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Secondary Educator Experiences Managing Digital Resources

Cameron Sharbel McKinley
Walden University

Walden University

College of Education

This is to certify that the doctoral study by

Cameron Sharbel McKinley

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Dr. Heather Pederson, Committee Chairperson, Education Faculty
Dr. Sunddip Aguilar, Committee Member, Education Faculty
Dr. Leslie VanGelder, University Reviewer, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

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Abstract

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by

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EdS, Lesley University, 2009

MA, Lesley University, 2006

BS, University of Alabama, 1987

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Secondary teachers use digital resources for teaching, yet little is known about how they find, evaluate, organize, and share these resources. This basic qualitative study was conducted to fill the gap and examine the experiences and practices of secondary educators in curating digital resources. Findings on how teachers manage digital information, strategies used, and necessary supports may aid in creating targeted professional development (PD) for teaching in face to face and blended environments. A conceptual framework based on Mishra's and Kohler's technological pedagogical content knowledge theory and Siemens' connectivism guided the research and informed the data analysis. The experiences of secondary educators when finding, evaluating, and using digital resources in the classroom, as well as the strategies used, and supports needed were investigated. Purposeful sample size of 15 educators currently teaching for at least 1 year participated in semistructured interviews. Data analysis involved the use of a priori codes from the framework categories. Teachers need collaboration time. Quality digital resources are critical to successful teaching and learning in blended and virtual environments and can lead to engaging and effective lessons when used correctly. PD on organization and curation is needed and beneficial. This study contributes to positive social change by informing future development of PD focused on digital resource management, curation strategies, and better ways of using and sharing resources with students. Better curation strategies and sharing could lead to quality digital resource repositories designed to meet blended learning needs in situations such as the recent Covid-19 crisis. These resources could be used to provide engaging content to students in a variety of learning situations who might not otherwise have access.

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Dedication

Dedicated to my parents, Arthur and Ginger Sharbel. To my dad who gave us unconditional love and support and who made us believe we could do anything. To my mom, who for her entire life, has modeled the love of learning with love, joy, and unending energy and who gave me the opportunity to realize the value and importance of being a positive and contributing global citizen.

Acknowledgments

I would like to thank my family, Jay, Joseph, EJ, and Mary Virginia who showed patience in the process and encouraged me in the journey. Many times, they heard me say that I could not do whatever it was they wanted to do because I had a paper due or a class assignment. They were always positive, realizing the importance of lifelong learning. I would also like to thank my "group" who encouraged me, prayed for me, and never let me give up on this dream. Thank you to my Creator for giving me the love of learning and the resources and supports to take this journey. Thank you also to my siblings who always encourage my dreams. Thanks to my work family of educators and students who demonstrate daily what dedication is all about. Thank you to my chair, Dr. Heather Pederson, who continued to advocate for me and to push me to create quality research. And to my committee members, Dr. Aguilar and Dr. Van Gelder who offered invaluable insights and advice throughout the process. And thank you to the educators who gave up time during their holiday break, in the midst of a global pandemic, to share their experiences in the hopes of helping to bring about positive social change in education.

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Chapter 1: Introduction to the Study

Introduction

This research study is focused on the experiences of secondary educators in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs. The Office of Educational Technology's national technology plan update includes the promise of providing high-quality digital learning content and resources for students as a part of its infrastructure goals to support learning (United States Department of Education, Office of Educational Technology, 2017). Key to achieving this goal is ensuring educators can curate and share digital learning content; especially through the use of openly licensed educational resources (OER; U.S. Department of Education, Office of Educational Technology, 2017). As a technology coach, I have developed robust search and technology skills, but despite my capabilities, recent attempts to curate content for teachers made me realize the increasing difficulty of doing so in the current digital landscape. Finding appropriate and engaging resources has become more difficult due the sheer magnitude of digital resources available.

The Internet, email, web applications, and social media have all contributed to a state of information overload and traditional methods are no longer sufficient for managing it (Mahdi et al., 2020). While teachers have an abundance of information literally at their fingertips, it can be a struggle to make sense of it and to use it for instruction. A university study looked at how OER's were used in higher ed and provided solutions for successful curation. One solution included a resource toolkit which included

support on where to find resources, how to evaluate, and a sample curation tool with a column to reflect and annotate the resource making it more beneficial for the end user (Horn et al., 2018). Research at the university level has looked at the issue but there is little research focusing on secondary educators (de los Arcos et al., 2016; Dezuanni et al., 2017; Diekema & Olsen, 2014; Ungerer, 2016; Yasmeen et al., 2019).

In this study, I focused on listening to teacher voices to learn how they manage information. This management includes finding, evaluating, organizing, creating, and sharing to meet student needs. The recent pandemic created conditions where the task is even more difficult as teachers are tasked with creating content for students learning in a variety of environments: virtually, blended, and face-to-face. Mishra's and Kohler's technological pedagogical content knowledge (TPACK) and Siemens' connectivism frameworks offer a shared lens to explore teacher practice allowing for the development of strategies and supports to enable teachers to provide the conditions that allow students to grow into critical consumers and effective communicators. The results allow for the development of tailored professional development (PD) to support teachers in managing resources with the goal of creating learning conditions where students can thrive.

This chapter presents the background and purpose of the study and the need for research on the topic from a secondary educator perspective. It also includes the study purpose, research question addressed, and a brief overview of the conceptual framework which is discussed in detail in Chapter 3. The chapter concludes with the definitions, assumptions, and scope of the study.

Background

Educators have access to a plethora of digital resources in addition to opportunities to create content (Shelton & Archambault, 2018). Working with digital information and resources can be overwhelming and requires competencies both to consume and to contribute (Bawden & Robinson, 2017; Kervin et al., 2019; Koltay, 2017). There are many sites offering curated collections for educator use, both company and teacher created (de los Arcos et al., 2016; E. A. Horn et al., 2018). Digital resources provide benefits such as collaboration and engagement but choosing and managing the use of these resources can be difficult (Farooq & Matteson, 2016; Gough et al., 2017; Kervin et al., 2019; J. Kim, 2018; Mnkandla & Minnaar, 2017; Vickers et al., 2015). This management involves digital content curation which is a primary competency for educators and offers learning benefits (Bates, 2015; Gadot & Baruch, 2018; J. Kim, 2018; Mihailidis, 2015; Tsybulsky, 2020; Ungerer, 2016).

A connectivist teacher needs the capacity to critically evaluate and manage online information in addition to the ability to guide students to resources without limiting learning (Foroughi, 2015). Seimens (2008) described a curatorial teacher in terms of providing a type of map to aid students in exploring and connecting to content in a meaningful and effective way. Digital curation involves "the use of digital tools to select, preserve, collect, sort, categorize, and share digital assets" (Tsybulsky, 2020, p. 1). In the past, the term was used in the context of libraries and museums but now is frequently referred to in the field of education. Teachers give a new lens to the curated material to make it meaningful for students and their learning (de los Arcos et al., 2016; Tsybulsky,

2020). In reviewing the literature, I found research from the health and medical education fields, business education fields, and university studies (see Cunnane & Corcoran, 2018; McCorkle & Alexander, 2019; Shaw et al., 2016). However, there is a gap in the literature for how secondary teachers use and curate information for teaching and learning. Asking questions to discover best practice would be informative and valuable. Ideas for future research include addressing the gap in the literature regarding disadvantages and challenges inherent to curation (Cherrstrom & Boden, 2019, 2020). Studies of the curation process and its effect on digital skills could be beneficial (Tsybulsky, 2020). If educators are to prepare students for their futures, the ways they are using and managing digital information for teaching and learning, the strategies they have found that work, and what supports are successful or missing needs to be understood.

Problem Statement

Ayteş (2020) defined digital content creation as the action of "finding, following, saving, organizing, interpreting and sharing the available digital sources around a topic" (p. 1). Antonio and Tuffley (2015) added the importance of critical evaluation to the definition. Due to recent COVID-19 concerns, many districts are operating in blended or virtual learning environments (Krueger & Snelling, 2020). School personnel are still assessing how the shift has affected teachers (Krueger & Snelling, 2020). Managing digital resources is even more critical when teaching in a blended environment (de los Arcos et al., 2016; Parks et al., 2016; Pulham et al., 2018; Pulham & Graham, 2018). There is a need to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies,

and support needs to transition to online learning. This study included participants who are secondary teachers across the United States.

Purpose of the Study

The purpose of this basic qualitative study was to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs. To address the study problem, semistructured in-depth interviews with 15 secondary teachers from around the United States were conducted. The findings in the study addressed the gap noted in the literature in understanding secondary teachers' challenges, strategies, and support needs relating to using digital resources. It also uncovered information on challenges teachers experienced providing digital content during the recent COVID-19 pandemic and strategies and support needed to meet similar situations in the future.

Research Questions

The following research questions were informed by the study purpose, research method and design:

RQ1: What are the experiences of secondary educators when finding, evaluating, and using digital resources in the classroom?

RQ2: What strategies do secondary teachers use for finding, evaluating, and using digital resources in the classroom?

RQ3: What support do secondary teachers need to find, evaluate, and use digital resources in the classroom?

Conceptual Framework

The TPACK framework guided this study. TPACK involves a researcher seeking to understand how technology is used by looking at more than just the technology, but also the content knowledge and pedagogical knowledge involved in its use (Mishra & Koehler, 2006). Surveys and open-ended questionnaires have been used to allow participants to share experiences with educational technology and find evidence of teacher TPACK (Koehler et al., 2013). Siemens' (2005) theory of connectivism provided the framework for studying the flexible nature of digital media and the connections made in using the tools for learning. Analyzing and understanding the use of social and digital networks is necessary to understand learning in this digital age (Sa'adi, 2016). Kultawanich et al. (2015) explored connectivism as a learning process and concluded that a core component was the teacher role in curating information, filtering, and modeling best practice. I explored this role to better understand teacher challenges, strategies, and support needs.

Nature of the Study

To address the study problem, I used a basic qualitative study to explore educators' experiences, strategies, and support in finding, evaluating, and using digital resources in the classroom. Semistructured in-depth interviews were conducted with secondary teachers in the United States. Participants were recruited from LinkedIn, Twitter, and educator Facebook Groups such as the National Network of State Teachers of the Year (NNSTOY) to answer the research questions. Participants included secondary teachers in the United States who teach in either a face-to-face or blended teaching

environment and who use digital resources in the classroom. Participants had at least 1 year of teaching experience. Interviews were conducted through video conferencing and were recorded and transcribed to look for themes related to the research problem. Participants were encouraged but not required to provide digital artifacts to include samples of curated content. Both manual and software-assisted analysis were used to analyze the data. Curry suggested that studying the role of organizational context in implementing new technology is appropriate (Yale University, 2015). Careful selection of data collection methods and the sequencing of the methods are important considerations when conducting qualitative research (Ravitch & Carl, 2016).

Definitions

Included below are the definitions of term associated with the research study.

Blended Learning: Blended learning combines face-to-face instruction with computer mediated or online instruction (Graham et al., 2019; M. B. Horn et al., 2014; Liao, 2015; Stevens et al., 2018).

Connectivism: A learning theory proposed by Siemens (2005) that explains how learners obtain knowledge in light of emerging technologies.

Curation: Curation (digital) is the process of managing information to increase its value for the use of others now and in the future (Poole, 2017). To curate is to blend ideas on a topic and share with additional value added to aid others in understanding the information (S. Hu et al., 2018).

Information Literacy: The Association of College and Research Libraries (year) defined information literacy as “the set of integrated abilities encompassing the reflective

discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (p. 8).

Information Overload: Information overload involves problems in finding relevant information due to the increased amount of available content (Mahdi et al., 2020).

In-service teachers: Licensed teachers who are actively employed in an educational institution.

TPACK: The TPACK model describes three knowledge domains, including pedagogical knowledge (PK), content knowledge (CK), and technological knowledge (TK; Koehler et al., 2013).

Open Educational Resources (OER): These educational resources reside in the public domain on the Internet and include textbooks, videos, podcasts, and any other learning related materials such as teachers' guides, lesson plan recreations, experiments, demonstrations, and curricula (Butcher, 2015).

Prosumers: A term indicating someone who consumes and produces.

Assumptions

This study was based on four assumptions discussed here. The first assumption was that qualitative interviews are an appropriate method for the study's purpose. The second assumption was that in the current pandemic situation, most teachers would be using some type of technology resource to teach in all educational settings to include face-to-face, blended, and virtual environments. The third assumption was that

participants would cooperate throughout the research process. The final assumption was that participants would be open and honest in answering the interview questions.

Scope and Delimitations

The study was conducted in the United States with secondary educators who use digital resources for instruction. Semistructured interviews with open-ended questions were used to collect the research information. Facebook educator groups such as the NNSTOY and VOYA Science Technology Engineering and Math (STEM) Educators were used to find participants. The fact that participants came from online groups already indicated that were using technology resources to connect to other educators. I also reached out to social media groups to find additional participants who may not be a part of the Facebook groups but were connected to the educators in the group because of work location.

Limitations

The study involved teachers from across the United States, so it did not focus on one school district or state. The small sample size was necessary due to the time involved in conducting interviews. The sample size limited the amount of data captured but still provided a chance for quality in-depth descriptive data. The study was limited to secondary teachers so I did not consider elementary educator experiences.

Significance

The significance of the study lies in its ability to identify existing challenges and effective strategies for using and finding, evaluating, and using digital resources in the secondary classroom. Research conducted on managing digital resources is most often

conducted in higher education or involves library media specialists (Dougan, 2016; Gadot & Baruch, 2018; Jung & Lee, 2015; Mohr & Shelton, 2017; Su-I Hou, 2017; Tsybulsky, 2020; Vickers et al., 2015). Secondary teachers' experiences in this area have not been explored as often or the studies focus on a single resource (Blaine, 2019; Gough et al., 2017; Jung & Lee, 2015; Martin & Carr, 2015; Vermette et al., 2019).

To design effective PD and to determine best practice, educator experiences with managing and engaging with digital content need to be understood (Bikson et al., 2017; Graham et al., 2019; Luo & Murray, 2018; Mohr & Shelton, 2017; Parks et al., 2016; Su-I Hou, 2017; Taranto & Buchanan, 2020; Veletsianos et al., 2018). This knowledge may help educators partner with foundations and content providers for mutual benefit (Bikson et al., 2017; Ksiazek et al., 2016). Findings provide an original contribution to the research in education technology and may allow for development of more effective use of digital resource pedagogy for secondary educators. The possibility of positive social change is strong since the research provides technology coaches and other lead educators with a better understanding of current secondary teacher challenges and strategies. This may lead to development of targeted professional development to meet educator needs.

Summary

Though quality digital resources are available for educators to use in teaching, the overwhelming amount of information and resources can make it difficult to find what is needed. In the current pandemic environment, more teachers are teaching in blended environments which sometimes require new digital resources. This chapter introduced the study problem, describing the lack of research on the specific topic and addressing the

benefits to educators of exploring the topic. The conceptual frameworks of TPACK and connectivism were previewed along with research on curation in education. These topics will be described and analyzed in Chapter 2. The section introduced the study purpose, research questions, conceptual framework, definitions, assumptions, scope and delimitations, limitations, and significance of the study.

Chapter 2 will describe the literature search strategies and the journals and keywords used to complete the comprehensive review. Literature on the two frameworks and how they shaped the study are covered. In addition, five themes are outlined with current literature described in support of the study design and methodology which is developed in Chapter 3. Chapter 4 includes demographics and data collection methods along with data analysis divided into nine themes. Chapter 5 includes the findings, limitations, and recommendations.

Chapter 2: Literature Review

The purpose of this basic qualitative study was to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs. Much of the literature has been in higher education rather than in secondary education. Additionally, student and preservice teacher experiences are documented in most studies instead of current secondary teacher experiences involving the use of digital resources. Little research was found on the topic of digital information management that specifically pointed to strategies used to evaluate, manage, and use digital resources. The literature on secondary educators curating information is limited because this skill is usually associated with librarians; though it is now applicable to all who encounter the vast number of digital resources available for teaching and learning. Although not directly related to secondary education, research findings from other disciplines in which managing digital information is key to work success, can help in topic exploration and understanding. A wider search for digital information management and strategies explores the strategies, professional development needs, and experiences of those who rely on digital information for teaching and learning. There is a need to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs to transition to online learning.

Literature Search Strategy

I started the literature review by using Walden University library's databases, such as Academic Search Complete, EBSCOhost, ERIC, SAGE, and Education Research

Complete, searching for peer-reviewed journal articles published in the last 5 years that focused on secondary educator experiences in managing digital resources. I also used Walden's Google Scholar interface to find information that linked back to the Walden databases. Frequent meetings with the Walden Resource librarians provided new tips and strategies and led me to add ProQuest Central, Sage Premier, and Thoreau to my database list. Keywords used for the searches included *information overload, information overwhelm, information management, curation, digital media, social media curation, personal information management, teaching, challenges implementing digital media in high school instruction,* and *teacher challenges in curating social media for instruction*. My initial goal was to understand educator experiences in finding, evaluating, and using digital resources. An additional goal was to discover peer-reviewed articles that explored the importance of educators' ability to manage vast amounts of information to teach and the strategies used to find, evaluate, and use the abundant resources available online.

In addition to keyword searches, articles used for this study came from journals including but not limited to *Computers and Education, Journal of Educational Technology Systems, E-Learning and Digital Media, Journal of Research on Technology in Education, Journal of Educational Technology, Educational Technology, Research and Development, The International Journal of Information and Learning Technology,* and *Journal of Research in Innovative Teaching and Learning*. I also used reference lists from journal articles, Google scholar listings, and related dissertations. These lists pointed me to additional online journals such as *Contemporary Educational Technology,*

Journal of Online Learning Research, and the Journal of Education for Library and *Information Science* which included further relevant scholarly articles.

The study also includes references on the TPACK framework and Siemens' (2005) theory of connectivism. The literature review is divided into five sections: (a) digital information overload, (b) digital information curation and management, (c) blended learning needs (d) strategies for digital information use, and (e) professional development and support. In Sections 1, 2, and 3, I reviewed articles on information overload and management in both face to face and blended learning environments, describing the need to investigate this topic as it relates to education. In parts four and five, I reviewed literature involving strategies and support needs for educators. The literature reviewed supports the study focus: The need to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs. The articles specific to secondary educators were limited, older than 5 years, or from other countries. These limited findings signify the need for additional research specific to secondary educators' experiences in the United States in managing digital resources.

Conceptual Framework

For my study, the TPACK framework offered a lens to examine the data from teacher interviews through specific knowledge domains. These knowledge domains help to categorize teachers' experiences and strategies when selecting digital learning resources. The interview data was analyzed and categorized through the domains which include pedagogical knowledge (PK), content knowledge (CK), and technological

knowledge (TK) and the interactions between the domains (see Koehler et al., 2013). The framework was useful in understanding how strengths in each of these domains relate to teacher experiences and support needs related to finding, evaluating, and using digital resources in the classroom.

