DEAN OF THE GRADUATE SCHOOL:

_____
Paul Gemperline, PhD

DEDICATION

This dissertation is dedicated to my amazing wife, Valerie Hawthorne, who has been the support and stability that has enabled me to complete this professional work; to my parents Joel and Terri Hawthorne; my brother Nathan Hawthorne and my two beautiful children Sydney and Shepherd Hawthorne.

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I'd also like to express great gratitude to the many Learn Platform employees who supported my work and had a clear understanding of the work I was attempting and its importance. They were supportive and encouraging of my work through every step.

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And last, but certainly not least, I want to thank the principals and instructional coaches of Franklin County Schools who served as participants in this work. Thank you for your gracious participation, thoughtfulness, passion for quality instruction, and willingness to keep open minds as we sought to evaluate current practices. It is your feedback that allowed for meaningful outcomes to be developed from this study.

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CHAPTER 1: INTRODUCTION

When students sit down in a classroom today, they are prepared to be introduced to practical and applicable information delivered and able to be processed in an engaging and individualized manner. During the past few decades, educational technology has evolved to a point where it has become a significant tool for information delivery within the classroom. In addition, educational technology has become a multi-billion-dollar industry that has given rise to companies that continually develop products, platforms, and resources that have promised to simplify instruction, improve student outcomes, and engage learners in ways traditional instruction techniques cannot (Crisp & Bonk, 2018). Educational technology as a pedagogy is a modern form of teaching that is art, science, and delivery system. Contemporary frameworks such as the Technological Pedagogical and Content Knowledge framework (TPACK) seek to define the process by which education technologies can be integrated successfully within the instructional environment (Koehler, 2012). Similarly, Dr. Ruben Puentedura's (2013) Substitution, Augmentation, Modification, and Redefinition (SAMR) model grew in popularity as a resource framework to establish the proper blending of educational technology resources within traditional instruction practices.

Despite the promise technology brings, the evolution of technology integration has led to the misuse of educational technology resources within classrooms in some schools. More than likely, many districts and schools have, without a proper framework of evaluation, added digital learning platforms, web-based technology tools, and other technology resources. This scholarly practitioner has found that, too often, school districts have added tools and resources without regard given to cost, value, resource overlap, equitable delivery, or even consideration for instructional time. Specifically, it has been this scholarly practitioner's experience that

consideration for pedagogical philosophy and goals for instructional time have gone unconsidered. The goal of this study is to establish a framework for how districts and schools can review resources currently in use as well as those they will identify in the future. This newly created framework will allow for the review of product quality, resource overlap, recommendations for use, and cost analysis and plan for equitable distribution or use.

Background of the Problem

In small, rural, low-income Title I school districts, the inclination in recent years, as observed by this scholarly practitioner, has been to supplement classroom instruction with the addition of web-based educational technology tools. The integration of classroom devices has allowed for an increased number of web-based educational technology resources that address such needs as student remediation, curricular support, and the extension of content standards for advanced learners.

Over the course of one month, beginning in the middle of October 2018 and ending in the middle of November of the same year, data were collected in a small north-central North Carolina school district to determine the number and significance of web-product educational technology usage in classrooms. The data collection revealed the significance of the curricular and instruction inconsistencies in district classrooms. Without a formal review, almost 700 different education platforms or products were being used weekly by just over 500 classroom teachers and over 7,500 students. During this limited time of data collection, it became clear to this scholarly practitioner that the development of a framework to review these resources and properly evaluate them needed to become a district priority.

Teachers have been using technology as a component of classroom instruction since the 1920s as radio and film were introduced to K-12 classrooms (Delgado et al., 2015). However, it

was a result of the National Defense Education Act (NDEA) of 1958, when funds were first allocated for research in the area of educational technology (Lamb, 2012). Lamb (2012) points to the creation of Title IV as leading to research and experimentation how best to use radio, television, and other related media within education. From the 1950s through the 1970s, educational technology shifted from audiovisual to systematic instructional design. Educational technology was focused on more of the process of instructional problems and solutions (Alenezi, 2017). It took the passing of sixty years, however, for public schools to begin using computers to assist individual students with learning (Cuban, 1993; Delgado et al., 2015). Early instruction using technology in the classroom began slowly and primarily with low-level skills and memorization as the focus (Delgado et al., 2015; Flick & Bell, 2000). Delgado et al. (2015) added that it was during this period that home access brought about a shift in how, when, and where learning could occur. Technology allowed for individuals to learn at home and meant learning no longer had to be face-to-face. However, in the decades since, massive investment has been made to technology infrastructure with little attention given to the needs to support it. In short, the tools purchased have, for years, gone largely unvetted for value, equitability, or quality. School districts, just as the rural district in this study, have been disorganized in the purchase and integration of educational technology resources. As a result, districts and schools now find themselves contractually bound to products, completely unaware of their quality or impact on student learning. In the district at the focus of this study, there were approximately 700 different Open Education Resources (OER) and paid subscription resources being used each month during the 2018-19 school year (LearnPlatform, n.d.). Following the collection and analysis of the data, this scholarly practitioner interviewed school-level instructional coaches and discovered that the majority of these products were largely unknown to curriculum leadership or

even school level administrations. Prompted by the staggering data, the superintendent agreed with this scholarly practitioner's request to further study and solve the problem by developing a framework to evaluate products. The need for the study and solution was apparent and became the sole focus of this study.

Problem Statement

In the United States, the educational technology industry has grown to more than fifty-five billion dollars annually (Johnson, 2011). Within the industry, United States' K-12 schools spent over 20 billion dollars on educational technology (Johnson, 2011). Franklin County Schools (FCS) spends more than a quarter of a million dollars annually on educational technology products and software (Franklin County Schools, n.d.). That total is in addition to traditional technology spending. Traditional technology needs include the following: devices, infrastructure, and annual subscriptions to access online content and materials. In 2018-19, FCS technology spending from state funding equaled $481,240.86. However, 64.7% was used on technology software and educational technology resource needs. Only about one-third of all state technology spending was used on devices and hardware needs. In total, FCS spent $713,194.42 on technology in 2018-19. Beyond traditional budget spending on technology, FCS was awarded $770,000 in Golden Leaf federal grant support in 2018-19 for the purpose of additional devices in 6th through 12th grade classrooms.

The annual technology commitment runs deeper than just being financial. The curriculum impact is more significant. Today, educational technology resources are having a significant impact on how instructional time is used. In this scholarly practitioner's observation, educational technology resources have gained traction in a variety of instructional settings including core literacy blocks, core math blocks, and remediation blocks. Items purchased or accessed for

instructional purposes are being used to remediate, supplement traditional curriculum resources, and in some cases to be the primary source of curriculum in harder-to-staff classrooms.

In summary, districts like FCS are buying educational technology product resources, unvetted, and allowing or even promoting their use in classrooms. During a four-week period during the fall of 2018, a Chrome extension was used to measure the educational technology use by product across the district. The findings measure the use of over 700 different educational technology product resources in use in Franklin County's 16 schools during that four-week period. The specific concern in this finding is that these products are not vetted for academic quality, nor is there a framework by which the district can monitor, evaluate, and filter these product resources prior to their purchase or use in classrooms.

Purpose of the Study

The purpose of this mixed-method action research study was to evaluate web-based educational technology resources to determine their impact on instruction and equitable delivery throughout low wealth schools. In a qualitative sense, the study gathered information from practical stakeholders within low wealth schools and a low wealth district to learn more about what resources are available and used within their schools. Additionally, this study collected testimonies from school level instructional coaches who monitor the use of current product resources within FCS schools. Quantitatively, the study measured the equitable distribution of product resources to low wealth schools. The study measured the volume and frequency of products used throughout the low wealth district. Qualitatively, the study evaluated the quality of the products used and rationale for their original purchase. This study reviewed survey data collected from principals whose schools use these educational technology products. Furthermore, through interviews and a scoring rubric, the study helped identify quality product resources for

school use. Finally, this study provided the opportunity for the district to create a product resource library for school personnel to reference when they look for supplemental instructional resources.

In Figure 1, a study progression illustrates the steps that were taken by the scholarly practitioner throughout the duration of this study. Beginning with a review of current educational technology resources in use, the scholarly practitioner then established the quality of those resources through the use of a product resource rubric. Once product resource value was established, the scholarly practitioner created a product resource library and established a framework for requesting the instructional use of product resources in the future. Upon completion of the study, the scholarly practitioner provided principals and all appropriate stakeholders with access to the product resource library, and the product resource request framework. Stakeholders such as the superintendent, chief of academics, and director of technology received communication updates throughout the study.

Research Questions

The following are the questions the scholarly practitioner answered during this study:

1. How did the implementation of a rubric to evaluate educational technology product resources influence perception of current product quality throughout the district?
2. What are the most significant criteria to include in a rubric for evaluating the quality of educational technology?
3. What could be done to monitor the equitable provision and use of subscription-based educational technology product resources in its Title I schools?

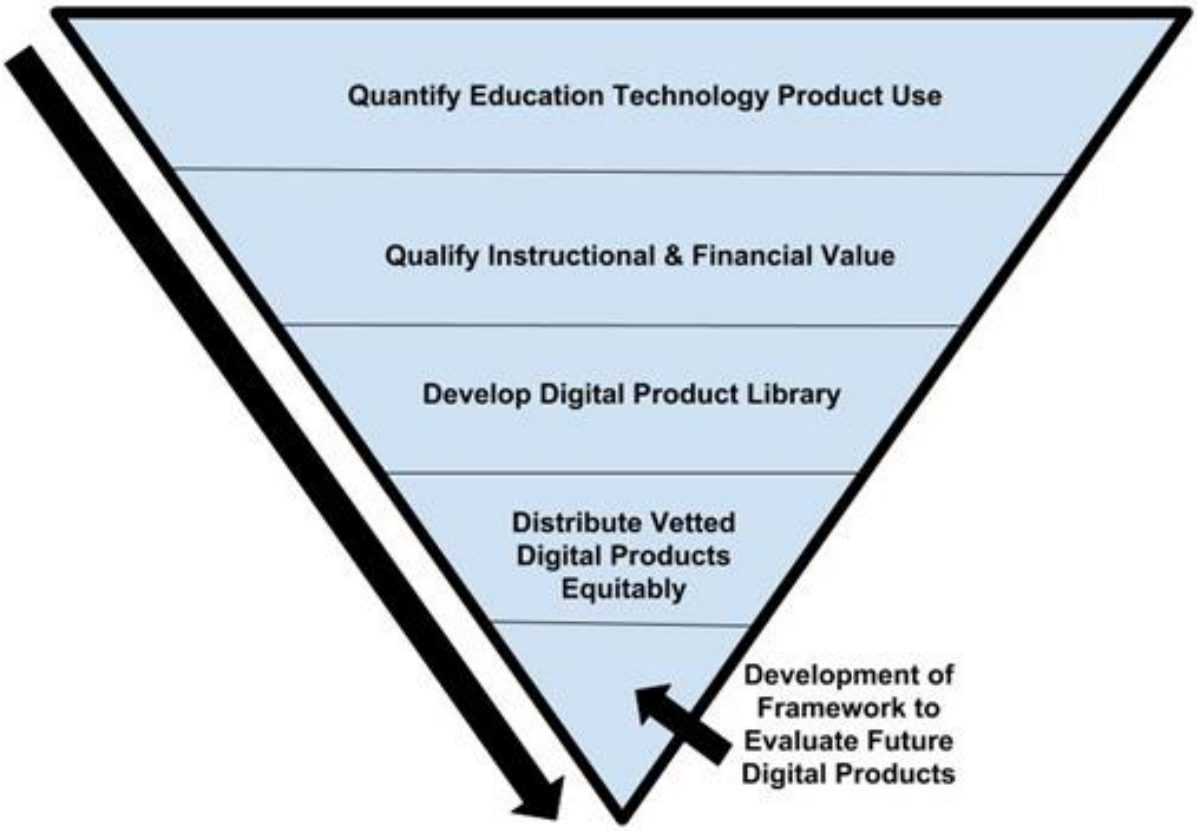


Figure 1. Draft study progression.

Conceptual Framework

According to Hattie (2008), in the United States, the majority of teachers believe teaching should be unquestioned; for them it is a private matter to be kept behind closed doors and rarely challenged. Those from outside the classroom seem to believe teachers' success stories are adequate justification to leave their classrooms and instruction alone (Hattie, 2008). However, Kozol (2005) points out that over the past few decades, there have been "galaxies of faded names and optimistic claims" such as, "Focus Schools," Quality Schools," "Blue Ribbon Schools," and "Magnet Schools," all claiming they are better and different, with little evidence of either" (p. 193). Hattie (2008) continues by saying that, unless the teacher demonstrates unethical behavior or incompetence, traditionally schools have allowed for any classroom instructional approach. Watters (2014) explains that with the advent of a more standardized curriculum used by the majority of states, a shift in the educational technology industry priorities has become more about areas such as software, professional development for teachers, and classroom time for students to use these new tools. The latter can be best achieved through the industry narrative that products are standards and curriculum aligned (Watters, 2014).

However, beginning with Koehler, the work to identify the appropriate use of educational technology began to take shape in the form of TPACK. Koehler (2012) describes TPACK as having at its heart three forms of knowledge: Content, Pedagogy, and Technology. According to Koehler (2012):

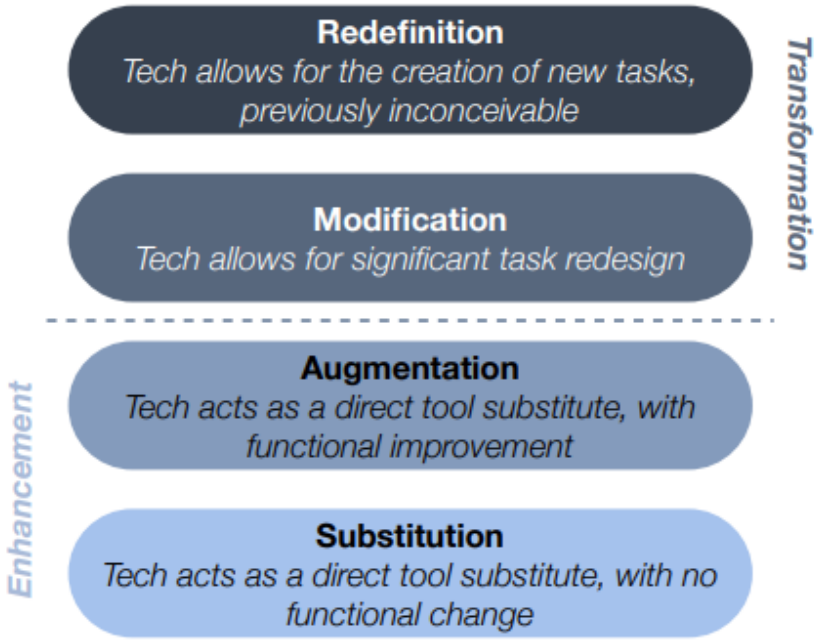
> The TPACK approach goes beyond seeing these three knowledge bases in isolation. The TPACK framework goes further by emphasizing the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (PCK),

> Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge. (p. 2)

In 2013, Ruben Puentedura's SAMR model gained traction as a framework for teachers to support the integration of technology tools into classroom lessons. The SAMR model attempts to synthesize for teachers, the challenging technology world with the demands of designing rich learning tasks (Kirkland, 2014). With districts allocating significant resources in educational technology, there is a need for teachers to understand how to enhance and transform instruction through the technology they are provided (Hilton, 2016). Additionally, Hilton (2016) notes that it is a forgone conclusion that technology will expand to every classroom as it becomes more affordable and mobile. Both TPACK and SAMR provide capacity for teachers to reflect on their use of educational technology tools but also allow for the future integration of emerging technology products (Hilton, 2016).

Illustrated in Figure 2 is the SAMR model as created by Puentedura (2013). The figure and model illustrate the evolution of instruction as technology is used with greater depth. The figure demonstrates the levels in which instruction can be changed and enhanced from redefinition through substitution.

Crisp and Bonk (2018) proposed that there is a need for feedback that works in concert in order to identify effective learner-centered instruction. They argue that since feedback is central to evaluation within any discipline, the application of feedback must be applied to the effectiveness of educational technology tools.



Note. (Puentedura, 2013). The SAMR Model illustrates the evolution of an assignment when enhanced or transformed through the use of educational technology.

Figure 2. SAMR Model.

Definition of Key Terms

Blended – Course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has a reduced number of face-to-face meetings (Delgado et al., 2015).

Cloud Computing Services – Provide on-demand network access to shared computing resources that require minimal management effort or service provider interaction (Pierce & Cleary, 2016).

District Content Specialists – The elementary and middle school content specialists represent content specific specialists which provide leadership specific to a content area to school administrators, instructional coaches, and staff members for the purpose of complete implementation of the Franklin County Instructional program.

Educational Technology – Computer-assisted instruction.

Flipped Learning is a pedagogical approach in which classroom-based learning is inverted, whereby students are introduced to the learning material before class, with classroom time used to deepen understanding through discussion with peers and problem-solving activities (Delgado et al., 2015).

Instructional Coach – The instructional coach will provide leadership and expertise as an instructional coach to building-level administrators, and staff members for the purpose of complete implementation of the Franklin County Instructional program.

Instructional Technology – Below, listed by date, are definitions for instructional technology over time. The definition has evolved over time in response to the evolution of technology within classroom instruction (Kurt, 2017).

- *1963:* Audiovisual communications is the branch of educational theory and practice concerned with the design and use of messages which control the learning process. It undertakes: (a) the study of the unique and relative strengths and weaknesses of both pictorial and nonrepresentational messages which may be employed in the learning process for any reason; and (b) the structuring and systematizing of messages by men and instruments in an educational environment. These undertakings include planning, production, selection, management, and utilization of both components and entire instructional systems. Its practical goal is the efficient utilization of every method and medium of communication which can contribute to the development of the learners' full potential – Association for Educational Communications and Technology (AECT).
- *1970:* Instructional technology … is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication and employing a combination of human and non- human resources to bring about more effective instruction – President's Commission on Instructional Technology (PCIT) Instructional Technology is the Development (Research, Design, Production, Evaluation, Support-Supply, Utilization) of Instructional Systems Components (Messages, Men, Materials, Devices, Techniques, Settings) and the Management of that development Organization, Personnel) in a systematic manner with the goal of solving educational problems.
- *1982:* Instructional technology is concerned with improving the effectiveness and efficiency of learning in educational contexts, regardless of the nature or substance of

that learning. …Solutions to instructional problems might entail social as well as machine technologies.

- *1994:* Instructional Technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning [1] – Association for Educational Communications and Technology (AECT).
- *1995:* The systemic and systematic application of strategies and techniques derived from behavioral and physical sciences concepts and other knowledge to the solution of instructional problems.
- *2013:* Instructional technology includes practical techniques of instructional delivery that systematically aim for effective learning, whether or not they involve the use of media. It is a basic purpose of the field of instructional technology to promote and aid the application of these known and validated procedures in the design and delivery of instruction.

NDEA (National Defense Education Act) - implemented by President Dwight Eisenhower, and passed into law on September 2, 1958 (Lamb, 2012).

OER **(**Open Education Resources) – Online Educational Technology Resources which are free to the public.

Web-Facilitated – Course that uses web-based technology to facilitate what is essentially a face-to-face course (Delgado et al., 2015).

Assumptions

There were a variety of assumptions that drove this study and work. In its simplest form, the general assumption being asserted was that the lack of a framework to review and evaluate web-based educational technology product resources was leading to the removal of proven

classroom teaching practices for the promised success of each new digital learning tool that enters the marketplace.

Broken down, the assumptions that led to this work can be listed in three categories: First, the assumption that a confused and crowded market of educational technology resources is leading to confusion about quality and effectiveness. Second, the assumption that a significant amount of money could be saved or repurposed with the reduction of resources that provide overlapping services and abilities. Third, by properly evaluating available resources, school systems could purchase and advise schools to provide only the best instructional tools available. These three basic assumptions led to critical conversations, development of a task force, and the collection of baseline data on digital instruction tools being used within instruction. Once collected, the usage data led to a final assumption which made this study necessary and possible. Data of usage revealed that in a district of 16 schools and just over 8,100 students, approximately 700 different digital products were being used each month during classroom instruction. This data supported the initial assumption and drove a final one, which was that district achievement could be positively impacted if it could provide a framework for establishing the use of only the best digital learning tools and were to purchase and advise schools accordingly.

Scope and Delimitations

The scope of work related to this study took place in a north-central North Carolina school district called Franklin County Schools; FCS serves approximately 8,100 students and has a total of sixteen schools: eight elementary, four middle, and four high schools. The demographics of the school district are 30% African American, 46% Caucasian, 20% Hispanic, 3% Two or More Races, and 1% Other. As a district, the percentage of economically disadvantaged students is 57%. For this project, a review of all K-8 schools and, specifically,

their use of web-based digital tools were collected and evaluated. The four middle schools in this study are located in different communities within the school district. All 12 of these K-8 schools are Title I eligible and currently receive Title I financial support. The financial Title I support received by these schools ranged from $61,000 in the smallest elementary school to over $140,000 in the largest middle school in 2018. These financial resources are to be used to address areas of need as determined by a needs assessment developed at each individual school. Among the acceptable areas these funds can be used is educational technology resources. Class sizes in FCS remain under 20:1 and compliant with state law in K-3 while maintaining a cap of 25:1 from 4th - 8th grades. FCS had a 1-year teacher turnover rate of 24% for the period of March 2017 - March 2018. Through district exit survey data collected from faculty departures, the district is primarily losing teachers to higher salaries found in local charter and Wake County schools, which border Franklin County to the southwest.

In North Carolina, school academic performance is measured and communicated to parents, educators, state leaders, and researchers. School performance, as required by G.S. §115C-83.15, have been reported since 2013-14. School Performance Grades in North Carolina are based on student achievement (80%) and growth (20%). Overall district performance in FCS placed the district consistently within the middle of over 100 total school districts in performance and continues to outpace the results of most surrounding school districts in the region. According to the most recently published data by the North Carolina Department of Public Instruction (NCDPI), FCS falls just below state averages in performance, but outperforms neighboring districts such as Johnston, Edgecombe, Granville, Vance, and Nash. North Carolina's school report cards provide school and district level data to parents, educators, state leaders, and researchers. Data provided include student performance, academic growth, and schools and

student characteristics. School report cards are designed to meet the needs of all users as published by the state of North Carolina (NC School Report Cards, n.d.).

Figure 3 depicts FCS's academic performance. Highlighted in this NCDPI performance graphic are school performance grades by percentage and school growth statuses by percentage. Reported School Performance Grades range from an A - F for each school. The pictured graphic illustrates a total of two D schools, nine C schools, four B schools, and one A school in 2016-17. Additionally, the graphic illustrates the number of FCS meeting growth at eight, not meeting growth at three, and exceeding growth at five during the 2016-17 school year.

Growth data indicate a significant increase in student achievement over the past four years. FCS's district rank has risen from 87th out of 115 four years ago to 60th out of 115 in 2017-18. In twelve K-8 schools, FCS is home to 4 B graded schools, 7 C graded schools, and 1 D graded middle school.

Instructionally, a collection of web-based digital resource programs was just completed in November of 2018. The data collection revealed the purchase and use of over four dozen programs in use across the 12 K-8 schools, carrying an annual cost of slightly under $400,000.00 to the district.

Limitations

Limitations embedded in this study are in the area of value and quality metrics. Being able to effectively develop a metric by which numerous digital learning resources are measured for their quality and value is a challenging undertaking. This metric, however, is also one that has the potential to significantly alter data outcomes and the overall success of strengthening core instructional practices throughout FCS. In addition, individual curriculum bias held by school administrators and/or by the district instructional coaches could have a significant impact

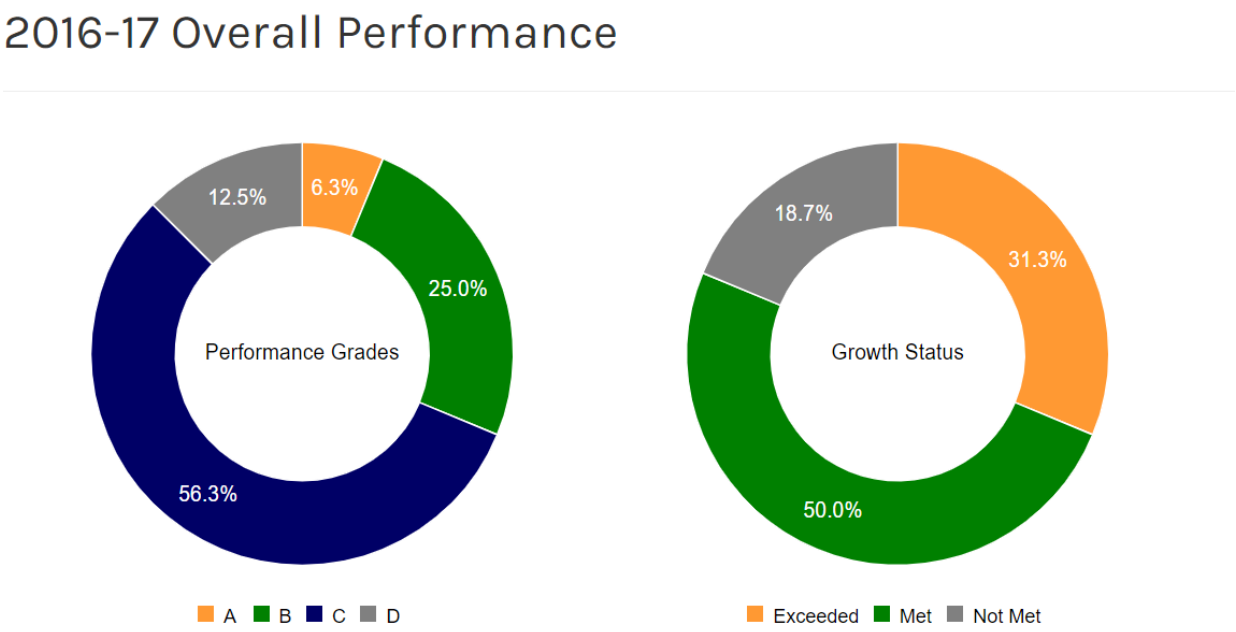


Figure 3. Franklin County Schools' overall academic performance from 2016-2017.

on the study's outcomes. One additional limitation is the potential strength of the product resources scoring rubric. The ability for the rubric to qualify a high-quality product resource and a low-quality product resource is a critical component of this study.

