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Arghhh! My Computer Screen Froze: A “Glitch” in K-12 Blended Learning Classrooms

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ARGHHH! MY COMPUTER SCREEN FROZE: A “GLITCH” IN K-12 BLENDED LEARNING CLASSROOMS

by

TRICIA HERBERT

A master’s thesis submitted to the Graduate Faculty of Liberal Arts in partial fulfillment of the requirements for the degree of Master of Arts, The City University of New York.

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Tricia Herbert

This manuscript has been read and accepted for the Graduate Faculty of Liberal Arts in satisfaction of the thesis requirement for the degree of Master of Arts.

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ABSTRACT

Arghhh! My Computer Screen Froze: A “Glitch” in K-12 Blended Learning Classrooms
by Tricia Herbert

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Our lifeworld occupies spaces drawn to new and emerging technologies that mediate our experiences to self, others, and the world. The presence of old and new technologies, the blackboard to the computer, in classrooms play a prominent role in shaping America’s education system. Schools today evolved from the technologies we design and use as individuals and as a society. Also, private and public K-12 education stakeholders believe blended learning, the meeting of traditional, face-to-face schooling with online learning at or from a school building, will transform schools. However, blended learning as a field lacks inquiry focused on K-12 school settings and roles technology and teachers play in schools. This project uses a postphenomenology lens to explore how roles in a blended learning classroom relate as demonstrated by a technological “glitch”, the frozen computer page during my online tutoring sessions and Aspire Public School troubleshooting posters displayed in their classrooms. The result is an interrelated model developed to study the relationship among students, teacher and technologies in blended learning classrooms.

Keywords: blended learning, glitch, post phenomenology
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Introduction

Every schoolhouse should be a temple, consecrated in prayer to the physical, intellectual, and moral culture of every child in the community, and be associated with every heart with the earliest and strongest impressions of truth, justice, patriotism, and religion (Barnard, 1848, p.41).

Today, children learn in school buildings bound to their neighborhoods. These pillars have educated generations of American youngsters. They testify to education pioneers who wish to have children, “instructed in separate spaces”. Therefore, we recognize “the appearance, layout, and location of those spaces” in our communities (Cutler, 1989, p.1). Historically speaking, America's one-room schoolhouse arrangement favored a large, dimly light and poorly aired room purposed to teach large numbers of multi-aged students together (Cutler, 1989). Barnard (1848) noted schoolhouses historically embodied a sacred duty to educate the child imbued with those qualities, tied to the nation’s well-being. Therefore, our education system evolved over time.

The formalized origins of America’s public school historians traced to the “common school” movement.¹ An action many historians explain as defined by its promise of free mass education for all children, publicly and locally funded.² Education crusader, Horace Mann, pushed to improve America’s schoolhouses based on his experience noting different schools in Europe.³ He noted Prussian school building arrangements featured single room, independent, self-sufficient, and single-aged classrooms (Cutler, 1989, p.4). Ultimately, children today learn in schools divided into single room classes housed within large multifaceted, purpose buildings. These buildings changed over the centuries from successful and failed school reform to encompass arrangements and designs

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¹ See Gutek’s (2012) explanation on the “common school” as the foundation for America’s public education system.
² See historian Cubberley’s (1919) work for an early historical account of American’s public education; Bailyn (1972) and Cremin (1961) for a critical historical account of education in early America and McClellan & Reese (1988) for a social historical account.
³ See Mann’s (1844) Seventh Annual Report where he documents his visits to the various European countries (England, Prussia, Germany) and observed their schooling apparatus. He writes a detailed account of his observations to include how teachers teach in the classroom.
aimed to educate the child.

Presently, education stakeholders support using of new and emerging technologies to transform our schooling apparatus. They speculate that these technologies will transform and empower our schools to educate students differently; thus, underscoring their notion that to educate frames learning as an individualized and personalized experience, while teaching is being framed as data-driven. These notions are said to form America’s future classrooms. In sum, education reformers see blended learning, mixing face-to-face learning with online learning, in K-12 schools as changing the way children learn and teachers teach.

**BACKGROUND OF THE PROBLEM**

In 1999, blended learning scholarship began popping up as scholars studied the phenomenon. The earliest studies occurred in business and higher education settings (Garrison & Kanuta, 2004; Singh & Reed, 2001). Thus, higher education’s experimentation with its distance learning programs helped to create this hybrid method. Today, we see K-12 schools (charter, public and private) experimenting with various blended learning models to suit their education needs. However, blended learning scholarship in K-12 settings does not reflect the current interest exerted by these institutions around the country. Also, the field’s overall research paints a complicated picture.

Firstly, let’s consider the fields many attempt to define the blended phenomenon. In 2002, Driscoll noted the term to be a verb that comprises four different combinations. She defined blended learning as being able to “combine or mix modes of web based technology to accomplish an educational goal”; “combine various pedagogical approaches to produce an optimal learning outcome with or without instructional technology”, “combine any form of instructional technology with face-to-face instructor-led training” and “combine or mix instructional technology with actual job tasks in order to create a harmonious effect of learning and working” (p.1). Blended learning as
a verb acts to “combine” or “mix” technology to an educational product for a learning purpose or non-technology means to create an educational purpose. On the other hand, Osguthrope and Graham (2003) defined the term as “a harmonious balance between online access to knowledge and face-to-face human interaction” (p.228). Therefore, we see two separate entities with different purposes needing a harmonious, balanced act.

Graham (2006) expanded on his previous definition to consider the historical context at play in blended learning. He defined it as follows, “Blended learning systems combine face-to-face instruction with computer-mediated instruction” (p.5). We see technology mediation within the blended learning instructional context. In that same year, Picciano (2006) defined educating with this method as, “a wide variety of technology/media integrated with conventional, face-to-face classroom activities” (p.96). Here, the term inferred an integration of technology and media with classroom associated educational activities. Up to this point, the scholarship considered blended learning to form mixing, balancing, combining or integrating technology with non-technology elements.

Furthermore, in (2012) Friesen analyzed a series of blended learning definitions. He pointed out that face-to-face and online-mediated instruction requires further expansion with its definition and context (p.1). He defined blended learning based on his research as, “the range of possibilities presented by combining internet and digital media with established classroom forms that require the physical co-presence of teacher and students” (p. 1). Friesen assumes that as a “design construct” (p.9) blended learning entails multiple possibilities, as the Internet and media combines with historically developed classroom practices alongside the human parts.

Finally, Christensen, Horn & Staker (2013) defined blended learning as

A formal education program in which a student learns: at least in part through online
learning, with some element of student control overtime, place, path, and/or pace; at least in part in a supervised brick-and-mortar location away from home; and the modalities along each student’s learning path within a course or subject are connected to provide an integrated learning experience. (p. 10)

Christensen et al. formed their definition based on the disruptive innovation theory. This approach sees technology’s journey as moving from sustaining technologies to hybrid technologies. Thus, blended learning travels the path of a hybrid technology and, is destined to transform our present education system. So, overtime, blended learning across the K-12 landscape will change schools’ organization.

These blended learning definitions differ significantly, even as Friesen (2012) sees a merging and balance after 2006 (p.1). Mainly, this thesis proposes that blended learning scholars fundamentally place human and nonhuman presences in space or place. But, what researchers have failed to capture stems from the historical life world shown in America’s school trajectory. America’s school practices show an overwhelming tendency to combine technology in schoolrooms. For example, the integration and favored blackboard use in classrooms by early educationists provide evidence on how technology influenced our teaching and learning practice (Barnard, 1848, p.58; Mann, 1841, p. 123).

Moreover, we classify traditional classrooms as a teacher dominated apparatus. However, we rarely consider how blackboards, as technological invention, helped to shape colonial teachers’ classroom practices. The blackboard allowed colonial teachers to shed their individual teaching style to incorporate whole class instruction and demonstration. Blackboards provided a visible platform to reach all students simultaneously. Researcher Phillips (2015) found the blackboard’s use at West Point military academy aided the school’s disciplinary practices (p.87). Also, he noted
the blackboard allowed teachers to inspect student’s work as they displayed ideas at and on the board orally and in written form (p. 93). Thus, the blackboard, as an education technology, transformed early colonial classrooms. Teachers opted to educate children simultaneously as opposed to one child through their blackboard use in class. Additionally, the blackboard differs from today’s use of computers in online learning methods. Whereby, the first favored the teacher; the latter prefers the student. In this scenario, it could be argued, therefore, that students learn content through and with their computer as opposed to from teachers.

