

DISCONNECT ED.

A Prototype for Educational Delivery
in Remote Learning.

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I'd like to thank our Lord, Jesus Christ, for this opportunity to expand my knowledge and share this project in the presence of God. I'd also like to thank my children Kayleigh and Taylor for providing support and laughter during my mid-life career change. Also, my family for their encouragement over the last 6 years.

Additionally, many thanks belong to those who have shaped and molded my life path with their positive influence in this stage of my life's journey. When I was uncertain whether an old oil painter could create art using a computer, Nick Paigo gave me the answer I needed to hear. Then, when I was drowning in elements of design and questioning my direction, Billy Fillmore gave me candor and solid ground in new artistic mediums. When I began to think I knew more than I would need, the professors of Liberty University provided new opportunities for growth as a designer, artist, and Christian.

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“The key to success is often the ability to adapt.”

~Anthony Brandt

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ABSTRACT

Even with complications, remote learning can be successful with the development of user friendly designed solutions. While there are educational tools and platforms available that electronically support remote learning, many students and teachers do not have deep technological knowledge and many lack internet access outside of school. Without access to the internet, many of them experience interruptions in their education. This underscores the needs of both the educator and the students during sudden and unexpected periods of school closure. The research objectives of this project focus on current learning tools, their design, and their accessibility during remote learning.

The level of technology available today plays a significant part in the design and delivery of K-12 education. The results of a literature review identified issues in remote learning, including those within the ongoing pandemic. In effect, this project identifies the importance of using design principles to solve this problem. The goal is to provide a solution that enables learning in remote environments with limited or no internet access, further emphasizing the importance of utilizing modern technology and design principles when creating effective remote learning tools.

Keywords: Remote Learning, Virtual Learning, Internet Learning, Mobile Learning, Modern pedagogy, Interactive Learning, Digital Learning, Educational Portability, Internet Connection

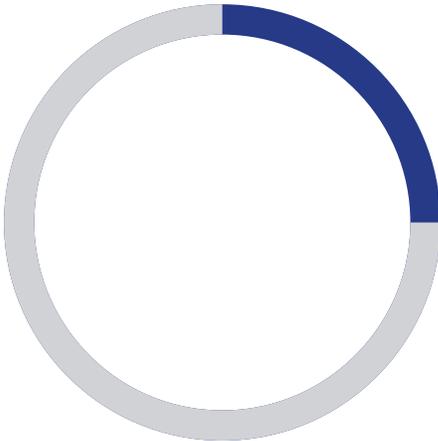
LIST OF DEFINITIONS & ABBREVIATIONS

Remote Learning: Throughout the duration of the project, remote learning (RL) is used as an umbrella term to reference multiple forms of distance education or virtual learning. It addresses any method used to deliver educational access to students not physically present in a classroom.

Abbreviation	Explanation
DL	distance learning
E-TEXT	electronic text
EL	electronic learning
ML	mobile learning
RL	remote learning
OL	online learning
LE	learning environment
VLE	virtual learning environment

CHAPTER ONE

The Problem



INTRODUCTION

Current options in remote learning used by K-12 educators during sudden and unprepared school closures lack organization, visual interest, and a universal means of delivery.

There is a vast body of research focused on electronic, remote, and distance learning, including the challenges these practices encounter in K-12 education. Other studies are available regarding the recent growth and inclusion of technology in learning. This thesis does not seek to add more information to those areas in the body of knowledge however, a gap exists revealing a weakness in remote learning due to the recent global pandemic.

While there are web accessible educational tools, and digital learning platforms available, a functional and engaging tool is needed during remote periods for students without access to the internet, with poor connectivity, or with limited capability when connected.

The research objectives of this project focus on current learning tools, their design, and their accessibility during remote learning. The level of technology available today plays a significant part in the design and delivery of K-12 education. This project identifies the importance of using design principles to create a solution which enables learning in remote environments with limited, or no internet access while using computers or tablets.

