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Expertise, Complexity, and Self-Regulated Engagement: Lessons from Teacher Reflection in a Blended Learning Environment

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Blended learning has been touted to have substantial benefits for both teachers and learners. Enacting blended instruction with students provides data and other information sources to support teacher reflection. However, reflective accounts from practicing teachers in these blended environments are missing from research literature. With these understandings in mind, I, a practicing teacher in a public middle school, collaborated with two researchers serving as critical friends to form a research team that reflected on blended learning in my class. By engaging in this study, reflection served my goal to integrate Google Tools into reading support, use authentic problem based learning (aPBL) to develop critical thinking, and increase student responsibility for learning. Findings center on my development of expertise in subject matter and technology, the complexity of the gathering and interpreting data produced in this blended environment, and engagement that changed through self-regulation used by myself and my students.

Keywords: *Teacher reflection, blended learning, collaborative research, technology in classrooms, teacher education*

This is not a traditional qualitative study, but one based on my reflective interaction with two critical friends, examining my work as a middle level teacher using blended learning. Blended learning is a form of education where students receive instruction using online tools in combination with face-to-face support (Oliver & Stallings, 2014). The ratio of online versus in-person instruction, as well as the places where the different types of instruction occur, varies widely from program to program in blended learning (Horn & Staker, 2011). Researchers contend growth of K-12 blended learning has been occurring faster than K-12 totally online learning (Barbour et al., 2013; Graham, 2013; Picciano et al., 2012). This growth created a need to conduct research to optimize its use (Barbour et al., 2013; Halverson et al., 2012). Moreover, these research efforts should be broadly directed at "all aspects of K-12 blended learning" (Drysdale et al. , 2013, p.19). This includes focusing on inclusive practices for traditionally underserved students (Rice et al., 2018). One such underserved population is students who require reading support in school.

Reflection is a way for educators to examine their practice, with an eye to improvement (Rice & Pinnegar, 2012). Blended learning can be useful in this self-examination by readily providing multiple strands of information to support teacher reflection, thereby sustaining teachers in their blended learning practice (Graham, 2013). However, few examples exist of what this reflection looks like for practicing teachers in blended learning settings. In addition, teacher educators need to understand reflective processes in order to prepare teacher candidates for digital learning environments, such as blended learning (Barbour et al., 2013). As the critical friend-supported reflections emerged in this study, the overarching goal remained examination of blended learning. Specifically, I asked: How do I, as a teacher, experience blended learning in a middle level public school while supporting reading?

CONTEXT OF THE STUDY

I am a practicing teacher with 27 years of experience and a doctoral degree in learning technology design and research. Currently, I teach United States history at a public middle school in the Atlantic Southeast. In my practice, I utilize blended learning in some form for each unit to expand student-centered learning opportunities. The areas of focus that are part of all of these includes reading support, authentic problem based learning, and use of Google tools. It is these models that the reflections shared here are based upon.

Prior to coming to my current public school, I taught social studies courses in a totally online private school. My experiences there helped me

become comfortable with the idea that online learning could occur in any setting. When I took up the position at my current school, I began to consider ways to use technologically grounded instruction based on Internet technologies. I was especially motivated to learn more about blended instruction when I discovered that in 2012, 34 percent of higher education courses were offered online, an increase of over 300 percent in nine years, and that online courses in high school supported college readiness (Allen & Seaman, 2013; Patrick & Powell, 2009). This realization elicited a sense of urgency for helping my students, many of whom are struggling against great learning and socio-economic disadvantage, to become educated in the use of online and blended learning strategies, in order to prepare them for higher education. While it may be true more recent research has questioned the worth of totally online learning to prepare secondary students for college, I felt working with technology strategies used in a blended environment could help (Protopsaltis & Baumi, 2019). The specific approaches I contemplated using included authentic problem based learning, multimodal web based content, and Google tools (Docs, Slides, Surveys/Forms, Sheets, and Classroom). The goal was to use these to engage students with individual and collaborative work, supported by frequent feedback.

After engaging in advocacy for this type of instruction, I was granted administrative approval to develop a blended class but was only permitted to offer it as an eight-week after-school elective where students would access content though blended delivery, but not receive credit on their transcripts. Under such circumstances, student enrollment and engagement was disappointing. This experience led to a determination to develop resources that would enable me to create and implement higher quality blended courses. One of these tools was a Reading Support Wiki housed inside the Blackboard learning management system. It offered audio of content text, as well as links to images and videos that provided clarification of difficult concepts. To integrate the use of authentic problem-based learning (aPBL), I used online and in-person strategies to work through the exploration of the Cold War. To structure this new unit, I began using a collection of Google tools. A summary of all of these tools and supports for blended learning environments appears as Table 1.

Table 1
Context of the Blended Learning Environment in this Study

Specific Context	Descriptive Elements
Authentic Problem Based Unit	• Subject matter dealt with Cold War U.S. related history
	• Instructional focus on development of critical thinking
	• Teacher supported student and teacher self-regulation
	• Content resources designed for student use
	• Students collaborated in small groups over three weeks
	• Linguistic text support included graphics, audio, and video
Reading Support Wiki	• Synchronous and asynchronous support provided
	• Resources located in same place on one wiki page
	• Formative assessments frequently conducted
Google Tools	• Included Documents, Slides, Surveys, and Drawing
	• Shared documents with students individually and in groups
	• Differentiation provided for extra support or extension
	• Authentic problems allowed student choice
	• Monitored work synchronously and asynchronously
	• Self-regulation around tool use embedded
	• Culminating authentic activity designed to connect to student final product

CONCEPTUAL FRAMEWORK

My teaching context in this study can be understood through a review of relevant literature that forms a conceptual framework. The major topics were: (a) collaboration and interaction, (b) inquiry and reading development, (a) assessment and self-regulation, and (d) learner perceptions. The contention is these concepts together from an environment that supports effective blended learning (See Figure 1).