Significance of the Study

The significance of this study is to make progress in the use of educational technology product resources from random and unqualified to that of organized and purposeful. Currently, schools in Franklin County use open and subscription-based digital learning tools with little thought of value, quality, or effectiveness. Based on observation and conversation, this scholarly practitioner concludes that schools currently appear to purchase or utilize tools and resources they stumble across, can afford, or even simply hear an endorsement of from someone they respect. The purpose and ultimately, the significance of this study is to help the district purchase educational technology more effectively and level the playing field for all K-8 schools in Franklin County Schools through the evaluation of currently used products, the provision of a library of approved quality products, and an established framework for the adoption of new and inventive product resources in years to come.

In addition to a framework development, there exists the need to determine the resources' academic benefits and to weigh them with the financial burden of the product. Educational technology product resources that grow more comprehensive often have significantly matching increases in costs. This study was designed to help offer FCS data points, which then provided district leaders the ability to make informed decisions. District leaders were informed as to which products fit best with instruction goals, expectations, and provided better value as a product or platform. Evaluating product resource quality through review by instructional staff was also a form of significant impact of this study. Once provided to district instructional staff, at

determined points of product use, teachers and other instructional staff were given the opportunity to review products using a district-approved rubric. Instructional staff applied the rubric to both OERs and subscription-based product resources during the product review in each Title I school. Results from these reviews were forward facing for instructional staff at the district level and within each participating school with important information regarding the product, its usability, alignment to standards, and instructional value to core instruction time.

An additional significant impact of this study was to determine if all schools within the district were being offered equal access to available web-tool resources. This study sought to determine educational technology resource usage throughout the district and to ensure resource balance and accessibility to vetted quality product resources at each school within the district.

Summary

When students sit down in a classroom today, they are prepared to learn skills and content delivered in an engaging and individualized manner. During the past few decades, educational technology has evolved to a point where it has become a significant tool for teaching skills and delivering content. In addition, educational technology has become a multi-billion-dollar industry which has given rise to companies that continually develop products, platforms, and resources that have promised to simplify instruction, improve student outcomes, and engage learners in ways traditional instruction techniques cannot (Crisp & Bonk, 2018). Educational technology as a pedagogy is a modern form of teaching that is art, science, and delivery system. Contemporary frameworks such as TPACK and SAMR seek to define the process by which education technologies can be integrated successfully within the instructional environment (Koehler, 2012).

This evolution of technology integration has led to district and school misuse of educational technology resources within classrooms. Districts and schools have, without a proper framework of evaluation, added digital learning platforms, web-based technology tools, and other technology resources. Too often, school districts have added tools and resources without regard given to cost, value, resource overlap, equitable delivery, or even consideration for instructional time. Specifically, consideration for pedagogical philosophy and goals for instructional time have gone unconsidered. The goal of this dissertation was to establish a framework for how districts and schools could review resources currently in use as well as those they will identify in the future. This newly created framework allowed for the review of product quality, resource overlap, recommendations for use, and cost analysis and plan for equitable distribution or use. The purpose of this study was to develop a functional framework that can assist districts in determining the instructional value associated with an educational technology product. The functional framework will give a school district the tools to determine, ultimately, if the paid subscription, or OER, is warranted for purchase or classroom instruction time. In addition, this framework provided districts with the ability to create and maintain a digital library of resources to allow, recommend, or deny the use of in classrooms. Furthermore, the developed framework will allow teachers, administrators, and curriculum leaders a process by which newly marketed products can be evaluated and measured as they enter the marketplace. At the core of this framework is a key question which drives much of this mixed-method study. What is the most significant criteria in measuring the quality of educational technology resources? The answer lies at the heart of the study: Determining whether their quality is significant enough to use valuable instruction time.

CHAPTER 2: REVIEW OF RELATED LITERATURE

The previous chapter discussed the need to create a framework for reviewing and evaluating digital web-based instructional tools. This chapter includes the framing and review of existing literature surrounding digital web-based instructional tools and their effectiveness as a portion of instruction time. This section of the greater work establishes literature perspectives that inform this study, including existing frameworks developed for the purpose of evaluating digital content.

Quality Instruction

Hattie (2008) refers to a measure of impact on instruction as a barometer. He also says we should be asking ourselves "what works best," not simply, "what works" (Hattie, 2008, p. 18). Hattie (2008) points to research synthesis indicating that everything works to a degree. The key, however, is being able to identify how much something works compared with something else. In Tables 1 and 2, Hattie (2008) illustrates the individual effect size from areas of major contributions to learning. The two areas he quantifies as having the greatest effect are teacher, and curricula.

When teachers use educational technology most effectively, they are providing students multiple opportunities such as problem solving, drill and practice, tutorials, programming, and word processing (Hattie, 2008). Hattie (2008) also found that educational technology devices are more effective when the student controls the learning, not the classroom teacher. Additionally, Hattie (2008) highlights that web-based instruction commonly neglects instruction fundamentals such as timely feedback and interaction. The average effect of web-based instruction was lower than other forms of computer-based instruction with an effect size of (d = 0.24) (Hattie, 2008).

Table 1

Average Effects for Each of the Minor Contributions to Learn

Contribution	No. of meta-analyses	No. of studies	People	No. of effects	*d*
Student	139	11 101	7 513 406	38 287	0.40
Home	36	2 211	11 672 658	5 182	0.31
School	101	4 150	4 416 898	13 348	0.23
Teacher	31	2 225	402 325	5 559	0.49
Curricula	144	7 102	6 899 428	29 220	0.45
Teaching	365	25 860	52 128 719	55 143	0.42
Total	816	52 649	83 033 433	146 626	-
Average	-	-	-	-	0.40

Note. (Hattie, 2008).

Table 2

Summary of Major Uses of Computers in Classrooms

Method	No. metas	No. effect sizes	*d*
Tutorials	8	78	0.71
Programming	2	43	0.50
Word processing	2	47	0.42
Drill & practice	9	506	0.34
Simulations	5	94	0.34
Problem solving	7	197	0.26

Note. (Hattie, 2008). The table highlights the effect sizes for users of computers in classrooms.

Hattie lists in Table 1 the factors with the greatest effect size related to learning. In Table 2, Hattie lists the most common uses for computers in classrooms and the effect size of each.

Ten years later, Pogrow (2018) noted that effect size as the newest form of criterion to characterize the value of research results. He also warned researchers about how to interpret effect size. Pogrow (2018) pointed to research evidence which only relied on relative performance between groups as a reason to question results. The effect size criterion most widely accepted for interpreting results is .2 equaling a small effect size, .5 equaling a medium effect size, and .8 equaling a large effect size (Pogrow, 2018). Pogrow (2018) provided context to the effect size measures by applying descriptive language. Effect sizes below .2 listed as "difficult to detect", effect sizes between .2 and .5 as "visible to the naked eye," and between .5 and .8 as "grossly perceivable" (p.70). A widespread problem in education is relying too heavily on evidence based on small effect size to guide practice (Pogrow, 2018).

Evolution of Technology in Schools

Teachers have been using technology as a component of classroom instruction since the 1920s as radio and film were introduced to K-12 classrooms (Delgado et al., 2015). However, it was not until the National Defense Education Act (NDEA) of 1958, when funds were first allocated for research in the area of educational technology (Lamb, 2012). Lamb (2012) pointed to the creation of Title IV as leading to research and experimentation how best to use radio, television, and other related media within education. From the 1950s through 1970s educational technology shifted from audiovisual to systematic instructional design. Educational technology was focused more on the process of instructional problems and solutions (Alenezi, 2017). It took the passing of sixty years, however, for public schools to begin using computers to assist individual students with learning (Cuban, 1993; Delgado et al., 2015). Early instruction using

technology in the classroom began slowly and primarily with low-level skills and memorization as the focus (Delgado et al., 2015; Flick & Bell, 2000). Delgado et al. (2015) added that it was during this period that home access brought about a shift in how, when, and where learning could occur. Technology allowed for individuals to learn at home and meant learning no longer had to be face-to-face.

In recent years, the one area of advancement in K-12 educational technology has been in Cloud Computing Services (Pierce & Cleary, 2016). Pierce and Cleary (2016) noted that through cloud computing, K-12 systems are better equipped to advance their educational technology infrastructure with modest financial investment. They listed additional benefits to K-12 systems using cloud computing services as having access to expert technical support, increased application flexibility, and the means to change services with little capital investment (Pierce & Cleary, 2016). This new era of educational technology provides the learner with access to learning materials anytime, anyplace, and on any device (Pierce & Cleary, 2016).

During the past fifteen years, the number of educational technology resource repositories online has grown exponentially (Di Blas et al., 2014). Di Blas et al. (2014) point to features of these repositories including those requiring no fees (OER's), those requiring fees, those which include all grade level content, and those taking a content-centric approach. This most recent stage of educational technology evolution is creating an organizational approach and integrating through teacher as well as student and family application (Di Blas et al., 2014). The organizational approach also indicates an "emphasis is first and foremost on what the educational resource is about (e.g. 'volcanoes'), next on what subject matter it is related to (e.g. 'science'), and finally on what school grade it could be applied to (e.g. 'third grade')" (Di Blas et al., 2014, p. 2).

Instructional Technology Evolution

During the past six decades, Instructional Technology (IT) has been defined many ways. Kurt (2017) points to seven different definitions alone. From the initial 1963 definition as audiovisual communications, this branch of education has developed to the 2013 definition as, the inclusion of techniques of instructional delivery that achieve learning, whether or not they involve the use of media. It is the focus of IT to assist the application of quality instruction with through instruction delivery (Kurt, 2017).

The Politics of Educational Technology

Watters (2014) argued that the educational technology industry benefited from a nation-wide movement to simplify curriculum standards. Specifically, the recent and significant gain in the educational technology industry has been the introduction and growth of the Common Core State Standards (CCSS) throughout much of the United States (Watters, 2014). Watters (2014) pointed to the educational technology industry as its ability to simplify and standardize its products across the U.S. Market. However, for more than thirty years, the rationale for buying education tools was related to efficiency, engagement, and work-force preparation (Watters, 2014). Watters (2014) explained that with the advent of a more standardized curriculum used by the majority of states, a shift in the educational technology industry's priorities has become more about areas such as software, professional development for teachers, and classroom time for students to use these new tools. The latter can be best achieved through the industry narrative that products are standards and curriculum aligned (Watters, 2014).

Conceptual Framework

Conceptually, the change in instructional emphasis over time as identified by Shulman (1986) is a shift away from content focus, to that of pedagogical process. He offered a side-by-

side comparison of the instructional shift for classroom teachers at the time of hire by the state of California over the past 150 years. Shulman (1986) identified, side-by-side, the list of teacher knowledge areas emphasized by the state of California from 1875 with those of 1985 (see Table 3). Shulman (1986) highlighted that "As we compare these categories (which are quite similar to those emerging in other states) to those of 1875, the contrast is striking. Where did the subject matter go? What happened to the content?" (Shulman, 1986, p. 5). As far back as the 1980s, Shulman identified a shift in emphasis away from content and subject matter and toward the knowledge of teaching procedures and practices (Shulman, 1986).

Since the rapid infusion of traditional classroom instruction with educational technology, teacher preparation has similarly evolved from an emphasis on technological knowledge, to a focus of the critical relationship between technology, pedagogy, and content (Drummond & Sweeney, 2017). Drummond and Sweeney (2017) also point to the important evolution of Shulman's (1986) conception of pedagogical content knowledge (PCK) which now includes the integration of the technology component. Drummond and Sweeney (2017) assert that recent research indicates a shift in teacher education programs, a shift which now includes more than basic exposure to media and technology. The shift highlighted by Drummond and Sweeney (2017) point to a clear need to support preservice teachers as they learn to teach their content through the use of technology while also enhancing the students' ability to learn nascent technologies.

Ten years prior to Drummond, Mishra and Koehler (2006) found that,

> The advent of digital technology has dramatically changed routines and practices in most arenas of human work. Advocates of technology in education often envision similar

Table 3

Teacher Conceptual Knowledge

1875	1985
1. Written Arithmetic	1. Organization in preparing and presenting instructional plans
2. Mental Arithmetic	2. Evaluation
3. Written Grammar	3. Recognition of individual differences
4. Oral Grammar	4. Cultural awareness
5. Geography	5. Understanding youth
6. History of the United States	6. Management
7. Theory and Practice of Teaching	7. Educational policies and procedures
8. Algebra	
9. Physiology	
10. Natural Philosophy (Physics)	
11. Constitution of the United States and California	
12. School Law of California	
13. Penmanship	
14. Natural History (Biology)	
15. Composition	
16. Reading	
17. Orthography	
18. Defining (Word Analysis and Vocabulary)	
19. Vocal Music	
20. Industrial Drawing	

Note. (Shulman, 1986). The table highlights the conceptual knowledge of teachers from 1875 and 1985.

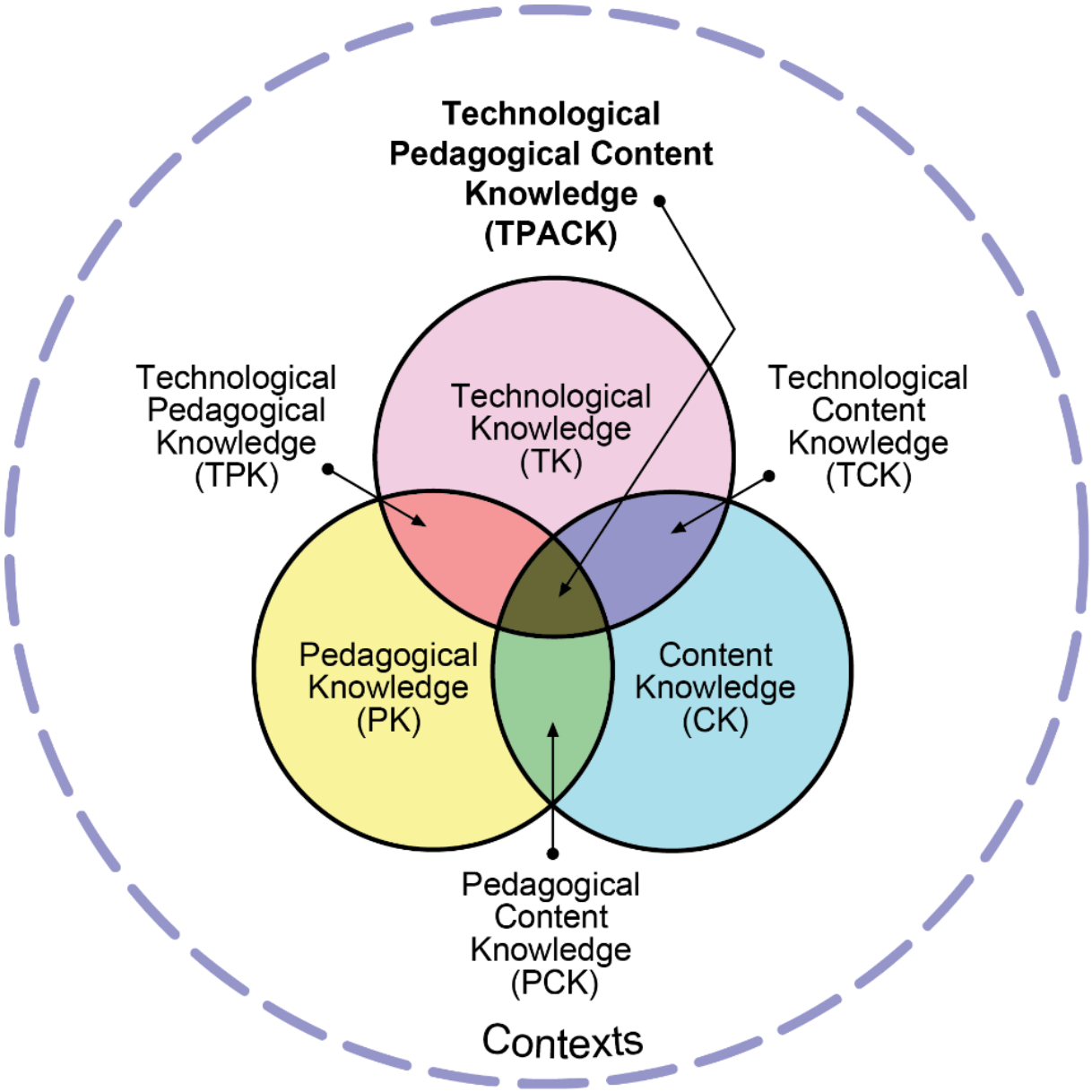
> dramatic changes in the process of teaching and learning. It has become clear, however, that in education, the reality has lagged far behind the vision. Why? (p. 2)

Mishra and Koehler (2006) explained that at its core, the TPACK framework must acknowledge that teaching is a highly complex activity. Just as Shulman (1986) had some 20 years earlier, Mishra and Koehler (2006) confirmed in the 21st century that teacher preparation programs have continued to emphasize teacher knowledge only in the areas of content and pedagogy.

Di Blas et al. (2014) addressed the emergence of technology as "A portal of educational resources: providing evidence for matching pedagogy with technology," a central issue impacting the continued integration of educational technology; which places emphasis first on the relationship between technology and pedagogy (p. 1). Emphasized by Di Blas et al. (2014) the TPACK model and framework advocates that educators consider how Pedagogy, Technology, and Content Knowledge intersect in order to better train pre-service administrators (see Figure 4).

Koehler (2012) described TPACK as having at its heart three forms of knowledge: Content, Pedagogy, and Technology. Koehler defined TPACK as:

> The TPACK approach goes beyond seeing these three knowledge bases in isolation. The TPACK framework goes further by emphasizing the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge. (p. 2)



Note. (Koehler, 2012). This model illustrates the convergence of Technology, Pedagogy, and Content (TPS).

Figure 4. TPACK Model.

Koehler (2012) furthered to explain that the framework is the understanding that these three forms of knowledge must not be seen only in isolation. In addition, Di Blas et al. (2014) saw TPACK as an extension of Pedagogical Content Knowledge (PCK) and the work of Cox and Graham (2009). The alignment of these content areas is interpreted as an appropriate use technology in the classroom (Di Blas et al., 2014).

Koehler and Mishra (2009) take this idea further when adding that the basis of technology use in the classroom should be centered on the alignment of these same domains. Additionally, he declares TPACK as the foundation of effective instruction using technology (Koehler & Mishra, 2009).

Technology Integration

In the early days of the twenty-first century, Paige (2002) suggested that next step beyond integration was the measurement of effectiveness. Paige (2002) argued that it was not enough to place devices in classrooms; they must be used to integrate with rigorous curriculum standards.

Learning is a developmental process, an interaction with a rich set of stimuli. Learning generates new knowledge that furthers a framework or understanding. Thus, the integration of educational technology would seemingly be an ideal pairing (Burns, 2013). Yet Burns (2013) found that the convergence of technology and learning to be confounding. Burns (2013) wrote that through a variety of uses, data points to mixed outcomes. For example, as measured by national and international examinations, students who were exposed to computer tutorials in math, natural science, or social science scored significantly higher than those who experienced traditional instruction (Burns, 2013). Also noted by Burns (2013) were the adverse results from a study of online versus face-to-face economics courses. Students in the face-to-face courses outperformed those taking online courses by nearly 15 points (Burns, 2013). Paige (2002) noted

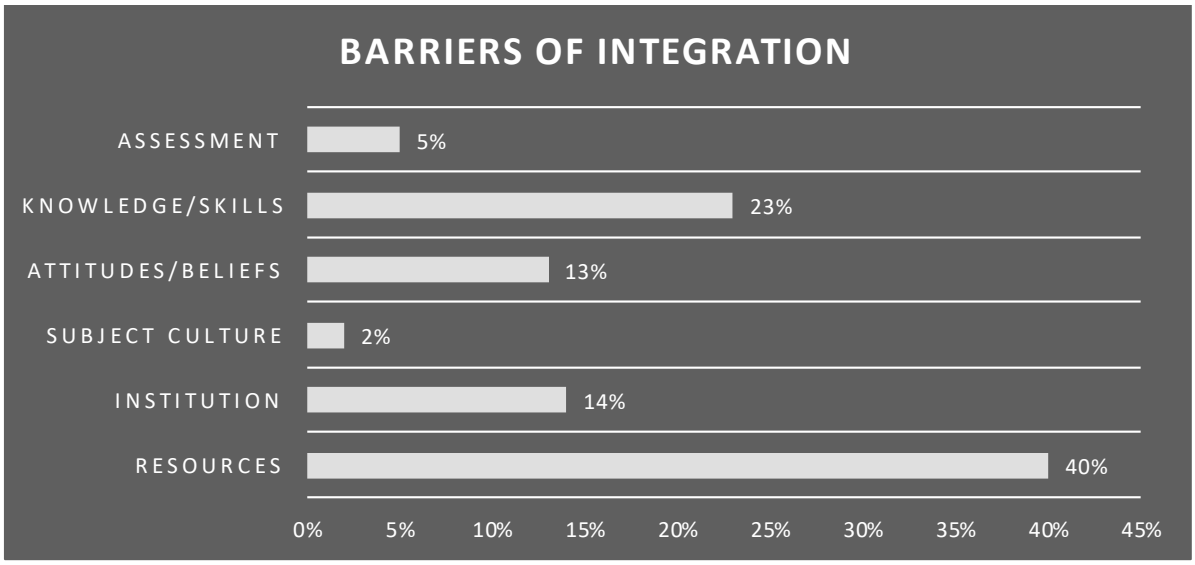
that in his 2002 study, 71% of teachers reported a need for strong instructional software. Years later, Delgado et al. (2015) found an extremely diverse number of technology uses regarding technology.

As instruction has evolved, so has the instructional use of technology. Technology has been integrated into classrooms to enhance the pedagogy of the environment and elevate the learning experience (Delgado et al., 2015). Delgado et al. (2015) also found that there is a significant and varied set of environments that can deliver educational content. Listed by Delgado et al. (2015) are a series of environments which, depending on school or even district resources, are commonly used. Examples of how technology can be integrated within instruction include the following: Bring Your Own Device (BYOD), Blended Learning, Flipped Learning, Flipped Classrooms, and Online Learning (Delgado et al., 2015). In Figure 5, Hew and Brush (2007) list the six main categories that made technology integration difficult.

Obstacles to Integration

Alenezi (2017) described educational technology as something that can be viewed as "the hardware, software, 'thinkware,' of learning." Instructionally, success of educational technology integration frequently depends upon how the teacher chooses to utilize it within instruction (p. 1). The classroom teacher may be familiar with technology, however, remain ill-prepared to integrate the technology in a way that enhances the instruction (Alenezi, 2017).

Pierce and Cleary (2016) list challenges to educational technology as being driven by K-12 school district finances. Their research used K-12 budget statistics which indicate funding constraints as an impediment to the addition of more educational technology resources (Pierce & Cleary, 2016). According to Pierce and Cleary (2016), the average K-12 district Instructional Technology budget was only 2.9% of total revenues, approximately 2% lower than the



Note. (Hew & Brush, 2007).