Thus, the different role kinds of technology alongside humans in the classroom and other nonhumans shape our education system. Consequently, as scholars seek to develop a blended learning definition, consideration needs to account for America’s school evolution. This thesis agrees with Friesen’s (2012) urging to expand the definition of blended learning and its context. In sum, technologies mediate our experiences as they span our embodied, background, alterity and hermeneutic relations in the classroom. Therefore, we shape our technology as they shape us overtime.

Finally, this project uses post phenomenology as theoretical framework and method to explore the human and nonhuman roles inter-related in a blended learning classroom. It uses my experience as an online tutor to study the “glitch” or frozen screen phenomenon. My experience sets the stage to focus this inquiry on exploring the actions students take to resolve a “glitch” during online learning. The students at Aspire Public Schools through their pre-blended lessons learn various troubleshooting practices to apply to a frozen page. The argument advanced with this project shows how the roles of students, teacher and technologies interrelate in a blended learning classroom. Their roles shape one another interdependently. This thesis intends to highlight the inter-relational roles within the classroom to help future scholars discover those transformations occurring in our
education system. Also, this project proposes an interrelated model to explore the relationship among teachers, students, and technologies in blended learning classrooms.

**STATEMENT OF THE PROBLEM**

Previous research overwhelmingly places students at the center of blended learning scholarship. Therefore, research with students comes at the expense of scholarly inquiry into the roles teacher and technology play in classrooms (Drysdale, Graham, Spring, & Halverson, 2013). Drysdale et al. also note research in higher education as opposed to K-12 settings dominate the field. This thesis seeks to fill the gap in research considering a K-12 setting and the roles teacher and technology play alongside students in blended learning.

**PURPOSE OF THE STUDY**

This study highlights how the roles in the classroom among teacher, students and technologies interrelate with one another. As a consequence, a change in one shifts either one or both. Therefore, the focus on human-technologies relations in the classroom helps to clarify the non-neutral role our technologies undertake in the classroom. Thus, when teachers teach and students learn with and through technology; it also teaches and learns with and through them. So, technologies do not transform by themselves but alongside its human and other nonhuman elements occupying our school life world. Finally, this study provides a model, which assumes that a change to any role among teacher, student, and technologies overtime will transform our school practice.

**RESEARCH QUESTION**

This explores how my experience with a “glitch” or frozen screen during online tutoring and Aspire Public School students’ troubleshooting practices explore roles as interrelated among students, teacher, and technologies in a blended learning classroom.
DEFINITION OF TERMS

Blended Learning: Friesen (2012) puts forward a new definition of blended learning in which he states it involves “a range of possibilities presented by combining internet and digital media with established classroom forms that require the physical co-presentation of teacher and students” (p.1).

Glitch: The term “glitch” has been used by Svelch (2014) to mean an interplay between technology and human awareness that helps us to “perceive” sometimes our computers act oddly or differently (p.56).

LIMITATIONS

This thesis has two limitations. The first limit results from the small sample size: two case studies. Thus, generalization with this study may be difficult. The second deals with the source of data. The second case study data on students in class experience with a “glitch” pulled from a secondary source: Aspire Public School’s handbook as opposed to in-class observation and interactions of students blended learning experiences and practices. These limitations highlight the need for in class observation and testing of the interrelated model proposed in this study.

SUMMARY and ORGANIZATION OF THE STUDY

American schools look favorably to blended learning approaches in teaching and learning. Blended learning supporters think it will change the way we educate in the future. Scholars cite the approach as changing our education system. As a result, America’s K-12 institutions have rapidly pushed to implement blended learning practices in schools. This thesis divides into five chapters.

The first chapter examines blended learning models from early colonial times to present. It provides descriptions of school practices in early American schools that set the stage for current blended learning models as studied from 1999. The second chapter explains the research method and framework used to analyze and structure this review: post phenomenology. In the third chapter,
a description of the two case studies alongside the “glitch” develops the project's data. Chapter four proposes a new model as gained from the “glitch” in online learning and the discussion on the use of blackboards in the classroom. Finally, the conclusion details a call for further research to inquire into the inter-relational roles in the classrooms using the proposed model.
School arrangement, in the early 1900s, played a significant role in evolving America’s school practice. These arrangements stem from the work done by reformers like Horace Mann and Alice Barrow. These early education pioneers wanted to change the way America educated their children. Henry Barnard’s (1848) *In school architecture: Or, contributions to the improvements of schoolhouses in the United States* documented America’s schoolhouse features and layout. In this book, Barnard captured five methods of instruction or systems of schooling practiced in American school buildings.

First, the “individual method” of instruction allowed teachers to teach individual students. The practice amounted to a teacher listening to or addressing individual children. Barnard (1848, p.79) described the pedagogical apparatus as follows

1. the teacher called a student to recite alone;
2. the teacher taught each child at their seat;
3. the teacher invited the whole class up and listened to individual student recitation.

Finally, the “individual method,” present in multi-aged schoolrooms, educated students as single entities.

Second, the “simultaneous method” of instruction included a whole class or school teaching. The “simultaneous method” gave teachers the ability to manage their time and work efficiently. While students benefited from its common learning mechanisms (Barnard, 1848, p.79), Barnard noted teachers performed direct instruction simultaneously in the same subject to pupils at the same knowledge level (p.79). According to Barnard (1848, p.79), the “simultaneous method” of instruction showed itself when

1. the teacher asked the whole school or class questions;
2. the teacher addressed explanations to the entire school or class;

3. the children responded with answers together;

4. the teacher pointed to individual children who gave their answers to the whole class or school.

Finally, the “simultaneous method,” as opposed to the “individual method,” sought to educate children as a collective, thus increasing the teacher’s ability to meet more student needs. Further, unlike the “individual method” and “simultaneous method,” the remaining three systems described below developed as ways to educate larger numbers of children together.

The “mutual method,” “monitorial method” or “Lancaster system” wished to teach many children using fewer resources. Joseph Lancaster and Andrew Bell fathered the plan. This method employed a system of “monitors” or advanced pupil teachers to instruct and supervise a class or school of children. Hogan (1989, pp. 386-388) described the system’s mechanism as follows

1. scores of multi-aged students in a schoolroom were divided and placed into “class” which was classified as “reading class,” “spelling class” and so on;

2. students with similar competence levels were divided into “classes” of ten to twelve students led by a monitor;

3. students were taught simultaneously by their monitors as opposed to individually;

4. students were promoted based on a system of continual “inspections” and “examinations” by subject matter monitors called “inspectors of reading,” “inspectors of arithmetic” and so on.

Finally, Rayman (1981) described the “monitorial method” as rigid since it ran on “rigid rules” and “strict discipline” whereby “absolute control” in the school came from the teacher. The schoolteacher selected and trained monitors and oversaw the entire arrangement (p.396).
Next, the “mixed method” Barnard (1848) explained, adjusted by mixing the “simultaneous method” and “monitorial system.” In the “mixed method,” the teacher instructed the whole school or classroom (p. 80). The old, expert pupil assistants taught small groups of kids. Ross (1858, p. 133) outlined the “mixed method” objective as followed

1. it secured children the advantages which they get from direct instruction by a schoolteacher with the “simultaneous method” and
2. it secured children the benefits which they get from a multitude of monitors in the mutual method.

Finally, the “mixed method” showed a need to capture those pedagogical advantages found in both the “simultaneous method” and “mutual method” to advance student learning.

Barnard cited the last way as the “Facher system.” The “Facher system,” a product of German schooling, separated teachers based on subject matters or specialized subject teachers. The system opposed the use of one teacher to instruct many disciplines in a multi-aged and multi-proficient leveled classroom or school (Barnard, 1848, p. 80).

Finally, these five systems of instruction in early American school history influenced the structure, organization, and design of schoolhouses and classrooms today. The next education system, an invention of the 1920s progressive era, shifted schooling to consider whole child development in a public space. It launched visible markings on American education as it expanded the role schools played in the child’s life. Also, it created a disruption as it expanded school design, curriculum, and pedagogy.