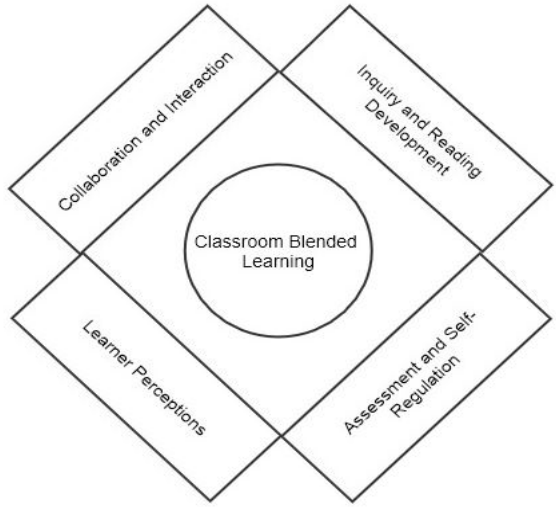

Figure 1. Conceptual Framework.

Collaboration and Interaction

Collaboration and interaction in blended environments is multi-faceted. Some research from higher education on blended learning has relevance for K-12. Specifically, I found that blended learning approaches that emphasizes the use of cloud-based internet tools promoted learner-learner and learner-teacher interaction for me as well as in previous studies (Rowe et al., 2013). However, those interactions need to be both synchronous and asynchronous to be productive (Forment, et. al, 2012; Stewart et al., 2011). For example, in a blended learning environment, Donna and Miller (2013) documented learning through use of one Google document to brainstorm general project ideas, and another document within smaller cooperative groups to work on parts of the assignment. Google Sites, a wiki based collaboration tool, has also been found to increase productivity among learners ranging from undergraduate to elementary aged (Frisch et al., 2013; Kovalik et al., 2014). Finally, key to collaboration in educational settings is communication with the teacher. In fact, Majid (2014) found learner-teacher communication can continue after an assignment is due, and that individual reflection was facilitated for students and teachers through use of Google Form questions embedded in a class blog.

Inquiry and Reading Skill Development

Whereas Google Tools have been found convenient and efficient for communication and collaboration, Marin and Halpern (2011) maintained that the major goal of education should be to help students learn how to think critically. Researchers have argued what I found in my practice, namely that using Google tools, such as Forms for formal and informal assessment, Drive for organization work materials, Docs and Slides for individual and synchronously collaborative work, can help accomplish this when employed to support an inquiry-based approach (Avramides et al., 2015; Rowe et al., 2013). The use of these Google tools in an interactive environment helped me support the development of authentic skills in my students, such as locating, critically analyzing, and sharing information. They had to use them to access necessary materials, receive feedback on shared work documents from collaborative peers and teachers, and meet the challenge to make their work better (Horton et al., 2013). All these skills supported engagement with digital materials in a blended environment.

I also found blended learning served as a context for reading skill development that intentionally integrates technology in learning. Previous research on texts in digital learning environments has suggested digital text is difficult to comprehend without support (Rice, 2017; Rice & Deshler, 2018). Nevertheless, researchers have recognized the importance of this type of internet technology use to the development of literacy (Leu & Kinzer, 2000; Pytash & O'Byrne, 2014). In fact, researchers have found K-12 students benefit from the ability of a technology enhanced blended approach to scaffold text and differentiate resources to support development of reading skills (Dalton et al., 2011; Healey and Klinghammer, 2002; Ortlieb et al., 2014). This was something done regularly in blended learning in my classroom. Going further, I found something already recognized by researchers, namely that a multimodal approach to blended learning that embeds interactive support before and during reading helps learners develop their vocabulary, reading comprehension and content knowledge in context (Dalton et al., 2011; Stevens, 2018).

When technology is used to scaffold reading support, determining what to read and for what purposes brings dilemmas because of the sheer amount of text available on any and every topic. One response is to focus the effort by increasing the use of authentic problem-based learning (aPBL), and thereby direct knowledge construction to specific purposes (Marra et al., 2014; Purichia, 2015). Using blended learning for aPBL in this way in my classes offered opportunities for using real-world problem situations to engage students in learning that is superior to traditional learning (Delialioğlu, 2012; Horn & Staker, 2015). Real world contexts are those in which the

skills developed or practiced may be used in the future, are tied to actual situations that have occurred, and are also of critical importance when trying to engage secondary learners (Barrows & Tamblyn, 1980; Brown & Duguid, 2013). Another important component of aPBL, relevant in Higher Education, and which I found applicable in my middle level learning, is the ill-structured problem intentionally designed to develop real-world learning skills (Marra et al., 2014; Reushle & Mitchell, 2009). The combination of the real world with flexible problems pulls student interest by allowing them control over assignments that relate to their lives.

An aPBL approach offers other benefits. These include developing skills in information analysis, argument construction, and the ability to transfer skills learned to other subject matter (Lombardi & Oblinger, 2007). In addition, Marra et al. (2014) stated something true in all learning levels, namely that learning that is situated in specific contexts, which is one quality of aPBL, produces more meaningful knowledge that is retained more easily due to being integrated in authentic contexts. In short, engaging in aPBL offers practice in skills like critical thinking, collaboration, and writing (Horn & Staker, 2011; Horn & Staker, 2015; Oliver et al., 2006).

Assessment and Self-Regulation

Another advantage I recognized in Google Tools is their ability to support assessment and self-regulation. Avramides et al. (2015) studied the use of Google forms as a formative assessment tool, and found it assisted teachers in evaluating student progress by combining qualitative data from forms with quantitative forms like test scores. Forment et al. (2012) found the html coding connected to many Google Docs applications made it possible to embed them within a class Learning Management System page, enabling learners and teachers access to assess progress. In fact, this is one strategy I used during the COVID-19 emergency remote learning shift to keep learners informed. Additionally, available information confirms processes of self-regulation are enhanced when students have access to information about their progress through Google tools, enabling them to determine how the strategies they are using are working, and what adjustments they can make with support from peers and teachers (Stevens, 2016).