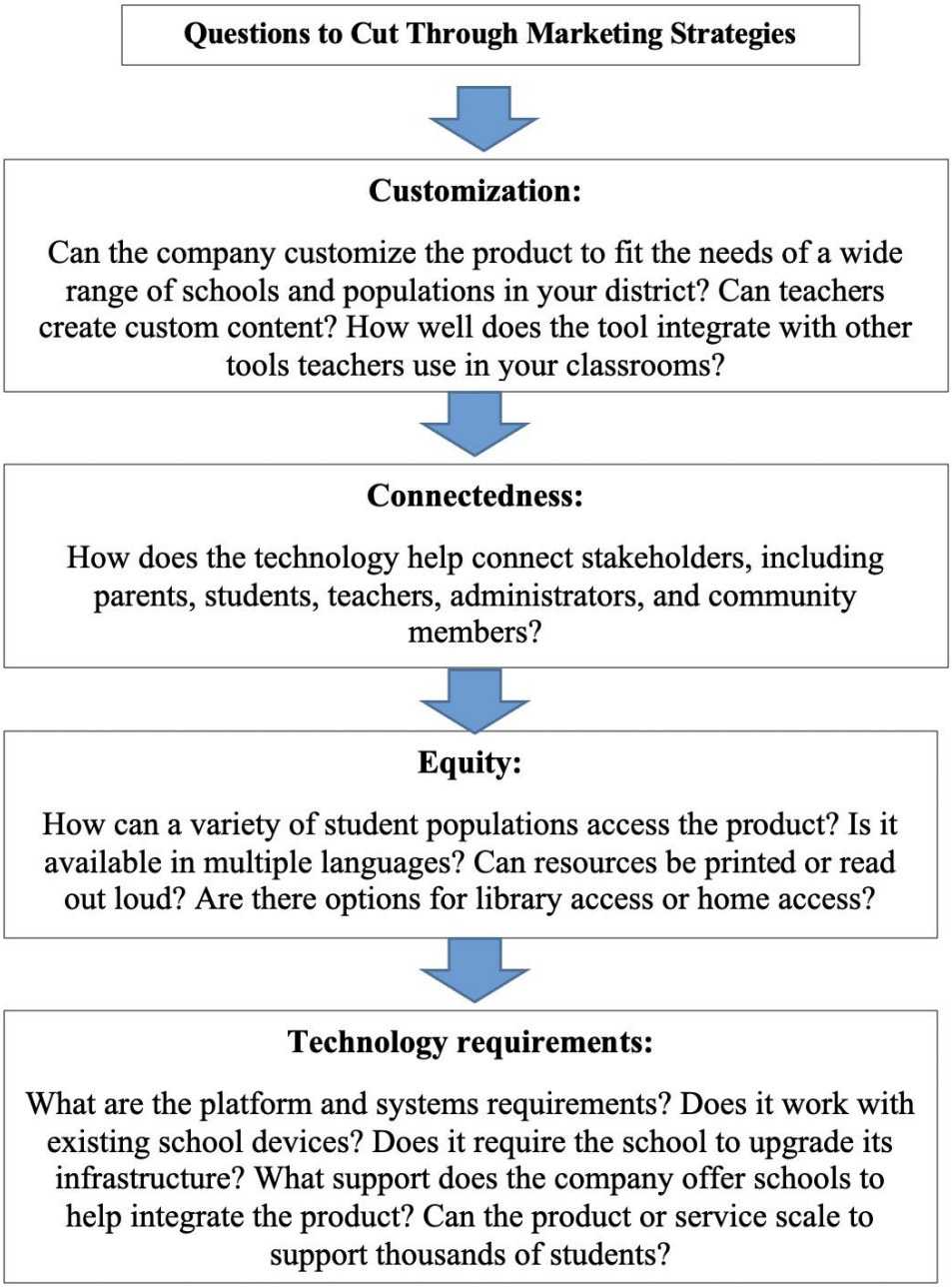
Figure 5. Barriers of integration.

investment of higher education and post-secondary institutions. Pierce and Cleary (2016) go beyond basic finances to point out that additionally, the ability to attract talent to implement and maintain newer technologies is challenging for many K-12 school districts. Pierce and Cleary (2016) also note that another area of concern, the ability of the United States to provide affordable high-speed internet as compared with other nations around the globe. A lack of proactive policies in this context could potentially limit competitiveness (Pierce & Cleary, 2016).

Identification of Quality Educational Technology Products

The majority of educators responded that in order to select an educational technology product for school or student use, first, they must identify the need for a product (Lindl, 2017). He sarcastically pointed out the good news of there being a product for every need and the bad news there are also hundreds to choose from. Lindl (2017) highlighted the Omaha, NE Public School District for developing a process by which educational technology products are approved or denied. This decreased the wait time on a decision by months. In Figure 6, Lindl (2017) provided questions that should be asked prior to making any educational technology product purchasing decision.

Lindl (2017) further discussed how products should be filtered. He pointed to the process used in the Charlotte-Mecklenburg (NC) School District whereby it is first determined whether a product is interactive or adaptive. Lindl (2017) continued by listing further filtering steps to measure a product as engagement, depth of learning, and accessibility for students and educators. In conclusion though, he also advised that schools need to implement methodically, pilot products, collaborate with vendors in order to achieve results both parties want. Finally, Lindl (2017) stated that there is no substitute for quality instruction.



Note. The figure lists questions which ask prior to educational technology product purchase.

Figure 6. Questions to cut through marketing strategies (Lindl, 2017).

Effectiveness of Educational Technology

Delgado et al. (2015) noted research on the effectiveness of technology use in classrooms is growing. He highlighted the fact that opposing views of the technology impact on achievement exist, but that there is no disputing the fact that students more and more have the opportunity to access technology and learning material beyond their school buildings. Delgado et al. (2015) answered three important questions concerning the effectiveness of K-12 technology use. First, how are schools using the technology they have invested in? Second, how are schools and districts using investments to support the integration of educational technology resources, and third, put simply, how effective is the use of educational technology? (Delgado et al., 2015).

Regarding the first question, Delgado et al.'s (2015) study found that most investing in educational technology are using that investment to deliver content in three primary ways. Delgado et al. (2015) reported that depending on the needs of the students and resources of a specific school, content was either web-facilitated, blended, or delivered completely online. In response to the second question, Delgado et al. (2015) found that in general, the U.S. government continues to increase investment in educational technology in K-12 education nationally. Delgado et al. (2015) noted that the U.S. government increased overall K-12 education funding by $93 billion from 2010 to 2013. During the same period, Delgado et al. (2015) stated that the educational technology investment also increased from .5% to .7% of the total investment. This rise in educational technology investment has led to a dramatic increase in device access and in turn, a significant increase in for-profit educational technology companies. These companies have reported a combined revenue of $2.4 billion in 2013, which is an increase of more than 6.4% in revenues since 2010. In response to the third question, Delgado et al. (2015) observed only modest effect-size impact from the increases in educational technology use. Specifically, in

the findings, only Computer-Based Instruction (CBI) demonstrated more than a +.2 effect-size change (Delgado et al., 2015).

From the Hew and Brush (2007) graph, Delgado et al. (2015) suggest that having a large volume of tools available is significant, but limitations remain. Hew and Brush (2007) highlight several important factors to improve effectiveness of educational technology in classrooms. One important strategy addressed by Hew and Brush (2007) that will improve effectiveness of educational technology tools within instruction was to appropriately pace integration. Hew and Brush (2007) pointed out that integrating resources in one or two subject areas at a time ensure access and adequacy of tools. Delgado et al. (2015) addressed the second question by noting the need for understanding as it applies to investment. Delgado et al. (2015) again pointed to the earlier work of Hew and Brush (2007) as they stated the critical role of investment in educational technology and the understanding of a school district that this investment goes far beyond the acquisition of classroom devices.

Finally, measurement of an individual tool's effectiveness is dependent on the identification of a quantifiable and distinct dimension of a construct (Crisp & Bonk, 2018). Crisp and Bonk (2018) proposed that there is a need for feedback that works in concert in order to identify effective learner-centered instruction. They argued that since feedback is central to evaluation within any discipline, therefore, the application of feedback must be applied to the effectiveness of educational technology tools. Due to its centrality, Crisp and Bonk (2018) also argued that feedback is potentially a better indicator of quality than other constructs. Crisp and Bonk (2018) listed the six dimensions of learner-centered feedback as namely, timeliness, frequency, distribution, source individualization, and content of the feedback. Applying these dimensions would arguably give a more comprehensive evaluation of an educational technology

resource and it effectiveness and add to traditional approaches of evaluation. Fallon and Forrest (2011) point to a comparison of classroom response systems with handheld response cards to help determine the benefits of digital resources over more traditional approaches. Educators in recent years made claims of wide-ranging benefits being derived from the use of digital classroom response systems. Response systems create anonymity, promote meta cognition, and increase engagement through a gaming approach to instruction and assessment. Additionally, Fallon and Forrest (2011) found that there were empirical reports of the enhancement of learning through the use of clickers. However, further investigation led Fallon and Forrest (2011) to the conclusion that traditional resources, such as handheld response cards produced similar student outcomes in assessment data. Specifically, Fallon and Forrest (2011) found from the comparison, digital response systems did not produce widespread improvements in assessment data, feelings of hope, or reduced anxiety as compared with more traditional approaches. Adding to this challenge, Cheung and Slavin (2013) stated the industry may not always communicate the complete story regarding educational technology products. According to Cheung and Slavin (2013), educational technology product developers use a strategy called cherry-picking as they demonstrate and promote product results.

A Learning Tool Option

In the twenty-first century, the proliferation of digital learning tools has increased exponentially. Learning tools of many types have emerged and become staples of instruction in schools throughout the United States (Crisp & Bonk, 2018). Learning options that include adaptive learning tools, augmented reality, open education resources, competency-based education, and learning analytics have become pervasive in classroom instruction. This

abundance of tools and learning tool options has caused a need for evaluation of these tools and their impact on student learning outcomes (Crisp & Bonk, 2018).

Technology Investment

In the first half of 2015, more than 2.5 billion dollars were invested in educational technology companies (Crisp & Bonk, 2018). The industry has been growing and shifting rapidly over the past couple of decades. These investments being made represent the development and expansion of education technologies in 118 countries during the first six months of 2015 (Crisp & Bonk, 2018). Crisp and Bonk (2018) highlighted the increases in recent educational technology investment by pointing out that from 2013 to 2015, the industry saw investment increases of 268%. Also drawing attention to the fact that the majority of those investments were made in educational technologies that were directly marketed to the learner-consumer.

One of the most significant changes in public education spending over the past two decades was the movement to increase access to technology. Delgado et al. (2015) noted that the reported ratio of students-to-devices had been reduced from 11:1 to 1.7:1. Throughout the United States overall spending on educational technology has not changed significantly over the past decade; however, there has been a significant increase in technology integration within classrooms. According to Delgado et al. (2015), over 97% of K-12 U.S. classrooms have at least one computer with 93% of those having internet access. A few years earlier, Schnellen and Keengwe (2012) pointed out that educational technology has forever changed the landscape of how students learn and access information. Schnellen and Keengwe (2012) clarified that the investment from K-12 schools in America goes beyond the 1:1 initiative to improve access. It also speaks to a change in how learning takes place in the classroom.

Motivation and Engagement

As the use of technology has become more common, students as early as elementary school are becoming digital natives and comfortable using educational technology within and outside the classroom (Gustad, 2014). This development is growing common in classrooms worldwide, not only in the United States. As a result, the effects of educational technology tools are impacting the learning of English Language Learners as well. Gustad (2014) noted that there is a correlation between increased motivation and improved reading outcomes. Scholarly practitioners have argued that there is a vast amount of recent research which supports the correlation between motivation and achievement, and that literacy learning is threatened with a lack of motivation among English Language Learners (Gustad, 2014). Gustad (2014) addressed motivation change of a print-bound text to that of a technology-based text and how it impacted literacy engagement. He noted in 2014 that motivated readers are engaged readers, and thus, is highly related to a student's growth in reading ability. He specifically identified the correlation of student reading with when that reading selection is connected to a stimulating activity (Gustad (2014).

In his study, Gustad (2014) began a project study whereby he implemented a Motivation to Read Profile (MRP) reading survey and provided an explanation and execution of podcast recordings. Survey data were intended to provide data insights into student reading attitudes prior to the project study. Gustad (2014) then had students create descriptive fictional stories, provide peer and self-editing using a fluency rubric that ultimately concluded with a final interview with the instructor. Results from the project indicated the podcast project had an apparent impact on the reading motivations of the students included in the study (Gustad, 2014). Gustad (2014)

identified a clear motivation increase based on survey results, student interviews, and observed behaviors.

Faculty-Perceived Usefulness

According to Salas (2016), the Technology Acceptance Model (TAM) perceived usefulness and ease of use are presumed to influence a teacher's attitude toward new technologies. The TAM model is designed to help determine the attitudes toward a particular technology or resource before efforts are made to adopt or introduce the product in a learning environment. Throughout disciplines, sustainability, acceptance, and usability are being examined to identify instructor attitudes towards the technology or digital resource (Salas, 2016). Salas (2016) went further as she identified a Birch and Burnett (2009) article which also emphasized the importance of attitude toward a technology and the decision to adopt it. Salas (2016) noted that in addition to usefulness, ease of use and purposefulness are equally important to examine and consider.

Pierce and Cleary (2016) proposed that the successful adoption of any new educational technology resource relies on the willingness of teachers to incorporate the new instruction tool into their lessons. According to Pierce and Cleary (2016), teachers already support increased use of educational technology in their classrooms. In a recent national survey, more than 75% of teachers polled "asked for" or "wished they could ask for" additional technology access in their classroom (Pierce & Cleary, 2016, p. 872).

Web Tool Types

Alaswad and Nadolny (2015) found Game-Based Learning as an effective means to motivate and engage students toward individual learning goals. Alaswad and Nadolny (2015) continued by presenting the idea that when paired, instructional design and game-based learning

mirror in structure. Alaswad and Nadolny (2015) further elaborated by providing a chart to illustrate this idea (see Figure 7).

Cloud-based products provide an extremely cost-effective and flexible model of delivery as educational technology resources. These services allow customization and the ability to scale implementation to suit k-12 education needs (Pierce & Cleary, 2016).

Podcasting has become another engaging means of content delivery and content media creation. Gustad (2014) noted that the student creation of a podcast gives students ownership of their learning and are then creations that provide the student with an actual audience.

Current analysis found that changes to educational technology integration remain necessary moving forward (Pierce & Cleary, 2016). Pierce and Cleary (2016) noted that the United States government needs to address licensing and purchasing agreements to ensure K-12 systems will maintain affordable access to software applications and are provided protections from vendor lock-in. Pierce and Cleary (2016) measured the relationship between (1) Implementation of the Educational Technology value change, (2) TCO of Technology management and end-user transaction costs, and (3) Productivity: Value of student outcomes and system reforms (see Figure 8).

As Means and Olson (1994) noted almost 25 years ago, educational technology struggled in its early stages of development but possessed the ability to exert a stronger impact on learning in K-12 schools. In their study during the early 1990s, Means and Olson (1994) identified five features of instruction that were important to improved student outcomes through technology integration. The five features included: (1) “An authentic, challenging task,” (2) “All students practicing advanced skills”, (3) “Work completed in heterogeneous, collaborative groups,” (4) “The teacher is a coach”, and (5) “Work occurs over an extended block of time.” Highlighted as

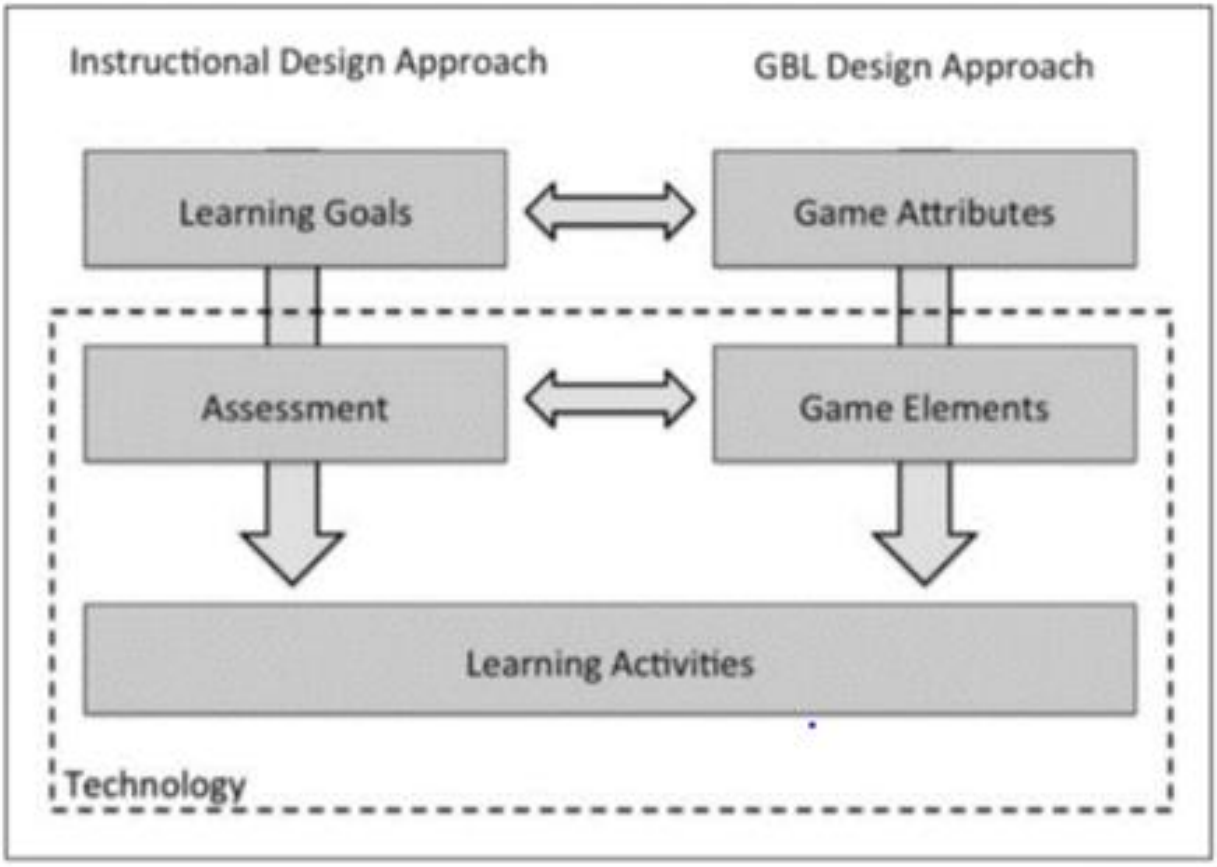
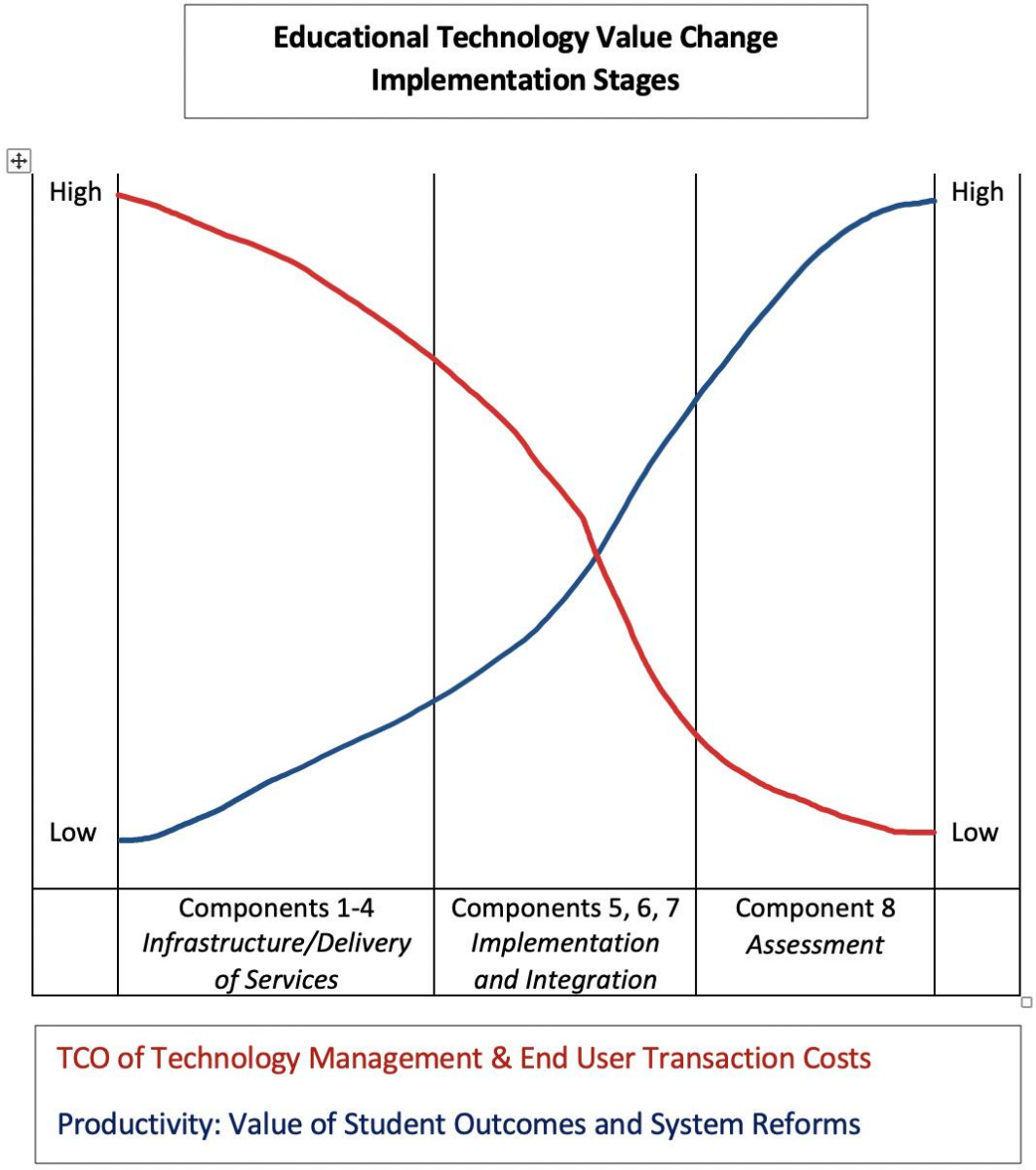


Figure 7. Game-based learning design process.



Note. The relationship between: (1) Implementation of the Educational Technology value change, (2) TCO of Technology management and end-user transaction costs, and (3) Productivity: Value of student outcomes and system reforms.

Figure 8. Educational Technology Value Change Implementation Stages.

an important component for implementation of these five features is the importance of a skilled classroom teacher (Means & Olson, 1994, p. 17).

Summary

As the use of educational technology has progressed through the past century, so has the complexity of its integration, impact on pedagogy, financial investments, and focus on student outcomes. Also challenging the evolution of educational technology are the classroom teachers themselves. Both in their limited preparation for the ever-increasing role of educational technology in the classroom to the ideological shift required to more fully embrace these new tools to enhance their instructional practices. What began as a few simple instructional tools has become a significant shift in pedagogical approach. It has led to the development of infrastructure to support the increases in need for access to both connectivity and learning tools. In recent years the focus has evolved beyond basic access and focused more on effectiveness and student outcomes as a result of instructional shifts in the classroom. The current challenge has become more about the evaluation of educational technology products to determine their value.

In an evolving market of for-profit companies all creating competing products within the marketplace, schools are left to make determinations of quality with little more than a sales pitch to guide them. The work ahead must now focus on determining which educational technology tools warrant instructional time and how they should properly be integrated to me targeted student needs.

The next chapter will explore the study design and methods used to help explore the questions guiding this action research study.

CHAPTER 3: METHODOLOGY

The purpose of this mixed-method action research study was to identify educational technology product resources and develop a framework for measuring their benefit and value in an effort to organize educational technology resources equitably across the district. Once the work was completed, teachers were provided a framework by which they can request the acquisition of new digital resources as well as have access to a library of previously vetted and recommended resources. Once the vetted resource library was created, teachers were able to draw from and use web-based products within their classroom instruction to address student learning needs. Additionally, schools also had access to a library of product resources which were provided with clear measure of value and benefit. Schools were then able to quickly identify key resources to address instructional weaknesses and student needs of micro and macro levels.

The following are the questions the scholarly practitioner answered during this study:

1. How did the implementation of a rubric to evaluate education technology product resources influence perception of current product quality throughout the district?
2. What are the most significant criteria to include in a rubric for evaluating the quality of educational technology?
3. What could be done to monitor the equitable provision and use of subscription-based education technology product resources in its Title I schools?

Research Design and Rationale

In this study, the scholarly practitioner ascertained the value of currently used educational technology products throughout a small rural school district. In doing so, this value data signaled the appropriateness of use within instruction in 12 district elementary and middle schools.

Additionally, the scholarly practitioner evaluated the value of an educational technology product rubric. The scholarly practitioner collected both quantitative and qualitative forms of data through this study. The collection of quantitative data, once reviewed, then led to the sequential collection and review of qualitative data points. The hope was that through this approach, a more comprehensive understanding of this research would be completed. This study is most clearly described as an explanatory sequential mixed-method design (Creswell & Creswell, 2018). The scholarly practitioner first conducted quantitative research, analyzed data results, which then led to further qualitative research and data analysis. This study is considered sequential due to one form of research following the other.

Action Research

The following study is grounded in action research as outlined by Mills (2003) as systematic inquiry conducted by teacher-scholar practitioners. Mills (2003) added that action research empowers educators to gather information within their teaching contexts to gain insights and improve practice and learning. Johnson (2005) further remarked that:

> In an action research project, you are not trying to prove anything. You are not comparing one thing to another to determine the best possible thing. Also, there are no experimental or control groups, independent or dependent variables or hypotheses to be supported. The goal is simply to understand. As an action scholarly practitioner you are creating a series of snapshots in various forms and in various places to help us understand exactly what is going on. (p. 24)

Sagor (2000) added that a control group was not needed. Rather, qualitative research usually involves the use of interview transcripts, observation notes, and journals that reveal meaning.

The scholarly practitioner used the Plan, Do, Study, Act (PDSA) Cycle to guide the improvement process for this action research study.

Langley et al. (2009) referred to the PDSA Cycle as providing a model for improvement. They illustrated how three questions drive the cycle. The focus being placed on what is to be accomplished, how improvement can be connected to a change, and how changes that can be made which results in desired improvements. Donnelly and Kirk (2015) pointed to the PDSA Cycle as s model learning and change. Additionally, Donnelly and Kirk (2015) listed key questions that must drive the cycle. Key questions that precede the cycle should answer what the scholarly practitioner ultimately wants to achieve and what problem they are attempting to address (Donnelly & Kirk, 2015).

In Figure 9, the Plan, Do, Study, Act Cycle of action research has been illustrated. The scholarly practitioner used this process outline as the study progressed. Additionally, the scholarly practitioner explains the application of the PDSA cycle to the study to be completed for this study and to addresses this problem of practice (see Figure 9).