The “Gary Plan” later called the “platoon school” or “work, study, play plan” developed by Gary, Indiana Superintendent William A. Wirt. The model expanded school as more than a place of religious, moral and intellectual development (Mohl, 1974, p.214). The author of the “platoon
school” model sought to prepare children for life outside school. The plan sought to develop a child’s life holistically using academics and special activities. The “platoon school” divided the child’s school day into two evenly timed platoons labeled “X” and “Y.” Platoon “X” opened the school day where children learned their academic subjects. Whereby, platoon “Y” formed the last part of the school day where students learned from engaging in special subject matters like swimming, theater, dance, music, literature, and athletics. Children in “platoon schools” alternated between “X” and “Y” platoons so every child joined in all activities. Overall, school design changed to grant the special subject matters, and school buildings added such features as a gymnasium, playgrounds, workshops, swimming pools and athletic fields (Mohl, 1974, p.215). Mohl (1974, p.215) explained the “platoon school” allowed flexibility in scheduling that catered to

1. students’ interests;

2. allow students to advance in their studies or catch up using remedial classes during Saturday school;

3. allow students to attend school part-time or all year.

Levine (2002) notes the “platoon school” reimagined school building use and enlarged the child’s curriculum beyond the three R’s (reading, writing, and arithmetic) (p. 52). Additionally, Spain (1926) explained the purpose of platoon “Y” was to “permit each child to participate with his fellows in group undertakings, to give play to his individuality as he enters into cooperative work with others, to give him opportunities for creative expression…” (p.738). Thus, platoon “Y” targeted the child beyond academic class studies to schooling as life in preparation for work outside. Finally, Mohl (1974) sums up the overall impact of the platoon schools as, “The Gary Plan and its successor, the platoon school plan, had a significant and shaping impact on the development of urban education in the twentieth century” (p. 233).
A Push to Blend Our Learning

America’s past schooling practices embody our system’s capacity for change and continuity. This project describes those instructional methods and school systems that aided in shaping America’s education evolution. Additionally, it purposely neglects to detail whether these early influencers reform efforts failed or succeeded as documented by many scholars’ works. This study provides brief descriptions on America’s past school era to show our present system holds many of its features. Thus, it notes America’s schooling evolution with the passage of time. An evolution set within a rich account showing the work countless men and women undertook in favor of or against a practice, arrangement, pedagogical theory, structure, organization, curriculum or learning style. These histories capture our struggle to answer the question: How do we educate our children? Thus, this project considers the prior education systems with the present cohere to continuity and change.

The earliest methods of instruction started the teacher as the dominant, in-the-room authority figure. We see the transition occurs as the teacher moved their practices from “individual method” to “simultaneous method” of instruction to promote student learning. This shift increases the use of whole class teaching that aids the rise of the authoritarian teacher at the head of the class. Eventually, the single child in education multiplied to include many children and increased the teacher’s overall classroom reach. Today, individualized learning because of education technologies like computers and adaptive learning software, lessens the teacher’s role as giver of all information. Thus, instruction with learning technologies shows a preference to educate children individually. In short, continuity and change in teachers’ practice shift their roles alongside those of their students.

In blended learning classrooms around the nation, students and teachers co-construct their roles
as instruction finds itself outsourced to educational technologies. The teacher’s role alongside their students sits in a decentralized area. Also, as individual instruction captures school’s attention, we see more teachers spending time with individual students as learning tracks towards the person of the child. Thus, teachers now master the art of small group or individual teaching to give tailored and specific instruction as opposed to whole group demonstrations. In short, educators and students, as classroom features, evolved through their daily practice overtime. This project thus far highlights our old American school arrangement and development to show the continuity and change in its history.

Blended learning highlights continuity and change in America’s school practices. To understand, consider the “mixed method” system fused the “simultaneous method” with the “monitorial method” of instruction to educate our children. Also, the platoon school structure blended play and career preparation with learning. The platoon school blends expanded school building design to include technical skill workshops to playgrounds in school yards to kitchens in schools. These examples show our education system’s blended evolution over the years. Therefore, to combine online learning with traditional face-to-face learning highlights a continued blending practice in the American education’s life world. Besides, blended learning in schools and classrooms will transform the arrangements, structures, and arrangements in our education apparatus. The following literature review presents the different models and frameworks developed in the blended learning scholarship canon. This literature review divides into three periods as seen in the work of Guzer and Caner (2014) as

2. Blended Learning Models in the Middle Years: 2006-2011
Blended Learning Model in the Early Years (1999-2005)

The early years of blended learning models traced its inspirations from higher education and the corporate settings. The first study on blended learning, according to scholars, sprouted its head in the year 1999 (Guzer & Caner, 2014). Besides, the models developed and advanced by researchers interested in and supporters of blended learning took inspiration from distance education.

Harvi Singh and Chris Reed (2001) remarked in their white paper, Achieving Success with Blended Learning, that in business blended learning held opportunities to improve, "quality, effectiveness, convenience and cost of the learning experiences" (p.1). They felt combinations of both “traditional and technology-based learning methods” contained the ingredients to “evolve” the way we learn (p.1). As such, the institutions “objectives” as opposed to the “learning technology” plays a significant role in “how we design and deliver learning programs” (p.1).

Both authors highlight blended learning dimensions (blend off-line and online learning, self-paced, collaborative learning; structured and unstructured learning) and ingredients (synchronous physical formats; self-paced, asynchronous forms) in their assessment of the field (pgs. 2-3). Mostly, they present a strategy guide to help decide a blended learning delivery method for an organization. The delivery method guide lists two phases that decide the ideal combinations for either self-paced or live format (pp. 9-11).

Finally, Singh and Reed explain the complexity in enacting blended learning in an organization. The optimal mix or blend requires multiple decision-making steps. They include special consideration of the organization’s resources, experience, employees learning styles as a forerunner to blended learning implementation.

Valiathan (2002) underscores the point that blended learning offers no “single formula” (p.1). As such, he outlined three models as showing the blended learning phenomenon:
1. Skill-driven model: combination of self-paced learning with instructor or facilitator support to develop specific knowledge or skills;
2. Attitude driven model: mixture of various events and delivery media to develop specific behaviors;
3. Competency-driven model: blending of performance support tools with knowledge management resources to develop workplace competencies.

To this end, blended learning research delivers specific results based on the different models in the workplace.

In 2003, higher education scholars, Kerres and DeWitt advanced their 3C blended learning framework: content, communication, and construction. The model sought to create a conceptual framework that shows “parts of a blended learning arrangement and their relative weight” (p.103). Therefore, both authors highlighted these three parts visible in every learning environment needed to enact blended learning methods (p.103)

1. The content component: the learning material;
2. The communication component: those interpersonal exchanges between and amongst humans;
3. The constructive component: the facilitation and guidance of individuals and those cooperative learning activities.

Finally, the authors note the primacy of one’s goals and objectives in developing blended learning as opposed to the delivery methods or technology.

Derntl and Motschnig-Pitrik (2005) develop the Blended Learning Systems Structure (BLESS) to study how technology integration improves learning. As such, their model uses a person-centered viewpoint alongside socio-psychological and technological properties to support education. In the
words of the authors, “The study focuses on the contribution of visual modeling of blended learning scenarios, on their semi-formal descriptions as patterns, and on the use of patterns as sources of user-centered support modules” (p.111). The layers used in the BLESS model from zero to five include

1. Layer 0: Learning theory and didactic baseline
2. Layer 1: Blended learning courses
3. Layer 2: Course scenarios
4. Layer 3: Blended learning patterns
5. Layer 4: Web templates
6. Layer 5: Learning platform

To this end, BLESS integrates technology use in a “layered framework” to mine, apply, evaluate and improve blended learning design (p.115). Derntl and Motschnig-Pitrik accept the importance of technological considerations to the blended learning process.