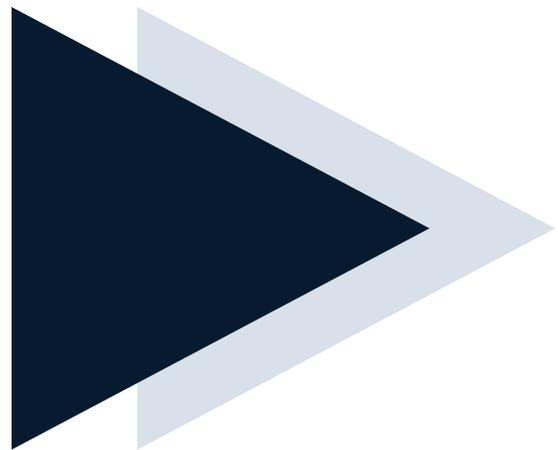
This further emphasizes the importance of utilizing modern technology and design principles when creating remote learning tools which help avoid a breakdown in education for remote learners. The study reviewed digital education, its terminology, and varying platforms which included requirements, advantages, and shortfalls. By reviewing empirical information, the study summarizes issues recently faced by K-12 schools which prevented access of electronic learning effectively in times of remote education. The literature also revealed examples of methods adopted for the ongoing period of remote learning.

An initial literature review provided a historical background of remote learning and electronic learning (hereafter abbreviated as RL and EL). It also identified shortfalls and solutions in recent methodology. The theory of distance learning (hereafter abbreviated as DL) has been a topic of study and discussion for over a century. It has been known by many terms including RL.

A gap in the knowledge appears where design & technology have been used for education delivery during periods of RL. There are several studies based on large educational software platforms created by commercial tech companies in various formats. There appears to be a limited number of examples assessed in the body of knowledge that revealed small-scale solutions for educators that are not reliant on technical efficacy or impacted by lack of internet connectivity.

“The level of technology available today plays a significant part in the design and delivery of K-12 education.”

This study intends to fill this gap by identifying methods and strategies that materialize in the form of an application prototype with an adaptable, accessible design solution. Created in Adobe XD, the application will be able to meet RL needs with or without internet access. A primary goal for this projects' solution is to avoid the impact technical limitations educators and students may have. The solution will be a functional design that is easy to use. Such a solution can provide a positive impact on the ability of educators to continue teaching when students are forced to learn remotely.



CHAPTER TWO

Research



RATIONALE

Even with complications, RL and EL can be successful with the development of designed solutions. While there are educational tools and platforms available to school districts that electronically support remote learning, many students and teachers do not have internet access outside of school. Without access to the internet, many of them experience interruptions in their education. This underscores the needs of both the educator and the students.

I have teenage children in high school who are learning remotely since the pandemic began. Many of their teachers use Google, Microsoft Teams, Schoology, and/or Zoom to provide education. However, the students still have to print multiple page documents and files which also need to be scanned then uploaded when completed. Several of the teachers are efficient with technology and are engaging students well. This is not the standard, merely the exception. There are others who are still learning to use the educational platforms I mentioned, or don't use them proficiently. This has created a lack of structure and organization in the course while confusing the students.

One role that design elements can assist RL is through wayfinding. This process has been applied in many cross-disciplinary practices. In the case of RL, the wayfinding is virtual and provides a designed pathway for students to navigate their coursework. Petroski wrote about grounding wayfinding in learning spaces, "Teachers that can construct learning spaces that support paths for students to find their way, can lead to greater levels of content mastery...(5)." One would expect the academic machine to be better prepared to provide RL with minimal interruption during school closures based on its vast body of knowledge. There were complications however, and they can be found in many areas of K-12 education during the emergency shift to RL.

RESEARCH METHODS

This study will benefit from a Multidisciplinary Design (MD) collaboration and a mixed method approach to proposed research used to answer the questions. Because the fields of EL and RL are vast and evolving, the research effort must be refined by searching the body of knowledge and focusing on the most recent issues facing the K-12 education system. Searches for secondary data were conducted to collect EBD solutions being used in K-12. By focusing on recent data, from the past 18-24 months, including literature and case studies a designed solution theory was developed.

Directed storytelling research provided examples of the most recent data regarding RL and EL issues. This is consistent with the trend already seen in the previous literature review. The storytelling ideas were clustered and reviewed for patterns. Results gathered from this method did provide insight into how instructional engagement is affected in RL, the role efficacy plays in RL, and how traditional pedagogical practices changed through EL in both positive and negative ways for the future. Further discussion of these points will be detailed later in the writing.

“Teachers that can construct learning spaces that support paths for students to find their way, can lead to greater levels of content mastery...”