Action Research Cycle I: Usage Data and Survey

Cycle I Plan

To begin this study and action research, the scholarly practitioner first deployed a Chrome extension to more than 5,000 staff and student instructional devices to gather current web-based educational technology product use within FCS. The purpose of the Chrome extension is to generate quantifiable context for the problem of practice. Additionally, the scholarly practitioner surveyed eight elementary schools and four middle school principals to gather information about school-specific product use rationale and instructional effectiveness. Surveys were created, shared, and collected from the 12 principals through Google forms.

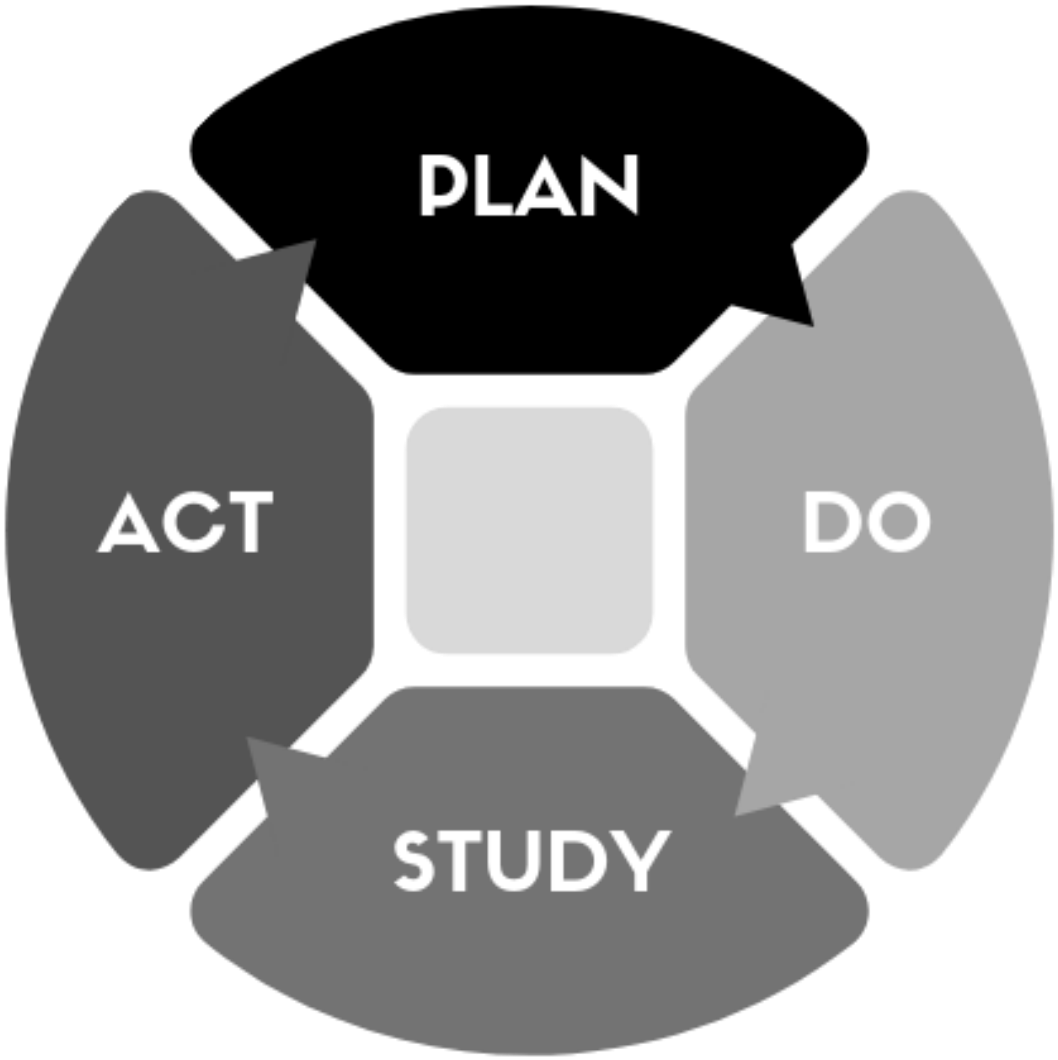


Figure 9. Action research: Plan, Do, Study Act Cycle.

Cycle I Do

In order to begin the study, the scholarly practitioner worked collaboratively with FCS's Director of Technology to deploy a Chrome extension to all devices used within instruction throughout the district. This Chrome extension captured educational technology product use across the district. The extension also enabled the scholarly practitioner to establish patterns of educational technology product use as well as determine whether products in use are subscription-based or open resources. Furthermore, the scholarly practitioner surveyed eight elementary school principals and four middle school principals. The surveys questioned principals to determine their rationale for purchase and use. Further, the survey also gathered principal reflection responses to overall product effectiveness.

Cycle I Study

As the scholarly practitioner collected data results during the first research cycle, both the Chrome extension data and the collection of survey responses were kept secure and private. Only the scholarly practitioner had access to data both during the study and after the study completion. Collection and organization of data collected through the Chrome extension were housed within the Learn Platform tool. This product use data are designed to provide context for the problem of practice at the center of this study. The scholarly practitioner was the only district official with access to this data result. Principal survey responses were collected and kept secure by the scholarly practitioner. Survey responses were transcribed and recorded within NVivo. NVivo was used to store and organize responses. In addition, the scholarly practitioner categorized, analyzed, and classified data.

Cycle I Act

In the PDSA Act stage, the scholarly practitioner had ten district instructional coaches use a rubric created by Learn Platform. The rubric was applied in order to measure and evaluate one paid and one open-source (free) educational technology resource currently in use within their assigned school. Rubric data was collected and kept within the NVivo platform.

Action Research Cycle II: Rubric Usage and Finding

Cycle II Plan

The scholarly practitioner had one paid subscription and one open educational technology product resource scored for all Franklin County elementary and middle schools. FCS Instructional Coaches used the Learn Platform rubric to score, measure, and evaluate educational technology products currently in use throughout Franklin County elementary and middle schools to determine their quality and value to classroom instruction.

Cycle II Do

Coaches used the Learn Platform rubric to evaluate one purchased and one open resource educational technology product currently in use in their buildings. Instructional coaches were trained on the rubric prior to using it to score educational technology products within their assigned schools.

Cycle II Study

The scholarly practitioner reviewed and analyzed scoring results from the instructional coach application of the Learn Platform rubric. Data results from the rubric application were transcribed by the scholarly practitioner within NVivo to keep data organized and secure. With NVivo, the scholarly practitioner hoped to visualize data from rubric scoring and discover new and meaningful connections between educational technology products and instructional quality.

Cycle II Act

Once the educational technology product rubric data was analyzed by the scholarly practitioner, interviews were held with four of the instructional coaches to gather rubric perception data. Instructional coaches provided the scholarly practitioner with their evaluation of the rubric quality, application, and its impact on their ability to evaluate web-based educational technology products.

Action Research Cycle III: Perception of Rubric

Cycle III Plan

The scholarly practitioner interviewed four instructional coaches to measure the value of the rubric used to score web-based educational technology products. The scholarly practitioner sought feedback from the instructional coaches through one-on-one interviews consisting of five questions each. The interview questions were designed to highlight the overall value of the rubric and its application.

Cycle III Do

Four instructional coaches were interviewed to establish rubric value-perception data. A five-question interview was held with the instructional coaches to ascertain the value of rubric application on web-based educational technology products currently in use in the schools they are assigned.

Cycle III Study

Interview data from the four instructional coach interviews were collected and kept secure by the scholarly practitioner. Interview responses were transcribed and recorded within NVivo. NVivo was used to store and organize responses. In addition, the scholarly practitioner categorized, analyzed, and classified data.

Cycle III Act

The scholarly practitioner shared findings from the four instructional coach interviews with the twelve cooperating elementary and middle school principals. Other district technology and curriculum leadership were informed of the findings as well. Following the data collection period, the scholarly practitioner created a district-wide framework by which all future educational technology products should be reviewed. The framework created would allow teachers and instructional leaders within a school to request approval to use or purchase new educational technology products which become available in the marketplace. The framework would allow district-level curriculum leadership a template to review the product and determine whether it will be provided, allowable, or denied for use within district instructional settings. Furthermore, the scholarly practitioner utilized the data collected and information gained to create a product library for the elementary and middle school principals and instructional coaches to use as a resource to identify vetted resource products. This library will provide school leadership means of organizing web-based educational technology products for schools to make informed instructional decisions regarding products to support instructional needs.

Population

The target population for this study was a small rural school district in North Central North Carolina. The district has 16 schools which serve a student population of just over 8,000 students and over 500 certified staff members. The district's schools are comprised of eight elementary schools, four middle schools, and four high schools. The rural district impacted by the study is home to four main towns and a total population of more than 60,000 residents.

For this study, more than 5,500 students attending all 12 of the district's elementary and middle schools will be impacted. The district demographics in grades K-8 in the district are

40.5% Caucasian, 31.1% African American, 22.2% Hispanic, 5% Two or More, .8% Asian, and.4% other (North Carolina Department of Public Instruction. Data & Reports, n.d.).

The participants in this study are in grades K-8 and all 12 schools are identified Title I schools. During the 2018-19 school year, all 12 schools served student populations between 49% and 64% low-income families (North Carolina Department of Public Instruction. Data & Reports, n.d.).

The scholarly practitioner chose the 12 elementary and middle schools due to the high volume of instructional technology in use in these schools. These 12 Title I elementary and middle schools utilized Title I funds to support the purchase of instructional technology product resources to support classroom instruction within their schools.

In Table 4, listed are the FCS low income statistics for the 2019-20 school year. Included are enrollment data and schools listed that are supported with Title I funds.

Sample and Sampling Procedures

The scholarly practitioner utilized nonprobability purposeful sampling within the qualitative portion of this mixed-method study (Creswell & Creswell, 2018). Instructional coaches were selected; four of the 14 total elementary and middle schools' instructional coaches were selected for interviews. Additionally, four district content specialists were called upon in the qualitative portion of this study. In addition to the four instructional coaches being interviewed, this group of 14 also completed an educational technology rubric to evaluate two educational technology products currently in use in their respective schools or content areas of focus. Each instructional coach and content specialist selected one paid subscription product and one open resource to evaluate using the Learn Platform rubric. Additionally, 12 district K-8 principals were surveyed during the study. For the quantitative portion of this study, the

Table 4

Participating Schools Low Income Breakdown (2019-20)

School	Enrollment	Served Title I	# Low Income	% Low Income
Bunn Elem	629	Yes	327	51.99
Bunn Mid	602	Yes	382	63.46
Cedar Creek Mid	600	Yes	296	49.33
Edward Best Elem	530	Yes	299	56.42
Franklinton Elem	428	Yes	235	54.91
Franklinton Mid	234	Yes	135	57.69
Laurel Mill Elm	279	Yes	151	54.12
Long Mill Elm	457	Yes	263	57.55
Louisburg Elem	502	Yes	318	63.35
Royal Elem	518	Yes	282	54.44
Terrell Lane Mid	431	Yes	249	57.77

scholarly practitioner interpreted data collected from a Chrome extension, which collected usage data from the district usage of educational technology products throughout the district. This sampling type was random and determined based on teachers and students who access educational technology products for instructional purposes throughout the district (Creswell & Creswell, 2018).

To determine the sample for this study, the scholarly practitioner selected the instructional coaches from within the district K-8 school buildings and district content specialists. This convenience sample allowed and ensured for equitable data collection throughout the district's 12 K-8 schools (Creswell & Creswell, 2018). Each coach and content specialist, 14 in all, were given a rubric to evaluate two existing educational technology products in use within their assigned school or content area specialty. Four willing coaches were then randomly selected to be interviewed regarding their perception of the rubric. This sample of instructional leaders then ensured equitable data collections and that all 12 schools had data representation. If more than four instructional coach participants volunteered to complete interviews, years of experience were used to determine selection. The four instructional coaches with the greatest number of years of experience were selected and interviewed. Additionally, the 12 district K-8 principals were surveyed during this study. The quantitative portion of the study was provided using a digital Chrome extension, which collected data from participants randomly. Participant data can only be collected and analyzed if they used educational technology products within their instruction either as instructors or students.

The scholarly practitioner utilized two different measures to determine sample saturation for this study. For the qualitative portion of this study, the saturation point was the completion of four interviews among 14 instructional coaches and 28 completed rubrics, two each, within the

same population. Twelve principal surveys were also considered as saturation points among survey responses. Within the quantitative portion of the study, the scholarly practitioner considered the saturation point to be the collection of usage data from at least 30% or more of district faculty and students (Creswell & Creswell, 2018).

Ethical Considerations and Informed Consent

During the entirety of this study the scholarly practitioner took great care to anticipate any potential ethical concerns. Prior the study beginning, the scholarly practitioner completed CITI Training and obtained IRB approvals for the study to be conducted. The scholarly practitioner also obtained approval of the study from both the University of East Carolina and Franklin County Public Schools. Additionally, the scholarly practitioner obtained approval from each of the 12 impacted K-8 schools and their principals to complete necessary data collection along with survey and interview completion. Care was taken in receiving approval from members of the curriculum leadership team, including the superintendent of FCS prior to completing the research study. In addition, the Director of Technology and Chief of Academics were both included in the decision to push out a Chrome extension to begin data collection district wide. School-level principals were informed prior to the Chrome extension being applied and prior to any data collection beginning.

As the study began, a disclosure of the study purpose was published for stakeholders in the district to review. Participants were provided consent forms and care was given in environments with sensitive populations. Participant interview and survey data were collected and kept anonymous by the scholarly practitioner, transcribed and stored digitally in Google, then will be destroyed in seven years. Data will be kept confidential with no individual responses being revealed. Respect was and will be given to participants with respect to power imbalances.

Participants were included in this study as collaborators. The scholarly practitioner took great care to ensure that information concerning an individual collaborator and their responses were not disclosed or used in a way that could negatively impact the participant professionally or personally.

Instrumentation

For the purpose of this study, the scholarly practitioner collected data using a digital platform known as Learn Platform. Learn offers a series of data collection tools that the scholarly practitioner utilized to identify, monitor, and evaluate educational technology product use in FCS. The first tool the scholarly practitioner employed was the distribution of a Chrome extension (see Figure 10).

This Chrome extension was digitally installed on every device used for instruction district-wide, both student and faculty. The purpose of the Chrome extension being installed was to begin collecting baseline data on educational technology product usage and frequency. The Chrome extension recorded the number of products being utilized, the number of teachers accessing products as part of instruction, and the number of students interacting with products within their instruction.

The scholarly practitioner also employed the use of a Learn Platform rubric tool. The purpose of the rubric was to determine the rigor and instructional quality in the educational technology tools being used within instruction. Learn offers this grading protocol to facilitate educators providing valuable insights on instruction technology they encounter daily. The design and research behind the protocol consisted of a manageable number of feedback areas, each feedback area representing important factors that determine the utility of a given technology

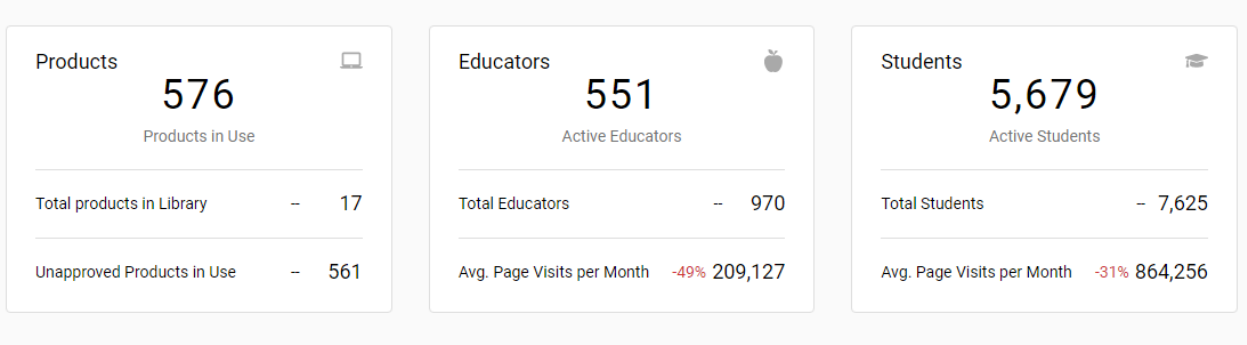


Figure 10. Screenshot from LearnPlatform Lea®n © 2017 (Ed. Tech product usage).

product. Learn developed the following factors by which effective and ineffective technology products are graded:

> First, Learn identified the initial set of factors based on professional experience, a review of extant rating systems, and interviews and focus groups with education experts, educational technology experts, and educators. Learn then formed construct definitions for each factor. To establish the content validity of the initial factors, a set of subject matter experts (SMEs) rated each factor on a scale from 1 (not necessary) to 3 (essential) and also provided qualitative feedback. Based on the results, Learn retained 13 core factors for the next phase.
>
> Using the 13 core factors, Learn generated items to measure each factor and built a survey that also included demographic variables, covariates, controls, and outcomes. Learn sent the survey to a convenience sample of educators (N = 103). Learn first conducted factor analyses to determine whether the measurement model and properties of the items and factors matched the underlying theory. Learn also examined descriptive statistics, the reliability of items and factors, the correlations among items and factors, and the extent to which items and factors related to outcomes. Ultimately, Learn retained psychometrically sound factors and used the items that were the best and most reliable indicators of the core factors for the Learn rating system. Filtering mechanisms were also retained, based on the research, to maximize accuracy, validity, and utility of reported usage by respondents. Then, based on the results, Learn developed a sound proprietary algorithm that normalizes and standardizes the results, while producing the best prediction of important outcomes. (LearnPlatform, n.d.)

Shown in Figure 11 is the LearnPlatform rubric which was used by district instructional coaches to evaluate and score selected educational technology product resources. The rubric in Figure 11 measured each product resource using eight criteria. The rubric measured each criterion using scoring values of A through F.

Further:

> Learn used a rigorous scientific approach to develop a set of core feedback areas and a scoring system for the Learn grading protocol that is grounded in and supported by both rational and empirical evidence. With the help of (SMEs) and educators who will ultimately use the Learn grading protocol, Learn hypothesized factors that should be important for determining the utility of education technologies. Then, Learn empirically validated the core feedback areas using data-driven evidence to substantiate the hypotheses. (LearnPlatform, n.d.)

LearnPlatform allows educators to analyze data and evaluate the impacts of education technology resources. Ultimately, educators can use LearnPlatform to generate evidence-based insights about education technology resources within and across schools and districts. These evidence-based insights will improve the discovery, purchasing, and evaluation of educational technology products in wide variety of educational contexts.

Noted in his article, Alenezi (2017) described educational technology as something that can be viewed as "the hardware, software, 'thinkware,' of learning" (p. 1). Instructionally, the success of educational technology frequently depends upon the ability of the teacher. The classroom teacher may be familiar with technology but remain ill-prepared to integrate the technology in a way that enhances the instruction (Alenezi, 2017). For the qualitative portion of this study, the scholarly practitioner used both interview and survey data collection methods to

CRITERIA	F	D	C	B	A
Ease of Use & Navigation	Difficult to Start; Difficult to Use; Significant Practice Required	Difficult to Start; Confusing to Use; Some Practice Required	Confusing to Start; Moderately Easy to Use; Light Practice is Helpful	Moderately Easy to Start; Easy to Use; No Practice Necessary	Easy to Start; Easy to Use; No Practice Necessay
Features: Comprehensiveness & Effectiveness	Features are Ineffective & Do Not Address Needs	Features Often Do Not Address Specific Needs; Limited Product Utility	Overwhelming or Insufficient Feature Set; Average Product Quality	Somewhat Cohesive Feature Set that Meets Most Needs	Cohesive, Powerful & E ffective Feature Set; High Product Utility
Content: Comprehensiveness & Accuracy	Inaccurate, Inappropriate or Insufficient Content	Questionable Accuracy; Insufficient Content; Differentiation Impossible	Mostly Accurate; Appropriate Content; Differentiation Possible	Accurate & Sufficient Content; Differentiation Included	Accurate & Comprehensive Content; Full Differentiation
Technical Merit (e.g., Absence of Glitches)	Non-Functioning, Completely Unusable or Terminates Productivity	Significant Debilitating Technical Issue(s); Requires Assistance	Occasional Debilitating Technical Issue(s); Requires Assistance	Occasional Minimal Technical Issue(s); No Assistance Required	Zero Technical Issue(s); No Assistance required
Alignment with Learning Objectives & Standards	No Alignment with Intended Objectives; Revisions Impossible	Unclear Alignment with Learning Objectives; Many Revisions	Occasionally Aligned with Learning Objectives; Some Revisions	Generally Aligned with Learning Objectives; Revisions Unnecessary	Clearly Aligned with Learning Objectives; Revisions Unnecessary
Impact on Student Learning & Engagement	Zero or Negative Impact on Learning; Students Dislike the Tool	Slight Impact for Some Students; Not Engaging or Motivating	Moderate Impact on Some Students; Engaging & Motivating	Significant Impact on Some Students; Most Students Engaged	Strong Impact on All Students; Self-Directed and Engaged
Impact on Teaching Efficiency & Effectiveness	Zero or Negative Impact on Teaching Efficiency & Effectiveness	Zero Impact on Effectiveness; Some Boost in Efficiency	Some Improvements in Either Teaching Efficiency or Effectiveness	Moderate Improvements in Efficiency and Effectiveness	Substantial Positive Impacts on Efficiency and Effectiveness
Professional Development (Quality and Amount Required)	Substantial PD Required; PD is Nonexistent or Poor Quality	PD is Required; Available PD is of Minimal Value	Some PD is Required; PD Quality is Below Average	Minimal PD Required; Available PD is Satisfactory	No PD is Required; Available PD is Excellent

Figure 11. Screenshot from LearnPlatform Lea®n © 2017 (product rubric).

determine from principals and instructional coaches if the instruction time being used for educational technology products was having the desired impact on the quality of instruction. The scholarly practitioner also conducted an interview among district instructional coaching staff following their application of the product rubric evaluation. Additionally, all 12 district K-8 principals completed a survey breaking down the rationale, impact, and response to documented educational technology product usage within their schools.

Appendix D lists the principal survey questions with the 12 schools that were surveyed. Appendix E illustrates the instructional coach interview questions that were used to collect rubric perception data.

Procedures

In order to complete this study, the scholarly practitioner completed a PDSA cycle which included three action steps. First, the scholarly practitioner completed the quantitative portion of the research through the use of a Chrome extension to collect educational technology product usage data. In the second PDSA cycle, the scholarly practitioner requested volunteer instructional coaches from within the school district's 12 elementary and middle schools use a rubric to evaluate two products each for quality. Finally, in the third cycle, four of the coaches were interviewed to evaluate their personal perception of the rubric and its application.

Initial Considerations

The scholarly practitioner obtained authorization for the study to be completed from the officials at East Carolina University, the Institutional Review Board and the local school system (FCS), along with selected staff members in schools where the research was conducted. The work of the scholarly practitioner was communicated to necessary stakeholders within FCS such as, the Director of Technology, the Chief of Academics, and the Superintendent of schools.

Study Participant Recruitment

Once approvals were received from the considerations above, information was sent by email to the potential research participants at the selected elementary schools, middle schools, and district central office. These instructional coaches, district content specialists, and principals were then invited to participate in the study, and their email responses were used to document their willingness to participate. Only individuals willing to participate were asked to complete a consent form and those who willingly provided consent forms were then asked to provide any additional information that would be relevant to the study.

Consent Procedures

The consent form for this study was taken directly from the templates provided by the university's Institutional Review Board. The scholarly practitioner adapted the provided templates to better align with the specifics of this research and study. All study collaborators were assured that names would not be used as identification, rather, only employee numbers. In addition, collaborators were assured that all interviews would be voice recorded, but once transcribed, recordings would be erased. These norms, standards, and procedures would be employed to preserve the highest level of ethical and professional environments and maintained throughout the study.

Selection of Study Participants

The scholarly practitioner selected participants who are experts in curriculum and have a high-level understanding of quality classroom instruction practices and strategies. All 14 potential participants are experienced educators with more than ten years of teaching experience. Additionally, all 14 potential participant instructional coaches were introduced to the rubric and evaluation platform by the scholarly practitioner. The scholarly practitioner modeled an

education technology product rubric evaluation and guided participants through a trial product evaluation. In order to receive a comprehensive source of data, 12 schools' principals were also surveyed. These 12 principals represented decision-making and budgetary authority over educational technology products being introduced and maintained within their building classrooms.

Data Monitoring and Analysis

Data for this study was gathered through interview recordings, survey responses, and rubric outcomes. All data were recorded, stored, secured, coded appropriately, and remained confidential at all times. The scholarly practitioner utilized NVivo to collect and secure transcription data. Within NVivo, the scholarly practitioner analyzed responses for themes, patterns, and clustered data responses. Data results were then imported to Microsoft Excel where data could be better sorted and filtered into organized visual representations of the data outcomes. Rubric results were then housed within the Learn Platform. These results were only accessible to the scholarly practitioner. The scholarly practitioner used the platform to analyze results and publish visual representations of the rubric product scoring. The principal surveys were given, collected, and transcribed into Microsoft Excel. Within Microsoft Excel, data were analyzed for themes, patterns, and clustered data responses. Microsoft Excel was then used to create visual representations of the data results.