Many scholars have also put forth models to describe how self-regulation impacts the learner's academic behavior. Pintrich (1999) posited that these models all share common characteristics to address cognitive strategies used by the learner to guide learning, and they all provide strategies for acquiring resources to complete learning tasks. Later, Zimmerman (2008) incorporated these characteristics in his self-regulation model that included the forethought, performance, and self-reflection phases. In my blended learning

environment, I supported students by helping them use these skills to monitor their own work, and thereby meet learning goals. While little research on self-regulation in blended learning environments exists to illuminate how teachers entwine their self-regulatory acts with those of their students, it is generally accepted that digital learning environments require self-regulation for success (Akyol & Garrison, 2011).

Learner Perceptions

Generally speaking, students are positive about using online tools from companies like Google in order to complete their work when participating synchronously and asynchronously in collaborative blended and online learning (Kannan, 2018; Martínez-Rodríguez & Benítez-Corona, 2020). In addition, researchers have found the positive impact Google Tools have on collaboration increases the likelihood students will continue to use, and benefit from them (Heggart & Yoo, 2018; Zhou et al., 2012). In fact, Google tools, such as Classroom and Drive together, not only positively impact learning, but are enjoyed by students (Alqahtani, 2019; Majid, 2014; Martínez-Rodríguez & Benítez-Corona, 2020).

However, using Google Tools is not without concerns. One barrier perceived by learners is a low level of teacher confidence and skill integrating technology, such as Google tools, in their learning design (Ertmer & Ottenbreit-Leftwich, 2010). This has also proven to be an issue for many teachers during the COVID-19 crisis, as evidenced by their requesting formal and informal coaching by a school based Tech Team of which I am a part, to support them in becoming familiar with Google tools. In addition, Donna and Miller (2013) found opposition on the part of learners who preferred communicating in person rather than using Google tools to collaborate while developing content knowledge.

Some of this uneasiness emerges specifically from problems related to Google Classroom use. Educators stated keeping students on pace when using Google Classroom can be problematic (Heggart & Yoo, 2018). Undergraduate learners in this study mentioned something I found true in K-12 learning, namely that using Google Classroom during the 2020 COVID-19 Pandemic was difficult at home, and they would have benefited from greater teacher support in knowing how to effectively manage it (Hassan et al., 2020). One factor impacting this was that many university instructors had never used Google Classroom, and did not know how to support learners during the early 2020 Covid-19 move to online learning. In addition, some socioeconomically challenged learners had trouble accessing Google Classroom during COVID-19 emergency remote online learning due to not having access to computers and reliable internet (Wesley, personal communication, April 27, 2020).

In summary, using online tools in this interactive way supports the development of authentic literacy skills such as locating, critically analyzing, and sharing information (Horton et al., 2013). For me persona, this was powerfully illustrated in May of 2020 when four students in one class asked to share the Google work document of one of them, and produced an advanced multimodal presentation related to events related to The Holocaust.

METHODS AND STRATEGIES

To structure this reflective study, I decided used a critical friend approach, and recruited several researchers with whom I had worked. They were able to work as detached observer critical friends due to their knowledge of blended learning in middle school environments, and their lack of direct contact with my classroom (Fletcher, 2019; Swaffield, 2008.) The trust we had previously developed allowed them to ask confrontational questions, and challenge assumptions I was making about what I observed in my blending (Costa & Kallick, 1993; Swaffield, 2008). Our hope was this approach would lead to greater understanding of blended learning that would benefit their practice as teacher educators, and mine as a classroom practitioner (Baskerville & Goldblatt, 2009; Creasy et al., 2004).

There were multiple ways we worked together throughout this project. One involved the critical friends analyzing reflections I had generated on shared Google documents. A reflection analysis protocol was jointly developed that directed identification of themes, which were then discussed during the bi-weekly research meetings. During these meetings we also developed problem statements related to the reflections, discussed possible responses that challenged me to think even more deeply, and reflected again. In addition, articles shared on the Mendeley research sharing application were discussed to gain further insight relevant to blended learning in middle level settings.

Building Teacher Knowledge Through Reflection

Teacher knowledge is a fabric of tightly woven strands (Korthagen et al., 2001). The foundation for reflection, whether it is autobiographical (Bullough, 1991) or critical (Gitlin, 1992), is experience. Prior teacher experience plays a large role in future decision-making that form teacher identity (Bullough, 1997). In a blended learning environment, this includes the pedagogical decisions teachers make about what technologies to use as an aspect of teacher identities (Rice, 2019). Teacher knowledge emerges as a combination of practical understanding from experience, and formal knowledge from the academy (Fenstermacher, 1994). Practical knowledge promotes action, whereas formal knowledge predicts action.

Teachers identify their knowledge strands, and interrogate those strands, through reflection (Moon, 2007; Van Manen, 1977). According to Shön (1983), those reflections that overlay practical action occur in three frames: *reflection in action, reflection through action*, and *reflection on action*—each frame constituting a different site for knowledge interrogation. Administration in schools can provide teachers with dedicated time to engage in this reflective action (Stevens & Rice, 2018; Sims & Penny, 2014). When this happens, teachers develop an attitude of respect and trust towards each other that results in an interactive process of reflection aimed at improving learning design (Stevens & Rice, 2016a/b). This collaborative reflection then supports learners (Lefstein et al., 2020; Owen, 2014).

Curriculum Making as Reflection

In addition to studying reflection's role in teacher knowledge, our reflective community also considered perspectives on curriculum as a complex, multi-faceted process that is made rather than implemented (Connelly & Clandinin, 1990). These understandings were also informed by Dewey's (1938) notions of continuity and interaction generated by experience, meaning that curriculum is organic and never in its final form. Continuity and interaction processes are key to pragmatic views of experience since they can be used to solve local problems in local contexts. Finally, Schwab (1977) propounded curriculum as *lives as they are lived*. Dynamic interchanges between teachers, learners, subject matter, and milieu promote theorization in learning environments that are inevitably local in design but highly regulated in execution.