These definitions provide the earliest visible example of a divide in blended learning scholarship between technology and non-technology. Some scholars advance arguments either for a feature associated with humans like objectives or against technology and vice versa. Consequently, the remaining models highlight the important role this dualism plays in how blended learning research unfolds. Further, we note researchers failed to address technology, thus, leaving gaps in the scholarship (Drysdale et al. (2013). In short, some scholars remark blended learning research canon as incomplete (Wang, Han & Yang, 2015, p. 381)

**Blended Learning Models in the Middle Years (2006-2011)**

In 2006, Charles Graham tilted the blended learning field to mark its historical development spans two systems: traditional face-to-face and distributed or computer mediated learning (p.5). He
noted both systems developed separately whereby new technology aids distributed systems. Furthermore, Graham explained three categories for blended learning systems (p.13) that is:

1. Enabling Blends: provide additional flexibility to the learners or blended that attempts to provide the same opportunities or learning experiences but through a different modality.
2. Enhancing Blends: allow incremental changes to the pedagogy but do not radically change the way teaching occurs.
3. Transforming Blends: allows a radical transformation of the pedagogy. These enable activities not practically possible without the technology.

The blends illustrate an understanding of how blending shows itself throughout the system (p.13).

In 2007, Yoon and Lim unmasked their "Strategic Blended Learning and Performance Solutions (SBLPS)." Their model helped to provide a strategy to decide what and how to blend to serve one’s instructional and non-instructional performance solutions. Hence, the proposed strategic blend or "the purposeful mix of delivery media (particularly face-to-face and various forms of technologies) to improve learning performance solutions which are derived from the goals and needs of an organization" (p.481). Overall, Yoon and Lim’s “SBLPS” entailed five phases (p.481) as follows:

1. Business and HR Strategies Analysis: Business and HR Strategy (Enterprise, tactical and integrated level) AND Analyze (tasks, learners, workplace, cost & benefits and technologies)
2. Performance Solutions: Instructional and Non-instructional
3. Delivery Media: Face-to-face and Technologies
4. Development and Implementation: Strategic Blending
5. Evaluation and Improvement: Strategic Blending

The five phases form a three-level view. At level one, the business, and HR strategies analysis, performance solutions and delivery media are three separate stages. These three distinct stages
become interrelated as organizations develop and carry out a strategic blend, level two. Finally, level three defines an organization’s evaluation and improvement of their strategic mix based on the performance solutions and delivery media. Overall, the authors’ model shows their position that “tools and technologies are the carrier of messages” (p.480) where delivery media connects this process.

Anthony Picciano, in 2009, defined blended learning as “a wide variety of technology/media integrated with conventional, face-to-face classroom activities” (p.10). He developed the “multimodal model” to frame blending learning. The model notices learner diversity displayed in their different learning styles, generations, and personality types (p.10). Consequently, Picciano’s model comprises six pedagogical objectives to blend as follows:

1. Content: media, course management systems (CMS)
2. Reflection: Blog Journal
3. Collaboration/Student Generated Content: Wikis
5. Dialectic Questioning: Discussion Board
6. Social/Emotional: Face-to-face

The bottom line for Picciano on blended learning remains with pedagogy, “The pedagogic objectives of a course should drive the activities and hence the approaches” (p.16).

The last model in the middle years of blended learning research is the time-based model proposed by Norberg, Dziuban, and Moskal (2011). The authors complicate time and place from the use of technologies in blended and online learning environments. More importantly, they view blended learning as a “boundary object” or the “ideas, things, theories, or conceptions that resonate and hold together a large community of practice where each member has some intellectual or
emotional investment in the idea” (p. 209). To inject “boundary object” into the literature tilts the field to accept blended learning as serving many individual stakeholders in a broad, coherent body. As such, it encompasses many definitions and agendas within a different context and represented by multiple individuals together.

Besides, Norberg et al. view time as shown by synchronous and asynchronous elements. Thus, blended learning seeks to combine various synchronous elements (face-to-face meeting, videoconference meetings, chats, and webinars) with different asynchronous elements (book readings, assignments, recorded lectures, asynchronous research, discussion, and collaboration) (p. 211-212). Blended learning’s purpose is based on this definition, and follows an optimal blend adopted to the course content, students’ needs, and teacher strengths (p. 212). We should note the consideration given to the teacher's strengths as essential to the blended process. Last, the time-based model outlines the synchronous and asynchronous elements intersecting to form a semi-synchronous center or a blend. Therefore, time, as opposed to place signals the future in blended learning.

Finally, the middle years of blended learning research show the most disruption in the field as scholars grapple with the phenomenon as more than a combination or mixture. Some authors chose to study the apparatus involved as “purposeful” or “strategic” as opposed to “optimal.” Still, others note how blended learning disrupts the notion of time. However, the separation between technology and human or its associated elements remain intact. Picciano holds pedagogy to be of more value while Graham highlights the different history of two systems. In short, little consideration given to the idea that both entities acted together in American classrooms for centuries.

**Blended Learning Models in the Present Years (2012 to Present)**

Blended learning in K-12 settings followed those models advanced by Michael Horn and studied
through the Clayton Christensen Institute for Disruptive Innovators. The Institute created a database of K-12 schools using these blended learning models in classrooms around America. Christensen, Horn & Staker (2013) see blended learning as a combination of those positives in online learning combined with those from a traditional classroom and thus, the notion that it provides the “best of both worlds” (p.5). The authors draw attention to four models being the rotational model (lab rotation model, station rotation model, flipped classroom model, and individual rotation model), the flex model, the a la carte model, and the enriched virtual models.

First, the rotational model in a course or subject entails students rotate on a fixed schedule. Next, the flex model uses online learning, where students work at their own pace on individual and customized learning objectives. The model works with a flexible schedule among different learning modalities. In the a la carte model students take a course or class purely online and have to go to school to have in class educational experiences. Finally, the enriched virtual model allows students to divide their time for each course between attending brick and mortar campus and learning distantly using online delivery content and instruction (Horn, Christensen & Staker, 2013, p. 28).

What follows are four examples of K-12 schools across America using one of the four models developed by Horn et al. The examples taken from the Clayton Christensen Institute for Disruptive Innovators program titled Blended Learning Universe directory.

Example 1: Rotation Model

a. A.L. Holmes Elementary-Middle School (Individual Rotation)
This school blends at the subject area level whereby, one part of the students’ rotation includes an online learning component. This school uses a customized schedule to rotate students.

b. Achieve Academy (Station Rotation)
Students at Achieve Academy rotate on a fixed schedule between three stations. The three stations
divide into a technology station; teacher-guided lesson station; and independent workstation.

c.  Clintondale High School (Flipped Classroom)
Clintondale High School split their schooling into two parts: at home and in class. Thus, students watch emailed videos and other content from their teachers at home. In school, they complete activities in the classroom including teacher and student-led discussions, in-class writing assignments, and online learning.

d.  Crestwood High School (Lab Rotation)
At Crestwood High School, students rotate among three learning experiences. These learning experiences involve direct instruction, independent learning, and collaborative learning. Finally, students move to a smaller classroom with a teacher to work on digital content.

*Example 2: Flex Model*
Acton Academy
At Acton Academy students from grades one to five use interactive technology and hands-on projects in a single, multi-age environment to learn independently. The school provides three guides to help students set their learning goals. In the morning, students work online alone, and at midday, they work off-line in collaborative learning situations. Finally, students have control over their learning pace and time.

*Example 3: A La Carte Model*
Flower Mound High School
At Flower Mound High School, students take part in courses as either in face-to-face classrooms or entirely online or in a blended classroom. In the blended courses, students meet at the school for two days a week. At school, they work in small groups or with their teachers. The remaining three days students use to complete online coursework created or selected by their teachers.
Example 4: Enriched Virtual Model

Chicago Virtual Charter School

At the Chicago Virtual Charter School, students learn remotely with their online teachers. Students attend an on-campus learning center for two hours and fifteen minutes a week. During the on-campus sessions, students receive face-to-face support for their online courses, and they can engage in off-line coursework.

The final model included in this review comes from the work of Wang, Han & Yang (2015). They proposed their complex adaptive blended learning systems (CABLS) as a framework to inquire into those issues left unexplored in the blended learning canon. They used the complex adaptive systems theory to illustrate blended learning’s complex nature. They developed their framework based on eighty-seven empirical studies in the blended learning literature. Lastly, they see technology as a “new element” in the blended phenomenon. The authors outline the following six subsystems in the CABLS model (p.383):

1. The learner: researcher, practitioner, collaborator (in the center);
2. The teacher: facilitator, moderator, guide on the side, adviser;
3. The technology: synchronous, asynchronous, off-line, online;
4. The content: collaborative learning, individualized learning, interactive learning, problem-based learning and deeper learning;
5. The learning support: academic and technical support;
6. The institution: strategy, support, service, and infrastructure.