Content knowledge (CK) is the "what" and includes the facts, concepts and theories that make up a teacher's subject area (Dalal et al., 2017). Pedagogical knowledge (PK) is the "how" and includes methods of teaching such as strategies and assessments. PCK is the intersection of pedagogical and content knowledge domains and could be demonstrated by how a teacher scaffolds content for learners. Technological knowledge involves how teachers select, evaluate, and integrate technology. This technology was not limited to devices but also included the content reflected in resources such as apps and online digital content. TCK is the intersection of the technological and content knowledge domains and involves how technology is used in a subject area for learning. TPK is the intersection of technological and pedagogical knowledge and involved how teachers choose and manage technology for students. The entire model considers how a teacher might combine the digital resources to enhance teaching and support student learning in the most effective way. This involves collaboration and sharing in addition to demonstrating mastery of content. The understanding that comes from the intersection of all the domains is the TPACK framework. TPACK helps to remind teachers to focus on all the domains and not just the technology piece (Xie et al., 2018).

Background and Current Research on TPACK

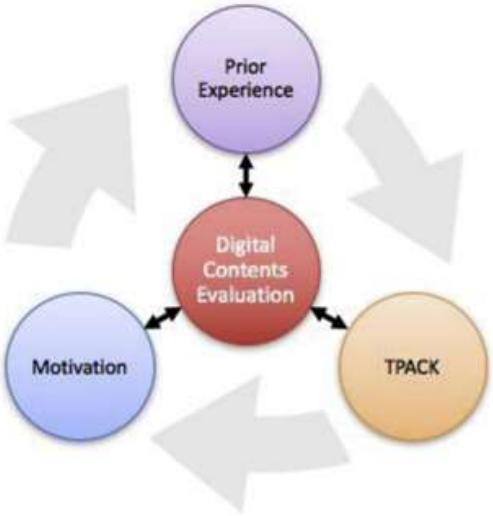
The TPACK model has been used to look at the knowledge domains teachers need to select appropriate digital materials to meet learner needs. Another domain has recently been added to TPACK to include standards knowledge making an expanded model named TPACK+S (see Xie et al., 2018). Researchers have looked at the importance of evaluating digital content through the lens of the TPACK domains and the increase in free and open source materials will increase the importance of developing an authentic and dependable process for evaluating these digital resources (Xie et al., 2018). In actual practice, the TPACK domains overlap and present in an integrated way. Additional research could help in understanding what digital resources are essential for teaching and learning (Heitink et al., 2016).

Teachers in a recent study participated in a year-long course on evaluating digital content for instruction (Cheng & Xie, 2018). Secondary teacher participants have been found to have a higher level of content knowledge (CK) due to the ability to focus on a single subject (Cheng & Xie, 2018). Digital content evaluation involves higher order thinking in addition to TPACK (Xie et al., 2017). Teachers' values and beliefs play a significant role in how teachers perceive barriers to technology integration and benefits seen from technology may increase these beliefs (Cheng & Xie, 2018; Vongkulluksn et al., 2018). The intersection of the knowledge domains, especially technological and content knowledge (TPK) can be increased through professional development. Hopefully, an increase in TPACK may lead to improvements in a teacher's ability to find and evaluate digital content that is engaging and purposeful for students (Dalal et al., 2017).

Increasing educators' TPACK through PD and other supports can reduce stress caused by technology integration implementation (Özgür, 2020). Some say TPACK does not take into account the new landscape of technology such as cloud technology (Hsu & Chen, 2019). Digital content evaluation involves prior experience and motivation in addition to TPACK as shown in Figure 1 (M. K. Kim et al., 2017).

Figure 1

Digital Content Evaluation Competency Development



Note: From "Building teacher competency for digital content evaluation", by M. K. Kim, K. Xie, and S. L. Cheng, 2017, *Teaching and Teacher Education*, 66, 309–324. https://doi.org/10.1016/j.tate.2017.05.0

Siemens (2005) Connectivism Theory

A second framework that guided the study was Siemens connectivism theory. Connectivism was proposed as a learning theory by Siemens (2005) on his blog, elearningspaces.org and after incorporating feedback he received, he updated it in 2005 to the current learning theory. Siemens argued that past learning theories do not account for learning in the digital age. No longer is learning only from personal experience but from

connections. He pointed out that learners in the digital age are challenged to make meaning and form connections. These connections between sources of information can result in useful information that is necessary and valued in our society today. Siemens proposed that new tools would change the way people work and function. He also recognized that education has been hesitant to acknowledge the impact these tools can have on learning (Siemens, 2005). Though this is still true in some circles, the current pandemic has increased the necessity and therefore the pace of implementing the digital learning resources needed for students and teachers to thrive. How teachers use and manage these resources and what connectivist strategies are used are key areas of focus for this study. Eight principles make up the learning theory and are listed below (Siemens, 2005).

1. Learning and knowledge rests in diversity of opinions.
2. Learning is a process of connecting specialized nodes or information sources.
3. Learning may reside in non-human appliances.
4. Capacity to know more is more critical than what is currently known.
5. Nurturing and maintaining connections is needed to facilitate continual learning.
6. Ability to see connections between fields, ideas, and concepts is a core skill.
7. Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
8. Decision making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality.

While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

Though all the principles play a role in this research, Siemens' (2005) last principle is core to this study. The act of curating digital information for learning involves strategic decision making. Through this lens, I sought to understand the strategies teachers use to overcome challenges in the choice and use of digital classroom resources. Connectivism theory directly relates to how teachers manage and curate information for learning. Connecting with each other and connecting information in meaningful ways is an important skill in the information age for both teachers and learners (Utecht & Keller, 2019). Connectivism addresses the limitations in previous theories such as behaviorism, cognitivism, and constructivism that do not consider learning in a digital information landscape (Bell, 2011). The speed of information growth outpaces people's ability to manage, interpret, and use it (Siemens, 2008).

The ability to make critical connections among the vast sources of information and data available and to apply it to classroom learning is of vital importance to education (Utecht & Keller, 2019). Connectivism involves value measuring and networked environments where learning stems from the interaction and communication of knowledge and resources (Banihashem & Aliabadi, 2017). One of the most visible applications of connectivism has been the massive open online courses (MOOCs; (Goldie, 2016; Mattar, 2018; Wang et al., 2018). These online learning opportunities offer many benefits to distance learners. MOOCs are connectivist in nature and benefit from curated content sharing (Traxler, 2018). Connectivism learning theory has been

used as the foundation for designing other collaborative courses which include outcomes that demonstrate connectivist principles such as collecting, applying, and sharing digital media in teaching and learning by creating a shared digital repository (Thota, 2015). Thota (2015) focused on university level course examples and the challenges faced in connectivist learning environments. Connectivism was used as a model of teaching and learning when studying the use of blogging in a university setting (Garcia et al., 2015). Online university courses benefit from connectivism principles (Reese, 2015). Now that online learning is more necessary at all levels, it is important to explore how secondary teachers are managing digital resources for student learning through this connectivist lens. My study provides examples from the secondary environment which is a gap found in the current research.

While many researchers focus on understanding connectivism and successful applications of the theory (see Downes, 2019), some argue that connectivism is not sufficient to be the lone theory informing learning in a digital learning environment (see Bell, 2011; Duke et al., 2013; Kop & Hill, 2008; Mattar, 2018). Though connectivism does not replace other learning theories, it embodies parts of other theories and can be considered both a learning theory and an instructional theory (Kropf, 2013). Mattar (2018) suggested it could function as an extension of constructivism to address that theory's limits. Research providing evidence of the tenets of connectivism that demonstrate the impact on learners and educators would be valuable (Corbett & Spinello, 2020). The theory has strengthened in acceptance over the years and will continue to

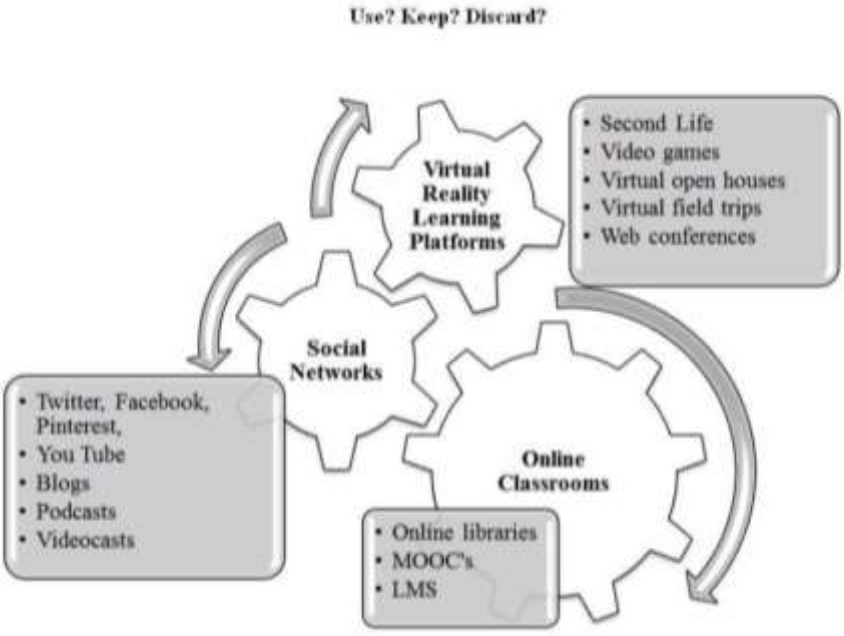
increase in importance as our access to networked technologies and resources grows (Corbett & Spinello, 2020).

Connectivism learning theory allows for best practice in advancing learning and instruction (Reese, 2015). One strategy for successful implementation of connectivism is to avoid giving students information that they can get themselves (Rice, 2018). Connectivism suggests that learners obtain knowledge through information reservoirs as shown in Figure 2 (Kropf, 2013).

Figure2

21st Century's Three Major Information Reservoirs

Note: From "Connectivism: 21st century's new learning theory" by D. C. Kropf, 2013,



European Journal of Open, Distance and E-Learning, *16*(2), 13–24.

Connectivism offers a learning theory that emphasizes the virtual resources more than physical resources recognizing the importance of networks in helping others connect

to knowledge (Guder, 2010). Though the need to catalog or curate information is still important, it can be done by multiple members of a learning community (Guder, 2010). Students should have the opportunity to explore, research, and create (Reese, 2015). According to Foroughi (2015), educational researchers must investigate what skills teachers and students need to succeed in this connectivist and digital learning environment.

Evidence of the acceptance of connectivism as a learning theory is its inclusion on the list of learning theories online at http://www.learningtheories (Goldie, 2016). Numerous studies have explored and recognized connectivism as a valid and useful learning theory (Flynn et al., 2015; Wang et al., 2018). Connectivism provides a lens through which education can seek solutions to global challenges (Shukie, 2019). A shift to a connectivist learning approach is needed to better prepare students for future success (Kivunja, 2014). The connectivism principles should be applied in course design across the board to engage learners and improve learning outcomes (Reese, 2015). More research to determine what supports are needed to increase teachers' confidence in implementing connectivist learning principles would be valuable (Ostashewski & Reid, 2015). My study explored teacher experiences to find strategies used and supports needed to find, manage, and use resources in ways that give students these opportunities.

Literature Review Related to Key Concepts and Variable

Digital Information Overload

Information overload as a concept is not new, though not to the extent we see today (Rudd & Rudd, 1986; Yates et al., 2017). When examining recent search analysis

of educators using a support website, findings showed an increase of 30 times over the previous year. The number of views relating to the topic of ***organizing content in the digital learning environment*** increased 6 times from one month to the next (Cavanaugh & DeWeese, 2020). The abundance of information can cause digital amnesia and other difficulties in evaluating resources appropriately and can affect quality of life (Gui et al., 2017; Petrașuc & Popescul, 2019). Teachers use social media to share tips on specific remote learning tools such as Zoom and Flipgrid (Trust et al., 2020). This practice adds to the large amount of data teachers are exposed to when searching for resources. A recent study found that social networks, though beneficial, are a factor influencing information overload (Roetzel, 2018).

Many online learning products and offerings include reviews which teachers can use to evaluate the resource. Reading product reviews can cause information overload, overwhelming consumers and rendering them unable to make a decision (H. Hu & Krishen, 2019). In reviewing education content, might this same type of overwhelm and inability to decide occur? Teachers around the world admit that finding quality resources among the vast amount of free choices is a challenge (de los Arcos et al., 2016; Diekema & Olsen, 2014; E. A. Horn et al., 2018). There is a difference between information overconsumption and dealing with information overload. Solutions offered include strategies such as twigging, delegation, and training (Koltay, 2017; Rudd & Rudd, 1986). Some indicators show that highly educated individuals are better able to cope with the latter (Gui & Büchi, 2019).

A recent study found that little was known about how K-12 teachers use the abundance of digital resources for day to day classroom interactions (Vermette et al., 2019). Knowing how educators find, use, and personalize resources in addition to the barriers faced in doing so can aid designers and support providers in offering improved and tailored support (Vermette et al., 2019). Difficulty in finding information due to the enormous amounts available is not limited to education but is present across disciplines (Bawden & Robinson, 2017). The ability to cope with information overload should be considered an important skill related to well-being (Gui et al., 2017). Identifying and teaching skills and competencies to overcome information overload would help mitigate the problem (Benselin & Ragsdell, 2016; Yasmeen et al., 2019).

Digital Information Curation and Management

Cherrstrom and Boden (2019) discuss the expanding role of curation in education and the need for future research to explore adult educators and how and why they curate for student learning. In the literature review, the authors observed an obvious expansion of curation to include content curation for teaching and learning that involved formal and informal collaborative partnerships (Cherrstrom & Boden, 2019). Teachers curate for many reasons to include insufficient resources provided by a district curriculum. When teachers recreate collections or create content they have been referred to as *prosumers* (S. Hu et al., 2018). Martin and Carr (2015) surveyed 701 K-12 educators regarding multimedia and technology use to learn what they are using to create or curate multimedia and its effectiveness for student learning. Recommendations were to compare technology use between different school levels and between rural and urban in addition to

finding out the benefits of additional tools and resources. A qualitative study of K-12 teachers found that they did not taking advantage of already curated repositories and lacked the curation skills needed to use the resources to positively impact teaching and learning (Diekema & Olsen, 2014).

Curation is a critical competency. Educator curation allows for personalization of the teaching and learning process and increases authenticity (Deschaine & Sharma, 2015; Ungerer, 2016). When curating learning resources for students, providing them in a way that reduces cognitive load may allow students to better absorb and process the information (Walkington & Bernacki, 2018). Future research is needed to learn more about the digital literacy competencies needed to curate information and how activities compare to traditional classroom assessments. More formal pedagogies to support incorporation of curation type activities in the classroom are needed (Mihailidis, 2015; Ungerer, 2016). Content curation is a powerful way to provide quality resources for the learning environment instead of using only in-house resources (de los Arcos et al., 2016; Sharma & Deschaine, 2016). Digital curation can involve a large expenditure of time, but efforts may be recognized when the benefits are realized (Ungerer, 2016).

Curators should add value to the organized collection of information (Tsybulsky, 2020). The act of sharing the curated content is vital to the process as this is the part that allows others to benefit (Ungerer, 2016). Social media is used to curate digital information yet much of the research has been in higher education versus the K-12 environment (Greenhow et al., 2019; Tsybulsky, 2020). Social bookmarking and other social media sharing is a way to share curated content but many educators at the

university level still resort to using the organization-provided content (Traxler, 2018). Multiple examples show curation use by students to engage them in the learning process and to prepare them for college or career (Cherrstrom & Boden, 2019, 2020; Shaw et al., 2016; Tsybulsky, 2020). Little research exists about secondary teachers' content use (Shaw et al., 2016). Digital curation tools and resources are not new but the application of curated tools for learning is more of an innovation (Ungerer, 2016). This study explored secondary teachers to see how or if they curate content for learning, strategies they may use, and what supports best prepare teachers to participate in this shift in provided content.

Blended Learning Needs

Teaching in a blended learning model requires skills that are not required in traditional courses (Stevens et al., 2018). The blended learning curation process involves selecting appropriate resources for the different levels of online teaching (Bryson & Andres, 2020). Despite previous experience in blended learning, teachers in a recent study were overwhelmed with teaching online and needed substantial support (Trust & Whalen, 2020). With more hybrid learning and constantly changing digital tools, it is more important than ever for teachers to understand and use digital tools effectively (Bates, 2015; Graham et al., 2019). One study included 2290 in-service teachers in a district in the Eastern United States. The researchers looked at the needed competencies for teaching effectively in a blended environment. With an increase in blended learning needs, they found a need for more testing of teacher readiness (Graham et al., 2019). There is a need to look at high school teachers who teach blended and in 1:1

environments. Qualitative interview questions could provide details that could improve the instrument and find out more in-depth information (Graham et al., 2019). Stevens, Borup and Barbour (2018) examined a year-long PD program for high school social studies teachers and librarians using the College, Career, and Civic Life (C3) framework for Social Studies and TPACK to look at effectiveness of the program to help teachers overcome barriers in teaching in a blended environment. The authors recommended future studies to help identify best practices. Parks, Oliver and Carson (2016) found a need for blended learning support and recommended an investigation of PD offerings and delivery to determine what types allow successful implementation of blending learning.

Online and blended learning involves both resource creation and resource curation (Sandars et al., 2020). Since the start of the Covid-19 pandemic, quick adoption of curation methods has been necessary. When there is a lack of relevant resources, teachers resort to active curation to fill the void (S. Hu et al., 2018). Bryson and Andres (2020) found that curated materials were bundled and linked to a learning map to guide students through the learning resources and to identify connections between resources and learning targets or outcomes. Two types of curation were required - digital resources to support self-study and resources to support online and real-time learning. Further curation occurred with students helping to co-create and bundle resources (Bryson & Andres, 2020). There are challenges involving blended learning research which include possible bias in those conducting the research and the difficulty in defining what constitutes success in blended learning (Stevens et al., 2018). Gaining teacher perspectives could aide in defining successful practices. Shifting to blended and online learning can be

transformational but relies on successful curation of learning experiences to be at the heart of the shift (Bryson & Andres, 2020).

Strategies for Digital Information Use

It is important to find strategies to combat information overload (Giunti & Atkins, 2020). In a recent study of K-12 teachers, the top challenge mentioned when shifting to remote teaching was feeling overwhelmed with the amount of available online resources and tools (Trust & Whalen, 2020). Additionally, they were challenged by a lack of knowledge about these online/remote teaching and communication tools (Trust & Whalen, 2020). In this same study, teachers reported that asking colleagues, conducting internet searches, and reviewing district and outside organization resources were the top ways in which they prepared for online teaching (Trust & Whalen, 2020). Finding content is time-consuming.

Sometimes online collections and learning activities created by content providers are not designed by educators and must be tweaked to be used or teachers may create their own content to complement what they find (Dezuanni et al., 2017). Davis (2017) discusses productive vs consumptive curation and how it might affect curation practices. Users decide on connections which in turn affects the content they find and share (Davis, 2017). One study found that teachers use social media feeds to follow topics that match classroom content, saving and sharing the content when it fits (Dezuanni et al., 2017). Another study found that crowdsourcing the rich annotation of digital resources, using text, audio, and video annotations, has proven to be an effective way to increase the value of and the ease in finding and using digital resources (Chen & Tsay, 2017). Finding other

successful curation processes and strategies would be helpful to educators. Successful educational curators can serve as change agents (Flintoff et al., 2014). Teachers use already curated lists, general search engines, and one-on-one or small informal group peer advice when navigating digital information resources (Vermette et al., 2019). Kim (2018) asked what content, strategies, and methods are needed to support curation competency development. The study used portfolios for assessment and involved library information services.