Quantitative Analysis

The survey, rubric results, and instructional coach interview data provided the basis for the quantitative analysis of this study. The scholarly practitioner analyzed survey data to determine the potential impacts web-based resources have on classroom instruction time and the instructional practices within classroom instruction. Data collected from the completion of the

applied web-product rubric were analyzed to determine the academic value in three primary educational technology products currently in use in FCS K-8 schools. Interviews conducted in the final qualitative data step provided valuable data regarding the overall perception of rubric quality.

Qualitative Analysis

The scholarly practitioner transcribed four interviews during one cycle. Once transcribed, the scholarly practitioner stored the digital records within NVivo and separated interview response data in spreadsheet format for ease of use. The spreadsheet format allowed the scholarly practitioner to individually review each response carefully and observe emerging themes and important details. A system for organization was used to streamline interview responses by question so clusters of like responses were easily seen by the scholarly practitioner (Mertler, 2019). Similarly, the scholarly practitioner transcribed, reviewed, and organized survey responses. The small survey of 12 school principals was organized into Google folders with data also placed into spreadsheet format for ease of use and filtering.

The scholarly practitioner took special care to review and flush out response themes that naturally clustered in both survey and interview data. In addition, the scholarly practitioner reviewed responses for outlier responses that could contradict themes. As the scholarly practitioner reflected on research questions, the review of supporting themes as well as conflicting responses was decided to both be crucial to the study as a whole.

Quantitative

The scholarly practitioner utilized the Learn Platform database to collect and review data collection results of educational technology products throughout the district K-8 schools. Housed also within the Learn Platform database is the rubric, which collected and maintained district

instructional coach responses and formal evaluation of educational technology products currently in use. Responses were collected by the platform and scored digitally to assign an overall rubric score for the product. The scholarly practitioner then used general product scoring data to support future decision making regarding the usage of the product within district K-8 schools. The quantitative data consisted of usage data collected in three types. First, the total usage of educational technology products throughout instruction district-wide, measured by month. Second, the data revealed the number of students engaging with particular educational technology products. The focus of this study was to record student use of products identified for rubric evaluation by 14 instructional coaches. Finally, the third data collection type focused on usage by classroom teachers. This collection type reveals the number of district teachers interacting with web-based educational technology product resources on a monthly basis.

Role of the Scholarly Practitioner

The scholarly practitioner in this mixed-method action research study is a male senior-level district administrator. Specifically, the scholarly practitioner has oversight in the areas of K-8 instruction, Federal Programs, ESL, Pre-K, all Instructional Coaches, and additional responsibilities assigned by the superintendent. The scholarly practitioner has been in the specified district for almost 16 years. In that time, the scholarly practitioner has held positions as a middle school social studies teacher, assistant principal, principal, and the current district leadership role. Geographically, the scholarly practitioner has served as principal in three distinct communities within the school district. The scholarly practitioner is not native to the district or community but does live within the community currently. In his time working in senior leadership, the need for this study has become apparent, and the overuse of unvetted educational technology resources has been eye-opening. The scholarly practitioner has a vested interest in the

quality of instruction and overall success of the school district and all of its 16 schools. The scholarly practitioner has great respect for those participating in the study, a passion for the equitable delivery of educational technology resources, and the fairness for how product resources will be evaluated during the study.

Summary

The methodology of this mixed-method action research study was to apply the PDSA action cycle to identify educational technology strengths, weaknesses, and overall quality. Quantitative and qualitative data were both utilized to examine whether or not the goals of this study were achieved. Three action cycles using the PDSA model were completed in order to collect and complete both the quantitative and qualitative data collection portions of this study. Through the use of the Learn Platform Chrome extension, product rubric, survey questions, and four interviews, all data was collected, secured, and analyzed. To conclude the study, the scholarly practitioner interviewed four coaches to establish rubric perception.

CHAPTER 4: FINDINGS

The purpose of this study was to determine whether the application of an educational technology product rubric would have a measurable impact on educational technology product resources use throughout a school district. Additionally, this study sought to identify the product resources of the greatest quality and develop a library of quality products to be provided equitably to all Title I schools. The following steps were taken to determine product resource quality: (a) a product rubric was administered to commonly used product resources by instructional coaches, (b) principals were surveyed, and (c) instructional coaches were interviewed before and after the application of the product rubric instrument. Results were examined, analyzed, and have been compiled in this chapter.

Preview

Throughout the findings reported in this chapter, the scholarly practitioner provides analysis from the quantitative and qualitative data collected as a result of action research. The collection of quantitative data, once reviewed, led to the sequential collection and review of qualitative data points. From this approach, a more comprehensive understanding of this research was completed. This study is most clearly described as an explanatory sequential mixed-method design (Creswell & Creswell, 2018). Demonstrating Creswell and Creswell's mixed method definition, the scholarly practitioner first conducted quantitative research, and analyzed data results. Next the scholarly practitioner conducted the qualitative research and data analysis. To fulfill Creswell and Creswell's sequential aspect, one form of research followed the other.

Highlighted here, the scholarly practitioner has reported findings grounded in action research as outlined by Mills (2003) as systematic inquiry conducted by teacher-scholar practitioners. The scholarly practitioner conducted a three cycle PDSA which resulted in the data

reported and subsequent themes presented within the chapter. Themes identified from data collected are presented in response to the respective study questions. Relevant data collected from both quantitative and qualitative portions of the study were applied within themes of applicable study question responses. In total, nine themes emerged from a compilation of principal surveys, instructional coach interviews and the collection of district product usage data.

COVID-19 Impacts

During this study, work to complete the research was impacted by the onset of the novel coronavirus responsible for Covid-19. Areas of impact included IRB approval, data collection and analysis, as well as reporting findings. Additionally, it is believed that the scholarly practitioner contracted the virus in late April of 2020. The scholarly practitioner suffered mild flu-like symptoms and recovered while quarantined at home in under two weeks.

As the virus began to impact the focus region and North Carolina specifically, the scholarly practitioner had just received IRB approval to begin the study and the proposed action steps. On March 10, 2020, NC Governor Roy Cooper issued Executive Order 116 which declared a state of emergency to prevent the spread of Covid-19. Only four days later on March 14, 2020, Governor Cooper issued Executive Order 117, which officially closed K-12 public schools statewide. The closure of K-12 schools officially began on March 16, 2020. During this time, the scholarly practitioner had begun collecting education technology product usage, and the grading of education technology products by the 14 district instructional coaches using the Learn Platform product rubric had commenced. The initial closure of school completely halted research progress and the collection of data. On March 23, 2020, Governor Cooper extended the K-12 closure order through May 15, 2020, by Executive Order 120. This extension led to further delays for the scholarly practitioner. The action steps with the greatest negative impacts were the grading of education technology product resources by district instructional staff, the subsequent interviews

of four instructional coaches regarding the grading process, and the completion of an education technology product survey by 12 Central NC elementary and middle school principals. During the time of remote work and meeting limitations, the scholarly practitioner identified methods for remote interviews, survey submission and analysis, and education technology product resource grading. In July of 2020, the scholarly practitioner was able to resume the grading of education technology resources and complete the subsequent instructional coach interviews. Additionally, in July, the education product survey was sent and completed by the 12 Central NC elementary and middle school principals. In all, the scholarly practitioner estimates that the action steps within this study were delayed by approximately four months.

Study Questions

The following are the questions the scholarly practitioner answered during this study:

1. How did the implementation of a rubric to evaluate educational technology product resources influence perception of current product quality throughout the district?
2. What are the most significant criteria to include in a rubric for evaluating the quality of educational technology?
3. What could be done to monitor the equitable provision and use of subscription-based educational technology product resources in its Title I schools?

Participants

The scholarly practitioner selected participants who are experts in curriculum and have a high-level understanding of quality classroom instruction practices and strategies. All 14 potential participants were veteran educators with more than ten years of teaching experience. Additionally, all 14 potential participant instructional coaches were introduced to the product rubric and evaluation platform by the scholarly practitioner. The scholarly practitioner modeled

an education technology product rubric evaluation and guided participants through a trial product evaluation. To gain school specific perspective for resources being used, 12 schools' principals were also selected to participate in this study. These 12 principals represent decision making and budgetary authority over educational technology products being introduced and maintained within their buildings' classrooms. In addition to the participants selected for this study, the application of a Chrome extension was used to measure educational technology products in use in the 12 Title I schools in the district. Table 5 highlights the level of experience for the instructional coach participants that participated in the study.

Data Analysis

Culcatta (2019) noted that through a shared vision and approach, the Los Angeles school district is finally taking the necessary steps to meet its most central goal of facilitating improved student learning. By creating a proper vision for education technology integration to support and enhance instruction, Los Angeles school district is laser focused on the professional development necessary to meet their goals (Culcatta, 2019). To that same end, the scholarly practitioner who designed this study has collected Chrome extension data that points to an ambiguous and splintered approach to education technology product acquisition. Table 6 illustrates the use of more than 2,800 education technology product resources during the 2019-20 school year within identified Central NC K-8 schools. Furthermore, more than 99% of those products have yet to be reviewed or evaluated formally by the district. Those 2,800 products accessed as part of instruction during the 2019-20 school year impacted the instruction of more than 7,400 students. As the scholarly practitioner reviewed district education technology product resource data, there were no apparent practices yet in place for the equitable onboarding of vetted resources. Culcatta

Table 5

Instructional Coach Demographics

Coach	Level	Content Area Supported	Years of Experience
Coach 1	Elem	All	14
Coach 2	Elem	All	32
Coach 3	Elem	All	18
Coach 4	Elem	All	15
Coach 5	Elem	All	23
Coach 6	Elem	All	24
Coach 7	Elem	All	20
Coach 8	Elem	All	19
Coach 9	Elem	Math	25
Coach 10	Elem	ELA	15
Coach 11	K-12	Sci	19
Coach 12	K-12	All	26
Coach 13	Middle	Math	11
Coach 14	Middle	ELA	15

(2019) wrote that the lesson many districts must still learn is to seize opportunities to rethink ill-gotten implementation efforts, clarify priorities, and build staff knowledge around them. Represented in Figure 12 is a bar chart quantifying district educator use of product resources during the 2019-2020 school year. The figure illustrates the number of educators and the volume of education technology resources they accessed during the 2019-2020 school year. Of particular interest to the scholarly practitioner was the large number of educators that were utilizing such a large number of different product resources. As measured by the LearnPlatform Chrome extension, 45 different teachers accessed more than 20 different education technology resources within their instruction throughout the year.

Study Question #1

Question #1 in this study addressed how the implementation of a rubric to evaluate educational technology product resources influenced perception of current product quality throughout the district.

Lack of Rubric Perspective

Following the four instructional coach interviews to gather feedback respective to the use of the Learn Platform rubric to evaluate current education product resources, one common response centered around the general nature of evaluation. Instructional coach respondents repeatedly reported that they struggled to interpret the perspective from which they should approach the rubric. One example provided by Coach 1 was to ask if they should have responded to the ease of use rubric question through the lens of a teacher or student. This coach identified that ambiguity within the application of the rubric had significantly altered responses and has the potential to significantly alter grading results. When asked to describe their confidence level felt in using the rubric, Coach 1 shared the following:

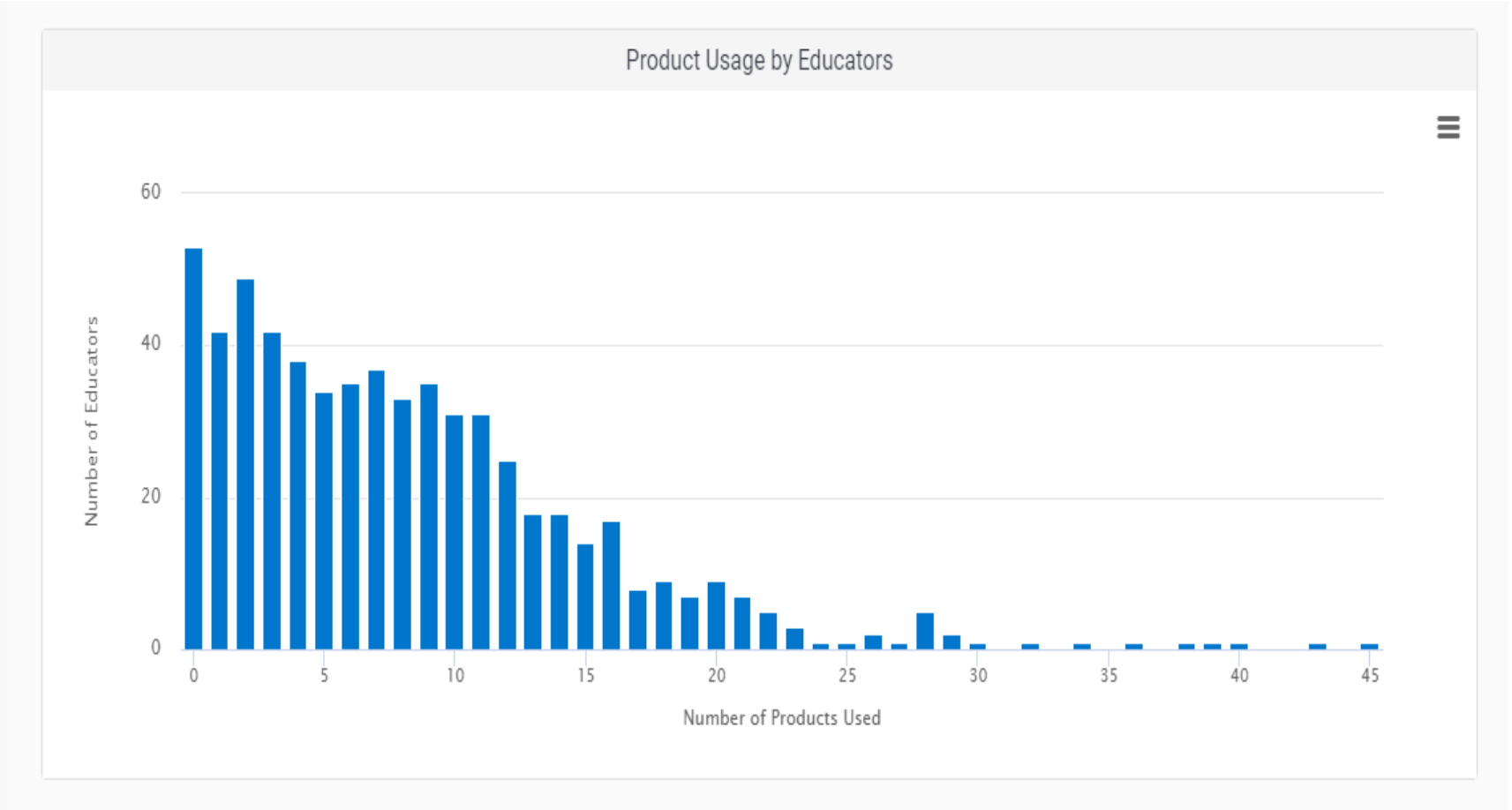


Figure 12. Screenshot from LearnPlatform Lea®n © 2017 (product usage by staff).

> For the most part I feel confident with the rubric I used. There were some questions on the rubric that made me waffle between, is it asking me how the teacher views it or is it asking me how the students view it? And that happened for a couple questions, not every question. I had to make the decision in my mind, Ok, I want to look at it this way to answer this question. So that's the only issue, that some questions I had to step back and decide how I was going to look at it.

In general, the interviewed coaches either directly or indirectly referenced the point that the rubric scoring perspective was not clear. As a further example of this, Coach 4 highlighted that perspective of the evaluator forced them to use personal judgment in determining valuation. Coach 4 shared the following:

> There are a couple of little areas that I kind of, you kind of have to use your own judgement for, especially if you are not in the classroom and the question asks you how you feel about using it in the classroom.

Coach 1 went further to say, "There were maybe one or two questions from the rubric that you had to kind of decide, how am I answering this question? Am I asking or answering it from a teacher's perspective or a student's perspective?" The scholarly practitioner noted that in all, the coach responses clearly pointed to different valuations based on the decided perspective the evaluator took during the grading process.

Confirmed Opinions

A second theme extracted from the instructional coach interview responses was reported by two of the four coaches. Both pointed to the rubric formally confirming their previously held assumptions of products they evaluated. They both similarly addressed how, through the use of the grading rubric, they were able to substantiate the strengths and merits of the products they

had previously supported the use of in their building classrooms. Coach 4 specifically stated that one product they evaluated and felt was strong already, the rubric made them feel even better about. Similarly, Coach 2 reported the rubric confirmed a product evaluated provided further confidence in providing an endorsement to classroom teachers, saying, "It's still going to be a tool that I use, and I'm going to promote to others." In each of the instructional coach interviews, the coaches consistently identified areas of the rubric that caused them to review components of the product resources they had not previously considered.

Focused Lens

A third lens that presented itself during the review of instructional coach interview responses was that the rubric used to evaluate products provided an organized lens by which to measure product quality. All four coaches pointed either directly or indirectly toward a realization that the rubric provided them a focused lens through which to view and evaluate the product resources they graded. The rubric provided specific criteria important to successful instructional practices or learning outcomes. Specifically, Coach 3 shared that from their perspective, the rubric "gives us a new framework of how we think about what we're purchasing, and to make us think more in-depth before we purchase a particular item, and if we already have something that does that." Coach 2 added, "The rubric does make you dig into a product and grade the product's alignment with learning objectives. It really makes you think, am I assigning this just to assign it, or does this have some educational merit behind it." In these examples, as well as others, the rubric forced evaluators to analyze product resources through a specific and consistent lens. It brought about new insights. In some cases, it confirmed previous perceptions, while in others, it simply forced new ways of perceiving familiar resources.

In Table 7, the scholarly practitioner lists seven of the most widely used paid subscription products throughout the Central NC school district. All seven of the products listed were used by at least 100 teachers during the 2019-20 school year within the district to supplement instruction. With three of the purchased products, more than 25% of students from within the district were captured as having had accessed the product during the school year. All seven of the product resources identified in Table 6 were graded using the Learn Platform rubric as a B product or higher.

Table 8 records the most commonly accessed education technology product resources across the Central NC District during the 2019-20 school year. This list demonstrates the high level of instructional interaction students and staff have with Google suite products. One more clearly demonstrated fact is the high level of product usage throughout the Central NC District in support of assessments. Half of the most commonly used education technology products in the Central NC District were products used to assess student learning in one form or another. Research by Mehta et al. (2019) supports education technology training needing to go beyond the basic gathering of tools and instead enable educators with an adaptable, creative mindset. Mehta et al. (2019) suggest that tool-centered training falls short of meeting the needs of teachers in contemporary classrooms. The data collected in the Central NC District aligns with the finding from Mehta et al. and presents an image of basic tool use with little evidence of training or implementation of product resources of greater depth of learning.

In Table 9, the top ten most common educational technology product resources are again listed by order of use. In this table, product resources are listed with educator grades provided from internal instructional coach grading and through the Learn Platform. Only one of the most common products in use within the identified Central NC district during the 2019-20 school year

Table 6

Chrome Extension Product Use Breakdown (2019-20)

District	Educators	Students	Products	Unapproved Products
Central NC School District	1,790	7,461	2,800	99.46%

Table 7

Chrome Extension Paid Subscription Product Resource Usage

Product Resources	Faulty Usage	Student Usage	Product Grade
Acheive3000	529	3,149	B
Vocabulary.com	248	2,278	A-
Reflex Math	249	2,681	A-
Smarty Ants	282	627	B+
BrainPop	191	793	A-
Newsela	143	909	A-
Raz-Kids	108	152	A-

Table 8

10 Most Commonly Used Education Technology Product Resources (2019-20)

Product Name	Educators	Students
Google Docs	1,223	6,504
Google Drive	1,147	6,319
Google Slides	1,111	6,175
Google Forms	988	5,830
Google Classroom	950	5,689
Quizizz	774	5,574
Google Sites	958	5,360
Kahoot	769	5,504
Quizlet	701	5,337
Schoolnet	730	5,148

received a grade of less than A-. Grades were achieved using a minimum of three grades from at least three different individuals.

Study Question #2

Question #2 in this study addressed what the most significant criteria to include in a rubric for evaluating the quality of educational technology were.

Alignment to Goals and Standards

During the review of responses from a survey completed by the Central NC district elementary and middle school principals, the scholarly practitioner found that several themes emerged. The first theme that presented itself was in response to the instructional rationale for the purchase of educational technology products currently in use in their buildings. The majority of principal responses acknowledged the importance of the product being aligned to state standards and identified school goals. Principal 2 shared an example of why they selected and supported the use of the product resource BrainPOP. They shared, "BrainPOP/BrainPOP Jr. contains standards-aligned lessons which include videos and activities that focus on various content areas, such as, Science and SEL." In a similar response, Principal 4 answered that the rationale for product resource purchase they used was through "school improvement team discussions on what products should be bought out of Title I money to achieve school goals." Principal 5 added that their "school leadership team decides based on teacher input. That resources must be aligned with the North Carolina Standard Course of Study and provide appropriate challenge." These responses point to alignment and identified goals, but no clear measure for how they determine a consistent or structured way to determine quality.

Resource Outcomes

Conversely, the Central NC district elementary and middle school principals identified a wide-ranging list of responses when sharing their personally observed outcomes to instruction as a result of the current building product resources. Principal responses included a music product resource that increased engagement and a product resource that helped "reinforce teaching." Principal 9 gave anecdotal evidence that "when used with fidelity, products can have positive outcomes." Principal 9 indicated that "we have seen specific growth in some students through the use of the Imagine Math product." The larger perspective identified by the scholarly practitioner was that building instructional leaders were not looking for clear and measurable results from the products they supported for use within instruction. Principal 7 pointed to the evaluation of quality coming from outcomes identified by the vendor and within the product itself. The principal wrote, "Teachers track progress on both IXL and Myon" from within the products platform. In all examples of identified outcomes, principals differed in how they identify outcomes and what level of outcome was necessary to determine the quality of a given product resource.

Rubric Criteria

In Table 10, illustrated are responses extracted from four instructional coach interviews. Identified within the table are criteria from within the Learn Platform rubric specifically mentioned or implied as priority considerations when determining educational technology products to endorse and support within instruction. Variations in responses were found to exist depending on the type of educational technology product graded with the Learn Platform rubric. The most common response centered around the impact on teaching and efficiency, and

Table 9

10 Most Commonly Used Education Technology Product Resource Grades

Product Name	Educator Grade
Google Docs	A
Google Drive	A
Google Slides	A
Google Forms	A-
Google Classroom	A-
Quizizz	A-
Google Sites	A
Kahoot	A-
Quizlet	A-
Schoolnet	B-

Table 10

Mote Important Rubric Criteria (2019-20)

Coach	Ease of Use & Navigation	Comprehensiveness & Effectiveness of Features	Comprehensiveness & Accuracy of Content	Technical Merit	Alignment with Learning Objectives & Standards	Impact on Student Learning	Impact on Teaching Efficiency & Effectiveness	Recommend
Coach 1	X				X		X	
Coach 2		X	X				X	X
Coach 3		X	X			X	X	
Coach 4			X		X	X	X	X

effectiveness. All four coaches either directly or indirectly referenced this rubric criterion as an important condition when evaluating product resources.

Illustrated in Figure 13 is the overall satisfaction of building principals with the current educational technology resources utilized in their building classrooms. It was noted by the scholarly practitioner that none of the building principals surveyed had an identified evaluation method for measuring product resource effectiveness directly. Though satisfaction measured in the survey ranged from neutral to very satisfied, only a single principal confirmed having specified an amount of instructional time for the educational technology product resources in their building classrooms (see Figure 14). Though technology integration has been occurring for several decades now across the United States, Reich (2019) notes that if students are not presented with a challenging curriculum, it will not matter the format, paper, or computer. Yet, to date, the Central NC District has no practice or protocol in place to determine whether or not each product in use has a challenging curriculum. In principal survey responses, no measure of the quality review was referenced as a practice when implementing new educational technology product resources within classroom instruction.

Study Question #3

Question #3 in this study addressed what could be done to monitor the equitable provision and use of subscription-based education technology product resources in its Title I schools.

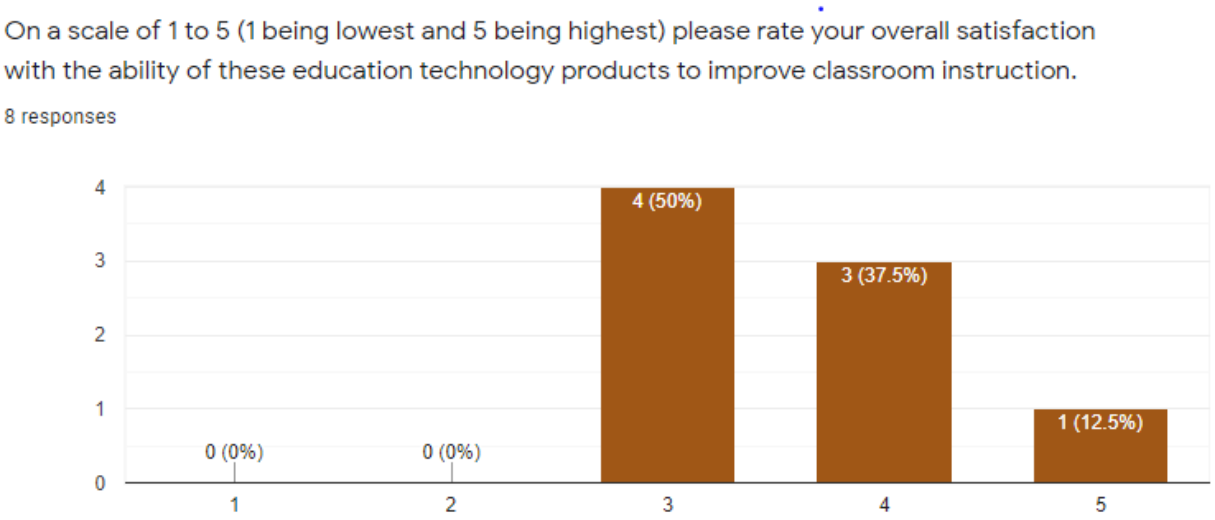


Figure 13. Screenshot from LearnPlatform Lea®n © 2017 (principal survey product satisfaction).