~Petroski

SUMMARY OF FINDINGS

There will be plenty of time to prepare a solution, so we will keep researching. This could easily be a perception of the decades spent compiling educational theories on DL and EL. It is of no coincidence the technological boom and subsequent advancements would seemingly advance the arrival of an event that would bring education to a sudden paradigm shift. The theories did not seem to fit but, learning at a distance was not a new concept.

According to Black, “The second half of the 20th century saw a number of phenomena that led to growing interest in research: these included favorable experience and research findings about the effectiveness of distance education; the implementation of educational reforms and socio-economic justification for distance education.” Black also noted there was not only a growth in research, but in centers for the research to take place around the globe. These included the University of Wisconsin; the American Center

for the Study of Distance Education at the Pennsylvania State University; the Institute of Educational Technology, UK; the Education Center of Berlin, Germany; and the Centre for Distance Education at Athabasca, Canada. (4).

The beginnings of research in distance learning took hold during the mid-20th century and there was enough interest funding was provided to support these well-known institutions in their efforts. Early DL was framed around primitive methods of communication and correspondence. Courses were developed for students that evolved with the technology of the time. Coursework was mailed back and forth. Coursework could be faxed. Coursework was augmented with VHS tapes to watch at home. Then class lectures were watched live on a cable television channel. Fast forward to what we now view as modern methods, the terminology associated with DL has developed to include several categories that can be configured to each individual’s needs.

Some records show DL theory was being discussed almost a century ago. Certainly, the amount of literature indicates the academic body has spent an exhaustive amount of time theorizing and analyzing trends instead of designing solutions.

In 2015, Kompen noted there are several definitions for the terms related to the methodology included in an individual's personal learning environment (hereafter abbreviated as PLE). "Through the years, several different names have emerged to characterize innovative approaches and technology supported initiatives: distance education, technology enhanced learning, multimedia learning, computer based training, computer assisted instruction, Internet based training, web based training, online education, virtual education, virtual learning environments (hereafter referred to as VLE), mobile learning, distributed learning, computer-mediated communication, and more.

The term EL encompasses all of these approaches, and the word can therefore be considered an umbrella term... (121)." The speed at which technology advances effects the individual, their personal learning environments,

and the way education and interaction take place pedagogically with educators.

Kompen also discusses the technological growth happening rapidly as described by witnesses at its current scale. "Technologies are undergoing exponential growth patterns directly related to Moore's Law which states that computing power approximately doubles every 18 months...(cited in Kompen 121)." While this information may not seem profound, it is worth maintaining as a point of context in this project. Certainly, there is a vast amount of literature indicating the academic body has spent an exhaustive amount of time theorizing and analyzing trends instead of designing solutions. Current technology provides a multitude of options for teaching in EL.

In a 2019 literature review, Karen Arnesen, et al. examined two decades of trends in the field. Arnesen states it is generally accepted there have been four systematic efforts to broadly examine the field through the reviews of its literature. Rice examined themes broadly relating to K-12 distance education. Barbour and Reeves examined themes more specifically related to K-12 online learning through the lens of the benefits and challenges. Cavanaugh et al. examined open source themes related to K-12 online learning, and Hasler Waters, Barbour, and Menchaca examined themes in the literature related to full-time K-12 online learning (cited in Arnesen, et al. 33).

Some records show DL theory was being discussed almost a century ago. Certainly, the amount of literature indicates the academic body has spent an exhaustive amount of time theorizing and analyzing trends instead of designing solutions. What is notable about Arnesen's literature review is finding although there are still many uncertainties, the field of K-12 online learning (hereafter abbreviated as OL) has grown rapidly in recent years with an acceleration of new articles and new authors. Additionally, Arnesen's results show a timeline which began primarily focusing on theoretical articles but is now emphasizing an increase in data-based articles (33). Finally, the study findings generally indicated the field of K-12 online learning is maturing from concept to data-based conclusions (49).

These points add credence to the solution suggested within the goals of this project of a design based prototype. The use of technology undoubtedly provides educators innovative ways to establish engaging RL environments capable of meeting students' needs. Singer (cited by Ott 3) reports 30 million K-12 students were using Google programs in some regard and Google Chromebooks accounted for over half the number of devices purchased by schools. Commercial educational platforms, such as the type provided by Google and Microsoft, are an environmental change to the learning environment of a school district. Some public schools may not select this option for a myriad of reasons.