Teachers use a variety of social media platforms and strategies for curating information (Willet & Carpenter, 2020). Curation through tagging has been explored (Barton, 2018; Greenhalgh & Koehler, 2017). Tagging is a powerful way to find and share content during the curation process and many of the curation tools incorporate this feature (Sharma & Deschaine, 2016). Twitter has been used successfully by teachers for just-in-time teaching and learning (Greenhalgh & Koehler, 2017). The challenge of identifying and teaching best practices in digital curation is difficult due to constant change inherent in the field (J. Kim, 2018). Interviews could be valuable in understanding teacher interactions with tools like Reddit (Willet & Carpenter, 2020). Ungerer (2016) evaluates digital curation tools through the lens of the SECTIONS model proposed by Bates and Poole (2003). This model considers criteria that includes students' education level, ease of use and reliability, costs, teaching and learning, interactivity, organizational issues, novelty, and speed of incorporation. Curated resources can supplement course resources with culturally responsive content (Karimi et al., 2019, 2020). A study of higher education faculty found that keywords, tagging, bookmarks, and labels are some

of the strategies used to organize information though retrieving information still proves difficult for educators who could benefit from PD to improve these skills (Yasmeen et al., 2019). A study of K-12 teachers recommended that research focused on educator preferences, criteria used in finding relevant information, and how social recommendations fit into the process would be beneficial (Diekema & Olsen, 2014). Additional research on how educators apply digital curation in relation to pedagogy is needed (Trust & Whalen, 2020; Ungerer, 2016).

Professional Development and Support

Transitioning from print to digital resources can be difficult for teachers and requires access to quality content in addition to thorough PD to help teachers with successfully evaluating, selecting and integrating the digital content (Xie et al., 2017). U.S. teachers have less collaboration time than teachers in other countries (Darling-Hammond & Hyler, 2020). More support is needed to include offering teachers the opportunity to see examples and strategies from their colleagues (Vermette et al., 2019). Rethinking schedules to allow blocks of collaboration time could help teachers in finding resources and developing innovative teaching practices to support our new normal (Darling-Hammond & Hyler, 2020). PD that is collaborative in nature such as in the form of Professional Learning Communities (PLCs) is more beneficial to educators and to the students they serve (Meeuwen et al., 2020). The study questions provide the opportunity to learn from teachers about any collaborative strategies used and if they were beneficial to managing digital information. Sharing teacher ideas and strategies is necessary to support their growth in using digital tools and this support becomes even more important

as more students use computers as often as a pencil for a learning tool (Vermette et al., 2019).

Teachers need support when finding and evaluating digital information (Johnson et al., 2020; C. C. Shelton & Archambault, 2019). PD on TPACK is necessary to help teachers evaluate digital content. PD with a TPACK foundation can be helpful if it is organized, has clear expectations, and is relevant to a teacher's practice (Dalal et al., 2017; Xie et al., 2017). PD can be used dynamically to create instructional materials to meet current needs such as those created by the COVID19 pandemic (Sadler et al., 2020). It is important to learn from teachers what types of professional development and support allow teachers to improve in finding digital content that is engaging and purposeful for students. Supports such as specialists and training on rubrics and other evaluation instruments can help move teachers to higher levels of TPACK competence (M. K. Kim et al., 2017).

Collections may already be available for teachers to use curated by school librarians who are skilled in curation and can offer PD for teachers who need help using resources for instruction (Welz, 2017). In addition to individual teacher professional development, instructional designers should also be involved in supporting the development of resources for online and blended learning (Johnson et al., 2020). A mixed-methods study that included interviews with information technology experts found that users would benefit from industry professionals serving as middlemen to curate information and to provide built-in filtering options (Giunti & Atkins, 2020). Blended learning PD should allow for collaboration, practice, and reflection (Stevens et al., 2018).

Collecting and sharing best practice in blended learning would benefit PD initiatives (Stevens et al., 2018).

PD should be engaging and meaningful to teachers and refrain from adding to the already-present information overload to impact real learning (Kennedy, 2016). Long term professional development is more effective in changing teacher beliefs which can in turn hep them to be more willing to implement positive change (Tondeur et al., 2017). Conole (2018) discussed the importance of Continuing Professional Development (CPD) based on the 7 C's of the Learning Design Framework to help teachers benefit and use digital technologies.

The Create part of the framework involves teachers understanding how to repurpose existing materials or to design original material to share. Teachers could benefit from a framework and PD to learn how to use digital resources in different contexts (Karimi et al., 2020). One study found that the connectivist approach resulted in the ability to provide quality digital teaching resources for classrooms and professional development (Chan et al., 2015). Research on how teachers used technology for emergency remote teaching could help in developing better supports and PD for educators (Trust & Whalen, 2020). Shared educator insights on curated materials can help others better understand how they were used and how they might be used effectively with different student populations (Karimi et al., 2019, 2020).

Summary and Conclusions

This chapter provided a comprehensive review of the literature that influences this study. The review started with a selection of studies discussion the TPACK framework

and Siemens' (2005) theory of connectivism. These frameworks offer a lens through which to explore the research problem. The next five sections reviewed studies involving one of five themes related to the study problem and purpose. The sections included literature discussing digital information overload, digital information curation and management, blended learning needs, strategies for digital information use, and professional development and support. Digital information overload is an increasing problem in today's world leading to the need to find strategies to manage and use the information (Cavanaugh & DeWeese, 2020; Gui et al., 2017; Petrașuc & Popescul, 2019). Curation is a critical competency requiring support (Mihailidis, 2015; Ungerer, 2016). Literature included studies involving teaching in both face to face and blended learning environments, describing the need to investigate this topic as it relates to education. In the final sections, the selection of literature focuses on recent strategies used and supports needed for managing digital information. The final section included a discussion on professional development as it relates to the topic study and significance. The articles specific to secondary educators were limited, older than five years, or from other countries. These limited findings signify the need for additional research specific to secondary educators' experiences in the United States in managing digital resources. The literature reviewed supports the qualitative study focus: the need to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom in order to better understand their challenges, strategies, and support needs. Chapter 3 provides details on the design and implementation of the basic qualitative study.

Chapter 3: Research Method

The purpose of this basic qualitative study was to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs. Because all qualitative research is interpretive, it is acceptable to label this type of study simply as a basic qualitative study (see Merriam & Tisdell, 2016). This chapter includes discussion on the research design and rationale for the study, the researcher's role, methodology, participant selection, instrumentation, data collection, data analysis, trustworthiness, and ethical procedures. The chapter concludes with a summary of the elements of the research method and process.

Research Design and Rationale

The purpose of this basic qualitative study was to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs. The following research questions were informed by the study purpose, research method and design.

RQ1: What are the experiences of secondary educators when finding, evaluating, and using digital resources in the classroom?

RQ2: What strategies do secondary teachers use for finding, evaluating, and using digital resources in the classroom?

RQ3: What support do secondary teachers need to find, evaluate, and use digital resources in the classroom?

After considering the study's purpose and research questions, I chose a qualitative research method for my approach. Qualitative researchers are interested in exploring lived experiences and perspectives and the interpretations of those experiences (Ravitch & Carl, 2016). Basic qualitative studies look at people's interpretation of their experiences and the meaning they attach to them. Data is collected through open-ended interviews or document analysis in this type of study (Merriam & Tisdell, 2016). The qualitative approach is an appropriate fit for this study as it is flexible and gives participants a meaningful voice. Qualitative research allows participants to serve as "story-tellers" which can result in the illumination of important issues that may not be uncovered in less flexible research methods (Kozleski, 2017). Qualitative research can also lead to more expansive results that include multiple ways of knowing and learning (Kozleski, 2017). During teacher interviews, ideas may be uncovered that would not be found otherwise. For example, responses might involve strategies that serve underserved populations or culturally responsive digital resources might be shared. These topics may be uncovered by probing questions and participant descriptions that would not be obtained using other research methods. The basic qualitative method selection emerged from the research questions, study goals, and research context.

Quantitative research was not appropriate for this study as it does not fit the study design. Quantitative research involves analyzing data numerically using statistics and mathematics (Ravitch & Carl, 2016). The research questions in this study are best answered with rich descriptive data which can be obtained through interviews with follow-up probes for clarification. The research questions were designed to look at

teacher experiences as a whole versus a quantitative approach which would be used if the research questions were relational or causal with a hypothesis to test.

Role of the Researcher

My interest in this topic is rooted in my personal experience as a technology integration coach and as a researcher. In my role as technology coach, I am the same level as a certificated teacher. I serve as an objective interviewer of secondary teachers to discover how they find, evaluate, and use digital resources in the classroom in order to better understand their challenges, strategies, and support needs.

I am a member of several teacher educator groups on social media including NNSTOY, VOYA STEM Educators, National Board for Professional Teaching Standards, and other educator-focused groups. Though these groups are used to seek participants for the study, I do not hold any authority over the participants in any of the groups. For the purposes of this qualitative case study, my role as investigator was to interview, record, and analyze data. I protected participants from harm and maintained confidentiality through open and honest communication, member checks, and personal identification of biases as described by Merriam and Tisdell (2016), Thomas (2017), and Ravitch and Carl (2016). Participants were able to review transcripts to validate transcription and to provide feedback and comments. I kept a reflective journal to increase awareness of potential biases and other ethical concerns and to record thoughts and assumptions.

Methodology

Participant Selection

The basic qualitative study used open-ended semistructured interviews for data gathering and analysis. The population included in-service secondary teachers who use digital resources for teaching in person and/or online. The process for the selection of participants was purposeful to ensure participants were unique in their ability to answer the research questions (Ravitch & Carl, 2016). The goal of purposeful sampling and qualitative study is not to generalize but to answer the research questions to gain understanding (Ravitch & Carl, 2016). By inviting participants from a pool of teachers engaged online, I hoped to glean answers to the research questions that could inform the design of future supports that meet educator needs. Included teachers had experience teaching with digital resources for at least 1 year. I used social media to invite participants interested in participating and selected from those who met the criteria to take part in the study.

If potential recruits chose not to participate, no further contact was involved that was study related. I planned to select from 10 to 15 participants for this study. The actual study involved 15 secondary teachers. Depending on the diversity of the sample, saturation could have required up to 30 participants, but it was more likely that 10 to 15 would be appropriate for my study (see Burkholder et al., 2016). Some researchers are hesitant to use the word saturation because of the implication of one truth (Ravitch & Carl, 2016). I set aside the time and resources to include additional participants if saturation was not reached but I had sufficient data at 15 participants. A purposeful

random sample from educators recruited in online social media spaces was used. Purposeful random sampling is useful in reducing bias when small samples are used due to the limited availability of time and resources (Ravitch & Carl, 2016).

Instrumentation

Data collection instruments for this study included a consent form, interview protocol, interview questions, interview guide, recording of interview, and follow up email to participants. Once the informed consent was completed, participants were invited to choose an interview appointment time from an online appointment scheduler. Interviews took place through video conferencing and phone calls and were recorded for transcription. Participants were made aware of the recording in the introduction to the interview and were reminded that they could opt out of the study at any time.

I developed the interview guide (Appendix A) as described by Rubin and Rubin (2011) to align with the research questions. A follow up email included a transcript of the interview for participant review. The interview questions are aligned to the research questions to ensure the sufficiency of the data collection. An open-ended question was included at the end as a good practice to allow participants to add additional comments (see Ravitch & Carl, 2016). I tested multiple versions of the questionnaire with friends and family to find the best instrument (see Lambert, 2012).

Procedures for Recruitment, Participation, and Data Collection

Participants were recruited from educator Facebook Groups including NNSTOY, VOYA STEM, and other Educator groups. Twitter and LinkedIn were used to recruit additional participants. Participants included secondary teachers in the United States who

teach in either a face-to-face or blended teaching environment and who use digital resources in the classroom. Participants had at least 1 year of teaching experience. An online form was provided to volunteers to determine those teachers who meet the study criteria. Those who did completed an online informed consent. Once the consent was completed, participants received a link to an online appointment scheduler to schedule an interview time slot. Interviews were conducted through video conferencing and audio from the conference was recorded and transcribed to look for themes related to the research problem. A phone option was offered for those who were unable or unwilling to participate in a video interview. Three participants opted for the phone-only option. Participants were offered the option to provide digital artifacts to include samples of curated content, but it was not required.

Interviews were designed to last 45 minutes, but participants were asked to set aside an hour to allow time for questions at the beginning and end of the interview. Once the interview transcription was complete, a copy of the transcription was emailed to the participant for checking. A thank you email was sent at the completion of the process.

Data Analysis Plan

Both manual and software-assisted analysis methods were used to analyze the data. First, the interviews were transcribed into written words using the Otter.ai transcription software. I then listened to the audio to make necessary corrections in the transcription. I examined all data applicable to the research problem with the realization that it was not be possible to identify and code every theme or concept represented in the interview data (see Rubin & Rubin, 2011). Visual representations of data are used to

share results and findings. As Saldana (2015) advised, I used a hybrid coding method to include a priori codes and inductive codes. The NVivo program was used to assist in analyzing the data.

Trustworthiness

Credibility

Credibility means that the findings of the study are believable given the data presented (Merriam & Tisdell, 2016). One way credibility is demonstrated is by making sure the interview participants chosen are knowledgeable about the research issues (Rubin & Rubin, 2011). The participants for this study were in-service secondary teachers who use digital resources and therefore were qualified to elaborate on the research questions. Rubin and Rubin (2011) caution of the need to ensure participants accurately speak about their experiences. Question phrasing is designed to prevent participants from possibly distorting or omitting information and to be non-threatening. There were also enough overlapping questions to allow for consistency checks.

Transferability

Transferability is supported by using thick descriptions and maximum variation (Merriam & Grenier, 2019). To ensure transferability, it is important to share details on exactly how the study was conducted including participant descriptions, data collection methods, time periods, and limitations. I shared details about this study including possible limitations to ensure transferability. By documenting my findings, sharing my insights, and providing the reasoning behind my conclusions and analysis, I have increased the trustworthiness of my findings.

Dependability

Dependability means that there is evidence of consistency in data collection, analysis, and reporting. Demonstrating that the data collection method is reasonable, and that the collected data answers the research questions helps to provide dependability for a study (Ravitch & Carl, 2016). The study interview questions are aligned to the research questions and are designed to provide detailed descriptive data. Memos were used throughout the study to make note of any researcher bias.

Confirmability

Conformability requires that other informed researchers would come to the same conclusions when examining the same qualitative data (Babbie, 2017; Schwandt et al., 2007). Collaborating with others for a research study is one strategy that could help with validity. I collaborated with my chair and committee members to discuss and receive feedback on the processes and methods used.

Ethical Procedures

The Walden University Institutional Review Board (IRB) approval was required and obtained before any participant recruitment or data gathering occurred. The IRB approval number is 12-16-20-0727365 and was included on the consent form for participants. Recruiting posts clearly described the research topic and all participants were provided an informed consent to make participants aware of their rights and the requirements of study participation. Participants were reminded that they were free to refuse participation and/or withdraw from the study. Pseudonyms were used in place of actual participant names to protect participants. I attempted to eliminate potential

research bias by creating the semistructured interview questions and probes, being aware of misinterpreting interview data, remaining consistent during the interview/data collection process, and including all data when analyzing the results. In addition, I excluded participants who work at the site where I currently serve as a technology coach because of the possibility of a conflict of interest.

I informed participants that all data was stored on the researcher's personal computer with two-step password protection and that once the study is completed, study data would be transferred to a USB drive and stored under lock and key for a period of five years at the researchers' home. After that time, data will be destroyed in line with Walden University's policy. To ensure both internal and external transparency, researchers must be honest with participants about all aspects of the study and must disclose limitations when sharing the final results (see Ravitch & Carl, 2016). Written assurance to participants stated that any information gathered through the study will remain confidential.

Summary

This section described the study methodology. Topics discussed included a clear description of the research design and rationale for the study, the researcher's role, methodology, participant selection, instrumentation, data collection, data analysis, trustworthiness, and ethical procedures. A basic qualitative study was conducted with 15 secondary educators who met the study criteria. In-depth semistructured interviews were used for data gathering and analysis. The population included in-service secondary teachers who use digital resources for teaching in person and/or online. Data analysis

involved manual and software-assisted analysis. The issues of trustworthiness were addressed to include credibility, transferability, dependability, and confirmability. Ethical considerations discussed included IRB approval and participant and data protection and procedures.

Chapter 4: Results

The purpose of this basic qualitative study was to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs. To address the study problem, a basic qualitative interview study was conducted. The following research questions were used to guide the basic qualitative study:

RQ1: What are the experiences of secondary educators when finding, evaluating, and using digital resources in the classroom?

RQ2: What strategies do secondary teachers use for finding, evaluating, and using digital resources in the classroom?

RQ3: What support do secondary teachers need to find, evaluate, and use digital resources in the classroom?

This chapter includes specifics regarding the setting, data collection, data analysis, results, and evidence of the trustworthiness of this research.

Setting

The setting for this study was a virtual setting that included secondary teachers in the United States who responded to recruiting posts. The interviews were conducted with secondary teachers in the United States who volunteered to participate using the Zoom conferencing tool or a phone call depending on participant preference. Sixty-six percent of the participants were from Alabama with the others from California, Illinois, Tennessee, and Wisconsin. The interviews were conducted during December 2020 and January 2021 during teacher holiday breaks. These interviews were conducted during an

on-going pandemic which may have resulted in teacher video-conferencing fatigue. Two teacher participants had or were recovering from the COVID-19 virus. All participants have experience teaching in both virtual and face-to-face environments. Most are currently teaching in a blended or hybrid environment due to the current global pandemic, with some having all virtual students in addition to the hybrid environment, and two currently teaching all virtual despite having taught only face-to-face in previous years.

Demographics

The participants for this study included 15 secondary teachers in the United States. Participants taught a variety of subjects and grade levels including math, science, language arts, social studies, visual arts, world language, and career tech. The average number of years of teaching experience among participants was 15.9 ranging from 2 to 37 years. Demographic information is shown in Table 1. Pseudonyms were used to protect participant confidentiality.

Table 1

Research Participant Demographics

Participant	Subject	Years Teaching	Location
Brooke	Science	16	Tennessee
Alexa	Language Arts	16	Alabama
Kayla	Language Arts	20	Alabama
Regina	Social Studies	15	California
Jacob	Career Tech	32	Illinois
Brian	Math	2	Alabama
John	World Language	20	Alabama
Pete	Science	37	Alabama
Tina	Language Arts	25	Alabama
Sloan	Math	9	Alabama
William	Visual Arts	3	Illinois
Diana	Math	19	Alabama
Beverly	Math	3	Alabama
Sheila	Career Tech	17	Wisconsin
Michael	Science	5	Alabama

Data Collection

The data included 15 semistructured interviews conducted virtually through video conferencing and phone interviews. After receiving IRB approval 12-16-20-0727365, I posted recruiting information targeted to teacher groups on Facebook, Twitter, and LinkedIn. There were 18 teachers who showed interest in volunteering for the study. Of that number, all met the criteria for participation but only 15 scheduled and completed the interview. Participants signed up for interview appointments based on their availability.