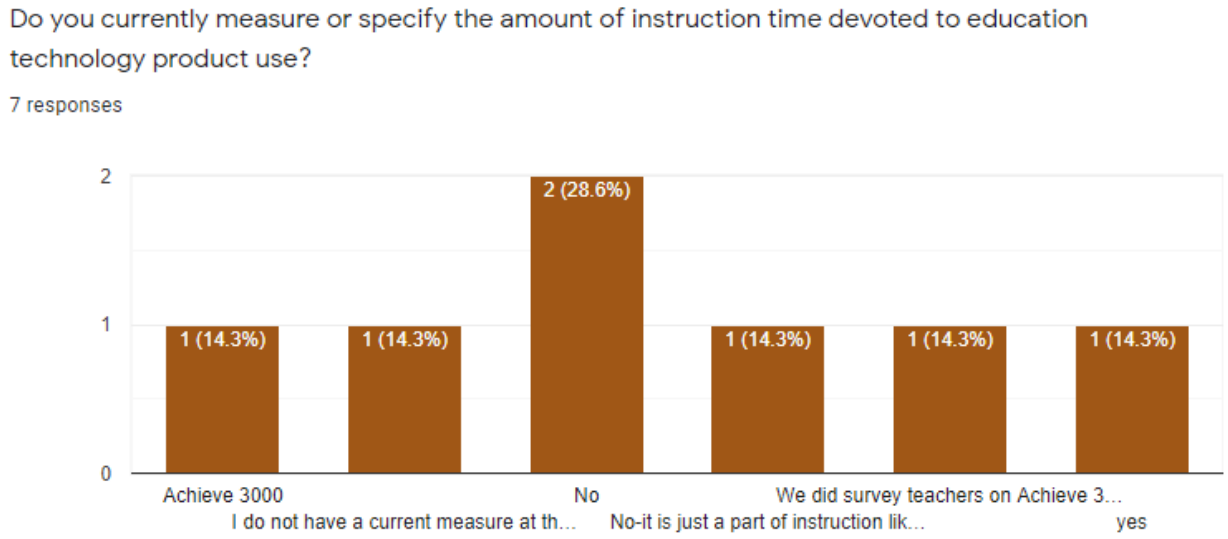


Figure 14. Screenshot from LearnPlatform Lea®n © 2017 (principal survey instructional time).

Resource Selection

One theme that developed from principal surveys impacting equity was the manner in which principals select, approve, and ultimately purchase educational technology product resources for their buildings. In the survey collected from the Central NC District elementary and middle school principals, they were asked to share the products which they purchased for their schools. Principal responses varied greatly on this question. From the survey responses provided by the principals, the most common process was to have School Improvement Teams making the decisions via committee. Principals 3, 4, 5, and 6 all cited School Improvement Teams or simply teachers declaring needs, asking for product resources they liked or were familiar with as reasons for adoption and purchase of resources. These similar yet random approaches point to a deeper inequity within instructional resources between district schools. When determining an equitable provision of resources that will impact instruction, Reich (2019) believes the first step toward achieving digital equity is to lead educators toward a clear understanding of equitable teaching practices in general. Riech's findings suggest there may need to be a more basic and foundational approach to core instruction in the Central NC District before greater equity in education technology resources can be achieved. Finally, to the question of instruction time and the impact from identified resources, four principals indicated that they have no current means of measuring the impact on or within instruction (see Figure 14). Additionally, only one principal surveys teachers to inquire about use during instruction and the overall impacts observed on instruction by the teacher. Despite the lack of a consistent measure for the impact on instruction, in the final survey question regarding resource satisfaction, five principals still rated their satisfaction with purchased education technology resources as a 4 or 5 (see Figure 13). It is worth noting that there was no measurable way observed by the scholarly practitioner to correlate the principal

satisfaction ratings with the lack of a process by which to measure the impacts on instruction. In closing, inequities clearly exist from school to school in how products are selected, the resources known therefore available to each school, and a consistent way to determine if the purchased resources are meeting the needs they were purchased to support.

Inconsistent Resources

In addition to the decision-making process used to make education technology resource purchases, principals were also asked to simply list educational technology product resources they have endorsed for use within instruction in their buildings. The answers provided by the elementary and middle school principals were filled with overlapping lists of product resources that frequently did not match. A good comparison to examine this resource provision contrast was demonstrated in the responses from Principal 1 and that of Principal 2. Their lists of provided resource products were vastly different. Principal 1 simply noted that their school chooses not to approve or use any school identified subscription education technology resources. In contrast, Principal 2 listed six education technology resources they purchase to support various instructional purposes. In some cases, two elementary schools would identify educational technology needs in the same grade level and content yet chose two different vendors and products to support the need. Chrome extension usage data collected confirms the principal responses. In fact, on average, principals named about a half dozen products purchased for use in their building classrooms. Chrome extension data suggests the resources being accessed beyond those they pay for vary greatly by school, but far outnumber the products provided and approved by the principals. Reich (2019) writes of the need to apply an equity lens and simply ask educators how much consideration is given to equity as they plan around education technology. In order to accomplish what Reich is suggesting, schools must begin to capture what resources

are being used for instructional purposes before equity can be improved at the building grade levels or individual classrooms.

Summary of Findings

Throughout the review of the data collected, the scholarly practitioner was able to confirm some previously held beliefs and uncover evidence supporting the need for further study. Clearly supported in these findings is that currently there is an unbridled use of education technology resources in the small rural county at the center of this study. Specifically, the findings demonstrate support for further work to strengthen instruction, improve equity, and to measure the impact of resources as it relates to the use of education technology in schools. Education Technology is having a significant impact on teaching and learning. These findings point to the need for additional and targeted research to support the integration of these resources with consistency and fidelity to ensure student growth and instructional success.

CHAPTER 5: DISCUSSIONS AND IMPLICATIONS

The underlying assumption asserted through this study has been that by using or developing a systematic approach to review and evaluate educational technology resources, a school district could identify, purchase, and provide high quality products with equity throughout the system. In recent years, public schools have been overwhelmed by an educational technology market which has been growing exponentially. In the United States alone, the education technology industry has grown to more than fifty-five billion dollars annually. Within the industry, United States' K-12 schools spent more than twenty billion dollars on educational technology (Johnson, 2011). According to a "Market Analysis Report" (Education Technology Market Size Report, 2020-2027, n.d.) published by Grand View Research, the overall education technology industry has grown to more than eighty-nine billion dollars in 2020.

It has been the assertion of the scholarly practitioner that districts can augment the educational technology wave of products through the application of a framework by which products can be effectively evaluated for quality and effectiveness. Through a structured process of evaluation and review, products could be measured from pre-determined criteria and communicated with district leaders who purchase product resources to support and supplement instruction.

The equitable purchase and provision of educational technology resources have been uneven and unmonitored. As new resource products enter the market asserting the many features they provide and the positive impacts learners will experience, districts and schools are sold promises from salespeople that may or may not be actualized. Due to the vastness of the marketplace and the many competing educational technology resources, the scholarly practitioner has found that district and school resource purchases have as much to do with

preference and price as they do quality and equity. It is the long-held belief of the scholarly practitioner that once a clearly established measure for quality and effectiveness has been determined, an equitable district resource provision can be realized, and thus, providing only the strongest of educational technology resources for all schools, faculty, and students throughout the district.

The scholarly practitioner conducted the research study in a Central North Carolina school district. The study was completed within a district situated in a rural community with slightly more than 8,000 students. From this population, the study focused specifically on the eight elementary and four middle schools within the district. Prior to this study, the scholarly practitioner determined that more than 700 educational technology resource products were in use instructionally. Faculty and students alike were engaging daily in dozens of diverse products during instruction that were achieving varied levels of engagement and interaction. From this early Chrome extension data, which measured district education technology usage, the scholarly practitioner confirmed early assertions that a framework for evaluating and reviewing these product resources was required to weed out less impactful resources and provide higher quality resources with equity.

This study was grounded in action research as outlined by Mills (2003) as systematic inquiry conducted by teacher-scholar practitioners. Mills (2003) added that action research empowers educators to gather information within their teaching contexts to gain insights and improve practice and learning. Using the Plan, Do, Study, Act (PDSA) Cycle, the scholarly practitioner gathered data from three cycles which compiled qualitative and quantitative results. Data collected within these cycles included measurement of educational technology resources, 12 elementary and middle school principal surveys, and four instructional coach interviews.

Additionally, school district instructional coaches used the identified LearnPlatform rubric to evaluate educational technology resources currently in use throughout the district.

In this study, the scholarly practitioner ascertained the value of currently used educational technology product resources throughout a small rural school district. In doing so, this value data signaled the effectiveness of use within instruction in 12 district elementary and middle schools. Additionally, the scholarly practitioner evaluated the usefulness of an educational technology product rubric. The scholarly practitioner collected both quantitative and qualitative forms of data through the study. The collection of quantitative data, when reviewed, led to the sequential collection and review of qualitative data points. Therefore, this study is most clearly described as an explanatory sequential mixed-method design (Creswell & Creswell, 2018). Demonstrating Creswell and Creswell's mixed method definition, the scholarly practitioner first conducted quantitative research, and analyzed data results. Next the scholarly practitioner conducted the qualitative research and data analysis. To fulfill Creswell and Creswell's sequential principle, one form of research followed the other.

As the study concluded, the results compiled demonstrated qualitative and quantitative results which were able to be organized into distinct themes. The themes that emerged were largely consistent with the expectations of the scholarly practitioner. Each of the three study questions at the center of this study had two or three themes emerge. Interestingly, the issue of equity became most apparent in principal survey responses when the survey demonstrated such varied approaches to selecting educational technology resources to support instruction in their buildings. The only common response noted was the inclusion of school improvement team members as a determining factor in what product resources were selected to support instruction within their buildings.

Discussion

During the past few decades, educational technology has evolved to a point where it has become a significant tool for information delivery within the classroom. In addition, educational technology has become a multi-billion-dollar industry that has given rise to companies that continually develop products, platforms, and resources that have promised to simplify instruction, improve student outcomes, and engage learners in ways traditional instruction techniques cannot (Crisp & Bonk, 2018). Educational technology as a pedagogy is a modern form of teaching that is art, science, and delivery system. Contemporary frameworks such as the Technological Pedagogical and Content Knowledge framework (TPACK) seek to define the process by which education technologies can be integrated successfully within the instructional environment (Koehler, 2012). Similarly, Dr. Ruben Puentedura's (2013) Substitution, Augmentation, Modification, and Redefinition (SAMR) model grew in its popularity as a resource framework to establish the proper blending of educational technology resources within traditional instruction practices.

The emergence and growth of educational technology within schools and classrooms was reflected in the Central NC school district usage data measured over the past year and during this study. The LearnPlatform Chrome Extension used to measure educational technology resources uncovered 1,790 educators and 7,461 students had accessed 2,800 different product resources during the 2019-2020 school year. From those 2,800 product resources found 99.46% of those were never formally approved by the Central NC school district.

However, it is more than simply discovering a new product resource and applying it within instruction. When teachers use educational technology most effectively, they are providing students multiple opportunities such as problem solving, drill and practice, tutorials,

programming, and word processing (Hattie, 2008). Additionally, Hattie (2008) highlighted that web-based instruction commonly neglects instruction fundamentals such as timely feedback and interaction. The average effect of web-based instruction was lower than other forms of computer-based instruction with an effect size of (d = 0.24) (Hattie, 2008). An effect size of .24 according to Hattie can be translated as having only a small positive impact on student achievement. An interview response from one of the instructional coaches supported this finding when the coach remarked about the LearnPlatform rubric's ability to provide a level and consistent measure by which similar product resources could be compared to one another. Prior to the use of a rubric, coaches would make decisions regarding quality based on personal experience with a product resource or the shared experience of another educator. Never before did they have an equitable and consistent means of evaluating like product resources to determine a best fit for their school's academic needs.

Assertions and Claims

As measured across the small rural school district referenced within this study, more than 2,800 product resources were discovered to be in use. The scholarly practitioner has determined that more than 99% of the products in use have not been evaluated for quality as identified by the data illustrated in Table 5. Currently used educational technology resources have not been equitably provided or evaluated for appropriate application prior to instructional use. It is again the assertion of the scholarly practitioner that in order to improve the random application of product resources, a product resource library must be created to organize quality and available products.

Additionally, development of a product resource identification structure must be created for the organization of resources. The format used for this should refer to products using a series

of labels associated with the district evaluation of the product. Examples of an organizational product label structure are provided in Figure 15. Structure labels include identifiers for cost, approval statuses, and whether or not a product has been evaluated. Additionally, if a product receives approval, the scholarly practitioner believes equity will improve with the inclusion of a recommendation label to accompany the strongest of resources that all grade well.

Conclusions and Lessons Learned

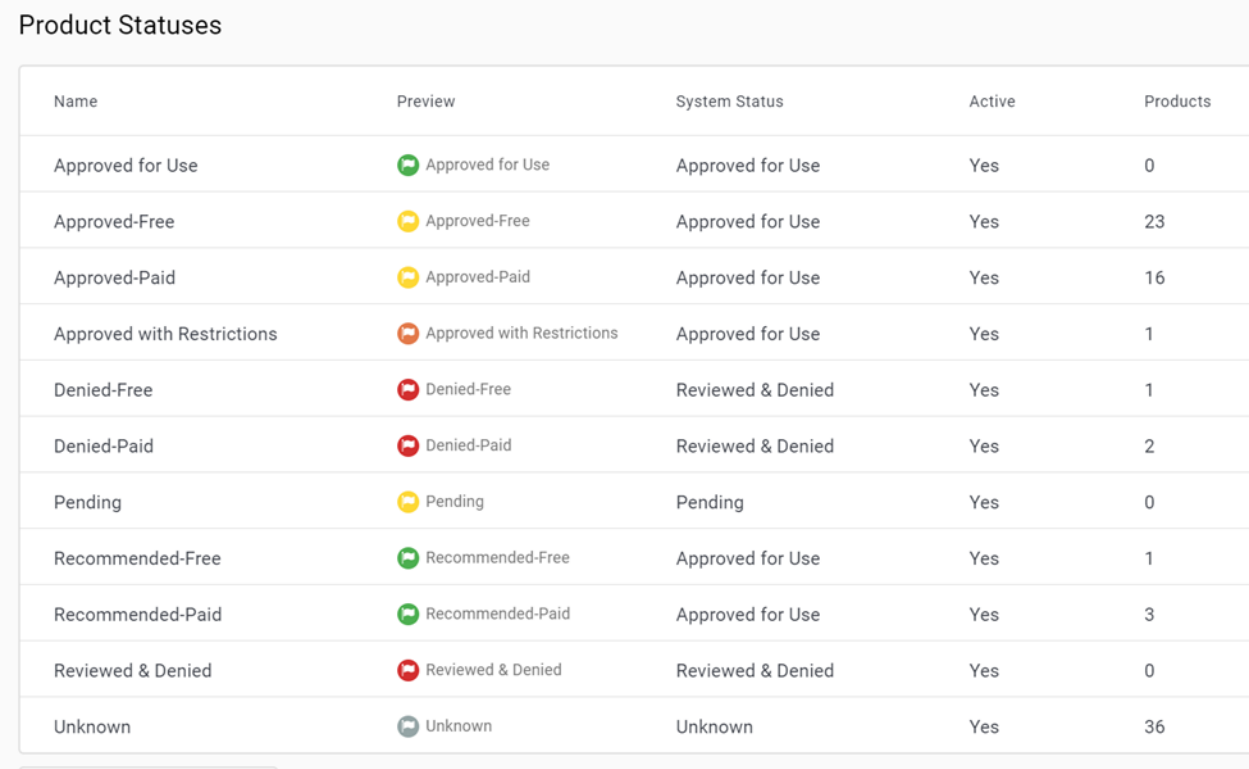
This study and its findings were deeply rooted in three study questions designed to determine educational technology resource quantity and quality. Qualitative data were collected from principal surveys and instructional coach interviews. Quantitative data were collected to review the volume of resources in use in the small rural district in which the study was conducted. Both types of data were compiled and analyzed to develop the findings to the three research questions. The following conclusion statements have been built from the findings and are supported by the data collected from the study.

Conclusion Statement – Research Question #1

How did the implementation of a rubric to evaluate educational technology product resources influence perception of current product quality throughout the district?

Product Perception

Instructional coaches consistently confirmed for the scholarly practitioner that the application of the rubric confirmed prior perception of the products evaluated. Coaches felt the application of the rubric largely strengthened previously held impressions of resources and did little to alter opinions. The rubric, once applied, forced a more detailed investigation of different criteria for each resource but failed to change the minds and perceptions of those completing the



Product Statuses

Name	Preview	System Status	Active	Products
Approved for Use	Approved for Use	Approved for Use	Yes	0
Approved-Free	Approved-Free	Approved for Use	Yes	23
Approved-Paid	Approved-Paid	Approved for Use	Yes	16
Approved with Restrictions	Approved with Restrictions	Approved for Use	Yes	1
Denied-Free	Denied-Free	Reviewed & Denied	Yes	1
Denied-Paid	Denied-Paid	Reviewed & Denied	Yes	2
Pending	Pending	Pending	Yes	0
Recommended-Free	Recommended-Free	Approved for Use	Yes	1
Recommended-Paid	Recommended-Paid	Approved for Use	Yes	3
Reviewed & Denied	Reviewed & Denied	Reviewed & Denied	Yes	0
Unknown	Unknown	Unknown	Yes	36

Figure 15. Screenshot from LearnPlatform Lea®n © 2017 (product resource label structure).

evaluation. The rubric did lead to a more comprehensive perception of resources and an understanding of what considerations should be given prior to future resource selection.

Product Quality

Product quality is at the center of this study for each resource evaluated. It is the firm belief of the scholarly practitioner that weeding through the overwhelming number of products in the marketplace and evaluating them beyond a vendor sales pitch is paramount to the strong instructional application of education technology resources. The identification of a rubric such as the one used for this study is fundamental to establishing a value for each resource. The LearnPlatform rubric used during this study was effective for generating a graded evaluation of each product. During this study, the scholarly practitioner observed the applied grades trended almost exclusively toward the grades of A and B. No product resource was graded as an F during this study. Another key observation noted by the scholarly practitioner was that products evaluated by the instructional coaches were products they already had used and formed opinions of through prior experiences. Consequently, grades given to evaluated products tended to be inflated.

Conclusion Statement – Research Question #2

What are the most significant criteria to include in a rubric for evaluating the quality of educational technology?

Rubric Criteria

In their evaluation of products purchased to support classroom instruction in their schools, the 12 principals surveyed in the small rural district during this study identified only one significant criterion, alignment to standards, as a rationale for purchase. Principals in the small rural district, prior to this study, focused on only one of the eight separate criteria used within the

LearnPlatform rubric. During the study, instructional coaches used the LearnPlatform rubric and found two of the eight criteria to be more important than the others as they evaluated and graded product resources. Instructional coaches noted in interview responses that both the Impact on Teaching Efficiency & Effectiveness as well as the Comprehensiveness & Accuracy of Content as the most important rubric criteria of the eight used.

The scholarly practitioner found that the criteria used in the LearnPlatform rubric were limited by their general language and allowed for too much ambiguity in responses and perception. Though the application of the rubric was helpful in breaking down resources to a degree, rubric criteria must be more specific to strengthen evaluation. Additionally, in underlying ways, criteria importance appeared to be influenced by the role of the reviewer. Coaches approached the evaluation of resources from an instructional perspective, with grade level standards and research-based instructional practices as fundamental components of their primary role. This likely influenced their responses to the question of rubric criteria importance due to the lens from which they approached the rubric itself. Principals listed how products were selected in survey responses but did not apply the rubric in this study. For that reason, their criteria were focused more on teacher preference and general school needs determined by committee vote or recommendation. Both roles approached the important criteria in a given resource from significantly different perspectives. It is only when a structured rubric is applied by all stakeholders that important and otherwise overlooked criteria will be considered.

Conclusion Statement – Research Question #3

What could be done to monitor the equitable provision and use of subscription-based education technology product resources in its Title I schools?

Usage and Monitoring

Continued use of the Chrome extension will be a needed to provide continued monitoring. If diligent and consistent monitoring of product resource use is eliminated, the introduction of new and unevaluated resources will certainly find their way back into classroom instruction. It is the strong recommendation of the scholarly practitioner that constant and consistent monitoring of product use during instruction be maintained to ensure the fidelity of application within classroom instruction. Additionally, through the Chrome extension, school districts will be able to identify new resources as they are used within instruction. Currently, this is most often observed as vendors offer free components of their complete product, which are available for purchase. Having the ability to identify these free product components provides an opportunity to evaluate the resource prior to a school entering into a contract for the complete product.

Equitable Provision

The equitable provision of product resources is reliant upon the process of product usage monitoring and product evaluation. The further development of a product library to house and inform schools of recommendations and approved resources will encourage an equitable product playing field of options for schools to access. It is the recommendation of the scholarly practitioner that when seeking to provide equitable educational technology resources that the district use the same protocols to determine the educational technology provisions that will be purchased and furnished to district schools. Furthermore, it is also recommended that those selected resources be provided to all schools, content areas, or grade levels equally as aligned to school identified needs. By doing so, districts will be providing an equal foundation of quality resources to all of their schools. Moreover, the library would then, in turn, provide schools with

the additional information necessary to provide vetted quality educational technology resources as strategies to address targeted learning challenges unique to their environment and needs.

Contributions to New Theory and Practice

As a result of this study, the scholarly practitioner is recommending a process for curating educational technology resources. The scholarly practitioner has used the study results to develop a protocol by which new products may be requested, evaluated, graded, and added to a district created product resource library. Figure 16 illustrates the process protocol recommended by the scholarly practitioner. Traditionally, in order for educators to select an educational technology product for school or student use, first, they must identify the need for a product (Lindl, 2017). However, Lindl also points out that the good news is there is a product for every need and the bad news is that there are also hundreds to choose from. This protocol has been developed for application within the participating school district but could, in theory, be applied to other school districts for application. The figure demonstrates the protocol that would begin at an identification step and ultimately ends with a recommendation label and placement within the identified district's resource library. The protocol allows for a logical progression from the discovery of a resource once it enters the marketplace through request and review steps at the district level. The protocol then allows for a period of review that results in the application of a recommendation status for the requested resource. The protocol's final step has the requested resource placed with a recommendation status label into the curated resource library for school-level leaders to view.

From a structured protocol, the resultant assertion is that a strengthened and curated library of resources will be accessible to school-level curriculum leadership. Once building

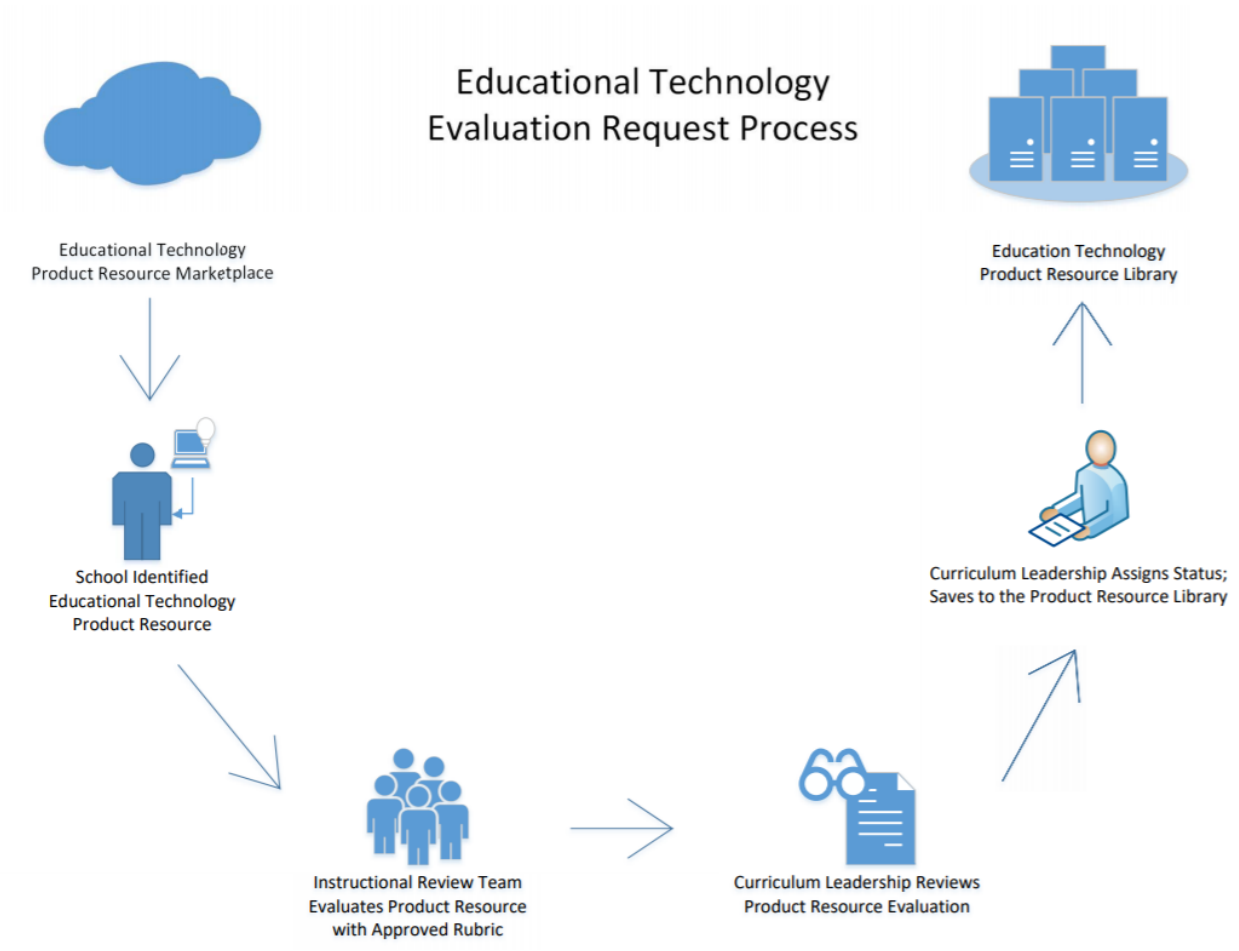


Figure 16. Educational technology evaluation request.

leaders have only the strongest of resources to review, individual academic needs will then be paired with the best available resources.