In short, this framework imagines blended learning research as interdependent seen from the six subsystem layers.

The final years of blended learning research show an expansion on how to view the phenomenon.
The Christensen et al. models illustrate a divergence in practice between K-12 settings and higher education or business. However, the models’ multiple expressions in K-12 settings attest to the point that we are witnessing a “boundary object” (Norberg et al., 2012). Besides, both authors use different theories to undergird their research: disruptive innovation and complex adaptive systems. As such, Wang et al. implore the field to view the phenomenon as interdependent with them noting the coevolution between teachers and learners with other subsystems.

**Closing Statement**

America’s school system evolved from blending technology and humans over its development. The system presents signs of change and continuity. These signs shown through technologies used in Barnard’s five systems help to shape teachers’ dominant practices overtime. Also, American schools have placed technologies, teacher, and students together in the schoolhouse for centuries. As such, school structure, pedagogy, organization, and design reflect the interrelationship among these elements in the classroom.

However, the blended learning research canon presents a dualist path. Some scholars push scholarship highlighting the nontechnical aspect of the field. Other authors focus on technological process in blended research. This divide between technology and non-technology forms the dualism which is obvious in the literature. Thus, many gaps remain in the research field. Finally, this thesis sees teachers, students and technologies as interrelated in the classroom as depicted by the change and continuity in America’s school practices today. American schools continue to blend learning in classrooms.

The next chapter outlines the framework and methodology of this project used to support its development: post phenomenology. Thus, the phenomenological study of the human-technology relationship being embodiment, hermeneutic, alterity and background relations.
Chapter Two

Post phenomenology in Blended Learning: Method and Theoretical Framework

Again and again, officials mistake the medium of instruction-laptops- for how teachers teach. Smart people have said for decades that personal computers, laptops, and handheld devices are only vehicles for transporting instructional methods; machines are not what teachers do in the classroom (Cuban, 2006, p. 29).

Cuban and other like-minded scholars argue for schooling as a human project against the fetishizing of technology in schools. They see computers as “machines” for use, or a means to an end. Therefore, their critiques offer opportunities to examine our technological desires for blended learning models in classrooms tied to our human-technology relations. As such, should the role of humans outweigh that of technologies? Should we favor technology’s role in society above the human users? Additionally, is it possible that both people and technology play important interconnected roles as they interact with one another? These questions voice this project decision to use post-phenomenology as method and framework to understand our human-technology relations with computer use.

Mr. Cuban’s critique points to school officials and other education stakeholders who align the “machine” as the answer to those historical problems plaguing our education system. These stakeholders vocalize their vision of technology in policy documents, advocacy initiatives, and philanthropic aims. For instance, the United States Department of Education: National Education Technology Plan (NEPT) states

Technology can be a powerful tool for transforming learning. It can help affirm and advance relationships between educators and students, reinvent our approaches to learning and collaboration, shrink long-standing equity and accessibility gaps, and adapt learning experiences to meet the needs of all learners.⁴ (p.3)

⁴ See U.S Department of Technology’s (2017) Reimagining the Role of Technology in Education: 2017 National
The plan illustrates inequity and inequality as issues benefiting from technology’s inclusion in schools. Thus, arguments favoring technology as “machine” for instruction or “transformational” tool testifies to positions developed by philosophers of technology.

Philosophy of technology, as a field explained by Don Ihde, reveals a multitude of scholarly meanings to settle technology’s role in society. In short, this thesis uses the philosophy of technology to understand its non-neutral tendencies that allow its negative, positive, and transformational role in our lifeworld. The “glitch” or frozen page experienced in online tutoring points beyond technology as a useless “machine.” It indicates that despite references applied to technology as being timesaving and happening anytime that it could also exhibit time as lost and not happening. Furthermore, post-phenomenology as method and framework sets up the projects objective to argue technology as embodied - its co-constructed role with teacher and students in a blended learning classroom. In summation, human-computer relations in blended learning research calls scholars to study technology not only as mediation but also embodied within our classrooms.

**Philosophy of technology in blended learning**

The philosophy of technology pulls from the fields of pragmatism, phenomenology, and neo-Marxism. The research field links to the philosophy of science as some philosophers of technology see science as separate from technology, and some see both as connected through a “material culture” (Ihde, 2004a). The former assumes that technology is neutral while the latter sees it as non-neutral. For illustration, scholars have labeled educational technology in the classroom as a failed endeavor and just a machine. This position favors technology as a neutral entity without considering how it shapes our education practices because of its non-neutral feature.

Furthermore, the philosophy of technology canon illustrates two viewpoints useful to

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Educational Technology Plan Update

5 See Don Ihde (2004a) for a description of the influence praxis traditions has on the philosophy of technology field.
understanding varying positions taken for or against the use of educational technologies in classrooms. Firstly, some philosophers hold utopic positions toward technology. These scholars regard technology as encompassing divine qualities. Secondly, other researchers support a more dystopic view of technology. Philosophers like Martin Heidegger, Jacques Ellul, Jose Ortega and Lewis Mumford engage in “single, generalized Technology” and tend to hold anti-technology or dystopian views (Ihde, 2004a). In this worldview, technology presents itself as a threat against our humanness or as “autonomous” and a “historical determinant” (Ihde, 2004a). Ihde (2004a) explains both perspectives regarding technology as follows

As technologies become more fore fronted within the philosophical reflection, it is clear that there can be both a positive and a negative characterization of the same ever more powerful and explicit phenomenon. Extrapolated “utopian” directions find counterpart “dystopian” directions. (p. 94)

In short, technology in our education ecosystem reveals a need to capture both its negative and positive attributes in blended learning scholarship.

Don Ihde explains technology transforms its use-context. He makes the case by observing how work turned during two events in human history: the industrial revolution and world wars (Ihde, 2004b, p. 94). Ihde explains that factories, an industrial revolution technology, increased the quantity of gun ammunition, a war technology, available for use in the wars (p.94). Consequently, these technologies alongside changes in society during the 1900s helped to transform the world wars into a human disaster (p.94). Similarly, blended learning models use of online learning illustrate transformation in the ways children learn and teachers teach.

For illustration, we take as original our public-school buildings with its sectioned room spaces. However, the current classroom design evolved from the multi-aged, one-room schools popular
during colonial times. The introduction of common schools changed this design to reflect single aged, partitioned classrooms. Over time, building design technologies transformed class sizes to articulate a specially, dimensioned, and mandated room. In sum, technology as non-neutral helps explain the transformative role it plays in our human-technology relation as seen through our school evolution.

Postphenomenology as method

Post-phenomenology, an approach developed by Don Ihde, uses traditions in phenomenology and in pragmatic studies (from John Dewey’s perspective) to understand the human-technology relation. Firstly, from pragmatic studies, Ihde (2009) focuses “practice” and its “anti-essentialist” and “non-foundational”: properties. Thus, an inquiry into human-technology relationship derives from experience in use without looking to uncover “truths” or “knowledge” (Ihde, 2009, p.10). Pragmatic traditions help post-phenomenology avoid phenomenological problems with “subject/object”; “internal/external”; “body/mind”; “ego” and “consciousness” (Ihde, 2009, p.10). Secondly, Don Ihde incorporates phenomenology’s analysis of experience. He takes “variational theory” from the field to aid in the development of post-phenomenology to show variations in the embodiment and the lifeworld (p.11). Ihde (2009) explains how traditions in pragmatism and phenomenology helped to develop a post-phenomenological framework.

The enrichment of pragmatism includes its recognition that “consciousness” is an abstraction, that experience in its deeper and broader sense entails its embeddedness in both physical or material world and its cultural-social dimensions… phenomenology includes its more rigorous style of analysis that develops variational theory, recognizes the role of embodiment, and situates this in a lifeworld particular to different epochs and locations. (p.19)
Furthermore, “multistability” results from a variation analysis (Ihde, 2009 p. 16). In other words, different practices are linked with different contexts. Ihde (2009) illustrates multistability with the aid of archery examples used by various cultures: Chinese, French, British, and Mongolian. He noted their stabilities as shown in the “actual materiality of the bow, the bodily technique of use, and the cultural-historical role of technology (archery) plays as a variant” (p.18). To illustrate, K-12 school system today utilizes different expressions of the four blended learning models developed and advanced by Michael Horn: rotation, flex, a la carte and enriched virtual. These four models develop differently in different school contexts based on experience, resources, capacity, and capability with educational technologies in K-12 schools.