The interviews took place between December 20, 2020 and January 6, 2021. I reminded participants of the statements on the informed consent ensuring confidentiality and anonymity. The virtual interviews lasted between 30 and 60 minutes. I used Zoom and a phone app to record the audio and Otter.ai to transcribe the interviews. I listened to each interview and manually checked transcription to correct any errors or mismatches. I also took hand-written notes on a printed interview guide. I used member checking by emailing participants the completed transcription for verification and to allow participants to voluntarily share any artifacts relevant to the study. There were no variations form the data collection plan outlined in Chapter 3, nor were there any unusual circumstances during data collection.

Data Analysis

I asked secondary teachers my research questions about their experiences, strategies, and needed supports with finding, evaluating, organizing, and sharing digital resources. I used a semistructured interview guide with open-ended questions and probing questions when needed, to gather the data needed to answer the research

questions. Secondary teachers' perspectives were explored through the lens of Siemens' (2005) connectivism theory and the TPACK framework (Mishra & Koehler, 2006).

The data analysis process for this qualitative study was performed in two stages. First, I used a priori codes from the framework and research questions to code data and look for categories and themes. Additional codes emerged as I continued to read through the data. These codes were then grouped into emerging categories as described by Saldana (2015). The categories included: Finding, Social Media Sites and Repositories, Evaluating, Organizing, Sharing, Connecting, Professional Development, and Support. Second, I created a spreadsheet with these categories and as I listened to the recorded interviews again, I took notes and captured quotes while categorizing them into one or two of the categories. After looking through the data again, it became clear that two additional areas should be addressed. These areas were digital resources and pandemic. I noticed several responses related to these two areas and it was important to capture them to create context for the remaining categories. Many times participants do not directly name a concept but when describing it based on specific characteristics, it is possible for the researcher to assign a code or theme to it (Rubin & Rubin, 2011). I also captured quotes and thick descriptions that illustrated particular themes. I was mindful of the importance of properly representing the participants' experiences throughout the analysis process. See Table 2 for a complete list of themes and subthemes.

Table 2

List of Themes and Subthemes

Themes	Subthemes
Digital Resources	
Pandemic	
Finding	Social Media Sites & Repositories
Evaluating	
Organizing	Strategies in organizing
	Challenges in organizing
Sharing	Challenges in sharing
	Sharing tied to positive student outcomes
Connecting	
Professional Development	
Support	

Results

The results for this qualitative study are reported by themes that emerged while investigating the data. I begin with a discussion of how digital resources was described to the participants and how participants described digital resources during the interview process. Next, I include results that specifically mention the current pandemic, as this situation affected responses due to teachers working in new environments such as virtual and blended learning environments that they did not all experience prior to the pandemic. The remaining results are discussed by themes garnered from the initial framework

categories and from the research questions. These additional themes included: Finding, Evaluating, Organizing, Sharing, Connecting, Professional Development, and Support.

Theme 1: Digital Resources

I started each interview with a description from my interview guide of what digital resources could include. I read, "Digital resources for this study could include resources such as online articles, blogs, podcasts, videos, images, online collections and repositories, social media feeds, or other content mentioned by participants." It was interesting to see the variety of digital resources used by teachers. Some teachers mentioned helpful online tools such as Brian who uses Doodly whiteboard animation software to get concepts across. Some described the use of multimedia that included movies like *Hidden Figures* to teach math or popular songs to teach English while connecting students to music they enjoy. John mentioned using real French commercials as a resource for students to learn a foreign language from native speakers. Others described tools to connect, such as Trello, or to organize, such as bookmarks and Google docs or folders. Some tools like YouTube were used to find content and to share it through curated playlists for extra help. Brian uses WooTube, a useful math channel, as part of a curated list of channels he shares with students for optional extra help. Many tools such as online repositories or quiz sites were used after seeing a recommendation on social media or hearing about it from a school colleague. John mentioned using Quizizz because he saw how other teachers on social media were using it and wanted to use its live polling feature to increase student engagement. In some cases, a teacher used a tool for a different purpose than intended. For example, Brian uses Zoom to create

instructional videos versus to connect for a video conference. He said that it provided better presentation and editing tools than his previous video editor. All participants had now used some type of video conferencing software to include Google Meet, Zoom, and Microsoft TEAMS due to the new teaching environment related to the current pandemic. Tina mentioned that live streaming and recording were helpful to students. Tina summed it up with a thought-provoking comment saying, “I think we need to use resources to better us, but not to replace us.” Some of the digital tools mentioned in the interviews are: *Desmos*, *Edgenuity*, *EdPuzzle*, *Flipgrid*, *Geogebra*, *GimKit*, *Gizmos*, *Jamboard*, *Kahoot*, *Merge Cube*, *Nearpod*, *Padlet*, *Pear Deck*, *Poplet*, *Quia*, *Quizzizz*, *ReadWorks*, *Screencastify*, *Trello*, and *Whiteboard.Fi*.

Theme 2: Pandemic

The current global pandemic increased the need for digital resources and better organizing methods, especially when sharing with students. Tina described the situation like this, “I feel like this year is so much about survival…this year is not necessarily how to get more innovative with resources. It's how to make the resources work with our COVID situation.” Sloan mentioned that after the pandemic, she uses technology all the time, even with traditional students. Most mentioned that the pandemic forced them to use digital resources and tools they had not used in the past and that they felt more confident now because of it. Diana mentioned that the pandemic cut short 9 weeks of time and that kids needed remediation. She noted,

> I hate to blame everything on the pandemic, but, you know, we cut short nine weeks last year. So, I have these kids that, you know, I mean, I know people are

> giving grace and everything, but for them to be successful for the rest of their high school and college, that still needed to have certain skills. So, I knew I needed to find something engaging for them.

Diana and Beverly both mentioned gaps in learning from the pandemic and the need to use digital resources to help fill those gaps. These two teachers are from more economically disadvantaged schools than most of the other participants, which could be an area for future research.

Teachers also mentioned that the pandemic made the need for streamlined curriculum more critical. Tina explains this as one of her technology goals,

> Everything that I create with technology, my coworkers also use it. That has been my charge this year … to streamline our curriculum, where you don't have to be in the classroom to be able to use it... I spend a lot of time kind of taking our units and streamlining them.

She felt like many of these tools and sharing practices should continue after the pandemic commenting,

> This will continue after pandemic or should, … In the past, kids are absent or sick for a week… they really lose the instruction. … I think now we're going to be a lot more cognizant of… many ways we can do a better job sharing with kids who are not physically present…I think we are going to be better teachers because of all this, and I think we'll use technology better.

As reflected in these teacher responses, the pandemic increased the supports needed for using digital resources for teaching.

Theme 3: Finding

The problem most often mentioned in relation to this concept was a lack of time. John described it this way, “The wealth of things that is out there is more than I can ever use, more than I can ever consume, and more than I can ever even explore." Teachers described differences in finding practices between when they were new to teaching a subject to when they were more established in teaching it. Most looked to colleagues in the building first, and then to district provided resources, professional organizations, trusted teachers on social media, or repositories. Sloan discussed district resources saying,

> The apps that are already with our school district, I trust them. Like Gizmos is an actual site that our school district purchased, as well as Desmos, the fact that our school district purchased… but as for if I was using something off Teachers Pay Teachers, you have to test those out first because that's coming from everywhere.

Brian stated,

> I would say the majority of the resources that I find that I use are either on YouTube, or…connecting with past mentors, and…I'm part of the UTeach network. So, I get those newsletters and stuff like that.…They're usually trying to… give us resources…to use. So, anything that I picked up from conferences just talking to other teachers’--stuff like that.

Many of the teachers, like Brian, mentioned that teacher connections helped in finding the resources they needed.

All participants agreed that there were plenty of digital resources to choose from, maybe even too many. Three teachers described the process of finding resources sometimes leads to going down a “rabbit hole”. Most agreed they needed more time, with one teacher adding that he could use a secretary to help with finding and organizing resources. Most search for digital resources by content standards. Pete says that sometimes you get lucky and find something quickly and sometimes it takes hours. He describes it saying, “Sometimes… you just you find something you think it's gonna be good and then you look through it and it really doesn't hit…what I really want. It sounds good, but it's not.” Teachers mentioned a constant struggle between finding quality resources while limiting the searching time to a manageable level.

Many teachers mentioned Facebook Groups targeting specific content or teacher subject area. One group was called “Teaching During Covid”. Others mentioned groups that included: Tennessee Teachers Looking for Resources, Teaching Tolerance, Facing History and Ourselves, Equal Justice Initiative, AP Literature, Marketing Educators, Business Educators, Delta Math, Schoology group, NBCT group, French Teachers in the U.S., and Bitmoji for Educators. Some participants mentioned following teachers on social media that they heard about from colleagues or at conferences. Some look through public content in repositories. The science teachers interviewed mentioned the need to find online simulations since they could not do experiments easily with virtual students. Michael describes how he uses a simulation site called PhET, “Normally I did demonstrations in class…or we would do hands on labs, that's not possible for full time virtual students. So, I've always used PhET for some things, but this year, I've used it a

lot more for sure." The Facebook groups were a strong source of support and resources for most of the teachers in the study.

Brian mentions finding a lesson on transformations in Desmos that a teacher made public. He says, "After I found it, I worked through the slides…and worked through the lesson, myself, and then I posted it…we went through it and class and I built lesson around it." Most were not aware of many of the free Open Education Resources (OER) repositories I shared during the interview process. One teacher has students find and curate resources. They all drop resources with descriptions into a shared document, the teacher reviews them, and then the students can access it throughout the year. Most teachers felt the need to remix resources to fit specific needs. Tina notes, "That's stuff I create… I really can't find examples of that…maybe that's my perfectionism, but I will look at what's out there and then I'll go do my thing with it." All teachers mentioned that they wanted to use places that made it easy to find resources. Regina follows one teacher online because "He is very organized and very easy to find. And I rely 90% on his stuff." Sloan also agrees that she needs an easy way to search by standard and grade level. Sheila says that resources need to be easy to find. The varied experiences mentioned highlighted teacher needs for connecting with others, testing resources, and remixing resources to fit specific classroom needs.

Strategies for Finding

Many strategies for finding quality resources were uncovered during the interview process. William uses video evidence of successful lessons that he finds on Twitter commenting that it helps him to hone his own practice. Michael searches Google for a

specific type of physics problem which leads to a set of problems. He then backs up to the site that hosted the problem set and usually finds good resources there. He bookmarks the site for later use. Michael suggests that teachers should have a solid idea of what they want to do before starting to look. Many participants mentioned district hosted portals as a starting point such as Clever, Classlink, and Schoology Resources. Others mentioned finding resources in the tool site repositories housed on sites like Desmos, Gizmos, Nearpod, EdPuzzle, and others.

Two teachers mentioned difficulties in finding resources due to the unique nature of their career tech courses. These teachers looked to industry sites to find resources. Jacob says,

> I don't really feel like I have any place to look. And so, I look at industry level stuff. I'm always constantly looking for ideas like in the film industry, or NASA, or medical research or really, I look out as far as I can. I'm like, so how do I figure out how to scale that down and bring it to my kids.

William gets students to help in finding and curating resources. He describes the process,

> Most years what I will do is I will have my kids sit down and I will say 'Hey, I need you all,' we're in a big, shared document, 'I want you to start dropping resources that you find interesting. And give a small description.' And these resources can be fine art, visual arts, to even science and different things like that. And I just want this huge scope of different resources. They all drop them in, I review them. And then we create a very nice document with the link in the description that the students can access throughout the year.

Beverly relates how she succeeded in reaching a struggling virtual student by using a YouTube video that used basketball to explain the math concept of combining like terms. She found the video using Google with the search words “combining like terms” and “YouTube” and then searched through the videos until she found one that met her needs to connect to the student. She describes her success,

> After he watched the video, and there were some practice problems in the video. ... I'm like, okay, so who's on the same team? He could pick them out in a while. Can we combine these two? He's like, No, I'm like, why not? They're not on the same team. Boom! They don't have the same Jersey on, so…it clicked much more than me saying Xbox, yam or whatever I could have said.

The various strategies in finding resources included using Twitter recommendations, targeted Google searches, district hosted portals, industry resources searches, and student curation. The strategies proved useful to study participants.

Challenges in Finding

Though most were able to find needed resources, there were still some challenges. Sheila reflects,

> I have a hard time. I think trying to find just short enough units that you can … embed in to refresh the curriculum, but then also stay within my timeframe ... I think that's hard. I feel like when you're trying to just piece little bits together, sometimes the continuity isn't there. Sometimes the length of time that you have to fit it in, is difficult. … when it's not your own, that you haven't created, it feels a little disjointed…It looks great on paper, but then, when you go to deliver it, it's

> …not quite what you were hoping it was going to be or as engaging or easy for the kids to grasp.

All participants felt mentioned the lack of time as a challenge keeping them from looking for new resources.

Social Media Sites and Repositories

I presented a list of social media sites and repositories at the end of the interview to get feedback on teacher interaction with any of the sites. Sites I presented to interview participants are found in the interview guide in Appendix A. Some of the sites were used by many of the participants while others were used by few to none. Pinterest was mentioned by a few participants. Reddit was not used by any of the participants and LinkedIn was not used to find resources. I did not include Instagram on the interview guide, but a few teachers mentioned following teachers on this platform. The other social media sites are shown below with selected teacher comments.

Teacher Pay Teachers (TPT) was mentioned by all of the participants. The majority felt it was very useful and found quality resources they could use in their classrooms. A few teachers felt it was ineffective--only offering worksheets. Those who used it mentioned that it was more useful to them when they were a new teacher or new to teaching the content as it provided a good starting point. Beverly says, “My very first year I had this whole anxiety about teaching, I bought a whole a whole curriculum from…Teachers Pay Teachers. And so, I still have it because it covers all of the standards for seventh grade math.” Some teachers moved away from using it as much as they began to create their own content or found other sources. Some teachers could use district

money to purchase from TPT while others were forbidden to use school money for TPT purchases. Alexa responds, “I find a lot of stuff on Teachers Pay Teachers…I find like digital breakouts and stuff like that. That is by far my favorite place to go.” She said after her district no longer allowed her to use her school money to purchase, she visited it less. She remarked “I liked it because it kept my units new and refreshed. I was always getting new ideas.” In describing her experience finding a useful resource on TPT Diana notes,

> I had to do a lot of research prior to make sure that it was going to do… I love Teachers Pay Teachers, I have put stuff on Teachers Pay Teachers, but you also have to be very careful that it's [not] just surface and not really going to let you know where…misconceptions are in their learning. So, I was very pleased with this particular one. And this was the first year I had seen anything from her.

While many of the teachers found value in this site, Tina described a different experience with TPT saying,

> I go to organizations I trust. I don't like teachers …paying money and downloading from Teachers Pay Teachers and giving kids a bunch of run-off copies of worksheets. And they can't differentiate that for their ESL kids or their special ed kids. So, they're not differentiating at all. Because they bought something from Teachers Pay Teachers. And it's a lot of work for … our ESL teacher because…we have teachers bringing her stacks of Teachers Pay Teachers worksheets and saying how I am supposed to use this with my ESL kids. …if you'd create your own curriculum, you could differentiate it.

Overall, TPT was a useful site with a variety of resources meeting the needs of most of the teachers in the study.

Twitter

A good number of the participants used Twitter for finding resources. Alexa said, “I follow some really good English teachers on Instagram and Twitter.” When asked how she knew who to follow she said,

> I honestly do not remember…several years ago, I went to a workshop called "Keeping the Wonder" and … I started following the people that were presenting there… once I started following one teacher, they started…highlighting and recommending other teachers …I…do not remember how I found out to follow the first one…maybe I found their resource on Teachers Pay Teachers…and they said … check me out on Instagram or Twitter, and I followed them. And that...got me started.

Sloan mentioned finding resources when participating in an EdChat. She said, “I'll be an educational chat that happens. And we're just talking about a resource and I’ll go look it up.” William said,

> I follow a lot of other professionals on Twitter and so they will give…tidbits about things that they've done in the classroom, maybe some video evidence…and I will take those ideas and try to implement them as well…. It’s just a good resource for … polishing my own teaching practice at times.

Jacob says,

> I can fly through Twitter in a heartbeat. And I'm like, okay, I know people I follow people that have interesting stuff. And there are certain…keywords or graphics that catch my eye. And they usually lead me where I want to go…. I started out with a core group…if I see they recommend or they retweet stuff regularly, then I know that they find value in their stuff. And I go there.

Sheila talks about her Twitter use saying, "Once in a while, but it's not my go to. It's only a few people that I have…followed…that…post something that catches my eye. But most of the time … it's Facebook or Pinterest, or Teachers Pay Teachers and YouTube." Diana says,

> I do look at Twitter because I follow…Sarah Vanderworth. … Dan Finkel…I follow a lot of educators …. Joe Boaler… So, I do a lot on Twitter. But mainly, that's more for people that I admire…more role model stuff, not teachers as much in the classroom. Because I don't know every teacher in the classroom.

Brian, Brooke, John, Kayla, Regina, and Tina did not use Twitter.

Facebook

Ten of the teachers mentioned specific uses of Facebook for finding resources. Pete, Sloan, Tina, Michael, and William did not mention using Facebook to find resources. Brian notes, "The entire math department is using this Delta Math for homework. And there's a Delta math Facebook page. And I'm a part of that." As mentioned in the finding section, teachers found a multitude of resources from Facebook groups including: *Teaching During Covid, Tennessee Teachers Looking for Resources, Teaching Tolerance, Facing History and Ourselves, Equal Justice Initiative, AP*

Literature, Marketing Educators, Business Educators, Delta Math, Middle School Math Teachers, Teaching With Schoology, NBCT group, French Teachers in the U.S., and *Bitmoji for Educators* to name a few. Diana describes her use of Facebook saying,

> I'm constantly coming through looking. What have others encountered? What have they found to work? In fact, I just found out about some new game GIZmet or something like that. That is like an among us game, which is a big thing with the kids in middle school right now. So, Facebook's probably the biggest.

Facebook groups provided many quality resources for teachers in the study.

YouTube

Most participants used YouTube videos at some point. Michael uses YouTube videos to help explain concepts and for enrichment. Sometimes he Google's the topic with the name of a specific YouTuber he follows to find the perfect resource. A few teachers mentioned podcasts under YouTube and Jacob hosts his own podcast. Brooke mentioned that she uses ClipGrab to get parts of YouTube videos because YouTube is blocked at her school. Alexa used YouTube to find specific videos to accompany books they read as a class. Regina uses it to replace out of date VHS tapes from the History Channel and National Geographic. Brian gives students lists of YouTubers to follow such as Eddie Woo (WooTube) and he also uses it to share content he creates using Doodly, a white board animation software. Pete uses *Bozeman Science* and the *Amoeba Sisters* video channels to reinforce science concepts. He also uses a Frank Gregorio playlist which describes itself in this way: "Here, you will find dramatic, visually stunning video "trailers" in the natural sciences choreographed to powerful music, designed to motivate

and inspire students at the beginning of a lesson to the wonders of Biology, Earth Sciences, Physics, Astronomy, Chemistry, Environmental Science and Math." Beverly said she uses YouTube for everything. She notes, "This is also helpful for our kids... to actually … play out the steps actually, like going through the steps is easier than just seeing them written down. So, I definitely like to use YouTube." William creates video lessons and playlists but screens every video before adding to a playlist versus just sharing another teacher's playlist. Diana uses videos from Dan Finkel and Joe Boaler which were featured in TedTalks but also have other channel videos. Sheila uses YouTube to see how other teachers use digital tools. She says she is a visual learner and seeing tool demonstrated on videos helps her know how to use them with her students. Michael uses physics specific videos he finds. He says,

> There are some very good physics specific YouTubers…that either explain the concept concisely and with visuals that are really nice or maybe they just talk about a topic…I also use YouTube for…like, Hey, if you're really interested in this topic, and want to dive in further, here's a YouTube video that you can go watch. Like, it's kind of outside the scope of the class.