Summary

Organizing the flood of resources on the market and providing a filter for the district and school consumer has been at the heart of this research and study since its inception. The use of a rubric to evaluate instructional technology resources did not conclusively demonstrate that the rubric used was completely effective in identifying and differentiating products based on quality. It did provide enough data to demonstrate that products do not provide the same levels of instructional value to the instructor or learner. Similarly, the rubric did not reshape opinions of product resources in use, but it did reinforce some and revealed additional criteria to be considered from products currently in use. Additionally, the use of the Chrome extension and application of the rubric has led to a greater ability to provide supplemental technology resource support in a more equitable manner.

Initially, the identification of product resources in use was eye-opening for not only the scholarly practitioner, but also the principals and instructional coaches participating in the study. This identification has led to a new perspective and improved understanding of the resources that are approved as tools for instruction. As a result, the district, instructional leadership, and staff were provided a consistent framework by which these tools are reviewed, evaluated, and approved for use as supplemental instructional resources. In the end, this will support the ability of the district to improve upon equity, provide stronger instructional guidance, and strengthen how funds are utilized to provide curriculum support resources.

Implications

Policy

Lindl (2017) developed a series of questions to guide consumers regarding educational technology resources, helping them see past marketing tactics and purchase product resources that better meet their needs. Lindl's focus was on product customization, equity, connectedness, and system requirements. In this study, the scholarly practitioner has attempted to measure product value by taking the next step in evaluation. Building on the work of Lindl (2017), the scholarly practitioner has used a more specifically designed rubric to further highlight nuances among product resources and gain a greater understanding of product resource quality. It is the recommendation of the scholarly practitioner that each state, including the state which is home to the district at the center of this study, identify or develop a standardized rubric by which Local Education Agencies (LEA) can evaluate education technology product resources being marketed for use in their schools and classrooms. This work could begin with the use of the LearnPlatform rubric used within this study or using self-selected criteria developed to target specific LEA needs and priorities. The scholarly practitioner believes that with a standardized set of criteria to use as a foundation for development, product vendors will devote resources to more acutely shape products to meet state-determined educational needs. LEA policy makers would be well served to likewise align, if not mirror, state rubric frameworks as they seek to further sharpen the focus of how district resources are spent on education technology products used within district classroom instruction. Again, building from Lindl (2017), with greater collaboration from districts and vendors achieved outcomes will benefit both parties.

Practice

Crisp and Bonk (2018) noted that feedback is essential to evaluate any discipline, including education technology. The results found from this study support and reaffirm that

assertion. Through the development of an educational technology library, evaluation criteria labeling structure, and request process illustrated in Figure 13, schools now have a pathway to weed the proverbial garden of lesser quality resources. The framework developed and rubric selected will normalize the instructional approach to vetting educational technology resources that are used within classroom instruction. When stronger technology resources are identified and used within instruction, instruction itself will be strengthened. In the end, this strengthening of instruction has the potential to improve student learning outcomes.

Within instruction, schools are typically identifying time for core instruction, guided and independent practice, along with time set aside for intervention. Intervention can be remedial or content extension depending on the individual needs of the child. The implication being asserted by the scholarly practitioner is that by refining the process of evaluating educational technology resources, priority can then be placed on how, when, and where they best support instruction. That is, if they are evaluated and determined to be a quality instructional resource.

Also being asserted by the scholarly practitioner, is the impact that following protocols will have on the financial burden of purchasing and maintaining resources. By eliminating lesser resources, limited instructional funding will be filtered to purchase stronger resources and eliminate needless spending on overlapping products. The reduced array of resources in the product library will narrow the resource marketplace for principals and minimize the vendor influence during the identification and purchasing process.

Research

This study has focused specifically on the application of a rubric to measure the perceived quality of a district's educational technology resources currently in use. Results from the study have indicated that most products in use are perceived as quite strong as illustrated in

Table 8. With data pointing to all product resources being assessed at a high level, it is the opinion of the scholarly practitioner that additional criteria must be evaluated as components of an effective rubric. It is the sincere desire of the scholarly practitioner that this research continue in years to come. The rubric selected for this study is one that resulted in inflated outcomes. This fact highlights the necessity for further research and application to identify the most critical components of an effective rubric and the correlation between rubric grades and student achievement. The PDSA cycle followed in this study led the scholarly practitioner to the conclusion that the PDSA cycle should be completed using competing rubrics and results compared in order to measure the correlation between a specific rubric and the impact on student achievement. In a parallel study the scholarly practitioner also recommends using a variety of stakeholder groups to use the selected rubrics when evaluating product resources. A greater number of perspectives would strengthen the overall evaluations.

The educational technology marketplace is evolving at rapid pace. In order for the evaluation of marketplace resource products to remain current, a parallel study will be necessary. The scholarly practitioner has observed a trend over the course of this study that points to constant product rebranding, renaming, and updating. Product vendors consistently rename products, acquire and adapt competitor products, and update products with new features. A new and similar study would help monitor and evaluate this ever-changing marketplace of education technology products.

Study Context

This study was impacted by many factors related to the place it was conducted and the participants that took part in the study directly. The location of the study was small and rural, with only a small population of students and teachers to draw information from. Economical

limitations of this small district placed restraints on the number of subscription-based resources being utilized within the district. In turn, that small number of subscription-based resources restricted a broader review of those resources using the identified rubric. Additionally, only having a total of 12 elementary and middle schools in the district studied had an impact on the strength of the results as well.

Two stakeholder groups had a profound and direct impact on the study. In both participant groups, the principals and instructional coaches, this study was strengthened by the experience and depth of knowledge possessed by both stakeholder groups. The majority of principals had more than five years' experience in administration and none of the instructional coaches had fewer than 10 years of teacher and coaching experience. This consistent level of experience clearly strengthened the action cycle findings.

Limitations

Throughout this study, several limitations presented themselves within the research and study practices. One limitation clearly referenced by the scholarly practitioner was the use of only one product resource rubric to measure resource quality. There are more and more rubric tools such as the LearnPlatform rubric now in the marketplace, but no additional rubrics were utilized for the purpose of this study. This study would have been strengthened by the addition of multiple rubrics. Beyond the number of rubrics used was the limitation within the LearnPlatform rubric; there were only eight specific grading criteria. The study findings may have been further supported with the parsing of more specifically identified criteria.

The use of only fourteen instructional coaches also limited the study. All coaches participated in the grading of resources using the provided rubric, but only four were randomly selected to be interviewed following the experience. The study findings may certainly have been

more robust and detailed should more or all of the 14 instructional coaches have been interviewed. The limited number of instructional coaches also restricted the number of product resources that could be evaluated and graded using the rubric. With more than 2,800 resources in use, additional coaches would have allowed for more resource grades and a larger data set of evaluated products. Furthermore, evaluation and feedback responses from the rubric with additional stakeholder groups would have improved the study results. Having only an instructional perspective limited the perspectives revealed in the results.

Instructional coaches identified a limitation during study interviews when they pointed to a lack of clarity within the rubric. Participant coaches highlighted moderate confusion when administering the rubric due to a lack of an identified perspective. One example provided by a coach in an interview was the lack of certainty whether or not they should respond to a question of product ease of use from the perspective of the student user or the teacher user. Ease of Use was perhaps the rubric criteria most impacted by this limitation.

A second limitation involving instructional coaches centered around a decision made early on in the study design by the scholarly practitioner. It was originally thought that by having instructional coaches apply the identified LearnPlatform rubric to products they were familiar with, grading results would be strengthened. Though there did appear to be some truth in the assumption, there was a secondary outcome observed. Due to chosen and reviewed resources also being previously known resources, coaches were in fact, evaluating products they already felt were strong and even liked personally. It is now the assertion of the scholarly practitioner that this bias caused only preferred resources to be evaluated during the study and contributed to inflated and higher overall grading results.

Additionally, the Chrome extension used to identify product resources throughout the district was a limitation. The usage measure calculated by the chrome extension was limited in its ability to differentiate between resource products. More specifically this impacted the study by not differentiating between common resources such as Google Docs and more sophisticated instructional platforms such as IXL. Similarly, the LearnPlatform Chrome extension did not differentiate between teacher instructional tools and student instructional tools. One product resource type is used to support educator pedagogy while the other is a learning resource used by students to potentially impacting learning outcomes.

One final limitation was that of district size. Having focused on only 12 schools in one small, rural district isolated study results to one economic, geographic, and cultural environment. In future research studies it is the recommended that data should be acquired from a larger sample and a variety of environments. Participating schools from different geographical areas, population densities, demographics, and socioeconomically impacted settings are also encouraged.

Implication for Schools

It has been the goal of this scholarly practitioner from the beginning to provide districts and schools with a process by which educational technology resources could be identified, evaluated, organized and equitably allowed or provided to schools for use within instruction. This study was birthed from a real and present challenge which existed within the small rural district at the center of this examination. The resultant outcomes have confirmed many of the early assertions from the scholarly practitioner. These outcomes provide a process by which schools can better understand the value of educational technology resources impacting classroom instruction and student achievement in their buildings.

Recommendations for Superintendents and District Leaders

Watters (2014) explains that with the advent of a more standardized curriculum used by the majority of States, a shift in the educational technology industry priorities has become in large part about classroom time for students to use these new tools. The new industry narrative asserts that products are standards and curriculum aligned (Watters, 2014). Thus lies the foundation for the scholarly practitioner recommendations to superintendents and district leaders. Districts must have the capacity to determine the educational technology resources being used to supplement instruction. However, knowing what resources support instruction is only the first step. In addition, district leaders must be prepared to evaluate the effectiveness thereof and being used during core classroom instruction. These tools, which are marketed as a fix for struggling students if schools use the product for a vendor-determined number of instructional minutes per day or week, should be known, evaluated, and approved by district curriculum leadership. Instructional time and direct teacher instruction is being usurped by free and subscription-based resources without leadership approval.

A key factor that district curriculum leaders must also articulate clear criteria for is the teacher referral or request process. Since teachers and school-level instructional staff, it is most likely that the majority of resource requests will come from them. The scholarly practitioner recommends a request for and processes be developed and communicated from the district leadership level, so there are consistent and clear directions for instructional staff to follow when they encounter new resources in the marketplace. An important component to this request process that is strongly recommended is timely feedback communicated to the requesting teacher or school. It is very important to understand that in making a request, a teacher is taking instructional initiative and should clearly understand rationale for the decision made regarding

the resource they have requested. In many cases, if a resource is denied, a recommended resource, when applicable, should be shared with the requester so the need they are attempting to address can still be supported.

One further recommendation to district leadership is to beware of things that look too good to be true. In other words, beware of the promises made by vendors as they peddle their companies' product and attempt to convince district officials of why their resource is more beneficial to solve learning needs and areas of academic weakness. The education technology resources evaluated during this study can achieve their desired impacts, but that comes with significant buy-in, proper training, and fidelity of use. These three elements do not easily converge to generate the desired outcomes of those purchasing the resource. Care must be given to what resources are added, how to properly train those using the resource, and when to supplement instruction.

Recommendations for Principals and School Leaders

Conceptually, the change in instructional emphasis over time as identified by Shulman (1986) is a shift away from content focus to that of pedagogical process. This study has found Shulman's assertions from more than 30 years ago to be consistent with this scholarly practitioner's findings. Di Blas et al. (2014) addressed the emergence of technology as a central issue impacting the continued integration of educational technology, emphasizing the relationship between technology and pedagogy. For principals and school leaders today, this continued emergence of educational technology resources is an ever-growing challenge to address. It is the recommendation of the scholarly practitioner that principals collaborate with district curriculum leadership to identify the education technology use in the classroom instruction and set priorities for resource use. Principals and school leaders must have a firm

understanding of resources being used, their purpose and design, and then articulate to building teachers how and when to employ those tools to maximize student learning and protect instruction.

From the very beginning of this study and the gathering of usage data, it was quickly realized that the use of technology tools and resources was vastly beyond what was understood by curriculum leaders at the district or school levels. It is from this new understanding that this scholarly practitioner understands more reason than ever for principals and building curriculum leaders to observe instruction and increase time spent in classrooms observing the tools and resources influencing instruction. The scholarly practitioner has a sincere desire that from this study that building leaders would better understand the many hundreds of resources that are having an impact on student learning that may be happening without them knowing.

Also noted by the scholarly practitioner is the challenge faced by principals as instructional staff identify new resources that enter the marketplace. As principals and school leaders encounter requests to utilize new resources during instruction, this scholarly practitioner urges them to resist the impulse to blindly support the teachers to introduce the new product. First, there should be a time of evaluation and instructional prioritization for potential use. This responsibility should not be the responsibility of principals or school leaders alone. The district must act as the filter for what, when, and how new educational technology resources make their way into classroom instruction through the implementation of specific and structured protocols. Principals and school leaders should strictly follow those protocols when considering new products for use within instruction.

Leadership Development

This study and problem of practice approach to research has had a lasting and profound impact on how this scholarly practitioner attempts to address a perceived problem of practice within their purview of leadership. This deep dive into educational technology has provided insights into the depth of knowledge required to speak as an expert on an issue and more importantly, to appropriately adopt processes by which truly impactful and equitable improvements can be made. Figure 17 illustrates the leadership development of this scholarly practitioner throughout the problem of practice process and during the many research steps over the past three years. The figure notes stages of development undergone aligned with the basic processes of the PoP. The stages identified specifically illustrate the growth progression of the scholarly practitioner and outlines the learned ability to develop, test, and implement change in a comprehensive way. The growth advanced through the trial and developmental processes that were conducted on a structured and controllable scale. The figure concludes with the scholarly practitioner as the expert in the area of focus. It demonstrates the scholarly practitioner's preparedness to facilitate quality improvement upon a foundation of supporting evidence and purposeful direction.

As this study has come to a conclusion, this experience and process has taught this scholarly practitioner to be consistently looking for problems of practice that can be more deeply examined and addressed and that many challenges need to be systematically addressed through a comprehensive approach. Specifically, the PDSA model has provided this practitioner a structured approach to problem solving which generates the ability to then carry out meaningful change. This experience has improved this scholarly practitioner's awareness for

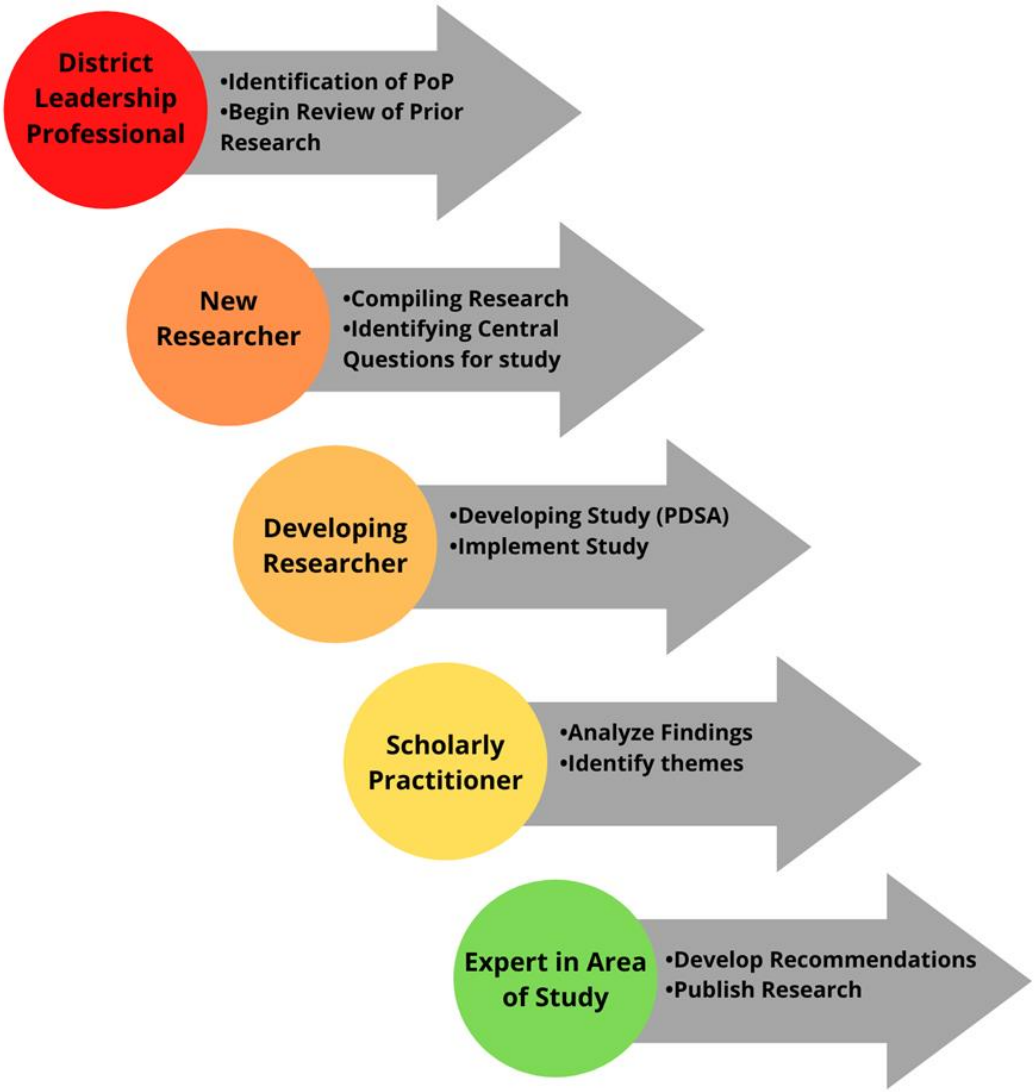


Figure 17. Personal professional development.

systematic needs and inequities as they relate to curriculum. It has created a broadened perspective and generated a passion to address practices that do not function effectively or areas of disorganization. This study specifically identified a curricular area that was unmonitored and without structure. Thus, this awareness by the scholarly practitioner has been further sharpened.

Henceforth, the scholarly practitioner will adjust their approach to equity versus adequacy as it relates to curriculum and district provisions. The scholarly practitioner likewise understands that what is adequate is not always equal based on individual school needs. By evaluating educational technology resources across district elementary and middle schools, the study illustrated the need for the district to provide foundational educational technology resources and to allow schools, once products are determined to be of high quality, to purchase or implement product resources which meets needs unique to the individual school or identified students.

Another area of growth for this scholarly practitioner has been the area of collaboration through the improvement process. Though not new to the scholarly practitioner, the idea of collaboratively addressing systematic deficiencies has been further emphasized and appreciated by the scholarly practitioner as a result of this study. In this context, time and care were given to develop an approach with the participation of many from within district leadership and curriculum staff. It is now a firmly held belief of the scholarly practitioner that due to stakeholder collaboration, results of a more considerable measure were achieved.

Moreover, the scholarly practitioner's understanding as it relates to potential study limitations has evolved and been strengthened. When this study was being developed, the scholarly practitioner had a limited grasp on the possible limitations that would later be realized during the study. From the inception of this study to it becoming operationalized and ultimately

completed, limitations were identified that were never foreseen. Moving forward, a greater understanding and recognition of possible limitations will be considered as future needs are addressed. Though much thought and care may be given to address a need, a constant cognizance of unanticipated outcomes and developments may occur. It is the role of the scholarly practitioner to prepare for as many of these occurrences as can be anticipated but ultimately readdressed in subsequent research if applicable.

Closing

As a result of this study, a concrete and profound professional development has been realized by the scholarly practitioner. This newfound understanding will be transferred into a shared professional learning experience for the additional district and school leaders in the days to come. Learned practices and approaches will be reapplied and further enhanced as they are applied to the needs of different types and within different contexts. Profound gratefulness for the experience is the culminating takeaway!

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** ·
rede.ecu.edu/umcirb/

Notification of Exempt Certification

From: Social/Behavioral IRB
To: Geoffrey Hawthorne
CC: Daniel Novey
Date: 3/2/2020
Re: UMCIRB 19-001980
Using A Framework To Review And Evaluate Educational Technology Resources

I am pleased to inform you that your research submission has been certified as exempt on 3/2/2020. This study is eligible for Exempt Certification under category # 1 & 2ab.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

Document	Description
Dissertation Proposal(0.01)	Study Protocol or Grant Application
Exempt Research Consent(0.02)	Consent Forms
Instructional Coach Interview Questions Revised(0.02)	Interview/Focus Group Scripts/Questions
Principal Survey Question Revised(0.01)	Surveys and Questionnaires

For research studies where a waiver of HIPAA Authorization has been approved, each of the waiver criteria in 45 CFR 164.512(i)(2)(ii) has been met. Additionally, the elements of PHI to be collected as described in items 1 and 2 of the Application for Waiver of Authorization have been determined to be the minimal necessary for the specified research.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX B: DISTRICT PERMISSION TO CONDUCT RESEARCH STUDY

November 1, 2019

Dr. Rhonda Schuhler

Superintendent, Franklin County Schools

53 W. River Rd., Louisburg, NC 27549

RE: Permission to Conduct Research Study

Dear Dr. Schuhler:

I am writing to request permission to conduct a research study within the Franklin County Schools. I am currently enrolled in the Educational Leadership Program at East Carolina University, under the direction of Dr. Dan Novey, Ed.D., and in the process of writing my dissertation. The study is entitled Using a Framework to Review and Evaluate Educational Technology Resources.

I hope that you will allow me to conduct this study using the principals and instructional coaches from each elementary and middle school. Due to the nature of the study, the principals will participate in a survey of education technology products in use within their classrooms. They will identify the rationale for their purchase and use within instruction time. Instructional coaches will be interviewed and asked to identify and evaluate products in us within classrooms in their school building. Once identified, instructional coaches will rate the overall quality of the product using a product rubric. At the end of the study, principals and coaches will be left with a library of education technology resources which they can then use to select products which have been evaluated and recommended for use. Additionally, upon study completion, a web-tool product library will be created for principals to access as they identify new products to enter the marketplace. They will be able to submit a request for new products to be evaluated for value, quality, and whether the product is well aligned to address the academic and instructional needs within that school.

The principals and instructional coaches who volunteer to participate will also be given a consent form to sign and returned to the primary researcher (copy enclosed).

If approval is granted, participants will be contacted and provided the consent form. Times will be set up with the principals and coaches to complete interviews and surveys. Principals and instructional coaches participating will be provided an outline of what is expected and a timeline of events. Once results from the applied product rubric have been used to evaluate product quality, the district product library will be created.

Participant survey and interview data will be pooled for the study and individual participant responses to principal/coach surveys will remain absolutely confidential. Should this study be published, only pooled results will be documented. No costs will be incurred by the school district, the participating schools, or the individual participants.

Your approval to conduct this study will be greatly appreciated. I will follow up with a conversation later next week and would be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address: hawthorneg18@students.ecu.edu.

If you agree, kindly sign below and I will pick up the letter from your office when it is ready.