Lastly, post-phenomenology starts with an “examination of the things themselves” (Ihde, 2003 p. 8). In this sense, it illustrates an empirical construct from the philosophy of science through the study of concrete case studies. Ihde (2009) describes this as different “from generalizations about “technology uberhaupt” and a step into the examination of “technologies in their particularities”” (p. 22). Furthermore, Ihde (2012) explains that to examine things one needs to start by looking at the phenomena and then observe how the phenomena show themselves. The second step requires a description of said phenomena without the use of explanations. Third, “horizontalize” or “equalize” and lastly, separate the “structural” or “invariant” aspects of phenomena. In other words, to complete a thorough post-phenomenological investigation necessitates that one observes a thing in its contextual use. Aagaard (2016) writes, “post-phenomenology helps researchers explore technological mediation…This can either be done through in-depth exploration of the typical use of a given technology (PowerPoint) or critical comparison of multiple versions of a technology (e.g. analog and digital books)” (p.11).
**Post-phenomenology as theoretical framework**

Below the concepts in human-technology relation being the embodiment, hermeneutics, alterity, and background relations outline this project’s post-phenomenological framework.

**Embodiment Relations**

Don Ihde’s (1990) concept of embodied relations illustrates our everyday technological experience in the lifeworld. As such, we embody our technologies through how we use and perceive its uses. Ihde explains this concept by considering the use of eyeglasses. The wearer’s vision of their world transforms as a result, of the corrected lens. Ihde explains that we wear our eyeglasses every day and adjust to its uses. The adjustment occurs as the technology fades or “withdraws” overtime (Ihde, 1990 p.73). Thereby, our eyeglasses become a part of our experience in the world. Ihde (1990, p.89), represents our embodied relations as technology mediation of our world as follows

(I- technology) --- world

Ultimately, we find embodiment points to a “use-context” where the technology fits the context based on its design. Furthermore, it is through the “use-context” that we obtain insight from those features magnified or reduced as we wear the eyeglasses. Let us consider another example - the computer keyboard. The keyboard amplifies our ability to create a written text legibly and presentable. On the other hand, it reduces the need to learn penmanship skills. As such, classroom practice favors developing students’ typing skills as opposed to teaching handwriting. Consequently, teachers do not devote time to teaching handwriting skills like cursive in the classroom.

Additionally, Ihde notes embodied relations reveal desires for “total transparency” or “total embodiment.” In these cases we desire our technologies to be human. For example, “total
transparency” sketches a desire to make our technology “I.” The other desire displays an urge to have technology’s power (Ihde, 1990, p. 75). These desires stem from both utopian and dystopian viewpoints. Ihde writes, “Negatively, the desire for pure transparency is the wish to escape the limitations of material technology” (p.75).

**Hermeneutic Relations**

Hermeneutic relations, according to Ihde, imply “interpretation” that is “textual” and understood through the “reading” of it. In human-technology context, he describes it as an “interpretive action” seen as we understand a word through the reading of technology. Furthermore, we read text since writing mediates our words. Ihde (1990) explains,

> Writing is a technologically embedded form of language. Writing is inscription and calls for both a process of writing itself, employing a wide range of technologies (from the stylus for cuneiform to word processors for the contemporary academics) and other material entities upon which the writing is recorded (from clay tablet to computer printout). Writing is technologically mediated language. (pp. 80-81)

The hermeneutic relations according to Ihde present itself as follows

I--- (technology-world)

We read our technology in the world and by it, experience the “text.” As such, Ihde explains that “The parenthesis now indicates that the immediate “perceptual” focus of my experience “is” the control panel. I read through it, but this reading is now dependent upon the semi-opaque connection between the instruments and the referent object” (p.85). Consequently, “readable technologies” act as an extension of our hermeneutic and “linguistic” abilities “through the instruments, while the reading itself retains its bodily perceptual position as a relation “with” or “towards” the technology” (Ihde, 1990, p.88). As such, Ihde notes hermeneutic relations vary the
human-technology-world relations as we can “‘read’ ourselves into any possible situation without being there” (Ihde, 1990, p.92). To illustrate, children at Acton Academy hermeneutically experience learning while “reading” their adaptive learning software as they engage the visuals and sound. Consequently, students’ see their progress through words indicating they have mastered or not mastered a concept or skill. Thus, learning progress shows itself as numbers on a screen.

**Alterity Relations**

Alterity relations, according to Ihde (1990), show the ways we relate to and with technology as an “other” or “quasi-other” (p. 97). For example, our computers display alterity since its otherness signals a “quasi-otherness” (p.106). In other words, it lacks a “world reference” to base our “technological reflexivity.” Consequently, alterity relations differ from embodiment and hermeneutic relations as we relate “to” our technologies expressed as

I----technology- (-world)

In this case, the connection to the world is through the technology. Ihde describes this as “The world, in this instance, may remain context and background, and the technology may emerge as the foreground and focal quasi-other with which I momentarily engage” (p.107). In blended learning, students receive instruction from a “quasi-other” teacher as reproduced by computer screen as they join their adaptive learning software.

Ihde sees our capacity to relate to technology as “other,” may lead us to fantasize our relation of the “quasi-otherness.” The result leads to a “romanticization” of technology. Furthermore, he notes “fantasy” as with “total transparency” refuses to consider the role technology plays in our human-technology relations. Hence, our educational technologies do not present an end unto themselves, or just a means. As such, fantasy and total transparency, fail to indicate the way our relation to
technology differs in specific ways as the transformation of our human experience becomes visible (pgs. 106-107).

**Background Relations**

Background relations imply that our technologies blend with our environment and appear invisible. Ihde (1990) describes the process as, “The “withdrawal”… as a present absence, it nevertheless becomes… a piece of the immediate environment” (p.109). Ihde explains our homes provide insights into our background relations. This occurs through insulated technologies like windows that provide shelter from the cold. However, humans fail to note the window’s covering capacity. Therefore, its absence from our awareness sits in the background (p.111). Ihde (1990) explains background relations differ from embodied, hermeneutic and alterity relations as their functions engage our focal awareness. While, background relationships operate outside our focal awareness, and, thus, deflect “use-context” as it conditions our lifeworld.

However, instances of breakdown in our technology forefronts the “absent presence” of background technologies. Ihde illustrates the “absent presence” visibility as one considers a home without windows. The cold air comes into the warmth of our homes would move the windows from our background experience into our focal awareness. Overall, Ihde (1990) writes,

> Different technologies texture environments differently. They exhibit unique forms of non-neutrality through the different ways in which they are interlinked with the human lifeworld. Background technologies, no less than focal ones, transform gestalts of human experience and, precisely because they are absent presences, may exert more subtle indirect effects upon the way the world is experienced. (p.112)

During online learning, the frozen screen pulls the computer from the background to our conscious awareness. As such, it pushes the closeness of the online platform away to alert each participant
that our learning takes place at home as opposed to a classroom.

**Closing Statement**

The philosophy of technology and post-phenomenology allows this thesis to highlight the human-computer relation in an online tutoring platform and a blended learning model. The identification of “glitch” as we use technologies to teach and learn benefits from considering its human-technologies relation as co-constructed within classroom practices. The next chapter outlines my online tutoring and Aspire Public Schools blended learning model. It then describes the experience of the “glitch” or frozen page in an online tutoring session and those practices Aspire Public school students use as they face a frozen page during their online learning session.
Chapter 3

A “Glitch” in our Blend

The “Glitch”

The word “glitch” scholars reveal first appeared in the Times magazine article (1965), “The Glitch & the Gemini” (Boyle, 2015; Nunes, 2011 & Svelch, 2014). “Glitch” described an error linked to the destruction of the Gemini 6 capsule, Agena. The Times article (1965) explains “glitch” as a “space-age devil that caused trouble” (para. 4). Consequently, “glitch” expressed itself as a troublesome disruption. Today “glitch” evolved to indicate an error or bug (Goriunova & Shulgin, 2008) or an annoying, unpredictable quirk (Svelch, 2014). This project takes “glitch” to mean, as defined by Svelch (2014), an interplay between technology and human cognition that helps us to “perceive certain computer behavior as a glitch” (p.56). Therefore, the frozen computer page as “glitch” illustrates our human awareness to an unusual in use technological incident.