EDUCATION IN MOTION

Use of available technology is similar according to an article Shannan Maughan wrote in Publishers Weekly about the efforts to provide learning at home during the Covid pandemic. "Districts around the world to figure out how to keep millions of students engaged in learning mode while they're at home (2020)." Educational technology companies have stepped up in an effort to assist K-12 schools. Things like digital library management platforms can make books available online and through electronic text (abbreviated as e-text), or classroom ready open educational resources (OER) for DL appear to be part of an EL future (Maughan).v

In other research, Enfield shared the results of a study on the value of using e-text. In this instance, e-text was provided to students through online access during their course's curriculum. However, e-texts are now common for course textbooks which are formatted as electronic publications (EPUB) for both online and desktop viewing. This would indicate the move from online access to remote access of the e-text. This study found the e-text provided a useful reference for students, it was activity-oriented, and challenges within the e-text were designed so students were forced to work along with the lessons to create successful RL (454).

Recently the evolution of eLearning continued with the learner's use of mobile devices to interact in a PLE. Referred to as mobile learning (hereafter abbreviated as ML), Berge states ML can occur virtually anywhere. This includes traditional classrooms participating in a formal lesson, looking up something of interest, or using the environment as part of the learning experience through interaction with a device (208). "Certainly, mobile learning shares many of the same theoretical underpinnings as most EL, teaching, and learning in general (208)."

Many EL methods are acceptable with the right design and functionality. The requirements to provide those methods in a PLE can have both a positive and negative impact. For example, envision a last-minute school day change that will require a teacher of 30 years to utilize a video

conferencing application to present mathematics to a fourth-grade class of 20 students, 8 of which do not have internet at home to view the class.

If a school is prepared and has developed their curriculum to include a methodology suitable for video presentation offline, there would be no problem. Of course, each of the students would also require adequate adaptability in their role as a learner, such as internet access and an electronic device to record the video presentation or download it from the school web platform.

Now envision this same scenario with a few changes. The teacher still encounters the schedule change and is required to present a class through video conference and, eight of the students will still miss the presentation due to lack of internet connectivity. This time, the teacher has provided each student a virtual lesson file to use on their home computer which contains embedded videos, imagery, examples, and notes from the course. The virtual lesson can be opened and viewed using any HTML browser, without internet connectivity, and provides a guided course for them to follow. This is a modest scenario which provides a quick visualization of things that could be encountered when using technology in RL. As Young and Bush state (cited in Curlin-Loring 28) "... it [EL] should be done with careful consideration and planning that address the specific purpose, possible effect on instruction, students and desired outcomes."

A QUESTION OF SHORTFALL

In March 2020, almost on cue, the education world got a dose of this reality. The paradigm shifted from discussing and writing about EL theory, to an immediate application of remote education. In many cases it was done without an educational plan while access to the field of EL is expanding due to technological improvements which, as previously mentioned, are advancing at an exponential rate. These facts do not fit well with K-12 education systems that have only recently moved past theory towards creating solutions by combining modern pedagogical methods with both EL and RL. Without an immediate need to develop solutions and academia has yet to realize its full potential. This essentially creates a bottleneck in the process of delivering lessons virtually.

The pandemic became the mother of RL invention by providing the sudden and unexpected shift from classroom to remote learning. It did not allow learning technology to evolve at its own pace. As Harris et al. believed “This requires an intentional shift in pedagogical practices... Described as technological pedagogical content knowledge (abbreviated as TPCK), this combination of skills and knowledge pose a challenge for teachers because they often lack the ability to effectively integrate discipline-specific technology to support students’ cognitive development (cited by Sabado 6).” Still, while many teachers can see there is a need for modernization in their pedagogy, Sabado points out “...they

are uncertain how to move forward productively (9).” Similar findings from Curlin-Loring’s qualitative ethnographical study regarding the impact of technology provided similar factors. “Lack of digital knowledge causes teachers to fear technology (89).” Included in the findings was fear in trusting students to use their devices properly, and veteran teachers having a fear of stepping outside of their comfort zones by using technology (89). An argument can be made that even with an optimum environment, and equipment, there has to be a willingness to embrace modernization. Observations of learning during the pandemic are slowly beginning to enter the body of knowledge through journals and articles.