Data Collection

The study data, in its most basic form, consisted of three extended reflections (approximately 2,500 to 3,000 words) I completed using Google Documents. These reflections were planned and organized as a statement of problem or interest regarding practice, a set of procedures to gain insight into the problem, outcomes of procedures, and then lessons learned. In this way, the written reflections formed artifacts for analysis. The critical friends responded to these reflections with comments and questions (Loughran & Northfield, 1998; Rice & Pinnegar, 2012). The reflections, and their reactions, were discussed in bi-weekly research meetings held in a Google Hangout. During these meetings, which lasted as long as 1 hour, we discussed articles shared on the reference managing service Mendeley, discussed practice in our work environments, and evaluated the study progress.

Data Analysis

In order to represent the many types of data accurately and reveal findings that would resonate with both teachers and researchers and in the academy, analysis methods needed to be systematic, but not rigid. To this end, data were analyzed using emergent qualitative document analysis (Altheide et al., 2008). There are several steps in this process.

The first was to gain familiarity with various genres and types of documents or texts. The type I concentrated on was reflection. Therefore, I went through and read about the reflective processes, but I also read about the forms and purposes of reflection. For example, Mena-Marcos and Tillema (2006) classified reflections as *talking the talk, talking the walk, walking, the talk,* and *walking the walk*. Each type carried with it different purposes and methodological strategies. As I considered this work, I contemplated the ways in which I was engaging formally with these various types through my written accounts, as well as in meetings with my critical friends. The second step was to re-read the original reflections, comments, and research articles, and make notes before conferring at bi-weekly research team meetings. The third step was to build a protocol focused on finding both shared and unique variables (also called themes). The critical friends and I together proposed themes, presented evidence supporting them, and used evidence to challenge each other's conclusions. The fourth step was to revisit the themes individually once more to ensure they represented the data, and to consider disconfirming evidence (Ryan & Bernard, 2003).

FINDINGS

This study of teacher reflection in a middle level social studies blended learning environment centered on integrating digital materials into reading support, using authentic problem based learning to develop critical thinking, and increasing student and teacher self-regulation in both of these areas. The desire was to answer the question: How do I, as a teacher experience blended learning in a middle level public school? Relevant findings focus on the ways in which teacher reflection: (1) developing a stance of expertise (2) demonstrating teacher thinking about the complex and manifold data for curriculum making, and (3) opening spaces for revealing self-regulatory processes of both teachers and students. These findings are summarized in Table 2 and expanded upon in the following sections.

Table 2
Summary of Findings

Findings about Teacher Reflection
Developing Expertise
• Technology integration
• Subject matter knowledge
• Availability to students individually and as a group in and outside of school
Demonstrating Teacher Thinking about Complex Data
• Google Forms' role in monitoring work pace
• Synchronous and asynchronous comment tools for coaching
• Learning Management System tools as support
• Digital resources for use as extension support materials
Revealing Teacher Self-Regulatory Processes
• Students' perceived opportunity to engage with subject matter
• Student optimization of pace to differentiated supporting resources
• Student use of supported goal setting as a self-regulatory process
• Teacher instructional and emotional responses to student self-regulation •

Developing an Expert Stance around Subject Matter and Technology Integration

The first theme emerged around my authority as a teacher, and the way in which this authority folded into my identity as a subject matter expert in social studies, and a technological expert regarding the devices and programs used in blended learning. The following excerpt from the study reflections illustrates the development of this stance around subject matter expertise:

> I gained access to a 30 computer mobile laptop cart in early January and I began planning an aPBL experience based on U.S. Cold War history. I chose this unit because it was two months in the future, and the intervening months would allow me to successfully design the unit. I also decided on this topic because I found a believable situation from the period that allowed me to wrap the flexible aPBL elements around it. This reflection emphasizes the importance of computer access to a problem based student-centered approach.

In this introduction, I accepted responsibility for the unit, saying it was my decision, based on what I thought planning time would allow, and on technology resources available. However, I also emphasized the believability of the unit, and the fact that it was based on true events in order to lend authenticity to the ill-defined problem being developed for my students.

Both of these (time and resources) are important considerations, but in and of themselves, would have been insufficient to help the unit take shape. A third factor, my discovery of a scenario that was sufficiently authentic, was brought together with my belief in the importance of problem based learning, and then the unit was born.

The reflections continued to describe the scenario that was designed for my students:

> The authentic situation centered on learners operating as employees of an organization that had been contracted to produce a presentation showing Russian young people what had actually been going on in the U.S. during the Cold War era. This was to be used at The Monsters of Rock show, an actual event, held on a Soviet air base in September 1991, literally days after the KGB had made one last attempt to remove Boris Yeltsin from power. In order to engage students an authentic video clip was shown from a funeral march for four young men killed protecting Yeltsin from KGB aggression. My learners were told they were being given a chance to reach out to the Russian youth and help them through a tough time.

This reflection reveals enthusiasm for the activity in which I was trying to engage my students. The details of U.S. history were carefully recounted as an assertion of not just my knowledge, but my interest in historical events. My own sense of intrigue was apparent as I told my students that they have "the chance" to help Russian youth, rather than the "assignment" to do so.

However, I was also interested in asserting expertise around technological devices and platforms. In my reflections I established this expertise by talking about what worked well, and what did not. The following reflection discusses my attempts to use the reading support wiki that was built with students. In this reflection, I am clearly interested in the design of the wiki and how it did not materialize as I had envisioned:

> There were insufficient collaborative work opportunities included in reading support wiki design, as it focused simply on basic content presentation. Inclusion of occasional activities

> where students worked in small groups could have resulted in improved understanding of reading and content, more efficient collaborative work skill usage, and increased opportunities for self-monitoring with teacher support.

I realized that the reading support wiki failed because it was not as interactive as desired. During research meetings, I talked about how I expected the wiki would be inherently collaborative because that is what wikis are supposed to do, but in reality, wikis do not force collaboration, they merely allow it among users who are ready and willing to use properly designed experiences to do so. Further reflections supported this conclusion:

> Students were not provided a private sharing space where they could record their thoughts and ask the teacher for individual help. This weakness could be addressed through the use of private blogs, monitored by the teacher, where students post reflective thoughts, and ask questions relevant to assigned tasks.

Such was the typical rhythm reflecting and revising the instructional materials and tasks to build stronger experiences.