Research on the “glitch” phenomenon does not attribute itself only to error or quirk in function. Some scholars posit “glitch” as the manipulation of mistakes in its properties. They demonstrate this manipulation in music, art, and other mediums. For example, Boyle (2015) describes data bending techniques in “glitch” art. Furthermore, Boyle (2015) defines “glitch” as “metastability… any glitches as generative and not as errors to be corrected” (p.14). Therefore, “metastability” favors “glitch” as no corrective errors as this provides the opportunities for use. Furthermore, glitch as “metastable” shifts the conversation away from the utilization of the instrument to cooperation in its “glitch” state (Boyle, 2015, p.26). In sum, in this state, a “glitch” does not stop or freeze action since it provides the space for work.

Other researchers, like Nunes (2011) favor “glitch” as context based where its historical antecedent links back to the Age of Enlightenment. As such, bugs or errors inadequately describe
the phenomenon “glitch.” Furthermore, other scholars, especially those in music, see an error like silence as places to inspire new sounds. Cascone (2000) describe this use-context as “In this new music, the tools themselves have become the instruments, and the resulting sound is born of their use in ways unintended by their designers” (p.16). She sees background relations especially those from silence as playing an important role in developing “glitch” music. Whereby, “The data hidden in our perceptual “blind spot” contains worlds awaiting our exploration if we choose to shift our focus” (pgs.13-14). In sum, the context and its use serve important backdrops for some scholars working with the “glitch” phenomenon.

This thesis sees “glitch” as a use-context phenomenon interlinked amongst students, teachers, and their education technology lifeworld within a classroom. Thus, how educators and students relate to their perceivable technological “glitch” affects their teaching and learning. Thus, “glitch” as “metastable” competes with learning and teaching for schooling for the sake of obtaining knowledge from error. In such an instance, we attempt to master our technologies as opposed to relating to it for teaching and learning. The remainder of this chapter describes “glitch” as a relatable experience as seen in online tutoring and Aspire Public Schools blended learning classrooms.

**Online learning: The tutoring platform**

My beginnings as an online tutor started in 2016 as a volunteer with a nonprofit education program. The organization offered free live online mathematics tutoring to grades three and four students. Each tutoring session ran from Monday to Friday and lasted thirty minutes. I tutored children in one to one and in group sessions from six-o’clock to eight-thirty each night. The organization divided their program into three thirty-day sessions and one twenty-day session. Finally, they conducted their online tutoring through an education platform. I used this platform to tutor the children.
The platform screen comprises a whiteboard situated in the center of the screen. On the left side of the whiteboard sits the writing tools (pencils, text, highlighters), math features (line tools, rectangular tools, grid tools and LaTex tool to create equations), and other miscellaneous items (select tool, pointer tool, eraser, clear all and settings). The icons above the whiteboard include document, video, and text importing tools alongside a poll, breakout session, and share items. The right side of the whiteboard hosts at its top the live audio enhanced webcam videos and underneath, the chat box. The chat box contains an “emoji” feature filled with various human emotion displays.

Figure 1: Tutoring platform features

**Experiencing a frozen “glitch” during online tutoring**

The platform’s whiteboard centered the tutor sessions. It offered numerous opportunities to write, draw, create, and import images, text, and videos. I began the sessions with exercises like breaking apart numbers to multiply. The primary tool of choice the pencil allows visible shareable markings for all participants to witness on their screen. The writing feels awkward as I use the mouse or mouse pad to form numbers. The mouse pad, unlike the pencil, requires no gripping to create words but physical motions with one’s fingers. Over time the fingers weary from the
contorted movements used to form numbers. Thus, the numbers look crooked and uneven scrawled across the board. The whiteboard's writing permits shared interaction as it shows itself to every individual in the session. A few times during the tutoring the need to erase incorrect markings posed many challenges. The too frequent application of the eraser to the whiteboard froze the page. Consequently, the up and down wiping motion stops the pointer. The stopped pointer introduces the “glitch” to the session as the page froze. Next, the webcam video feed begins to freeze and unfreeze itself before it halts all activity. On some days, the session ends as the whiteboard tools, the video, chat, and audio stops working altogether.

Figure 2: A frozen eraser with clicker

**Blended learning at Aspire Public Schools**

Aspire Public Schools’ Blended Learning Teaching Assistant (BLTA) handbook explains that its schools comprise about thirty-eight small K-12 schools. These schools educate approximately fifteen thousand students living in underserved California and Tennessee areas. Also, the school aims to improve college education rates amongst students in low-income neighborhoods (The BLTA Handbook, p.5).
In 2011, Aspire introduced their blended learning initiative. The organization structured the pilot around the question, “What should the role of technology be in learning?” (The BLTA Handbook, p. 6). The question informed their decision to use a station rotation model in their K-5 classrooms. According to Christensen, Horn & Staker (2013), students rotate on a fixed schedule in a rotation model. Additionally, the station rotation model allows children to rotate at fixed, designated stations (p.28).

Aspire Public Schools organized their classrooms into three evenly divided and fixed sections. Their first section offers one third personalized learning (thirty minutes’ adaptive software learning in Mathematics and Literacy); their second section offers one-third teacher headed small group instruction, and their final section offers one-third independent and collaborative learning (The BLTA Handbook, p. 6). Furthermore, Aspire observed their students’ skill and content development; developed their students’ technological capabilities; utilized small group instruction to target weak academic students’ learning needs; and increased their teachers’ ability to offer specific student support in their quest to understand technology’s role in the classroom. (The BLTA Handbook, p. 7). In short, their station rotation model pilot initiative enabled them to understand how their teachers will instruct and how their students will learn.

Finally, Aspire Public Schools incorporated two systems to aid their use of a blended learning model in classrooms. According to their handbook, they introduced the “Blended Learning Assistant Teacher” into their school model. This teacher provided instructional and technological support to students and teachers. Greenberg, Wright, & Schwartz (2015) write this about the Blended Learning Assistant “Wizard” Matty Sung from Aspire Monarch Academy, “On any given day, Matty is a teacher, coach, thought partner, data analyst, troubleshooter, project manager and cheerleader” (para. 3). Secondly, they designed a series of twenty-one pre-blended lesson routines.
to prepare children for their blended learning environment. According to their BLTA handbook, lesson titles include “location of workstations,” “correct behavior at workstations,” “computer workstation etiquette,” “caring for the computers part one and two,” “preparing to rotate,” and “troubleshooting problems during login” (p.14).

Relating to a frozen “glitch” in a blended learning classroom

Aspire classrooms insert such technical children guides as their troubleshooting tips poster. The poster contains helpful student practices to use as one faces a frozen page or “glitch”. Specifically, the poster states, “Page is Frozen (won’t respond)” follow these steps

1. Click on the green refresh icon or press the F5 key.
2. If the page still does not respond, close it using the red square with x in center icon and reopen the page.

The frozen page as “glitch” troubleshooting poster tips allow students to resolve their own technical issues while engaged in online learning.

Closing Statement

The frozen computer screen or page as “glitch” present during online tutoring and in a blended learning classroom illustrates its use-context behavior. In other words, users perceive an oddness in their technology engagement. The present chapter describes my tutoring experience with “glitch” during online tutoring. Additionally, Aspire’s troubleshooting poster tips present students with technical knowledge to resolve their online “glitch” or frozen page problems. The next chapter will describe colonial school’s blackboard use in classrooms. Also, it will provide a discussion on how the presence of a “glitch” or frozen page demonstrates the human-technology relations in education. Finally, it introduces a model called the inter-relational roles in a blended learning classroom:

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Student, teacher, and technologies.
CHAPTER FOUR

Our Inter-relational roles: Student, Teacher, Technologies

The history of the blackboard consequently warns against presuming that there is an unambiguous or unidirectional way technologies structure historical actors’ experience or agency. Blackboards are not “naturally” temporary devices for large lecture halls any more than they are “naturally” instruments for testing the mettle of future officers. Rather, they are always situated among contingent premises (Phillips, 2015, p.107).