The other teachers mentioned using YouTube to find resources but did not give specifics.

Repositories

I shared an Open Education Resources (OER) repository list with teachers asking they were aware of the resources or if there were others not listed that they used frequently. If they were aware of one of the resources listed, I asked them to describe how they used it. Of the eight free repositories listed, most teachers were only aware of

one or two. Most had heard of Khan Academy and two teachers said it was useful to them while others said the students did not enjoy it. A few had used PBS Learning Media, Google Applied Digital Skills, and the Smithsonian Learning Lab. The entire list is shown on the interview guide in Appendix A. Participants shared a host of other resources, some free and some paid. These are shown in Table 3.

Table 3

Participant Shared Digital Resources

Resource	Link	Description
Alludo	https://www.alludolearning.com/	The Alludo personalized microlearning platform gives everyone in your district the professional development they need to take your district to the next level.
Amoeba sisters,	https://www.youtube.com/user/AmoebaSisters	Short biology videos
Amy Brown Sciences	https://www.amybrownscience.com/	Hello! I'm a biology and chemistry teacher of 31 years, wife, mom, science nerd, nature lover, adventurist, and TpT seller. I just love getting kids hooked on science!
Art of Ed	https://theartofeducation.edu/magazine/technology/online-resources/	
BozeMan Science	http://www.bozemanscience.com/	Paul Andersen has created hundreds of science videos. His video essentials for AP Biology, AP Chemistry, AP Environmental Science, and AP Physics 1&2 are aligned to the AP curriculum. He also has created a series of videos on the Next Generation Science Standards.

Center for Interactive Learning and Collaboration	https://www.cilc.org/	Free webinars. CILC connects learners of all ages with educators from around the world. Topics include STEM, Social Studies, Literacy, and Art/Music All programs free-of-charge and in webinar format
Frank Gregorio	https://www.youtube.com/channel/UCWxJwdNjOFOUvKAhsYo41lg	This channel is dedicated to providing teachers and students a powerful new resource to combat student apathy. Here, you will find dramatic, visually stunning video "trailers" in the natural sciences choreographed to powerful music, designed to motivate and inspire students at the beginning of a lesson to the wonders of Biology, Earth Sciences, Physics, Astronomy, Chemistry, Environmental Science and Math.
GimKit	https://www.gimkit.com/	Created by a high school student-I built GimKit to be the game I wanted to play in class! While working on GimKit I developed a passion for making learning memorable. I graduated in June 2019 and kept working on GimKit because of the positive impact I know it can have for teachers and students.
Gizmos	https://www.explorelearning.com/	Gizmos are interactive math and science simulations for grades 3-12. Over 400 Gizmos aligned to the latest standards help educators bring powerful new learning experiences to the classroom.
Google Arts and Culture	https://artsandculture.google.com/	Google Arts & Culture is a non-profit initiative. We work with cultural institutions and artists around the world. Together, our mission is to preserve and bring the world’s art and culture online so it’s accessible to anyone, anywhere.

Hacking STEM Lessons & Hands-On Activities	https://www.microsoft.com/en-us/education/education-workshop	Build affordable inquiry and project-based activities to visualize data across science, technology, engineering, and math (STEM) curriculum. Middle school standards-based lesson plans written by teachers for teachers.
iCivics	https://www.icivics.org/	iCivics exists to engage students in meaningful civic learning. We provide teachers with well-written, inventive, and free resources that enhance their practice and inspire their classrooms.
IF Profs	ifprofs.org	IFprofs is open to all professionals working in the field of French-speaking education. IFprofs members can find resources, interact with colleagues, and share their professional experience. They can access information related to their country space and follow what is happening across the global community.
It's Not Rocket Science	https://itsnotrocketscienceclassroom.com/	Comprehensive resources for busy science teachers
Kesler Science	https://www.keslerscience.com/	The Kesler Science Membership provides you access our entire library of middle school science resources. Never stress about lesson planning again.
Legends of Learning	https://www.legendsoflearning.com/	Over 2000 fun, curriculum aligned, math and science games created to engage students and assist teachers using hybrid learning, blended learning & distance learning models.

Mathematics Assessment Project (Math Shell Center)	https://www.map.mathshell.org/	The Mathematics Assessment Project is part of the Math Design Collaborative initiated by the Bill & Melinda Gates Foundation. The project set out to design and develop well-engineered tools for formative and summative assessment that expose students' mathematical knowledge and reasoning, helping teachers guide them towards improvement and monitor progress. The tools are relevant to any curriculum that seeks to deepen students' understanding of mathematical concepts and develop their ability to apply that knowledge to non-routine problems.
Misson US	https://www.mission-us.org/	Mission US is an award-winning educational media project that immerses young people in transformational moments from U.S. history.
Modern States	https://modernstates.org/	Take tuition-free, high quality courses online from top institutions for college credit.
NCTE-National Council of Teachers of English	https://ncte.org/resources/	The Secondary Section enhances the professional lives of English language arts educators and the quality of education of their students by providing multiple forums for significant dialogue on historical, current, and emerging topics of interest to secondary English language arts educators.
NCTM-National Council of Teachers of Mathematics	https://illuminations.nctm.org/Search.aspx?view=search&gr=6-8_9-12	Lessons and Interactives from the National Council for Teachers of Mathematics
Next Gen Personal Finance	https://www.ngpf.org/	FREE Resources for Your Personal Finance Class
PhET Simulations	https://phet.colorado.edu/	Interactive Simulations for Science and Math
Physics Classroom	physicsclassroom.com	Physics simulations and other resources.
Scale of the Universe	https://www.appannie.com/en/apps/ios/app/1062423259/	iPad App

Seneca Learning	https://senecalearning.com/en-US/	Free bite-sized content and interactive questions to keep students engaged
Simple K12	simplek12.com	Online professional development. Anytime. Anywhere… even at home in your pajamas!
Skillshare	https://teams.skillshare.com/schools/	Skillshare helps high school and college students develop the tangible skills necessary to solve problems creatively and better prepare for college or employment
Smithsonian	https://www.si.edu/education	Smithsonian is a laboratory for learning and innovation. All facets of the Smithsonian—19 museums, 14 education and research centers and the National Zoo—are committed to reaching communities near and far.
Speaking of History	http://www.speakingofhistory.com/intro.htm	Collection of resources for American history teachers by Eric Langorst.
Students of History (Luke Rosa)	https://www.studentsofhistory.com/	Complete curriculum plans for Civics, World, and US History. Each includes hundreds of the most engaging resources at your fingertips. Every day, every lesson is fully planned out and ready to go for in-class or Distance Learning with videos, projects, primary source analysis activities, online textbooks, and more.
WISELearn	https://wlresources.dpi.wi.gov/	Wisconsin Department of Public Instruction's dynamic digital library and network. Explore our resources and join Wisconsin educators dedicated to curriculum, instruction, professional learning, and collaboration. Extensive Library, Powerful Findability
Zoom In	http://zoomin.edc.org/	Empowering students to think deeply and write critically about pivotal moments in US history

Theme 4: Evaluating

Deciding whether to use a resource started with where they looked for it. As mentioned in the finding section above, most teachers look to people and organizations they trust to find the resources. When discussing evaluating resources, Tina says, “I will go to my professional development places that I trust, like, National Council of Teachers of English. I'll look on websites that I know are for my professional organization.” Every participant mentioned meeting content standards as a must for any resource involving content. Price was also a consideration. All teachers preferred free resources but would pay if it met all of their criteria. However, most participants preferred districts to pay for resources. Teachers also wanted resources that matched content and fit their teaching styles and student populations. Most teachers advised and practiced trying the resource themselves and/or trying with a small group of students first. Participants also mentioned looking for positive teacher reviews, ease of use, and ease of navigation. Multiple teachers mentioned that it is much better if it is easy for students to sign in without creating new accounts such as signing in with Google sign-in. Sloan elaborates on her needs,

> Easy access with an easy way I could search, I search by standard a grade level--definitely. Needs to have a way… that I could just put a link…and students could just go and …[use] Google Sign-on that's like my life saver, when students can sign on using their Google account.

Other responses discussed additional evaluation criteria such as the resource must make the students do work, should provide feedback to the students and to the teacher,

and should be district supported. For the most part, teachers trust a resource if their district provides it. Sloan notes, “I always start with what our district has purchased already.” Participants advised that it is best not to use too many different resources but to get good at a few things.

Participants felt resources need to be customizable and easy for differentiation for accessibility for ESL and others. Tina comments,

> As Educators, we can no longer just think about what we're doing in the classroom, everything has to be able to be user friendly, at home. For a child on a second grade reading level or a child on a 12th grade reading level, ESL, not ESL. They've all got to be able to use our curriculum.

Participants also discussed the need for resources to be flexible in accommodating changing schedules, which have been more common in the pandemic. Sheila mentioned that her school changed to a block schedule and her current plans were for a shorter time frame. In addition, resources need to work for students no matter whether they were in person or virtual. Sheila describes the situation,

> We're teaching face to face and virtual. So, when they're not in class. They're virtual. And they're logged in at the same time into our Google meet. So that…was very stressful in the beginning, and very hard to do. Plus, we switched from an eight-period day to a block. So, all of my planning…was way off. And my timing and everything that I had was…new. It was like, new teacher day one.

All participants discussed the importance of trying it out before trusting that it is a good resource. Pete notes, “I can't put a link on a page without reviewing it myself. So, I

just kind of will go through it and see if it…fits the mark." Alexa uses her school-age daughter to test digital breakout resources. Sloan tests resources herself or with family members and friends. John tests out resources himself and also listens to what others are saying online. A few teachers mentioned trying it on one class that was smaller or more capable before trying it with other groups. William advises teachers to do the research on a digital resource and make sure it does what it is supposed to do. He elaborates here,

> Small focus groups, I think are essential, because if anyone's going to give you feedback on how well they're going to do, it's the students themselves.… I usually try to pick a variety who are going to be able to give me good feedback and tell me, 'Hey, I ran into this issue', or 'I don't get this' …and then usually from there, it makes … pushing that artifact out a lot easier, you can kind of foresee some issues, and be able to tackle that pretty quickly." Evaluation is not a one-time thing. It should be reflective.

William explains, "Because technology is constantly changing…I have my reflection, but when I revisit it, three months later, tons have changed. So now I'm building off that reflection, and you know, kind of creating a working thought process, which is nice.

Each teacher mentioned student engagement as one of the criteria necessary for using a resource with students. Some mentioned that video length is important and that short videos are better than videos that go on and on. Sheila shares her thoughts on evaluating a resource commenting,

> I think it has to be something that when I'm introduced to it, I can see an immediate application for it. So, I think it's going to be user friendly. Cost is

> definitely a factor if I'm going to have to find funding or not, okay, because we do our budgets in the February for the next year…once that money is allocated, it's allocated, and it's tough to get it. It has to be something that I think that the students are going to find engaging, because being an elective class that's super important to have them engaged, otherwise, they're not going to talk about the classes, take the classes, and that is gonna hurt the program.

Most of the participants mentioned ease of navigation as important for use for themselves and for students. John says,

> Another thing that I look for is, how easy is it for the students to navigate it? You know, when I'm looking at the Kahoots and Desmos…all the various puzzles and things like that, I want to know, how easy is it going to be for my kids to get into it...I appreciate resources where the students can create accounts, and then things can be tracked across time. But I don't want the kids to have to create a new account every time they go to something.

As mentioned previously, participants discussed the need to fit the current blended and virtual learning situations which means that now resources need to offer self-paced options with meaningful feedback for both students and teachers. PearDeck and EdPuzzle were two resources mentioned that help meet this need. Diana describes her process in finding a resource that met this need:

> I just had to preview and…see exactly what was going to be the most beneficial for my students, where they would have to demonstrate perseverance, but yet it wouldn't frustrate them…. I'm all about productive struggle, [it's] a lot easier for

> that to happen when you're in the classroom though--Because I can see what they're doing and ask them questions. I can't ask them questions when I'm not with them.

She goes on to explain how a digital breakouts resource solved her problem. She notes,

> I came across an educator who had created great digital breakouts that gave options without it being multiple choice so that they weren't just guessing but they had ways to know if they were right or wrong in order to unlock the code and move on, and it was scaffolded.

Some online repositories and tools also met the need for self-paced resource with feedback including Desmos, Gizmos, GimKit, and Kahoot.

Multiple teachers mentioned need for resources to be accessible. Beverly describes difficulties at the beginning of the pandemic saying, “Well, when we first started, it was difficult for me to figure out how to get the material to the students.” She described issues caused by COVID and her district’s decision to wait to pass out resources left her with no textbooks and some students with no access.

Another aspect of accessibility mentioned in participant responses involved special populations Tina mentioned the importance of making resources accessible to ESL students and those on all reading levels. She discussed the need for a resource to work for her exact demographic of students. John mentioned authenticity as important when evaluating resources saying,

> One of the biggest things that I look for is… authenticity. You know, that's a real big, real big word in world language. Authenticity, meaning that something was

> built by native speakers. And it was *intended* for native speakers. So, in other words, it's not something that was just designed by a French teacher somewhere who was going hey, this is something that I think my students in class will be able to handle.

He introduces it to his students saying, “We're watching commercials today. And these commercials are commercials that actually run on TV, in French speaking cultures.” He reiterates, “Authenticity is a big thing.”

Some participants discussed the need for resources to be evaluated based on student tech comfort level. Brian evaluates by asking questions, “Does it confuse the kids more than helps the kids? …So those are my two: Is it easy to use or… is there too much of a learning curve? And then…does it actually help?” He goes on to say,

> For example, can students create an equation based on an ellipse? Can they now do that after using this resource? Well, if they can't, if that was the objective, you know, this resource did not help the way you thought it was going to.

Additional criteria became more critical during the pandemic as John describes here, “I also really look for …and this year, this became really relevant for us, is something that offers synchronous and asynchronous…access….If I create an activity, I want students to be able to access both.” John also mentioned the need for a resource to provide reports. He notes, “Depending on what the resource is, if it's a student response tool, then I want something where I can get reports…I can easily get those.” Michael also mentioned the importance of a resource giving feedback to students in addition to teacher feedback. Some teachers enjoy a tool that allows students to provide feedback in a variety

of ways. Brooke enjoys using Flipgrid for student video feedback and John uses it for students to collaborate with students in other countries. Jacob appreciates a tool that can give instantaneous feedback and summative feedback. Pete adds another important way he evaluates a resource saying,

> I really just know what I need…to help my lesson move along. In other words, the last thing I want to do is just talk at my students all the time, even when I'm in class. And that's the last thing I want to do when they're online, too. I want to make sure that they're doing the work, not me doing the work.

Strategies for Evaluating

William and Pete and others mentioned trying a resource with students and getting student feedback from small groups first. William also mentioned doing your research. Other suggestion included looking at tutorials for how others have used the resource to see how much can be done with it. Brian advises,

> I think the biggest thing with evaluation is setting your expectations beforehand. In other words, what you expect the students to accomplish from this thing…We can easily just throw up a resource and be like, hey, use this resource. It's cool. …There's a lot of different things that I think are just cool. But… what is it that I want my students actually to take out of this? And if you go in knowing that…you can evaluate a little bit better.

Challenges in Evaluating

Participants continually mentioned the lack of time as a challenge in all areas. Sheila shares,

> One struggle is having the time to sit down and sift through. Now we've got so much at our fingertips and the resources that we have, that finding time to sit down and just sift through it all, and then really make it fit is one of the biggest challenges. I think that I have.

When asked who should organize and evaluate, or curate the resources, Jacob reflects,

> They have…access to all these incredible tools now. But no one's really taught them how to organize, to build…this toolkit for success.…They had depended on textbook companies for years to do that for them…. you got the textbook, and then you got those cool supplemental resources of DVDs and workbooks and overlays. …Those days are pretty much over. And now you don't have anybody that vets them. And so, are you showing anything really of educational value, or not? …back even in the days of textbooks, at least, you had a set of standards for vetting that doesn't really exist right now, in a lot of places. So, it's kind of like the Wild West out there.

Theme 5: Organizing

Organizing ended up involving two realms- a teacher organizing their own digital resources and a teacher organizing resources for students. Most had no professional development on the topic of how to organize digital resources, and all mentioned difficulties in organizing at some level. Michael describes himself as “a poor organizer” and mentioned dropping links in a document but not adding descriptions. Kayla described her organization method as if one dumped out a file cabinet all over the floor. William shares his process saying,

> I probably could do better at this, I'm not gonna lie, I bookmark a lot of it, or I'll save links. I actually have a Google Drive doc that's full of just links with…descriptions of things that I like…. getting it to students. I typically just drop it in a Google Drive doc and put it on google classroom and say, 'This is what it does. This is…what you look at, and here's some support resources.' I have lost some that I've wanted back, I will admit… I would say organizationally, I need to do a little bit better. … it comes with comes with learning; I suppose.

For organizing their own resources, some mentioned the use of browser bookmarks, others used google docs, slides, and sheets, and others used google drive folders or archived LMS classrooms. Beverly says,

> A bookmark is my friend. … I'm sure there are better ways, but I know I bookmark things a lot. And I try to keep a notebook of my ideas of things that I want to implement. I started that last year, because one of my mentor teachers was like, you should write down everything you want to do…So…I keep a notebook.

A number of participants mentioned that they would appreciate someone curating for them. Some teachers mentioned that their districts organized resources for them on bookmarks, websites, or district repositories. Teachers mentioned Clever, Classlink, and Launchpad. Some participants mentioned organizing resources inside a product like Nearpod, Gizmos or Desmos. A few teachers used YouTube playlists. Some used a combination of these organizing tools while others had no real organizational strategy.

Teachers mentioned the need to have resources shared in such a way that the resource purpose is clear and easy to use by anyone, anywhere. Another thing frequently

mentioned was to have all the resources in one place. When organizing for students, one strategy participants used included putting material into one file with some type of flow. This is sometimes called a hyperdoc, which involves organizing material usually using a Google doc or a Google Slides presentation that includes instructions and a flow for student consumption. Tina describes her efforts to make resources usable for students saying, “So that was one of my goals for this year was … make everything very usable for them. And so, I can take…a hyperdoc and put my instructions and all their instructional videos, for … me and others, and all the resources they'll need and it's in one place." Pete describes his system saying, “I'm trying to have them do the least amount of clicks on things as possible. So, in other words, I don't put when I set up an assignment, they will get they will get one page and on that page, it has every link and then you know, of course I make it a Google doc and they can answer right on it and so they just turned in that one thing.” Kayla also mentioned organizing in this manner using slides. However, she sometimes has 3 or more versions of the slide deck based on the audience. One version is used to keep ideas and reflect on ways to improve the lesson in the future. William agrees that organizing should be a reflective process. He organizes with chrome bookmarks and on a Google Doc with resource descriptions. Later he revisits the document to reflect on how the resource worked and ideas for the future. He describes it this way,

> I myself am still a little unorganized, but the description part of it, that does help me by putting, ‘This hit this standard,’ ‘This was for this lesson,’ ‘This is how I used it,’ and then that reflective part, I think the reflective part's the biggest one.