Demonstrating Teacher Thinking about Complex Data

Students worked through the blended unit designed around the Cold War. In order to develop a greater understanding of the what and how of their work they were allowed to proceed at their own pace, which meant data had to be gathered around their progress. To do this, I used Google Forms to allow the students to report back to me on a regular basis.

Learners submitted one Google Form for each module, with modules designed to take between one and two days in class to complete. This allowed monitoring of their understanding, and pace of work. Learners generally submitted these on time, as they were connected to completion of work for their summative assessment presentations. Students observed struggling with completion of these Forms also received intervention coaching to support their efforts by: (a) comments attached asynchronously to specific places on their summative Google Presentation; (b) synchronous notes placed in documents where I found them working; and (c) having private or group conferences to address pace of work and content understanding. Arrangements agreed to, and comments made, were monitored to increase student follow through. In effect this was teacher regulation for the purpose of supporting the development of student self-regulation.

I found students filling out a form was insufficient, particularly for those who struggled making progress. To assuage this, I made commentary on

student documents, during and after work, and arranged meetings as necessary. In this way the Google Forms functioned as a means to capture reflection on, through, and of action (Shön, 1983). Being in a constant state of reflection when I employed the Google Forms allowed me to use the data, but also inspired a collection of more of it through conferencing with students.

In addition to the Google Forms, both the students and I used the Learning Management System (LMS) that listed resources that would help the students learn the subject matter. By placing the resources on the Internet using this system I was able to see which students attempted to access which resources and when:

> Learners were provided several resources through the LMS that supported their understanding of what was expected, including a document listing targeted content by module, and a unit explanation that included a list of skills targeted for development. A notice on the LMS advised them they could use the provided content resources, or search for their own sources based on the list of required facts. Support was given if the need was noticed or expressed.

In looking at the patterns of attempted access and usage, I was able to determine whether support was needed. Although I was not formally taught to read these patterns and respond, I developed those skills via the self-reflective processes. Noticing when students had not accessed any resources, or when they kept accessing the same ones, spurred me to action. In addition, I used data from Google Forms, and made opportunities to meet with the students.

In addition to the Google Forms and the resource access data, I had designed assessments for students to present their learning, in accordance with aPBL. These included support with: (a) sorting and organizing developing content information, (b) constructing presentations of their knowledge, (c) working effectively, and (d) taking the initiative to communicate to get necessary support. This communication could include face to face discussions in class, posting on the class blog, or evening discussions using the class online classroom.

I made additional plans to communicate with them using Google email, and to bring additional expertise into my classroom through online interaction with college professors and pre-service teachers. Past experience with blended learning taught me that the key to being successful would be continuously reaching out to students by any means necessary. Although generated data was plentiful and helpful, going back to them personally was the best way to monitor their interaction with content, and overall learning.

Revealing Teacher Self-Regulatory Processes to Teacher and Researchers

Previous examples in this article have mentioned self-regulation, particularly the level of self-regulation necessary to keep my students prepared to work. After they worked with the reading support wiki, part of my own reflective processes included asking them to reflect and give feedback. In a post reading support experience assessment students were asked whether anything in particular stood out about using the reading support wiki. Their comments highlighted the multimodalities of the site, their perceived ability to work at their own pace and the increased opportunities to engage in critical thinking about concepts and subject matter.

My own reflection was supported by what my students were telling me as they were working, but also when they were done. In addition, the use of post-unit feedback enabled me to position students to set new goals, offered insight into making instruction more helpful to them, and in effect validated my efforts.

As I worked with the students, there was a co-teacher alongside for part of the instructional time. While working with him, I was placed in the position of having my daily instructional routines and rhythms in the immediate purview of one of my colleagues. The validation from student comments in these cases served to not only make me feel validated, but also benefited the co-teacher.

Many students did like working at their own pace where they could go as slow or as fast as their understanding allowed and use whichever supporting graphic organizers they felt best suited their needs. They appreciated being allowed to set goals for their own pace, and not be controlled by that of their peers or the teacher. It was encouraging to see this positive reaction on the part of students to self-regulation, and that they were able to select from among the support offered that which served them best.

The students in the class seemed agreeable to providing feedback for me, but they also had to reflect on their own work. These reflections were intended to urge a metacognitive process in the students, but also sharpened the perception of my own expertise, and provided data. In these ways the students generated data for me as their teacher, but also for themselves, and they could see the ways in which I used the data to support them. In using those reflections to empower the students I let them see that they have choices in how and what they learn, and that they are in charge of making these choices.

While successes are highly public with the potential for validation from multiple sources, reflection also enabled me to see places where I was dissatisfied with this practice. As the students worked, I noticed places where they were not displaying any development of expertise. Learners, some of

whom were advanced academic students, used a mix of the teacher provided module videos, and their own self-directed research, but did not achieve high levels of success, as measured by effectively, accurately, and completely meeting all learning objectives. This challenge was indicated by a slow work pace on the summative assessment that may have indicated a lack of engagement, an inadequate historical understanding based on what was placed on the slides of their presentation, and anger and dismissiveness when consulted on their lack of progress. These problems may have occurred for a number of reasons, including low motivation to succeed, overconfidence in the ability to do a large amount of work in a set time period, and trouble doing self-guided research, even when given coaching and analysis guides. In addition, although students generally appreciated the support, they were also capable of responding with negative emotions. The fact I had these varied experiences demonstrates efforts to engage students can result in both negative and positive responses. The ways they intentionally expressed both of these emotions suggested they knew our collaborative efforts were leading to more learning.

When these experiences occurred, I felt there was something more that should have been done to help. The related reflections were important for sharing my work with critical friends, who were then able to give challenging feedback to prompt improvement, while also reminding me of the beneficial work going on in my class. These experiences underscore the emotional elements of self-regulation for teachers and students as they engage together in this intense work.

DISCUSSION

Although I was able to negotiate the Google Tools in order to accomplish my curriculum-making, other teachers may not be as successful. To date, there is no research documenting what sort of time and effort commitments teachers need to make in order to achieve the stance of comfortable expertise in technology use in their blended classrooms, while also developing content expertise, and working to explore their students' learning. Examining ways teachers contemplate how to remain focused, and feel supported in their work, will be a challenge for researchers to consider when they embark on studies of blended learning.