Sincerely,

Geoffrey Hawthorne

East Carolina University

Approved by:

Dr. Rhonda Schuhler — Name (Print)

Superintendent, Franklin County Schools — Position Title

Dr. Rhonda Schuhler — Signature

1/24/2020 — Date

APPENDIX C: CHROME EXTENSION

APPENDIX D: PRINCIPAL SURVEY

Principal Survey Questions (2019-20)

School	Participant ID	Principal Survey Question
Bunn Elementary Bunn Middle Cedar Creek Middle		Question 1: List as many educational technology products as you can that you currently maintain a subscription for within your school building.
Edward Best Elementary Franklinton Elementary Franklinton Middle		Question 2: Briefly describe the instructional rationale for the purchase of the education technology products currently in use in your building?
Laurel Mill Elementary Long Mill Elementary Louisburg Elementary		Question 3: Describe any of your observed outcomes to instruction resulting from the use of education technology products in your building?
Royal Elementary Terrell Lane Middle		Question 4: Describe how you currently measure or specify the amount of instruction time devoted to education technology product use?
Youngsville Elementary		Question 5: On a scale of 1 to 5 (1 being lowest and 5 being highest) please rate your overall satisfaction with the ability of these education technology products to improve classroom instruction. 1 2 3 4 5

APPENDIX E: INSTRUCTIONAL COACH INTERVIEW QUESTIONS

Instructional Coach Interview Questions (2019-20)

School	Participant ID	Instructional Coach Interview Question
Bunn Elementary Bunn Middle Cedar Creek Middle		Question 1: Please describe the rationale for the use of the educational technology products you evaluated with the Learn Platform rubric.
Edward Best Elementary Franklinton Elementary Franklinton Middle		Question 2: What impact did the application of the Learn Platform rubric have on your impression of the product resources you scored with the rubric?
Laurel Mill Elementary		Question 3: Describe the level of confidence you feel in the Learn Platform rubric instrument you used to evaluate the product resources in your building?
Long Mill Elementary		
Louisburg Elementary		
Royal Elementary Terrell Lane Middle		Question 4: In a word or phrase, please describe your overall perception of the Learn Platform rubric.
Youngsville Elementary		Question 5: Moving forward, how has the use of the LearnPlatform rubric instrument impacted your view of education technology resources?
Math Specialist Intervention Specialist Science Specialist Reading Specialist		

APPENDIX F: CITI TRAINING

Completion Date 09-Mar-2019
Expiration Date 08-Mar-2022
Record ID 30864040

This is to certify that:

Geoffrey Hawthorne

Has completed the following CITI Program course:

Human Research (Curriculum Group)
Group 2.Social / Behavorial Research Investigators and Key Personnel (Course Learner Group)
1 - Basic Course (Stage)

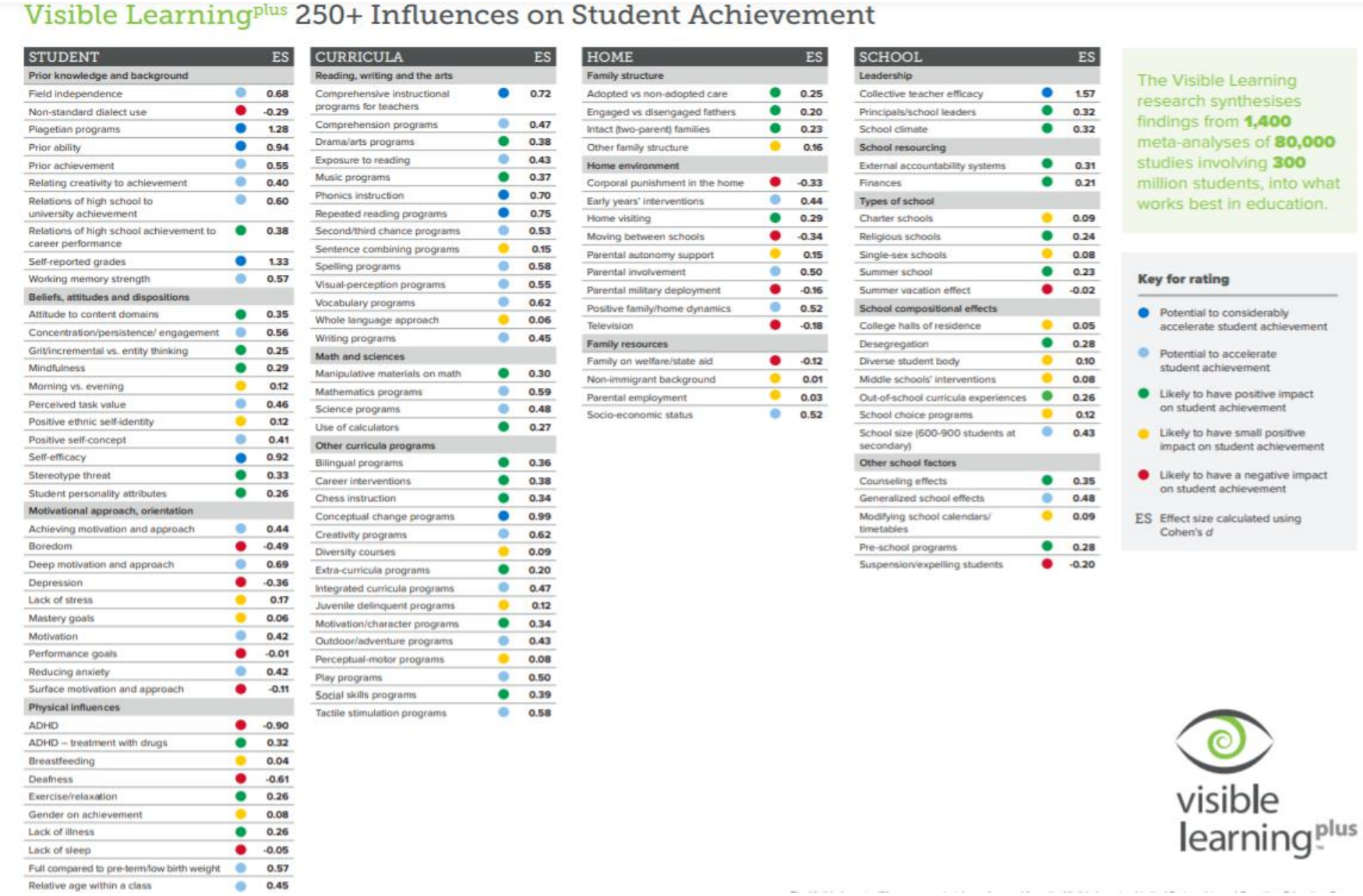
Under requirements set by:

East Carolina University

Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w63afb1dc-dc71-4629-9c8f-bb9d9895c9cd-30864040

APPENDIX G: HATTIES LIST OF FACTORS RELATED TO STUDENT ACHIEVEMENT



Visible Learning[plus] 250+ Influences on Student Achievement

STUDENT	ES
Prior knowledge and background	
Field independence	0.68
Non-standard dialect use	-0.29
Piagetian programs	1.28
Prior ability	0.94
Prior achievement	0.55
Relating creativity to achievement	0.40
Relations of high school to university achievement	0.60
Relations of high school achievement to career performance	0.38
Self-reported grades	1.33
Working memory strength	0.57
Beliefs, attitudes and dispositions	
Attitude to content domains	0.35
Concentration/persistence/ engagement	0.56
Grit/incremental vs. entity thinking	0.25
Mindfulness	0.29
Morning vs. evening	0.12
Perceived task value	0.46
Positive ethnic self-identity	0.12
Positive self-concept	0.41
Self-efficacy	0.92
Stereotype threat	0.33
Student personality attributes	0.26
Motivational approach, orientation	
Achieving motivation and approach	0.44
Boredom	-0.49
Deep motivation and approach	0.69
Depression	-0.36
Lack of stress	0.17
Mastery goals	0.06
Motivation	0.42
Performance goals	-0.01
Reducing anxiety	0.42
Surface motivation and approach	-0.11
Physical influences	
ADHD	-0.90
ADHD – treatment with drugs	0.32
Breastfeeding	0.04
Deafness	-0.61
Exercise/relaxation	0.26
Gender on achievement	0.08
Lack of illness	0.26
Lack of sleep	-0.05
Full compared to pre-term/low birth weight	0.57
Relative age within a class	0.45

CURRICULA	ES
Reading, writing and the arts	
Comprehensive instructional programs for teachers	0.72
Comprehension programs	0.47
Drama/arts programs	0.38
Exposure to reading	0.43
Music programs	0.37
Phonics instruction	0.70
Repeated reading programs	0.75
Second/third chance programs	0.53
Sentence combining programs	0.15
Spelling programs	0.58
Visual-perception programs	0.55
Vocabulary programs	0.62
Whole language approach	0.06
Writing programs	0.45
Math and sciences	
Manipulative materials on math	0.30
Mathematics programs	0.59
Science programs	0.48
Use of calculators	0.27
Other curricula programs	
Bilingual programs	0.36
Career interventions	0.38
Chess instruction	0.34
Conceptual change programs	0.99
Creativity programs	0.62
Diversity courses	0.09
Extra-curricula programs	0.20
Integrated curricula programs	0.47
Juvenile delinquent programs	0.12
Motivation/character programs	0.34
Outdoor/adventure programs	0.43
Perceptual-motor programs	0.08
Play programs	0.50
Social skills programs	0.39
Tactile stimulation programs	0.58

HOME	ES
Family structure	
Adopted vs non-adopted care	0.25
Engaged vs disengaged fathers	0.20
Intact (two-parent) families	0.23
Other family structure	0.16
Home environment	
Corporal punishment in the home	-0.33
Early years' interventions	0.44
Home visiting	0.29
Moving between schools	-0.34
Parental autonomy support	0.15
Parental involvement	0.50
Parental military deployment	-0.16
Positive family/home dynamics	0.52
Television	-0.18
Family resources	
Family on welfare/state aid	-0.12
Non-immigrant background	0.01
Parental employment	0.03
Socio-economic status	0.52

SCHOOL	ES
Leadership	
Collective teacher efficacy	1.57
Principals/school leaders	0.32
School climate	0.32
School resourcing	
External accountability systems	0.31
Finances	0.21
Types of school	
Charter schools	0.09
Religious schools	0.24
Single-sex schools	0.08
Summer school	0.23
Summer vacation effect	-0.02
School compositional effects	
College halls of residence	0.05
Desegregation	0.28
Diverse student body	0.10
Middle schools' interventions	0.08
Out-of-school curricula experiences	0.26
School choice programs	0.12
School size (600-900 students at secondary)	0.43
Other school factors	
Counseling effects	0.35
Generalized school effects	0.48
Modifying school calendars/ timetables	0.09
Pre-school programs	0.28
Suspension/expelling students	-0.20

The Visible Learning research synthesises findings from **1,400** meta-analyses of **80,000** studies involving **300** million students, into what works best in education.

Key for rating

- Potential to considerably accelerate student achievement
- Potential to accelerate student achievement
- Likely to have positive impact on student achievement
- Likely to have small positive impact on student achievement
- Likely to have a negative impact on student achievement

ES Effect size calculated using Cohen's *d*

visible learning[plus]

Visible Learning^{plus} 250+ Influences on Student Achievement

CLASSROOM	ES
Classroom composition effects	
Detracking	0.09
Mainstreaming/inclusion	0.27
Multi-grade/age classes	0.04
Open vs. traditional classrooms	0.01
Reducing class size	0.21
Retention (holding students back)	-0.32
Small group learning	0.47
Tracking/streaming	0.12
Within class grouping	0.18
School curricula for gifted students	
Ability grouping for gifted students	0.30
Acceleration programs	0.68
Enrichment programs	0.53
Classroom influences	
Background music	0.10
Behavioral intervention programs	0.62
Classroom management	0.35
Cognitive behavioral programs	0.29
Decreasing disruptive behavior	0.34
Mentoring	0.12
Positive peer influences	0.53
Strong classroom cohesion	0.44
Students feeling disliked	-0.19

TEACHER	ES
Teacher attributes	
Average teacher effects	0.32
Teacher clarity	0.75
Teacher credibility	0.90
Teacher estimates of achievement	1.29
Teacher expectations	0.43
Teacher personality attributes	0.23
Teacher performance pay	0.05
Teacher verbal ability	0.22
Teacher-student interactions	
Student rating of quality of teaching	0.50
Teachers not labeling students	0.61
Teacher-student relationships	0.52
Teacher education	
Initial teacher training programs	0.12
Micro-teaching/video review of lessons	0.88
Professional development programs	0.41
Teacher subject matter knowledge	0.11

Key for rating

- Potential to considerably accelerate student achievement
- Potential to accelerate student achievement
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ES Effect size calculated using Cohen's *d*

The Visible Learning research synthesises findings from **1,400** meta-analyses of **80,000** studies involving **300** million students, into what works best in education.

TEACHING: Focus on student learning strategies	ES
Strategies emphasizing student meta-cognitive/ self-regulated learning	
Elaboration and organization	0.75
Elaborative interrogation	0.42
Evaluation and reflection	0.75
Meta-cognitive strategies	0.60
Help seeking	0.72
Self-regulation strategies	0.52
Self-verbalization and self-questioning	0.55
Strategy monitoring	0.58
Transfer strategies	0.86
Student-focused interventions	
Aptitude/treatment interactions	0.19
Individualized instruction	0.23
Matching style of learning	0.31
Student-centered teaching	0.36
Student control over learning	0.02
Strategies emphasizing student perspectives in learning	
Peer tutoring	0.53
Volunteer tutors	0.26
Learning strategies	
Deliberate practice	0.79
Effort	0.77
Imagery	0.45
Interleaved practice	0.21
Mnemonics	0.76
Note taking	0.50
Outlining and transforming	0.66
Practice testing	0.54
Record keeping	0.52
Rehearsal and memorization	0.73
Spaced vs. mass practice	0.60
Strategy to integrate with prior knowledge	0.93
Study skills	0.46
Summarization	0.79
Teaching test taking and coaching	0.30
Time on task	0.49
Underlining and highlighting	0.50

TEACHING: Focus on teaching/instructional strategies	ES
Strategies emphasizing learning intentions	
Appropriately challenging goals	0.59
Behavioral organizers	0.42
Clear goal intentions	0.48
Cognitive task analysis	1.29
Concept mapping	0.64
Goal commitment	0.40
Learning goals vs. no goals	0.68
Learning hierarchies-based approach	0.19
Planning and prediction	0.76
Setting standards for self-judgement	0.62
Strategies emphasizing success criteria	
Mastery learning	0.57
Worked examples	0.37
Strategies emphasizing feedback	
Classroom discussion	0.82
Different types of testing	0.12
Feedback	0.70
Providing formative evaluation	0.48
Questioning	0.48
Response to intervention	1.29
Teaching/instructional strategies	
Adjunct aids	0.32
Collaborative learning	0.34
Competitive vs. individualistic learning	0.24
Cooperative learning	0.40
Cooperative vs. competitive learning	0.53
Cooperative vs. individualistic learning	0.55
Direct instruction	0.60
Discovery-based teaching	0.21
Explicit teaching strategies	0.57
Humor	0.04
Inductive teaching	0.44
Inquiry-based teaching	0.40
Jigsaw method	1.20
Philosophy in schools	0.43
Problem-based learning	0.26
Problem-solving teaching	0.68
Reciprocal teaching	0.74
Scaffolding	0.82
Teaching communication skills and strategies	0.43

TEACHING: Focus on implementation method	ES
Implementations using technologies	
Clickers	0.22
Gaming/simulations	0.35
Information communications technology (ICT)	0.47
Intelligent tutoring systems	0.48
Interactive video methods	0.54
Mobile phones	0.37
One-on-one laptops	0.16
Online and digital tools	0.29
Programmed instruction	0.23
Technology in distance education	0.01
Technology in mathematics	0.33
Technology in other subjects	0.55
Technology in reading/literacy	0.29
Technology in science	0.23
Technology in small groups	0.21
Technology in writing	0.42
Technology with college students	0.42
Technology with elementary students	0.44
Technology with high school students	0.30
Technology with learning needs students	0.57
Use of PowerPoint	0.26
Visual/audio-visual methods	0.22
Web-based learning	0.18
Implementations using out-of-school learning	
After-school programs	0.40
Distance education	0.13
Home-school programs	0.16
Homework	0.29
Service learning	0.58
Implementations that emphasize school-wide teaching strategies	
Co- or team teaching	0.19
Interventions for students with learning needs	0.77
Student support programs – college	0.21
Teaching creative thinking	0.34
Whole-school improvement programs	0.28

APPENDIX H: PRINCIPAL GOOGLE FORM SURVEY

K-8 Education Technology Product Resource Survey

Principals, in an effort to collect as much data as possible to support education technology needs, I am asking that you add your personal responses to the following 5 questions. The data collected here will aid in our provisions and support for current and potential product use moving forward.

Thank you all!
* Required

1. List as many educational technology products as you can that you currently maintain a subscription for within your school building. *

2. Briefly describe the instructional rationale for the purchase of the education technology products currently in use in your building? *

3. Describe any of your observed outcomes to instruction resulting from the use of education technology products in your building?

4. Do you currently measure or specify the amount of instruction time devoted to education technology product use?

_____

5. On a scale of 1 to 5 (1 being lowest and 5 being highest) please rate your overall satisfaction with the ability of these education technology products to improve classroom instruction. *

Mark only one oval.

	1	2	3	4	5	
Very Unsatisfied	◯	◯	◯	◯	◯	Very Satisfied

APPENDIX I: #GOOPENNC TOOLKIT

APPENDIX J: COVID-19 SCHOOL CLOSURE EXECUTIVE ORDER

Governor Cooper Issues Executive Order Closing K-12 Public Schools and Banning Gatherings of More Than 100 People

Raleigh
Mar 14, 2020

Governor Roy Cooper today ordered all K-12 public schools in North Carolina to close for a minimum of two weeks in response to COVID-19. The Executive Order also bans gatherings of more than 100 people. North Carolina currently has 23 people in 12 counties who have tested positive for COVID-19.

"We do not have the luxury of a wait-and-see approach. These are hard decisions but they are necessary so we can learn more about the virus," Governor Cooper said. "We do not want any regrets in the rearview mirror, and I am guided by one objective – doing what we must to keep people from getting sick and to make sure that those who do can get excellent care."

The Executive Order directs all public schools to close beginning Monday, March 16, 2020 for at least two weeks. The two-week period allows time for North Carolina to further understand the impact of COVID-19 across the state and develop a plan for continued learning for students should a longer closure be needed. Governor Cooper made the decision in consultation with State Board of Education Chair Eric Davis, State Superintendent of Public Instruction Mark Johnson, and North Carolina Health and Human Services Secretary Mandy Cohen.

Governor Cooper has appointed an Education and Nutrition Working Group to develop a plan to ensure that children and families are supported while schools are closed. The working group will focus on issues including nutrition, health, childcare access for critical health care and other front-line workers and learning support for children at home.

The Working Group will be co- chaired by Susan Gale Perry, Chief Deputy Secretary of NCDHHS and David Stegall, Ed.D, Deputy State Superintendent of Innovation at DPI, and will have representatives from DPI, NCDHHS, the State Board of Education, as well as other education, nutrition and childcare associations.

"I am standing up this new working group to ensure that children have enough food to eat, families have care in safe places for their young children, and student learning continues," Governor Cooper said.

In addition to closing schools, the Executive Order prohibits mass gatherings that bring together more than 100 people in a single room or space, such as an auditorium, stadium, arena, large conference room, meeting hall, theater, or other confined indoor or outdoor space, including parades, fairs and festivals. Violations of the order are punishable as a Class 2 misdemeanor.

The ban on gatherings does not include airports, bus and train stations, medical facilities, libraries, shopping malls and spaces where people may be in transit. Office environments, restaurants, factories, or retail or grocery stores are also excluded.

The Order received concurrence by members of the NC Council of State without objection. Read the full executive order.

Make sure the information you are getting about COVID-19 is coming directly from reliable sources like the CDC and NCDHHS.

For more information, please visit the CDC's website at www.cdc.gov/coronavirus and NCDHHS' website at www.ncdhhs.gov/coronavirus, which includes daily updates on positive COVID-19 test results in North Carolina.

APPENDIX K: EXECUTIVE ORDER NO. 117

State of North Carolina

ROY COOPER
GOVERNOR

March 14, 2020

EXECUTIVE ORDER NO. 117

PROHIBITING MASS GATHERINGS AND DIRECTING THE STATEWIDE CLOSURE OF K-12 PUBLIC SCHOOLS TO LIMIT THE SPREAD OF COVID-19

WHEREAS, the undersigned issued Executive Order No. 116 on March 10, 2020, which declares a State of Emergency to coordinate the State's response and protective actions to address the Coronavirus Disease 2019 ("COVID-19") public health emergency and to provide for the health, safety, and welfare of residents and visitors located in North Carolina ("Declaration of a State of Emergency"); and

WHEREAS, the undersigned established the Novel Coronavirus Task Force on COVID-19 to work with state, local, and federal partners in responding to challenges posed by COVID-19; and

WHEREAS, the World Health Organization declared COVID-19 a global pandemic on March 11, 2020; and

WHEREAS, on March 11, 2020, the President of the United States took executive action to restrict travel from Europe into the United States of America; and

WHEREAS, on March 13, 2020, the President of the United States declared the ongoing COVID-19 a pandemic of sufficient severity and magnitude to warrant an emergency declaration for all states, tribes, territories, and the District of Columbia pursuant to Section 501(b) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. § 5121-5207 (the "Stafford Act"); and

WHEREAS, on March 13, 2020, the President of the United States pursuant to Sections 201 and 301 of the National Emergencies Act, 50 U.S.C. § 1601, *et seq.* and consistent with Section 1135 of the Social Security Act, as amended (42 U.S.C. § 1320b-5), declared a national emergency that the COVID-19 outbreak in the United States constitutes a national emergency beginning March 1, 2020; and

WHEREAS, the North Carolina Department of Health and Human Services ("NCDHHS") confirmed the number of cases of COVID-19 in North Carolina continues to rise; and

WHEREAS, Executive Order No. 116 invoked the Emergency Management Act, and authorizes the Governor to exercise the powers and duties set forth therein to direct and aid in the response to, recovery from, and mitigation against emergencies; and

WHEREAS, NCDHHS has organized a Public Health Incident Management Team to manage the public health impacts of COVID-19 in this state; and

WHEREAS, first responders and health care professionals remain integral to ensuring the state is best situated to respond to and mitigate the threat posed by COVID-19 and such first responders and health care professionals should have the availability of all necessary personal protective equipment and continue to follow all necessary response protocols; and

WHEREAS, pursuant to N.C. Gen. Stat. § 166A-19.30(b)(3), the undersigned, with the concurrence of the Council of State, has the power to regulate and control the congregation of persons in public places or buildings; and

WHEREAS, pursuant to N.C. Gen. Stat. § 166A-19.30(b)(4), the undersigned, with the concurrence of the Council of State, may waive a provision of any regulation or ordinance of a state agency which restricts the immediate relief of human suffering; and

WHEREAS, pursuant to N.C. Gen. Stat. § 166A-19.30(b)(5), the undersigned, with the concurrence of the Council of State, may perform and exercise other such functions, powers and duties as are necessary to promote and secure the safety and protection of the civilian population; and

WHEREAS, further action is necessary to protect the health and safety of the residents of North Carolina, slow the spread of the COVID-19 outbreak, reduce the number of people infected, and avoid strain on our health care system; and

WHEREAS, the undersigned has sought and obtained concurrence from the Council of State consistent with the Governor's emergency powers authority in N.C. Gen. Stat. § 166A-19.30.

NOW, THEREFORE, by the authority vested in me as Governor by the Constitution and the laws of the State of North Carolina, **IT IS ORDERED**:

Section 1. Prohibition of Mass Gatherings

Pursuant to N.C. Gen. Stat. § 166A-19.30(b)(3), which allows for the undersigned to regulate and control the congregation of persons in public places or buildings and with the concurrence of the Council of State, to help protect the health and well-being of North Carolinians, I hereby prohibit mass gatherings in the State of North Carolina.

a. A mass gathering is defined as any event or convening that brings together more than one hundred (100) persons in a single room or single space at the same time, such as an auditorium, stadium, arena, large conference room, meeting hall, theater, or any other confined indoor or outdoor space. This includes parades, fairs and festivals.

b. A mass gathering does not include normal operations at airports, bus and train stations, medical facilities, libraries, shopping malls and centers, or other spaces where more than one hundred (100) persons are gathered. It also does not include office environments, restaurants, factories, grocery stores or other retail establishments.

c. Pursuant to N.C. Gen. Stat. § 166A-19.30(a)(2), the provision of this section shall be enforced by state and local law enforcement officers.

d. Violations of this section or orders issued pursuant to N.C. Gen. Stat. § 166A-19.30 may be subject to prosecution pursuant to N.C. Gen. Stat. § 166A-19.30(d) and is punishable as a Class 2 misdemeanor in accordance with N.C. Gen. Stat. § 14-288.20A.

Section 2. School Closures

a. Pursuant to N.C. Gen. Stat. § 166A-19.30(b)(5) which allows the undersigned to perform and exercise such other functions, powers and duties as are necessary to promote and secure the safety and protection of the civilian population, and with the concurrence of the Council of State, I hereby direct that all public schools close for students effective Monday, March 16, 2020 until March 30, 2020, unless extended beyond that date.

b. Pursuant to N.C. Gen. Stat. § 166A-19.30(a)(1), I hereby direct NCDHHS, the North Carolina Department of Public Instruction, and the North Carolina State Board of Education to immediately work together to implement measures to provide for the health, nutrition, safety, educational needs and well-being of children during the school closure period.

Section 3. Social Distancing

In coordination with the State Health Director and alignment with guidance from the Centers for Disease Control and Prevention, all persons are urged to maintain social distancing (approximately six feet away from other people) whenever possible and to continue to wash hands, utilize hand sanitizer and practice proper respiratory etiquette (including coughing into elbow).

Section 4. Distribution

I hereby order that this Executive Order be: (1) distributed to the news media and other organizations calculated to bring its contents to the attention of the general public; (2) promptly filed with the Secretary of the North Carolina Department of Public Safety, the Secretary of State, and the superior court clerks in the counties to which it applies, unless the circumstances of the State of Emergency would prevent or impede such filing; and (3) distributed to others as necessary to ensure proper implementation of this Executive Order.

Section 5. Effective Date

With the exception of section 2, this Executive Order is effective immediately and shall remain in effect for thirty (30) days or until rescinded or superseded by another applicable Executive Order. An Executive Order rescinding the Declaration of a State of Emergency will automatically rescind this Executive Order.

IN WITNESS WHEREOF, I have hereunto signed my name and affixed the Great Seal of the State of North Carolina at the Capitol in the City of Raleigh, this 14th day of March in the year of our Lord two thousand and twenty.

Roy Cooper
Governor

ATTEST:

Elaine F. Marshall
Secretary of State