William models resource organization on Pinterest. He has his own boards that students can follow, and he encourages students to create their own boards. He directs students to their boards when they get stuck on something and need help. Some teachers kept notes on paper in lesson planners and on calendars to use for future reflection.

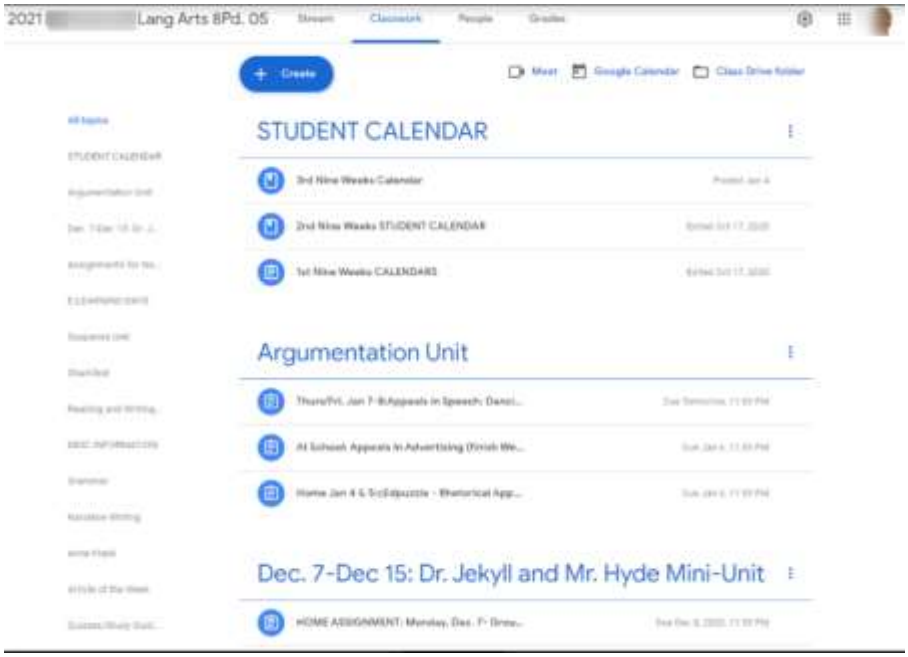
Organizing became more important during the pandemic and many teachers mentioned changing organization of materials for students to make it easier for them to find and use. Most mentioned that they used some type of Learning Management System (LMS) to organize materials for students and sometimes for themselves. LMS platforms mentioned included Google Classroom and Schoology. The pandemic and its resulting reliance on digital resources increased the use of the LMS for sharing and organizing for all the participants. Some teachers organized by unit or topic and others by time such as by week or day. Sloan talks about her organizing system,

> Well, it starts out by units so it's units first. And then once they click the unit it breaks that entire unit down by weeks. There are usually nine weeks in a unit, so I do nine weeks and then once they click each individual week, it individualized for each day.

Teachers switched between organizing methods based on student needs. Michael talked about how the district setup a Google Classroom model with organization ideas that he ended up using and finding helpful for his own classroom. Figure 3 shows a screenshot from one participant’s Google Classroom to demonstrate how she organized the content for students.

Figure 3

Screenshot from Teacher's Google Classroom



Strategies in organizing

Regarding how she helps stay organized Diana says, "I do a lot of color coding, because that's just how my brain thinks." She goes on to describe how she color codes based on delivery method. "For example, if it's asynchronous, it's in one color. If it's … synchronous, it's in a different color. If I'm doing it … through breakout rooms, it's in a different color." Jacob describes his method using Google,

> It works really well as either a Google doc or a Google sheet if I'm going to do a lot of stuff they probably go on a sheet and otherwise they go in a Google doc. You don't have to worry about…the hard drive breaking and losing your stuff and if you're traveling you can do it anywhere anytime--it's ubiquitous. … it's easy to query and easy to search… [I use] Google Slides … if I'm dropping images in.

John describes his system this way, “I'm bookmarking in Chrome and then the other one is I save things…from my Facebook groups. And I have a pretty big set of saved…Facebook categories…. more in Chrome, but even two places feels like too many.” Regarding his bookmark folders he says,

> I'll have topical folders…where I've got links, usually to very specific things, but then I'll have folders that I'll mark off and say…this is my videos folder and all of these sites in here have loads of videos… reading folders… student response tool folders, assessment tool folders.

His advice to teachers is, “The biggest thing is to decide on one system and stay with it.”

Challenges in Organizing

Jacob is concerned about how teachers stay abreast of changes in digital resources and how we plan for it. He describes his concern here.

> How do [teachers] stay abreast of changes with digital artifacts? You know, it moves so fast. And so, what are they doing? … you listed all of these things here, …the thing that I get a little bit concerned about is…storage. I think Google is going to be a constant for a while. … people use Moodle for a long time… then you’ve got to transfer all that stuff…and people get really frustrated with that.…

Jacob goes on to mention the importance of a digital resource growth plan. He says,

> How are you managing a growth plan? …like… DVDs, I don't know how many DVDs I’ve got … I can hardly find a DVD player that works right now. So, what am I going to do with all of those at some point? …To me, a migration plan for all this stuff is a big deal.

John describes a similar problem with a teacher he follows online for resources. She was using a wiki but then that went away, and she started using Wakelet. He shares his frustration,

> One of the things she does keeping resources for everybody and making them accessible. But every few years, she changes where she puts them. And that just drives me absolutely nuts. Because I can't ever really figure out where to go and look for things because it needs to be easy. If I'm going to go look for stuff. It needs to be easy.

He goes on to say,

> She also puts things on Pinterest, but I don't understand…why she would have multiple places where she would put them.…the moving them from one place to another place part is what … melts my mind and makes me go okay, I don't I just don't know that I could go digging [for the resources].

Tina describes the struggle in organizing for students.

> I'm still working on organizing google classroom, and making it usable, because kids just struggle, … between the hyperdocs and organizing their folders for them, just the way that I'm labeling things where they find things very quickly by date. I guess that's…something I'm going to keep trying to work on for their sake.

Theme 6: Sharing

Sharing digital resources with colleagues and with students is related to organizing in many of the teacher responses. Teacher confidence level is also tied to sharing as reflected in the responses. Some of the teachers mentioned being comfortable

sharing with peers but not always wanting to share more broadly. A few participants said they would sometimes make a resource public in a particular product. One teacher mentioned that he is an introvert and sometimes didn't share because he does not want to appear pushy. Most participants shared resources by email. Michael mentioned he did not want too much shared with him at one time. Teachers shared in a variety of ways. Some created Pinterest boards for other teachers or students to follow and one even encouraged students to create their own Pinterest boards. Pete and William both mention having students follow their Pinterest boards. A few mentioned sharing YouTube playlists with students or colleagues. Most did not spend a lot of time curating the content for others when sharing. This goes back to teacher responses that mention a lack of organization strategies or the lack of time needed to organize resources effectively for using or for sharing. William mentioned wanting to start a blog to share but hasn't had the time.

Teacher lack of time and/or lack of confidence keeps them from sharing. William says he doesn't always share because he doesn't feel the final product is ever polished enough and is always a work in progress. Kayla notes that it may take multiple times or people to share an idea because the first time might not be the right time to be able to listen. Brooke also mentioned that it took multiple introductions to Flipgrid before she was comfortable trying it out. She felt like as an older teacher she needed more support than younger teachers. However, younger teachers I interviewed mentioned learning many things from mentor teachers.

Few teachers mentioned using tagging or repositories for sharing, but some mentioned that they liked newsletters or when colleagues shared via email or social

media. Other sharing came most often through personal learning communities (PLCs). Small bytes were easier to digest. Michael said he digests it better when one idea is shared about every 1 to 2 weeks. He describes it this way,

> If someone is spoon feeding me a description once a week, or once every two weeks… I will read that. And it might click for me, like, Oh, that's something that I can use. I don't *want* that person to have to do that…But I have found that when I have found things that I want to use, *that's* … how it happened.

Teacher responses indicated that they were more likely to use something shared by someone they know versus visiting a repository. Though no one mentioned getting formal feedback from students, it seemed clear from responses that they were adjusting ways of sharing based on student response or performance. Most sharing with students came through an LMS such as Google Classroom. Teachers mentioned trying to organize the content for kids using topics that were either by unit or week or other time period or a combination. Tina said it was important not to overwhelm students with too many resources.

Challenges in Sharing

Sometimes a teacher did not share with teachers or students because of the seemingly difficult process. For example, Pete needed to make short videos for science demonstrations. He used his phone which required time to upload to a place where students could access them. In addition, his phone would run out of space and he would have to delete past videos. This made it time consuming and difficult to do all the time,

and since older videos were deleted, he would not have them for future use. Kayla describes the time involved in something that seemed simple saying,

> With having to move so many things onto a digital platform because of the pandemic. Things that I think…shouldn't take me very long actually do take a long time, just the number of clicks that it takes to create an EdPuzzle the way that I want to, … well, not even the creating of it, once I've created an EdPuzzle, just to be able to get that EdPuzzle posted, for each one of my classes. It just requires a lot of a lot of different steps.

William makes videos showing students how to use a site or resource. Sharing with students comes with challenges, too. William describes a time when he shared a link and it only worked for half the students. It had worked for the test group and then didn't work for students who were remote and then it didn't work for some in person after pushing it out. Decided he couldn't use that resource after much troubleshooting. A visual arts teacher notes that he screens every YouTube video instead of giving students someone to follow because some content may not be appropriate, especially in art. Teachers reluctant to share to avoid appearing pushy, they feel resource not "polished" enough, or because they are concerned about sharing something that was remixed from others' work and not being able to probably attribute credit. Sheila says, "So I'm not comfortable if it's something that I've created, I'm absolutely willing to share. But if it's something that I've pieced together, which I tend to do…. [I'm concerned] I'm not giving him credit."

Sharing Tied to Positive Student Outcomes

Sharing with students had to be different with in person kids versus virtual. Michael describes a situation where he delivers a presentation in class and can get feedback from the students, but his recorded version shared with virtual students did not provide the same experience. He describes the experience,

> I can even record myself working out the example problems, but then when they get to the part where they're supposed to do something, … I'm not there to make sure that they do it. They can … skip that …which is, I assume, is what they will do. And then also [for the in-person kids] …I'm like, okay, you try it. I'll walk around and see if they get it. And then I'll give them the answer to see that they've doing it correctly. So obviously, the problem is when they are doing it virtually, I'm not there to wait till they do it, and then provide the answer. So, I can provide the answer, but then they're not going to do it

Michael found a solution in a digital resource called Pear Deck that was shared by a colleague,

> It…happened…randomly. A teacher at [school name], just emailed everyone like, 'Hey, I'm sure you're thinking about this. I like this thing.' And I was like, 'Oh, this sounds great.' It's a Google Slides add on…You have to kind of like redo all your questions …but it's a nice way for the students to do it. Then … I can have … a student paced mode…So, when I do it in class, I can flip through it at my own pace. But if a student is at home, they can go through at their own pace. And then I can go back later and look at all the answers they put.

Tina also benefitted from coworker's ideas. She describes ideas she received from a new colleague who had been a 12th grade teacher but moved to middle school. She shares:

> He mentioned hyperdocs and so I researched hyperdocs. Now I'm using them all the time. He… got me started …doing Socratic seminars with Jamboard. He mentioned that he… had done a Socratic seminar with Jamboard. I was like, well, that's great, because then I can get everybody talking--not just my talkative kids. I started doing the inner outer circles with if you're on the inside, you're talking and if you're on the outside, you're on the Jamboard. So, …I get 100% engagement, rather than kids taking turns talking. So, … everyone's involved in the dialogue. Things like that, he'll throw something out and then I'll go play with it.

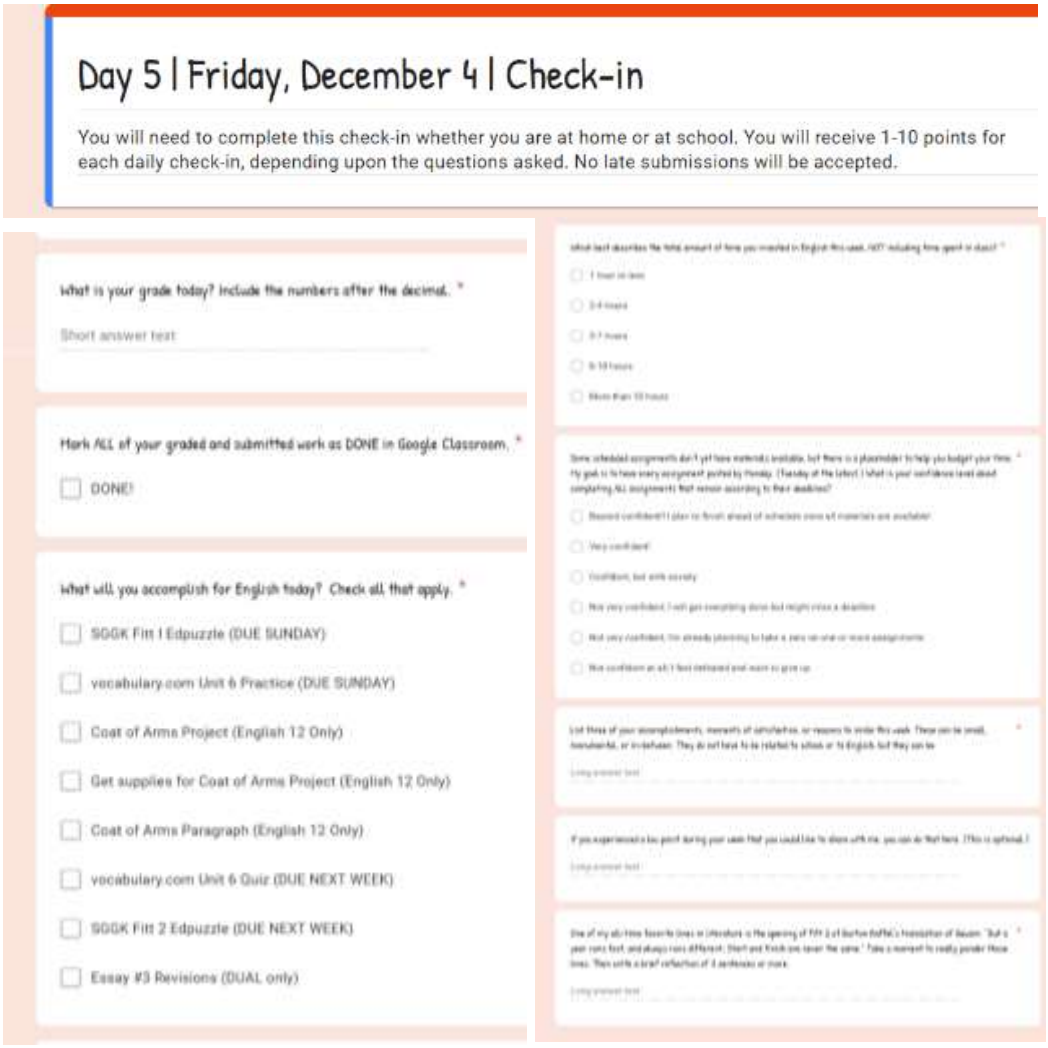
Sometimes sharing a tool brings about positive student outcomes. Kayla describes how she started using a daily check-in Google form shared by a colleague to help students stay on track.

> When they went to a blended model.… I find with students is so often, they'll take a zero on a small assignment and a big assignment and a medium assignment. …They'll just keep taking these zeros. They seem to have no idea what that's doing to their grade. Then they have this … moment at the end of the semester. And they all of a sudden want to fix it. … I had them do on this daily check …and, and it really kept a lot of students… in line.

The checkout form is shown in Figure 4.

Figure 4

Google Form Daily Check-In



All the teachers mentioned the need to record lessons to share with students. Some even used live streaming and recording and many were supported by colleagues or coaches in learning these new skills. Tina shares,

> We live stream through Google meet, and then recorded and then uploaded. So that's incredibly helpful. And I know some of our teachers are doing that every day, … I'll do Screencastify and just upload it. But for math…teachers [are] doing that pretty much every day because they need to see her work out the problems multiple times.

Regarding the benefits of continuing this sharing practice post pandemic, Tina notes,

> Kids are absent or sick for a week, or whatever, they really lose a chunk, they really lose the instruction…I think now we're going to be a lot more cognizant of… ways we can do a better job sharing with kids who are not physically present…and it's for reteaching… I think we are going to be better teachers because of all this.

These examples show how digital resource ideas shared from a colleague or tech coach benefitted student engagement and hopefully student learning.

Theme 7: Connecting

One refrain that kept repeating in the teacher responses was the need to connect with similar content teachers and the benefits that came from it. Connecting with colleagues helped teachers in finding, evaluating, and sharing digital resources. Most reported that time allotted to this was needed and would be beneficial. Most described experiences connecting with teachers in building, some mentioned conferences. Some felt conferences were necessary, while others felt like meaningful connections come from long term involvement versus a few days conference. Some felt a connection to online teachers who shared resources. Teacher sharing can directly benefit students. Tina’s

Hyperdoc and Jamboard examples above show how these ideas increased student engagement and ability to move through the lessons more easily while meeting the needs of both virtual and face-to-face students. The examples shared showed how these connections and sharing of ideas helped meet the needs of all learning environments at once, a need created from the current global pandemic. Michael received a tip from a colleague via email about PearDeck. He tried it and it allowed him to share content with virtual students in a similar way to how in-person students experienced the content. This was a problem he had been trying to solve and the email came just in time to offer a solution. He mentioned that a lot of time was involved to re-create his lessons in PearDeck so all were not yet converted, but he hoped to have time in the future to convert them all so they could be used to offer a student-paced option for all lessons. Useful ideas can be shared across grade levels. In two cases, participants mentioned how a high school teacher shared an idea that worked in middle school. Tina (English teacher) and Regina (History teacher) both mentioned this as a successful connection resulting in a positive student outcome. Regina describes her sharing scenario this way,

> Even before the pandemic, the high school teacher, at a history school meeting, a district meeting said, 'Hey, you know, Regina, you should really think about doing this. This is what I do at the high school.' And I said, Okay, I'll check it out. Maybe eventually, if I ever have time, and then *boom*, March hit, the pandemic hits, and I'm like, oh, my goodness, I have to have everything digital.

His recommendation of a site called "Students of History" ended up being something her district purchased for all the middle school teachers.

Connecting with colleagues and technology coaches also proved to offer benefits. Tina mentioned a coach spending 3 days solving a sharing problem for her. Michael mentioned enjoying ideas sent in a bi-weekly coach email. Sloan mentioned the need for more time with her coach. Brooke said her coach was patient and taught her one on one when she needed it. Connecting is tied to sharing. Some teachers, like Sloan and Pete find resources by participating in Twitter chats. William discusses sharing saying, “If we can move this to a digital realm, yeah, I'd love to bridge some of those gaps and see what other art teachers you know, think about certain resources and how they approach using it.” Connecting through conferences and networks was mentioned as key to finding, evaluating, and sharing resources. Brian says,

> Being a part of different teacher groups and forums is huge…connecting with other teachers and sharing info. So, one thing I really hate about COVID is not being able to go to conferences, because…, the networking you do…I've pulled so much from other teachers that aren't even in my district …. I would say the biggest thing is just expanding your network.