Clearly blended learning has not made my work any less complex, even though technological devices are used to provide, support, and evaluate instruction. Although I found Google Tools helpful for my work, it was still a tremendous shift in teacher knowledge to work through the curriculum planning, implementation, and evaluation (Dewey, 1938) in a blended

learning environment. More research is needed around what aspects of teacher knowledge of technological implementation are most critical for novice and expert teachers.

Working with my critical friends demonstrated collaborations between universities and schools are also critical. Rice and Pinnegar (2010) described how useful interactions can emerge, even if these are not part of large funded partnerships. Research on the relation aspects of these teacher-researcher collaborations is needed. This could include consideration of the ways in which such a collaborative arrangement might allow teachers to be in charge of their reflections, rather than having the researchers dictate terms to them. This is particularly important in studies where technology is a centerpiece because of the promise technology holds for making collaborative inquiries into teacher learning more balanced.

In addition, more research is needed to examine collaboration with other stakeholders. Parents constitute one such group, and examination should be made of how their technology expertise impacts their ability to support students, and what types of help they need from teachers to assist students at home. Students are also stakeholders, and it would be wise to study their views of essential elements in blended learning and analyze how they exert agency in self-regulation. Additionally, co-teachers can be a component of blended learning in Special Education and English Learner classes. It cannot be overstated how valuable I think it would be to inspect co-teachers views of blended learning planning and classroom practice.

Finally, my work in a blended environment is brought about by my desire to use my judgment to design curriculum. I do this work, even though it is time consuming, and even though it sometimes puts me in precarious spaces with colleagues in the community where I work. Individual teacher advocacy should not be the primary way that blended models come into schools, and teachers should not be forced to use Administration mandated blended learning techniques, particularly without preparation. Complicating matters further is the understanding that if my colleagues join me in using blended learning, I have to take on an additional advocacy load as a seasoned blended teacher. Considering this possibility, the importance of a collaborative approach involving all, from teachers through administration, cannot be underestimated. Future policies in schools need to take into account how to support teachers in being advocates for innovation, and for managing the spread of that innovation among colleagues in ways that burdens are shared. If the pandemic has taught us anything, it is now is the time to support teachers who are both prospective and practicing in using an array of technologies, tools, structures, and routines for learning (Rice & Deschaine, 2020). But even outside of a global health crisis, greater use of technologies in teaching for students who struggle was needed to achieve important inclusion goals.

CONCLUSION

This study used teacher reflection to support blended learning for reading support that supported an inclusive classroom. The findings highlighted my tripartite expertise in technology, subject matter, and student learning, my emerging understanding around data use in such environments, and the high level to which I engaged in self-regulatory practices while trying to promote them in my students. Future work in this area should focus on supporting educators in blended learning environments at both the university and school levels. I hope that readers gained a sense of the tremendous work it is for a teacher to develop knowledge and expertise, reflect on it, and then act on it in digital learning environments and that this knowledge will affect future work with teachers and the preparation of teachers candidates for the complex work that they are being asked to do in teaching with technology.

References

Akyol, Z., & Garrison, D. R. (2010). Understanding cognitive presence in an online and blended community of inqu ry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology, 42*(2), 233–250. doi:10.1111/j.1467-8535.2009.01029.x

Allen, I. E., & Seaman, J. (2013). *Changing course : Ten years of tracking online education in the United States*. Sloan Consortium.

Altheide, D., Coyle, M., DeVriese, K., & Schneider, C. (2008). Emergent qualitative document analysis. In S. N. Hesse-Biber & P. Leavy. *Handbook of emergent methods* (pp. 127-151). Guilford Press.

Alqahtani, A. (2019). Usability testing of Google cloud applications: Students' perspective. *Journal of Technology and Science Education, 9*(3), 326–339. https://doi.org/10.3926/JOTSE.585

Avramides, K., Hunter, J., Oliver, M., & Luckin, R. (2015). A method for teacher inquiry in cross-curricular projects: Lessons from a case study. *British Journal of Educational Technology, 46*(2), 249–264. doi:10.1111/bjet.12233

Barbour, M., Archambault, L., & DiPietro, M. (2013). K–12 online distance education: Issues and frameworks. *American Journal of Distance Education, 27*(1), 1–3.

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education.* Springer

Baskerville, D., & Goldblatt, H. (2009). Learning to be a critical friend: From professional indifference through challenge to unguarded conversations. *Cambridge Journal of Education, 39*(2), 205– 221. Doi: 10.1080/03057640902902260

Brown, J. S., & Duguid, P. (2013). Situated cognition of the culture of learning. *Educational Researcher, 18*(1), 32–42.

Bullough, R. V., Jr. (1991). Exploring personal teaching metaphors in preservice teacher education. *Journal of Teacher Education, 42*(1), 43-51.

Bullough, R. V. (1997). Practicing theory and theorizing practice in teacher education. In J. Loughran & T. Russell (Eds.) *Purpose, passion and pedagogy in teacher education* (pp. 13–31). Falmer Press.

Connelly, F. M., & Clandinin, D. J. (1990). Stories of experience and narrative inquiry. *Educational Researcher, 19*(5), 2-14.

Costa, A. L. & Kallick, B. (1993). Through the lensof a critical friend. *Educational Leadership, 51*(10), 49-51.

Creasy, J., Smith, P., West-Burnham, J., & Barnes, I.(2004). *Meeting the challenge: Growing tomorrow's school leaders. National College for School Leadership.* http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.128.546&rep=rep1&type=pdf

Dalton, B., Proctor, C. P., Uccelli, P., Mo, E., & Snow, C. E. (2011). Designing for diversity: The role of reading strategies and interactive vocabulary in a digital reading environment for fifth-grade monolingual English and bilingual students. *Journal of Literacy Research, 43*(1), 68–100. https://doi.org/10.1177/1086296X10397872

Delialio lu, Ö. (2012). Student engagement in blended learning environments with lecture-based and problem-based instructional approaches. *Journal of Educational Technology & Society, 15*(3), 310–322.