The blackboard in American schoolhouses first appeared at the United States Military Academy at West Point in New York (Phillips, 2015, p.82). Its introduction at the military academy changed the institutions culture. Phillips (2015) argues the blackboard’s role at the military academy coincided with an “examination culture” that favored oral recitations at the board (p.83). His research highlights the blackboard’s “material culture” or as presenting non-neutral properties. Thus, the blackboard, according to Phillips helped to shape the academy’s education. Phillips determined based on research, the development of a “recitation system” of instruction at the academy. This instructional method evolved as teachers at the academy deployed this apparatus: students were called to the blackboard; students were questioned at the blackboard; and students were corrected at the blackboard simultaneously. Thus, the “recitation system” advanced in the academy over such models as “rote call and response answers” (p. 98).

In summation, the blackboard as non-neutral technology helped to shape the West Point’s pedagogical practices and learning styles.

Wylie’s (2012) research considered how the blackboards use affected pedagogical practices. For example, he noted that it saved teachers from individually teaching one child as opposed to many in a whole class. Wylie explains, “The blackboard made this style of teaching (teacher explanation and demonstration) possible, by providing the teacher with a large writing surface visible to all the students” (p.262). As such, the teacher’s role became “model-maker” as they
drew diagrams and wrote words on the blackboard to instruct all the children seated, simultaneously (p.264). He noted that his helped to develop our “rote-based” system of educating (p. 271).

Finally, blackboards in the classroom affected how teachers taught and students learned overtime. The two pedagogical practices teachers used in their practice, “recitation system” and “rote system”, positioned children and educators differently. In the first, students played an active role in their learning. However, the latter showed teacher as more active to their passive student. However, it is the “rote system” that dominated our classrooms while the “recitation system” changed overtime. Consequently, teachers’ use and relationship with the blackboard helped to influence the way students learn and obtain instruction in classrooms. In short, America’s school history displays signs of continuity and change as opposed to predetermined results.

**Our Relationship with the “glitch”**

The troubleshooting tips students use to handle their frozen “glitch” illustrate how roles in the classroom relate between humans and technology. First, students at Aspire spend a third of their time in independent, online learning. They engage in learning using an adaptive software through their computer devices. The computer fades into the background when students plug into their devices. Additionally, they read their technologies through the sounds, words and images produced by the software. Thus, technology mediates these students learning as they embody their devices to learn. Further, children learn with and through a “quasi-other” teacher online. This “quasi-other” teacher takes the form of the content provided by the software.

As students perceive an oddness to their program or “glitch”, they engage it with the knowledge gathered during their pre-blended practice and the tips visible in the class. When students resolve their “glitch”, the computer moves from their background to their present
awareness as being “there”. Thus, the student’s role displays itself based on the “glitch” as active learner. On the other hand, the teacher plays an inactive role during the students’ troubleshooting episodes. However, it’s not the teacher’s inactivity that stands out but his/her absence or in the background presence.

The teacher, computer and “quasi-other” stand in the background as the child engages with online learning. However, as a “glitch” occurs, the computer and “quasi-other” educator stand present in the child’s mind. But, the teacher remains in the background. For example, the textbook, another learning technology, acted like a “quasi-other” teacher to students after its introduction to the schoolroom. Students read their “quasi-other” textbooks. Their teachers provided an interpretation to the textbook as they taught from or with it in classrooms. However, computer software allows students to read their technologies while the “quasi-other” reads to them. Thereby, how students relate with and through their “quasi-other” as individual learners and absent teacher underscores our school’s current transformation.

How this plays out overtime depends on considering teachers’ roles outside coaches, facilitators or guides. We need to consider that the teachers’ roles relate to not how education technologies shape teaching, but how their relationship with students impact instructional practices. Teacher, technologies and students’ roles are not separate but interrelated and connected one to another. However, we cannot be sure since technologies offer an interesting riddle as they never behave in a predictable way. Thereby, it’s safe to assume students will form relationships with their “quasi-other” software as they learn with and through computers. Consequently, even though teachers facilitate students’ learning through software choice and device; they outsourced their instructional practices to the “quasi-other” educator.

Further, station rotation model’s online learning section displays the rise of individual learner.
Computers effectively facilitate student learning as the micro-level: the individual. This is unlike the blackboard which introduced whole group learning at the macro-level in the classroom. As a result, the teacher’s role shifted from visible, dominant educator at the blackboard to that of being in the background with the computer. Similarly, the student’s role moved from the receiver of instruction with the blackboard to an active participant in education with the computer. Therefore, the individual learner’s rise with his/her computer device in classrooms actively places the child in education. However, this comes at the expense of the teacher and raises questions about the educator’s role in education.

Moreover, the education field finds itself transferring textbooks, paper, teacher and blackboard to the computer as a “quasi-other” in the classroom. Therefore, the rise of computer devices in the classroom with teachers and students requires careful inquiry into our relationship with its “quasi-otherness”. The slow relocation of old technologies to the computer device impacts the human-technologies relations in the classroom. The classroom with a computer device containing other simple technologies begs the question about the teacher’s future position in schools. Technology as “quasi-other’ or its alterity relations should be further studied to understand how it is shaping teacher and student roles in the classroom outside of terms like coach, facilitator and guide.

Finally, this project proposes an inter-relational roles model. The model intends to promote inquiry into the changing roles among the human and nonhuman features in our classrooms. In fact, our education technologies over the course of history allowed teachers to teach and students to learn differently. However, online learning with a computer device shows a rise of the “quasi-other” in education alongside the individual learner. We need to inquire into the teacher, student and technologies roles as inter-related as opposed to isolated and separated in the classroom. In summation, American schools inserted technologies like the blackboard into classrooms. The
blackboard helped to shape our past and present schools alongside students and teachers. Also, today’s computer device inclusion plays a similar role as it too helps to shape our schooling.

**The Inter-related model**

![Diagram of inter-related roles in a blended learning classroom: Student, Teacher and Technologies]

*Figure 3: Inter-relational roles in a blended learning classroom: Student, Teacher and Technologies*

Roles vary based on their relation in the classroom among the human and nonhuman entities (inter-related as opposed to isolated). This project assumes a change in any one role changes both technology and student roles singularly or together. The case of our “glitch” or frozen page or screen and those troubleshooting tips illustrates the rise of a “quasi-other”. We read and it reads back to students in the classroom. As the student applies his/her troubleshooting steps to resolve the “glitch”, the teacher, unlike the computer and “quasi-other” educator remains in the background. Furthermore, the “quasi-other” teacher who students interact with show that the role of the teacher moves from a “model-maker” (Wylie, 2012) with the use of the blackboard to missing with the computer. To summarize, the inter-relational model illustrates that the roles of teachers, students
and technologies are shaped by one another in the classroom. The practices upheld overtime result from this interrelationship in the classroom.

**Closing Statement**

The relationship humans and technology play with one another provide an important avenue towards studying how their roles interrelate. This thesis shows that as a child troubleshoots his/her “glitch” the teacher remains in the background while the computer and “quasi-other” teacher becomes visible. The next chapter finishes this project and provides future research areas.
Conclusion

This project recognizes a “glitch” or frozen computer page in online learning offers an opportunity to inquire into the interrelated roles in blended learning classrooms. My experience with “glitch” during online tutoring provides an opening to explore those troubleshooting tips. Aspire Public schools utilize to remind their students how to handle their frozen pages during online learning. The Aspire troubleshooting tips in their station rotation model prove the increase of the individual leaner and “quasi-other” in classrooms through computer devices.

Furthermore, evidence in early America schools display technology use in classrooms to teach and learn. Blended learning systems in schools through technology use from the “mixed method” to the “platoon schools” helped to shape our current education structure, arrangement and design. Therefore, the use of post-phenomenology to study the “glitch” in a blended learning classroom revealed the school’s capacity for continuity and change overtime. However, it is not the humans and the technology in isolation that produced this transformation. Students, technologies and teachers together shaped the way we educate and learn from then to now.

Future Research

Future research needs to focus on how the roles in other blended learning models used in K-12 schools are shaping our classrooms with specific attention to curriculum and the “quasi-other” or alterity relations.
APPENDIX

Figure 1: Tutoring platform features

Figure 2: A frozen eraser with clicker
Figure 3: Inter-relational roles in a blended learning classroom: Student, Teacher and Technologies
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