Diana elaborates on the importance of connection as she tells of a success she had in finding a way to teach patterns, something that had been a hands-on class activity, to her now virtual students:

> In my district, we have a very strong network, probably my closest teacher that I work with is actually an hour away from me school wise, but we email and text and tag each other all the time. … minimum, we talk three, four times a week…and then the teachers in my building, the math teachers we're very, very

> close. We are constantly are going back and forth to each other. ‘Hey, I tried this.’ ‘You need to try this’…in fact, I found out about gizmos this year. … But the seventh-grade teacher said, ‘Oh my gosh, I use this Gizmos, and they have a second one that I think would be great for eighth grade that had to do with solving equations.’ So, … we just share those ideas… …If we didn't have that network, …it would be obviously be much harder, because I honestly didn't realize something like that existed like Gizmos.

These examples demonstrate the important role networks play in helping teachers solve problems within this new teaching environment. Brian adds this example,

> I've been blessed to be in some really great groups and had some discussions that I would not have that if I was doing a one on one, I just would never have had these discussions and learned different things. For example, the ACT thing I did back in November, teachers were talking about different mnemonics that they use. And so, there's one teacher… ‘Oh, …I use this mnemonic… to teach this, or I use this to teach this.’ And I would not have had that. …if it was just a one-on-one session.

When asked if that could work virtually, he said he had recently used Zoom to do this. He described Zoom as having helpful breakout rooms where you can have small group discussions and then bring that back to the large group. He comments, “I found that to be extremely helpful. …better discussions come out of those.” In the interview he mentioned his wish that Google Meet had a similar feature since he could only use Meet with his

students. At the time of the interview, Google Meet did have that feature but he was not aware of it. Pete was also involved in networks but says this,

> Those are kind of hard to maintain. …I was in a group where we…met on Saturdays for…15 or 20 minutes. And … there was somebody in Texas, and there was somebody in Minnesota. And …definitely that there was something to be said for that. If you can't connect with people at your own school that are kind of in your own realm of how you kind of do things, it's always at least I think now it's kind of easier, at least you can find somebody outside of your own school or your school system across the nation that you can …connect with.

Tina also agrees that collaboration with colleagues and the tech coach is beneficial. She describes a collaboration experience saying,

> I'll have an idea… something I really want to do this year, and I couldn't figure out how to make it work. So, I got the tech coach. I would say a lot of my good ideas with technology come from collaborative either working with [teacher on team] or thinking I want to do something and not knowing how it's going to work and getting the tech coach to help me flesh it out.

William describes the importance of informal collaboration saying,

> In terms of experiences, I work with…the multimedia group at our school. And they … have developed really good systems for finding and evaluating stuff. And I've …worked under their wing that first year and learned a ton…It wasn't considered PD, because…it was in a working environment. But if it weren’t for

> working in that environment, I don't think I would be using technology the way I am now.

Kayla shows how a colleague visit helped her saying,

> Probably the most useful things that I have had has been just having colleagues who pop in and help me one on one with things like [name] is in the classroom right next to me, I would never have explored or used EdPuzzle had she not insisted on showing it to me. And she was very, very quick at being able to show it to me. So, I didn't feel overwhelmed by taking on some new something another, you know, but then I have another colleague, [name], who, together, we shared the creation of what we wanted to present through EdPuzzle. So, we divided up the duties, you know, and that helps.

Theme 8: Professional Development

Most participants discussed how blended and virtual environments required additional digital resources and organizational skills that were not required in the face-to-face environment and most were not prepared for and had not been trained to deliver and organize content in these new ways. Participant responses to questions involving support and Professional Development (PD) indicated it was nonexistent for organizing or evaluating. Teachers did not feel they needed help finding resources. They noted that resources were plentiful, and they felt comfortable in the places they searched for quality resources. Regarding PD on using digital resource tools, a few mentioned some success in self-paced offerings, others enjoyed learning from conferences, some said one-on-one was the best fit for them, and others described some helpful just-in-time PD offered by

peers or tech coaches. Sheila mentioned how she enjoyed an Edcamp style PD format offered during school hours on Wednesday's when students learned virtually. She loved that teachers had choice and flexibility and shared with each other. She was able to find resources she needed and learn how they could be used by participating in this PD. Others like Brooke and Tina appreciated personal attention from an instructional technology coach. Multiple teachers mentioned that it is important to do a few things well versus trying everything.

Throughout the interviews, teachers mentioned challenges that they thought did not have a solution when, as a tech coach, I was aware of a possible solution. Some examples included alternatives to filming content on a phone that was running out of storage, using Google File Stream in the same way as a network drive had been used in the past, using Google Slides presentations as a Microsoft school, ways to streamline curriculum so it works for anyone anywhere, and other issues mentioned by teachers. It was difficult to refrain from offering solutions and to just continue listening to responses when issues like this arose.

Participants continued to mention the need for time to collaborate and share what is working and what else is needed. They wanted to spend this time with teachers who teach the same type of content and students. Regarding PD, John mentioned that time to connect could be paired with a structure of expected outcomes. He describes the idea this way,

> As far as support, maybe just a really minimal structure. What is the need? …What options did you find to address that need? … What did you think about

> those options? …. Now, how are you going to implement it? You know, just to kind of move things along.

He went on to say that this should be supported with the money to adopt resources decided on by the group. As seen in many teacher responses, district purchased resources recommended by teachers were beneficial to teachers and students.

Tina mentioned setting PD goals and seeking help from tech coach and colleagues to reach those goals. A few teachers mentioned how seeing a lesson modeled could be helpful. Tina notes, “I'd like to use the Spheros…but I've never really had an idea of how they could be used in my curriculum. Maybe if…tech coaches come model how to use them…but I've never reached out and asked for that.”

Regina found personal connections over time most helpful. She elaborates here.

> Most PD is only for…one or two days. So, the relationships you're going to build in one or two days is…minimal…The one PD that I did do that really built a community of teachers that would… talk to each other and…really help each other was a PD…called "Teaching American History"…. It was a grant…funded by [a] Senator … Our local, county said…we're going to take 40 teachers… across the country… to Washington, DC, … to New York…to Boston…And of course, those 40 teachers…totally bonded … we tried to brainstorm how as a community we can help each other and make history… better for our community…We would meet …12 times a year. …. If you're meeting that often, it… amounted to something.

Two teachers discussed success with district purchased self-paced PD. The programs mentioned were Alludo and Simple K12. Both felt the programs were effective in teaching digital tools. Brooke said her tech coach offered self-paced PD that was also effective. She said that the coach would offer topics for a specific time period for PD credits if teachers submitted an artifact to demonstrate completion of the training.

Theme 9: Support

Support needs changed throughout a teacher's career and also varied based on newness of a teacher to teaching and/or to a subject area or to a new teaching environment such as in person versus virtual or hybrid. Most participants needed help with organization. Kayla shared, "I have such a big hot mess right now. I think I need a professional just sit down and help me go through all of these folders and sort of stuff out.… what I have going on is the equivalent of if I had file folders full of stuff and had just thrown them all over the room." Participants mentioned other support needs that included: time to collaborate, things that save time such as a tech coach troubleshooting a problem or someone finding a resource based on teacher and student needs, and the need to see successful organizational strategies that are working for teachers who teach the same subject in a similar environment. Pete says a secretary could help. He says, "So you know all those times when I spend hours on a Sunday or on an in an afternoon looking for something? … those are the kind of things that I can get them to do." Sloan mentions, "I think the problem with districts is that they don't have enough instructional technologists actually coming to the school to let teachers really play with these tools and apps, so they just sit there. Teachers are not aware of how to use them or even aware that

they're there.” Migration issues when platforms change or when districts change what is allowed is something teachers mentioned that disrupts organization methods. Jacob mentioned that it would be good to have a migration plan with alternatives publicized when tools are no longer available or allowed. Sloan stated that she loved using blogger and then the district blocked it, so she switched to Schoology discussion boards to fill that need.

Skye and Diana both mentioned the need for more instructional technology staff. Tina gave an example where technology staff was helpful to her in sharing a lesson with students. “Because I've had some ideas that I didn't know how to make them work and she spent three days troubleshooting one of my ideas, trying to make it work like three solid days. And she finally got it… But I never could have done that.” Sloan would like to see lessons modeled where the teacher is able to participate as a student if possible. Michael mentioned that the past teacher sharing her materials via Dropbox was very helpful when he started but that he doesn’t need it much now. Michael mentioned the value in a tech coach sharing one resource bi-weekly. This prevents overload but lets him stay in the know about new things he might could try. Pete noted, “If I could get a few more resources where it really was kind of organized by content and by standards, that would just be so helpful. Just across the whole United States. If I was a science teacher, especially if I was a new one too."

Though teachers did not specifically mention needed support in some areas, my knowledge as a technology coach allowed me to discern that teachers were unaware of support needs in some cases. Throughout the interviews, problems were mentioned as

unsolvable that I knew had existing solutions. For example, one teacher mentioned that if a resource were not in a particular format, she could not use it. However, it is easy to convert items from Google Slides to PowerPoint so for the most part they are usable in either format. Another teacher wished for breakout rooms in Google Meet and they already exist.

Sometimes teachers do not know exactly what to ask for. Pete says,

> It's kind of like [principal says] if you could tell me how to help you. And I said, [name], I just don't know, sometimes I'm in the midst of doing something. It's like, I'm sitting there in my class. And I go, like, oh, I've got a really great lesson today. And all sudden, it hits me, Hey, you got to make these, this video and add this document. You know, and so I … just have to do it.

Tina sums up the current support needs by saying, “I feel like this year is so much about survival. And this year is not necessarily how to get more innovative with resources. It's how to make the resources work with our COVID situation.”

Evidence of Trustworthiness

As discussed in Chapter 3, qualitative researchers rely on the qualities of credibility, transferability, dependability, and confirmability to ensure the study’s conclusions and findings are valid and avoid any ethical dilemmas I describe below the steps I took throughout the research process to safeguard the trustworthiness of the study.

Credibility

To ensure credibility, I completed several steps. I made sure that the participants chosen, in-service secondary teachers who use digital resources, were knowledgeable

about the research topic as described by Rubin and Rubin (2011). I also made sure the interview guide was designed to be non-threatening to allow participants to share without possibly distorting or omitting information. I used probing questions to clarify answers. I sent follow-up emails to all participants with the interview transcript for an accuracy check. The email included an opportunity for participants to provide changes or additional artifacts to support answers. Three participants responded with additional information or artifacts. One participant asked for a personal mention of an illness to be deleted from the transcript. I used triangulation and peer review with a qualified peer and my dissertation chair to further ensure credibility. I excluded participants from my work site to remove any conflict of interest since I serve as a technology coach for the teachers there. When using quotes or paraphrase of participant responses, I re-listened to the audio to ensure I stayed true to the participant's intent.

Transferability

To ensure transferability, it is important to share details on exactly how the study was conducted including participant descriptions, data collection methods, time periods, and limitations. This allows research audiences to use facets of the research design and conclusions (Ravitch & Carl, 2016). I provided rich descriptions of how this study was conducted to include the setting and participants. I also included the interview guide in the appendix for easy replication. I used thick descriptions from participants and explained the contextual relevance while reporting and analyzing the data. By documenting my findings, sharing my insights, and providing the reasoning behind my conclusions and analysis, I have increased the trustworthiness of my findings.

Dependability

I included actual quotes from participants whenever possible to aid in reducing researcher bias and interpretive authority as suggested by Ravitch and Carl (2016). I also employed validity strategies to include participant validation and thick description during data analysis and interpretation. Throughout the process I used memos and reflective journaling to describe and reflect on the process which aids in transparency and helps to mitigate problems with bias during data analysis and interpretation (Ravitch & Carl, 2016). Supporting artifacts added to the dependability of the study as they added an additional data source for data triangulation as described by Ravitch and Carl (2016).

Confirmability

To ensure confirmability, I used multiple strategies. I started with the frameworks and research questions for initial coding. I reviewed data multiple times coding it manually, then using NVivo software to code, then grouping codes, and then relistening to interviews and making changes to original coding. I supplemented the audio transcripts with written notes and memos taken during the interviews and during multiple re-listening to recorded interviews. I also consulted my chair to ensure my research questions were reflected in the interview guide used with participants.

Summary

This chapter included the data collection and analysis process used for the study. In addition, specific measures used to ensure study validity were outlined and findings for each research question were described. Responses were gathered during a global

pandemic where all participants had a change to the teaching environment they had experienced in past years. The interview responses described revealed teacher challenges, successes, strategies, and thoughts regarding finding, evaluating, organizing, and sharing digital resources. From reviewing the data, key findings related to RQ1 show that secondary teacher experiences in finding and evaluating digital resources demonstrate reliance on connecting with similar educators while struggling with organization and curation of the resources. Key findings related to RQ2 show that secondary teacher experiences employ effective strategies for finding and evaluating digital resources but struggle with sharing with students and teachers and with organizing digital resources for themselves and for students. Key findings related to RQ3 show that secondary teachers require different types of support for blended learning environments versus in-person environments and PD needs involve collaboration time and curation strategies offered in multiple, flexible formats. In the next chapter, I present my interpretations of the participants' responses in relation to the research questions and emergent themes.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this basic qualitative study was to explore secondary educators' experiences in finding, evaluating, and using digital resources in the classroom to better understand their challenges, strategies, and support needs. When I originally chose this topic, I was concerned about the growing number of digital resources and how teachers were able to manage them in their teaching environments. I could not have known that by the time my study would be ready for data collection, there would be a global pandemic with most teachers having been forced to teach in a blended or virtual environment where quality digital resources were essential and the learning curve was steep for many.

As a technology integration coach, I had seen teachers' successes and struggles over the years and had experienced my own struggles with managing digital resources. Though I heard many stories of experiences from elementary teachers, I did not have an understanding for where secondary teachers struggled in this area. The literature review shows that others had investigated some of these same concepts, but very few focused on secondary teachers, and of those, few focused on the concepts involved in digital content curation. It was my hope that by giving secondary teachers a voice and letting them share their concerns, successes, strategies, and needs, that those who have the capacity to make the changes needed to support these teachers, would be provided with valuable data gleaned from the synthesizing of their voices.

The study was conducted to address the gap noted in the literature in understanding secondary teachers' challenges, strategies, and support needs relating to using digital resources and to provide information on challenges teachers experienced

providing digital content during the recent COVID-19 pandemic and strategies and support needed for the future. This study came at a moment where teachers could still remember how it felt to teach in the in-person environment, while having been recently immersed in blended and virtual environments. This meant that responses were timely in offering perspectives on immediate needs for a new blended learning instructor, initial struggles, ongoing struggles, what helped and what did not. Their voices helped answer the study research questions:

RQ1: What are the experiences of secondary educators when finding, evaluating, and using digital resources in the classroom?

RQ2: What strategies do secondary teachers use for finding, evaluating, and using digital resources in the classroom?

RQ3: What support do secondary teachers need to find, evaluate, and use digital resources in the classroom?

Key findings included the importance and benefits of secondary teacher collaboration with like-minded educators, a struggle with organizing and curating digital resources, proven strategies for finding, evaluating, and sharing digital resources with room for support, and a need for PD that involve collaboration time and curation strategies offered in multiple, flexible formats.

It is my hope that these shared stories and experiences will result in benefits to others in finding, evaluating, organizing, and sharing resources to improve the learning experiences for teachers and their students everywhere. The next section includes my

interpretation of the participant response data along with connections showing that this data is supported by the research literature cited in Chapter 2.

Interpretation of the Findings

Secondary teachers' perspectives were explored through the lens of Siemens' (2005) connectivism theory and the TPACK (Mishra & Koehler, 2006) framework. Selected discoveries from this study confirm, disconfirm, or extend the findings from the literature. I analyzed these results by theme based on the research literature and the research questions. The interpretations below are shown through the lens of the study frameworks first, followed by themes found in the interview data that confirm the peer-reviewed literature discussed in Chapter 2.

RQ1

The first research question asked about the experiences of secondary educators when finding, evaluating, and using digital resources in the classroom. The findings confirmed teacher strengths in TPACK and the need for connection to networks to be successful. Findings are interpreted through these lenses in detail in the following paragraphs which is followed by a discussion on how the question findings are supported by the literature themes of digital information overload and digital curation and management.

Frameworks

TPACK. Interview data was analyzed through the TPACK framework. TCK is the intersection of the technological and content knowledge domains and involves how technology is used in a subject area for learning (Koehler et al., 2013). TPK is the

intersection of technological and pedagogical knowledge and involved how teachers choose and manage technology for students. Throughout the interviews, teachers reiterated that they knew what they wanted and looked for digital resources connected to standards. Teachers were confident in their content knowledge. This supports Cheng and Xie's (2018) findings regarding secondary teachers and the high level of content knowledge due to the ability to focus on a single subject. This relates to the CK piece of the TPACK framework.

A few of the participants mentioned having become more confident with technology use during the pandemic due to being forced to try new ways of teaching using digital resources. This supports findings from Dalal et al. (2017). Evaluating digital content involved teacher prior experience and motivation as described by Kim et al. (2017). Teachers reported the need to be motivated and ready to hear about a resource based on the success of others using it and needed to test it out themselves and have experience with it to feel confident using it. As mentioned in the literature review, TPACK+S was added to include standards knowledge (Xie et al., 2018). Throughout the themes of finding and evaluating responses included a focus on the standards. These findings support the literature discussed in this area and the findings of Xie et al. (2018).

Connectivism. Siemens (2005) pointed out that education had been hesitant to acknowledge the impact of new digital tools. It appears from the responses that the recent pandemic has forced secondary educators to acknowledge this impact. In the literature review, I focused on the management and curation of resources and the sharing through networks. As discussed by Utecht and Keller (2019), sharing information through teacher

connections on using digital resources in meaningful ways is an important and beneficial skill for teachers and in turn benefited their students. Responses also reflected Siemens (2008) study, pointing out that the information growth outpaces people's ability to manage, interpret, and use it. This study provided numerous examples from the secondary education environment which helps to fill the gap in the current research pointed out in the literature review. Rice (2018) identified that a successful strategy to implement connectivism is to avoid giving students information they can get themselves. Teacher responses showed that some teachers are using this idea successfully, using information reservoirs as described by Kropf (2013) and collaboration as discussed by Guder (2010) and Reese (2015).

These connectivist strategies are illustrated by William who has students follow and create Pinterest boards and who has students find quality resources and collaborate on a shared resource document. As Foroughi (2015) suggested, listening to teachers through this research was important and provided valuable information on what teachers need to be successful in the digital learning environment. Reese (2015) suggested that the connectivist principles be applied in course design. The responses from this study showed a need for better course design which would involve the organization of digital resources for students to be successful. Regina noted that she benefited from purchasing a full curriculum designed by a teacher that included tests, study guides, lessons, guided notes, and auto grading assessments. She said the package made it easy to implement flipped classroom and was engaging for her students. She discussed it here:

> A Virginia teacher who came up an entire [curriculum]...he took a whole year off from school, this was way before the pandemic many years ago. And he created a whole history curriculum for secondary… it's pretty straightforward. The kids have been pretty successful with it so far. So, I'm really happy with it…. And it's totally standards based because he's from Virginia, and I'm in California. And you know, sometimes the standards might be a little bit different, it's fine… he's covering the same stuff. I've taught for 15 years.