Dewey, J. (1938). *Experience and education.* Kappa Delta Pi.

Donna, J. D., & Miller, B. G. (2013). Using cloud-computing applications to support collaborative scientific inquiry: Examining pre-service teachers' perceived barriers to integration. *Canadian Journal of Learning and Technology, 39*(3), 1-17.

Drysdale, J. S., Graham, C. R., Spring, K. J, & Halverson, L. R. (2013). Analysis of research trends in dissertations and theses studying blended learning. *Internet and Higher Education, 17*(1), 90–100.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education, 42*(3), 255-284.

Fenstermacher, G. D. (1994). The knower and the known: The nature of knowledge in research on teaching. *Review of Research in Education, 20*, 3–56.

Fletcher, A. (2019). An invited outsider or an enriched insider? Challenging contextual knowledge as a critical friend researcher. In M. Green, S. Plowright, & N.F. Johnson (Eds.), *Educational Researchers and the Regional University* (pp. 75–92). https://doi.org/10.1007/978-981-13-6378-8_5 Forment, M. A., Casany, M. J., Mayol, E., Piguillem, J., Galanis, N., García-Peñalvo, F. J., & Conde, M. Á. (2012). Docs4Learning : Getting Google Docs to work within the LMS with IMS BLTI Google Docs as a learning tool. Journal of Universal Computer Science, 18(11), 1483–1500.

Frisch, J. K., Jackson, P. C., & Murray, M. C. (2013). WikiED: Using Web 2.0 tools to teach content and critical thinking. *Journal of College Science Teaching, 43*(1), 70–80.

Gitlin, A. (1992). *Teachers' voices for school change: An introduction to educative research.* Teachers College Press.

Graham, C. (2013). Emerging practice and research in blended learning. In M. G. Moore (Ed.), *Handbook of distance education 3rd Ed.* (pp. 333–350). Routledge.

Griffin, M. L. (2003). Using critical incidents to promote and assess reflective thinking in pre-service teachers. *Reflective Practice, 4*(2), 207–220.

Halverson, L. R., Graham, C. R., Spring, K. J., & Drysdale, J. S. (2012). An analysis of high impact scholarship and publication trends in blended learning. *Distance Education, 33*(3), 381–413.

Hassan, W., Ariffin, A., Ahmad, F., Sharberi, S. N. M., Nor Azizi, M. I., & Zulkiflee, S. N. (2020). Covid-19 pandemic: Langkawi vocational college student challenge in using google classroom for teaching and learning. *International Journal of Advanced Trends in Computer Science and Engineering, 9*(3), 3299–3307. https://doi.org/10.30534/ijatcse/2020/127932020

Healey, D., & Klinghammer, S. J. (2002). Constructing meaning with computers. T*ESOL-Journal, 11*(3), 3.

Heggart, K. R., & Yoo, J. (2018). Getting the most from Google classroom: A pedagogical framework for tertiary educators. A*ustralian Journal of Teacher Education, 43*(3), 140–153. https://doi.org/10.14221/ajte.2018v43n3.9

Horn, M. B., & Staker, H. (2011). Blended learning. *The rise of K-12 blended learning: Profiles of emerging models.* Innosight Institute. https://files.eric.ed.gov/fulltext/ED535181.pdf

Horn, M. B., & Staker, H. (2015). *Blended: Using disruptive innovation to improve schools.* Jossey-Bass.

Horton, J., Hagevik, R., Adkinson, B., & Parmly, J. (2013). Get connected: Incorporating technology into your lessons does not mean having to stay indoors. *Science and Children*, 44–50.

Kannan, J. (2018). Promoting critical reading using Google Tools – A Community of Inquiry approach. *Irish Journal of Technology Enhanced Learning, 4*(1), 16. https://doi.org/10.22554/ijtel.v4i1.30

Korthagen, F. A. J., Kessels, J., Koster, B., Lagerwerf, B., & Wubbels, T. (2001). *Linking practice and theory: The pedagogy of realistic teacher education*. Lawrence Erlbaum.

Kovalik, C., Kuo, C., Cummins, M., Dipzinski, E., Joseph, P., & Laskey, S. (2014). Implementing web 2 .0 tools in the classroom : Four teachers' accounts. *TechTrends, 58*(5), 91–96.

Lefstein, A., Louie, N., Segal, A., & Becher, A. (2020). Taking stock of research on teacher collaborative discourse: Theory and method in a nascent field. *Teaching and Teacher Education, 88*, 1-13. https://doi.org/10.1016/j.tate.2019.102954

Leu, D.J., & Kinzer, C.K. (2000). The convergence of literacy instruction with networked technologies for information and communication. *Reading Research Quarterly, 35*, 108–127.

Lombardi, M. M., & Oblinger, D. G. (2007). Authentic learning for the 21st century: An overview. *Educause Learning Initiative, 1*, 1–12.

Loughran, J., & Northfield, J. (1998). A framework for the development of self-study practice. In *Reconceptualizing Teaching Practice: self-study in teacher education* (pp. 7 - 18). Falmer Press.

Majid, N. (2014). Integration of Web 2.0 Tools in Learning a Programming Course. *The Turkish Online Journal of Educational Technology, 13*(4), 88–94.

Marin, L. M., & Halpern, D. F. (2011). Pedagogy for developing critical thinking in adolescents: Explicit instruction produces greatest gains. *Thinking Skills and Creativity, 6*(1), 1-13.

Marra, R. M., Jonassen, D. H., & Palmer, B. (2014). Why problem-based learning works: Theoretical foundations. *Journal on Excellence in College Teaching, 25*(3&4), 221–238.

Martínez-Rodríguez, R. C., & Benítez-Corona, L. (2020). The ecology of resilience learning in ubiquitous environments to adverse situations. *Comunicar, 28*(62), 43–52. https://doi.org/10.3916/C62-2020-04

Mena Marcos, J. & Tillema, H. (2006). Studying studies on teacher reflection and action: An appraisal of research contributions. *Educational Research Review, 1*(2), 112-132.