Several stories by teachers in the field were gathered for survey with results published in the *Journal of Literacy and Technology* (Wallace et al., 2020). Wallace denotes the wayfinders who found themselves in the midst of EL and RL should voice their personal perspectives of the unfamiliar territory in which they had a chance to test the canon of theories about RL (6). Emerging themes in this study confirm that education processes have been changed and there is a need to advance with new methods and models for teaching through EL. Teachers and students found themselves struggling with the shift to EL and efficacy needs to be improved by both parties to effect positive results. Still, RL must continue to advance and incorporate new technology to ease accessibility limitations.

A 2020 review of articles regarding e-learning use by students prompted this response from the authors. “Practically, policy-makers and educators could take a leaf from the results of this study to implement an innovative e-learning system that could enable the students to acquire and share knowledge in anytime anywhere settings (Mosfeta, 2020).” Summit Professor Richard E. Ferdig has frequently contributed to the body of knowledge and recently published a book of short stories collected from educators in the field. The stories pertained to the pandemic caused paradigm shift for DL and RE. Fortunately, he used a ‘medical model’ to have them peer reviewed and published for print in a modest 8 weeks (2020).

From this collection, two researchers from Purdue University shared an open access survey (Koehler & Farmer). The researchers asked participants to share experiences with eLearning by describing approaches, experiences, effective practices, challenges, and any improvement ideas in their stories. An overview of these surveys included many expected themes for RL such as issues with technology, lack of parental supervision, poor learning environments, and support for both staff and parents. Some of the challenges they identified included applications not functioning, time Management, learning new technology, managing multiple websites and overall confusion. While not completely disheart-

ened, the suggestions provided by teachers and parents shared a common theme. All participants seemed to be looking for open communication, flexibility, clear expectations, online and offline options for schoolwork.

A primary recommendation of KOEHLER AND FARMER was for schools to create a digital learning plan to assist them in preparing and facilitating future EL. Recommending more research to fully realize any impact their study, and others like it, will have. Research of information is always a solid recommendation. In this period of time, the creation of solution based designs are vital to finding what actually works, and recording the outcomes.

“Lack of digital knowledge causes teachers to fear technology.”

~Sara Curlin-Loring

The American Community Schools Athens (hereafter abbreviated as ACS), Greece, sets an exceptional standard in managing educational disruption. Avgerinou and Moros notes... "The school has developed and implemented its own blended instructional methodology [called i2Flex]." In their plan for K-12 education, Moodle is the learning management system (hereafter abbreviated as LMS) that facilitates learning, along with a "...wide range of educational technology tools."

The problem in the case of ACS pertained to grades JK-5 where teachers are not trained to teach online or participate in online professional development (583). Avgerinou and Moros report how "During the pandemic, ACS' Athens Elementary School had to swiftly move approximately 400 students in Junior Kindergarten through 5th Grade to an immediate virtual learning setting (584)." The constitution of ACS' 5-Phase process of virtual learning was founded in virtual teaching, teacher-student connections, TPACK (cited in Mishra & Koehler 2009), a pedagogical and technology balance, teacher support, assessments, grading, and feedback.

With successful results of ACS' process implementation during the shutdown, findings include an undeniable need for continued research, teacher preparation programs, technological tools, skills and practices (Avgerinou & Moros 587). Research shows this would be as close to being totally prepared a would be prior to the shutdown. The plan prepared by ACS was already in use, it only required adaptation for use in grades K-5. Even so, the disruption had to be addressed for 400 students.

How will teachers move past the struggles to provide meaningful EL? How will they ensure students advance during RL? Without a one size fits all solution, the research allows for many solutions. The early results are in, and they bring a change of methodology with them.

SUMMARIZING THE STORY DATA

Yet another approach to RL would be design and utilization of local tool using a much smaller scale combined with a locally curated plan. A rural elementary school in Nebraska prepared for RL by simply asking students to “bring home a note explaining the pandemic circumstance, a printed description of the possible new model of blended learning with iPads, and a survey about Internet access at home (Vu et al. 141).” According to Vu, The school then moved forward with a plan where students brought home iPads, necessary text documents, web references, and provided mobile Internet hotspots to those in need. Students worked at home and via Zoom sessions. The parents found this blended learning (hereafter referred to as BL) approach successful and resulted in an effective instructional practice (143).”

Both ACS and the rural elementary school in Nebraska gathered resources and support in respect to the needs of their students. These stories present how a well-funded academy and small-budget school both utilized modern

technology to create a relevant RL solution with available resources in a short notice. Returning to the collaboration of stories published by Ferdig, a content analysis plan was developed to generate a situational perspective of the stories. A search for single terms from the story text would provide data used to create a general understanding of RL during the pandemic (2020).