These teacher reflections and experiences support the importance of connections and teacher networks in using digital resources successfully in the classroom. The strong connections mentioned by each of the teachers helped them to find and share strategies that resulted in the use of quality and engaging digital resources for student learning.

Digital Information Overload (Finding and Connecting). The task of finding information did not appear to be a problem for teachers. Teachers responses showed they did use social media to share tips on specific remote learning tools as Trust et al. (2020) reported. However, the teachers in this study were more likely to *find* a shared resource on social media than to share it themselves. Teacher responses indicated in rich descriptions the places they looked for digital resources and the process they used to find acceptable resources. Good teaching is not just about the resource. It is about connecting ideas and seeing how others use a resource to engage students around a concept and then building on that and sharing. Kayla's lesson on 1984 has expanded over the years to include *Sound of Silence* cover songs, and digital copies of old southern history textbooks and newspapers. These resources help her engage students in discussion and connections

to the real world. Discussing the unit, she explained, “I'm especially proud of [it], that's one that I've worked on for years. So, you know, it's just it, it improves every single year.” Time for this type of resource development should be creatively built into the schedule.

Though many teachers mentioned trying to avoid a rabbit hole regarding the large amount of digital information out there, many had found strategies that worked for them when finding information. However, organizing that information was something all respondents struggled with and something where they had not received any PD. The teachers agreed that this was a support need and this supports the research mentioned in the literature review by Benselin and Ragsdell (2016) and Yasmeen et al. (2019).

Digital Information Curation and Management (Organizing, Sharing). This study’s findings supported Cherrstrom and Boden’s (2019) research on the reasons teacher curate information including insufficient resources provided by a district curriculum. A finding similar to Diekema and Olsen (2014) found that teachers did not take advantage of a number of already curated repositories.

In the literature, Deschaine and Sharma (2015) and Ungerer (2016) both discussed curation as a critical competency. The five C’s of digital curation proposed by Deschaine and Sharma (2015) that were crucial for university professors are the same things secondary teachers mentioned in the interviews. Collecting, categorizing, critiquing, conceptualizing, which consists of reorganizing and repurposing, and circulating, which is attributed to sharing and making accessible, were seen in multiple participant responses as teachers shared the need to make material their own, to revisit and reflect on resources,

and to share them with colleagues and students to promote learning. Participant responses regarding support needs validated findings from Mihailidis (2015) and Ungerer (2016) about the need for more formal pedagogies in this area. Teachers need and want help. They are willing to learn from others. Seeing and hearing about different strategies that work for others who teach the same way they do is helpful. Teachers are able to curate somewhat, but many shared that they could use help in finding ways to effectively curate content for themselves, their colleagues, and their students.

The study findings also supported research from de los Arcos et al. (2016) and Sharma and Deschaine (2016) regarding the power of content curation in helping provide quality resources in addition to in-house resources. Participants mentioned spending a good bit of time curating resources, but in most cases were able to show the benefits through student engagement or other learning benefits. These findings confirm findings from Ungerer's (2016) research.

The research findings discuss specifics of the variety of social media tools used by secondary teachers to curate digital resources which was necessary according to Greenhow et al.(2019) and Shaw et al. (2016) and extends the Tsybulsky's (2020) research from students to secondary teachers.

Blended Learning Needs (Evaluating, Pandemic). As mentioned by Stevens et al.(2018), teachers reported the need for new skills when teaching in a blended environment. Feelings of overwhelm and a need to find and redesign digital resources and to master new digital tools was evident in the findings and supports recent research (Bates, 2015; Bryson & Andres, 2020; Graham et al., 2019; Trust & Whalen, 2020).

Teachers reported the need to create new and specific resources to meet the new blended and virtual learning needs, as outlined by Sandars et al. (2020). Study results confirmed findings by Bryson and Andres (2020) and Hu et al. (2018) where teachers actively curated content to find new resources relevant to the new environment and discussed the need to provide a learning path or map to guide students through the resources. Some teachers accomplished this using hyperdocs, some with Google slides, some with daily check in forms and others with daily LMS posts. Teachers reiterated the requirement that a digital resource require perseverance but would not be so frustrating that students would not be able to continue. This would also depend on student comfort level with technology and/or content so resources could be organized and scaffolded with these criteria in mind.

As cautioned by Stevens et al. (2018), the challenge in defining what success looks like in blended learning is there, but the rich descriptive responses give needed evidence to support successful strategies using digital resources that were shown to improve student engagement and learning from these secondary teacher perspectives. More research could confirm this by looking at student learning growth data related to the digital resources used and concepts taught.

RQ2

The second research question asked about strategies secondary teachers use for finding, evaluating, and using digital resources in the classroom. As discussed above, connecting and networking both inside and outside of the school building is of extreme

importance in finding quality resources. Discussion on the question findings supported by the literature theme related to strategies follows.

Strategies for Digital Information Use

Study responses confirmed research by Giunti and Atkins (2020) and Trust and Whalen (2020) regarding the need for strategies to combat information overload and feelings of overwhelm. Phrases like “going down a rabbit hole” and “need more time” and comments about not knowing how to use the remote learning tools at first were common in the data. Findings mirror Trust and Whalen’s data reporting that teachers asked colleagues, conducted searches, and looked inside district and outside district to find resources to prepare for this new way of teaching. As noted by Dezuanni et al. (2017), many teachers felt the need to tweak activities they found or to create their own content after looking online. Tina explained, “I will Google things and then look at what other people have done and then I'll go make something myself.” Many saved social media feed content into social media repositories like Facebook and Pinterest. The study responses did not show as much use of the crowdsourcing methods using annotation as mentioned by Chen and Tsay (2017). This might be an area where professional development is needed to make teachers aware of this strategy and how it could be useful.

As mentioned by Kim (2018), it is challenging to identify best practice due to constant change in this field. Two teachers, John and Jacob mentioned concerns regarding this concept. The responses to the question of how teachers evaluate resources are almost identical to the SECTIONS model proposed by Bates and Poole (2003) and is

discussed in the literature by Ungerer (2016). Teachers mentioned evaluation considerations that included: student ease of use, reliability, cost, teaching and learning benefits, interactivity, which they described as engagement, and organization which the sometimes described as navigation. Though they did not directly mention the speed of incorporation, the responses lead one to assume this would be favorable during resource evaluation. Yasmeen et al. (2019) mentioned that higher education faculty used keywords, tagging, bookmarks, and labels to organize information, but organization still proved difficult and required additional PD. This study found teachers using keywords and bookmarks, but tagging was not mentioned. All the teachers said they would find benefit in PD on organizing, though it had not been offered in the past.

RQ3

The third research question asked about the supports secondary teachers need to find, evaluate, and use digital resources in the classroom. In the previous section, the need for additional support for blended and virtual teaching was described. Additional findings discussed below show that teachers need time to collaborate, flexible PD options that include choice, strategies to teach in a blended environment, and strategies to help in organizing digital resources for themselves and for their students. Discussion on the question findings supported by the literature theme of professional development and support follows.

Professional Development and Support

Responses showed teachers did benefit from PD both formal and informal through peers, which reduced stress and allowed for successful technology integration as

found by Özgür (2020). Some of the strongest connections from the research findings to the literature come from the professional development and support area. As found by Xie et al. (2017), the transition from print to digital resources was difficult for some and required support in evaluating, selecting and integrating content. As Darling-Hammond and Hyler (2020) reported, teachers have less collaboration time than those in other countries, yet collaboration with colleagues was mentioned as one of the main needs teachers had and one of the best places they found resources and support. These findings support research by Vermette et al. (2019). Teachers in the study continued to mention the value of connecting through PLC's, informal and formal collaboration and indicated the need for additional time to do this. These findings confirm research done by Meeuwen et al. (2020) and Darling-Hammond and Hyler (2020). Study responses showed specific examples of how teacher collaboration and sharing resulted in benefits to students again confirming research by Meeuwen et al. (2020).

Supports mentioned in research by Kim et al. (2017) such as specialists and training on evaluation instruments were mentioned by study participants as valuable and needed. Examples of teachers benefitting from technology coaches or requesting additional specialist report were found in the data.

As Johnson et al. (2020) mentioned, instructional designers could be of help in developing resources. Though this study did not involve specific mention of this, the responses could lead one to infer that if content were designed properly for the blended environment, it would be useful for teachers. Currently teachers are redesigning what they find to fit the blended environment.

Stevens et al. (2018) mentioned that blended learning PD should allow for collaboration, practice, and reflection. Many of the teachers in the study mentioned the need for collaboration and the need to practice what they learn and even participate in the PD as a student for this practice time. Reflective practices were described as beneficial to teachers in the study. PD where teachers share best practice would be beneficial as Stevens proposes and study responses show that teachers would welcome this format.

Tondeur et al. (2017) found that long-term PD is more effective and there are descriptions in the data of teachers who benefited from long-term collaborative PD with the same group of teachers. Conole (2018) discussed the 7 C's of learning design and the *create* part of the framework involved repurposing existing materials . This work, along with the work of Karimi et al. (2020) points to possible PD that would benefit teachers as they report the need to learn to use digital resources in new ways for online teaching.

Limitations of the Study

My role as a technology coach could have been and unintentional limitation to the study as it could have provided a biased lens to the interpretation of the participant answers. In Chapter 3, I described strategies used to diminish any potential bias. These strategies included reflective journaling, triangulation, and participant artifacts. I also followed up with participants to ensure accurate representation and capture of interview responses. An additional limitation included the fact that only one semistructured interview was conducted per participant. This design did not allow for follow up questions or clarification with participants. While some participants emailed follow-up

information, most did not. So, I was able to look at some teacher examples, but not all, to verify interpretation of interview answers.

A final limitation involved the recruiting and timing of the study. The study was conducted during a pandemic which meant that teachers were already overwhelmed with participating in video conference calls and with teaching in formats to which they were not accustomed. This could have resulted in less detailed answers and less follow up with examples of resources and requested organization screenshots.

Recommendations

As a teacher and later technology integration coach for the past 24 years, I have observed and collaborated with teachers on all levels from kindergarten to college level in looking at strategies to deliver engaging content that meets the needs of both teachers and students. Many times, it seemed we continued to do things the way they had always been done and innovation came slowly. However, this pandemic forced educators to change practice and use digital resources in ways that allowed for flexibility in delivery and assessment. In listening to their voices, it appears that most of the work is on the teacher to curate and customize the resources they need. Future studies should look at instructional design and how online courses should allow teachers to choose vetted resources based on teacher and student needs. This study could be replicated to gather more teacher experiences. The study could be improved by including a questionnaire as a follow-up to clarify and add to the interview responses. Kayla's email provided valuable and rich insights that were triggered from the interview but would not have been gleaned if she had not taken the initiative to share them. Observing organization methods inside

the LMS, drive folders, and browser bookmarks would also provide more rich visual data for future studies in this area. Future studies could look at differences between early career and later career educators and between suburban and rural school settings. Future studies should consider the secondary student perspective possibly tied to the teacher respondent.

Implications

The potential impact for positive social change is to support teachers in managing digital resources for student instruction. Though the sample size was small for this study, it contains important details from teacher voices regarding their struggles and successes in using digital resources to teach in the blended and virtual environments now common due to the ongoing pandemic. This study can contribute to the existing literature by highlighting teacher challenges and professional development needs in relation to finding, evaluating, organizing, and sharing digital resources. The recommendations can assist technology coaches and other education leaders in developing informed, targeted professional development that will benefit students and teachers. Districts can make wise purchases that are tested and proven useful by secondary teachers. PD can focus on these district-purchased resources. During this research, I heard teachers mention things they thought were not possible but that were currently possible. We can do better in meeting the needs of secondary teachers in managing digital resources. My recommendations are broken down into four areas and include:

Collaboration

1. Districts and administrators should build in frequent time for teachers to share ideas with colleagues whether in person, virtually or through repositories managed by tech coaches, librarians, or others.
2. The collaboration time should meet teacher needs, allowing flexibility in format offered, time, and delivery while requiring mild scaffolding that documents accountability.
3. Allow collaboration to occur in virtual settings. Keep best practices from the pandemic where teachers felt the need to collaborate on meeting the demands of blended and virtual learning. Use teacher new comfort with Zoom to host department-based trainings via web on district digital resources like LMS, textbook resources, etc. This allows for expanded collaboration and the chance for teachers to learn from anywhere.

Sharing

1. Encourage teachers to share in-progress work. Get teachers accustomed to seeing unfinished digital resources, virtually visiting other teachers—connecting and reflecting.
2. Share in a way (curated) that is usable, clear, and helpful to others. Many programing sites like MIT's Scratch program, offer remixing and reflection memos as an option. With so many teachers acknowledging they re-mix resources to make them their own, this idea could be tailored to educational digital resource sharing.

3. Allow and support easy collaborative classroom visits by letting teachers join other teacher's online classrooms to see lessons, see how it is organized, and see how students respond. Tools like Lil Sis make this easy to do.
4. Take advantage of teachers' new competencies with recording and use them to allow teachers to share more with others. Tools like Screencastify and Flipgrid can make this easier.

Digital Resources and Evaluation

1. Instructional designers should incorporate student learning paths and teacher customization into the digital resources and courses they design.
2. Vetted digital resources could take the place of the traditional textbook and must be flexible and teacher and student tested.
3. Repositories should consider the SECTIONS evaluation model and include teacher input through a clear and standard reviewing system.
4. Districts should host repositories that are easy to navigate, well-organized, and personalized to teacher needs.
5. Districts should vet resources based on teacher inputs and then support those resources realizing different needs for different teaching environments.
6. Consider using AI to help in resource evaluation. Collect teacher evaluation criteria and allow machine learning to learn what resources teachers with similar evaluation criteria ultimately find and use successfully after searching. Build in teacher reflection and feedback to improve the system.

7. Tech coaches serving secondary educators should share new information on digital resources in small bites, share the same idea multiple times, and in multiple communication formats while focusing on allowing teachers to excel at a few things. Timing is important. Sometimes teachers are not ready to hear an idea but will be ready later when it is more relevant.
8. Digital Resources collections or recommendations should come with teacher reflections on use and troubleshooting tips.
9. Train teachers to use an evaluation rubric as described by Kim et al. (2017) making sure to include items mentioned in the research such as ease of navigation, easy sign in, free or paid, engaging, meets standards, supported by district/admins, recommended/reviews, endorsed by national organization, proper level of difficulty, customizable.
10. Instructional design should be flexible allowing for teacher customization and multiple ways of viewing content to meet teacher and student needs.
11. Repository - a usable repository should be searchable by demographic and accessibility features (ESL, reading level, etc.)

Professional Development and Support

1. PD offerings should be flexible and informal and should include quality independent study options whether district developed or purchased.
2. PD credit should be given for peer-to-peer interactions with documented results.
3. PD Sharing - Tech coaches and others responsible for PD should make it easy for teachers to share their experiences with digital resources. For example, for

teachers afraid about remixing others' work, consider PD on Creative Commons. Also, teach curation skills, tagging, etc.

4. PD should include encouraging and making it easy for teachers to see how other teachers use digital resources. This could include a virtual visit to an online LMS to see how it is organized, virtual visits through a "Welcome Calendar" or encouraging teachers to share screencasts describing, for example, how they organize and why it works
5. Just-in-Time PD to help teachers like Pete learn better and easy ways to create and share video. Offer a place to find answers to an immediate problem, maybe in help desk format.
6. Organizing tips include collecting screenshots provided to teachers by LMS type or by resource type so they could see different ways of doing it - shared by teachers from various subjects, grades, LMS, etc. Include examples of organization options for students to see and use and based on skill level - color coding, folders, calendar, tagging, etc.
7. Add time saving PD such as training on RSS feeds which could notify teachers when resources meet their criteria allowing resources to come to them instead of them having to seek them out.

Conclusion

This study looked at secondary teacher experiences in finding, evaluating, organizing, and sharing digital resources. The results are clear. Teachers know what they need, and if given time, can remix digital resources to create quality resources that meet

the needs of students. Teachers have knowledge worth sharing if sharing it could be easy. Teachers need more time to collaborate when teaching in blended environments. Best practices gleaned from this collaboration time can benefit students. Teachers need districts to take the lead in making it easy to find and use resources that are proven to help students learn and succeed. Quality digital resources are critical to successful teaching and learning in blended and virtual environments and can lead to engaging and effective lessons when used correctly. PD on organization and curation is needed and beneficial. Implementing the suggestions discussed could benefit secondary teachers and their students in all teaching environments.

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Appendix A: Interview Guide

Digital resources for this study could include resources such as online articles, blogs, podcasts, videos, images, online virtual experiences, online collections and repositories, social media feeds, or other content mentioned by the participants.

Background

- Could you tell a little bit about your teaching background and your current position?
- Could you describe your current teaching environment? Is it face to face, virtual, blended or a combination?
- What are your general feelings towards using digital tools and resources for your class?

RQ1: What are the experiences of secondary educators when finding, evaluating, and using digital resources in the classroom?

- How do you find digital resources for teaching?
- How do you determine whether to use a digital resource?
- How do you use digital resources for teaching? Give examples.
- Can you tell me about an experience you had in **finding** a digital resource for a particular lesson or unit?
- Can you describe a way you **shared** digital resources for a lesson or unit? With students? With other teachers?
- Can you describe an example of when you faced a challenge in finding, evaluating, organizing, or sharing a digital resource?

RQ 2: What strategies do secondary teachers use for finding, evaluating, and using digital resources in the classroom?

- What are some strategies or tips you have for **finding, evaluating, organizing, and using** quality digital resources for teaching?
- Can you describe any tools you use to **find, evaluate, organize, and use** digital resources?
    - *(If needed, give examples such as: bookmarking tools, playlists, websites, blogs, social media tagging, LMS)*
- Can you tell me about how you share resources with students and which ways have worked best?
- Can you describe a lesson where you shared a set of digital resources with your students that you felt good about?
- What suggestions do you have on the use of digital content as a teaching and learning tool?

Q3: What support do secondary teachers need to find, evaluate, and use digital resources in the classroom?

- How much professional development have you received related to **finding, evaluating, organizing and/or sharing** digital resources?
    - How often? Format offered? Formal or Informal?

- Can you tell me about a professional development or other experience that helped you with **finding, evaluating, organizing and/or sharing** digital resources for teaching?
- What do you think is needed to support you in finding, evaluating, and organizing resources?

Closing

- Are there any questions you think I should be asking about this topic or anything you would like to add?

Optional (if time)

Look at this list of tools and selected curated content collections. Can you describe how you have used any of these? Were you aware of the OER Resources? Are there others not listed here that you use frequently?

Social Media for Resources
Facebook
Pinterest
Reddit
Teachers Pay Teachers
Twitter
YouTube
LinkedIn

Selected OER Resources
Annenberg Learner http://www.learner.org
Google Applied Digital Skills https://applieddigitalskills.withgoogle.com/s/en/home
#GoOpen http://tech.ed.gov/open/districts
Khan Academy https://www.khanacademy.org
OER Commons https://www.oercommons.org/
PBS Learning Media http://www.pbslearningmedia.org/
Smithsonian Learning Lab https://learninglab.si.edu