Moon, J. (2007). *Critical thinking: An exploration of theory and practice.* Routledge.

Oliver, R., Herrington, J., & Reeves, T. C. (2006). Creating authentic learning environments through blended learning approaches. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning: Global perspectives, local designs* (pp. 502-515). Pfeiffer.

Oliver, K. M., & Stallings, D. T. (2014). Preparing Teachers for Emerging Blended Learning Environments. *Journal of Technology and Teacher Education, 22*(1), 57–81.

Ortlieb, E., Sargent, S., & Moreland, M. (2014). Evaluating the efficacy of using a digital reading environment to improve reading comprehension within a reading clinic. *Reading Psychology, 35*(5), 397–421.

Owen, S. (2014). Teacher professional learning communities: Going beyond contrived collegiality toward challenging debate and collegial learning and professional growth. *Australian Journal of Adult Learning, 54*(2), 54–77.

Patrick, S., & Powell, A. (2009). *A summary of research on the effectiveness of K-12 online learning.* International Organization for K-12 Online Learning. https://www.k12.com/sites/default/files/pdf/school-docs/NACOL_ResearchEffectiveness-hr.pdf

Picciano, A.G., Seaman, J., Shea, P., & Swan, K. (2012). Examining the extent and nature of online learning in American K-12 education: The research initiatives of the Alfred P. Sloan Foundation. *The Internet and Higher Education, 15*,127-135.

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research, 31*(6), 459–470.

Protopsaltis, S., & Baumi, S. (2019). *Does online education live up to its promise? A look at the evidence and implications for federal policy.* Laura and John Arnold Foundation. https://mason.gmu.edu/~sprotops/OnlineEd.pdf

Purichia, H. (2015). Problem-based learning: An inquiry approach book review. *Interdisciplinary Journal of Problem-Based Learning, 9*(1), 1-4.

Pytash, K. E., & O'Byrne, W. I. (2014). Research on literacy instruction and learning in virtual, blended, and hybrid environments. In R. E. Ferdig & K. Kennedy (Eds.), *Handbook of Research on K-12 Online and Blended Learning* (pp. 179-200). EYC Press.

Reushle, S., & Mitchell, M. (2009). Sharing the journey of facilitator and learner: Online pedagogy in practice. *Journal of Learning Design, 3*(1), 11–20.

Rice, M., & Deschaine, M. (2020). Orienting towards teacher education in online environments for all students. *Educational Forum, 84*(2). 114-125.

Rice, M. (2019). Projections of identity: How technological devices become us and why it matters in ELA teacher education. *Ubiquity, 6*(1), 22-40.

Rice, M. (2017). Analyzing text cohesion in online learning environments: Implications for students with reading difficulties. *Bordón Revista de Pedagogía, 69*(3), 107-123.

Rice, M., Deschaine, M., & Mellard, D. (2018). Enlarging opportunities for online and blended learning that serves diverse students. *Journal of Online Learning Research, 4*(2), 117-121.

Rice, M. F., & Deshler, D. D. (2018). Too many words, too little support: Vocabulary instruction in online earth science courses, *International Journal of Web-Based Learning and Teaching Technologies, 13*(2), 46-61.

Rice, M. & Pinnegar, S. E. (2010). Organic collaboration: Sustaining teachers and teacher educators in the cottage industry of curriculum making. *Teaching and Teacher Education, 16*(3), 373-388.

Rice, M. & Pinnegar, S.E. (2012). Reflection under construction: Using the Handbook of Reflection and Reflective Inquiry in practice. *Reflective Practice, 13*(6), 1-7.

Rowe, M., Bozalek, V., & Frantz, J. (2013). Using Google drive to facilitate a blended approach to authentic learning. *British Journal of Educational Technology, 44*(4), 594–606.

Ryan, G. W., & Bernard, H. R. (2003). Techniques to identify themes. *Field Methods, 15*(1), 85-109.

Schwab, J. S. (1977). Translating scholarship into curriculum. In S. Fox & G. Rosenfeld (Eds.) *From the scholar to the classroom: Translating Jewish traditions into curriculum* (pp. 1-30). Melon Research Center for Jewish Education.

Shön, D. (1983). The reflective practitioner: How professionals think in action. Basic Books. Sims, R. L., & Penny, G. R. (2014). Examination of a failed professional learning community. *Journal of Education and Training Studies, 3*(1), 39–45.

Stevens, M. (2016). Space for all: Middle level students in blended learning environments. *Voices from the Middle, 24*(2), 50-55.

Stevens, M. (2018). *Technology Enhanced Learning For English Language Learners* [Unpublished doctoral dissertation]. George Mason University.

Stevens, M. & Rice, M. (2016a, November). *A case study of a professional learning community in a highly diverse blended school*. Association for the Advancement of Computing in Education E-Learn Conference, Washington, D.C. Retrieved from Learning Technology Library. LearnTechLib.org. ISBN 978-1-939797-25-4.

Stevens, M. & Rice, M. (2016b). Inquiring into presence in a middle level blended learning classroom. *Journal of Online Learning Research, 2*(4), 447-473.

Stevens, M., & Rice, M. (2018). Collaborating to create curriculum for diverse students in a middle level blended learning environment. In P. Greathouse & B. Eisenbach (Eds.) *The online classroom: Resources for effective middle level virtual education* (pp. 83- 96). Information Age Publishing.

Stewart, A.R., Harlow, D.B., and DeBacco, K. (2011). Student's experience of synchronous learning in distributed environments. *Distance Education, 32* (3), 357-381.

Swaffield, S. (2008). Critical friendship, dialogue and learning, in the context of leadership for learning. *School Leadership & Management, 28*(4), 323-336. doi:10.1080/13632430802292191

Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum Inquiry, 6*, 205-228.

Zhou, W., Simpson, E., & Domizi, D. P. (2012)Google docs in an out-of-class collaborative writing activity. *International Journal of Teaching and Learning in Higher Education, 24*(3), 359–375. Retrieved from http://www.isetl.org/ijtlhe/

Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45*,166–183.