The total terms searched was fixed at 3 searches of 6 terms, for a total of 18 terms. An option for additional terms was left available but not used. The study results were taken from the text of the authors’ stories describing the environment they perceived dealing with the emergency paradigm shift. This study allowed for explicit terms identified in the search to reveal any the existence of patterns or themes in the text. The terms could later be used for research in the design phase by identifying emotions felt by the individuals from the stories (appendix 1).

CONCLUSION

There are decades of research and theory about distance, electronic, and remote learning which continuously evolved to incorporate technological advances. Any tested solutions developed for K-12 classroom education did not envision a sudden paradigm shift to home schooling. Being forced into that specific territory, research indicates an urgency to develop new design solutions suitable for RL and EL that minimize a disruption in student learning as traditional classroom learning is consistently being interrupted.

Teachers and students alike require support to successfully engage in RL, and support should be available in several forms relative to this goal. To be effective, teaching tools used must meet the needs of the purpose they are designed for. The usability requirement of this project is high, with a very low learning and support threshold. In short, the tools must be easy to understand and user friendly. An additional charge for a solution is to provide education professionals the ability to incorporate any litany of lessons, lectures, and resources they would normally deliver in their traditional classroom pedagogy in periods of RL where Internet access is scant, or non-existent for any reason. This cannot be achieved by simply reviewing literature and studies alone. It must be done by combining design based

research, practices, and sound design principles to provide a positive impact on education. In this way, detractors that have affected both educators and students throughout this educational shift can be alleviated. The project research has revealed a scalable solution that lies at the intersection of education and graphic design providing an approach to creating a successful deliverable for this project.

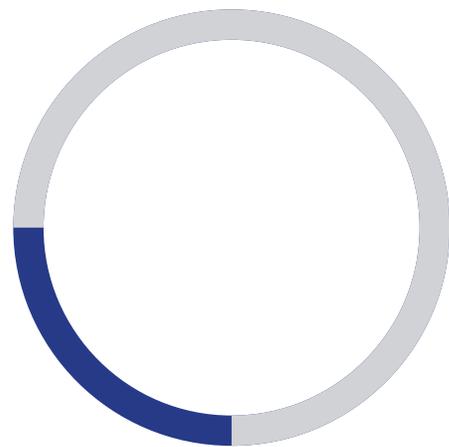
Modern applications are have the capability to use multimedia resources including video, audio, and animations. An interactive presentation can be created in the form of an application that would incorporate a teacher's classroom learning plan, and function within a browser with or without internet connectivity. Such a presentation can be stored on a portable drive or downloaded directly to a machine's local drive when internet is available. The capabilities of a browser can be used to access the application's data and assets that are locally stored. This designed solution will give educators an accessible method of delivering education in a remote environment at a moment's notice. Using the performance of an application to create a user-friendly, multiplatform means of student engagement. In conclusion, the aim of this research project is to provide an accessible asset for educational practices through advanced design.

“Learning needs to be what learners want, and often learning needs to be where learners are; as opposed to the conventional, just-in-case, dispensation of fixed knowledge, or the “tethered” e-learning that ties people to physical locations.”

~Berge

CHAPTER THREE

Visual Process



DESIGN PROCESS

In design thinking, empathizing with the real users of a solution requires an understanding of their environment in context to the problem being solved. A simple qualitative content analysis of the data gathered during the previous research phase provided insight and understanding of what was being experienced by those effected. I utilized a collaboration of recently published stories as a source to create a conceptual analysis. The first purpose was to generate an emotional perspective of the stories so I could understand the feelings being expressed during the sudden shift to remote learning. A second purpose was to generate a list of needs. The understanding gained from those stories helped to determe from basing my solution solely on my own ideas, and to avoid bias in my thought processes.



EMOTION KEYWORDS FROM RESEARCHED STORIES

DEFINE THE PRODUCT

Based on an understanding of the research, I determined that creating a solution required a clear set of guidelines. In this case, the problem in RL is created by a lack of adequate internet access for teachers and students. This has often been referred to as the internet divide, the digital divide, and most recently termed the distance learning digital divide. By any name, this has been an ongoing issue for years.

The pandemic shift to remote learning in the last year has left educators to deliver learning experiences to students attending school by remote means that may not have internet connectivity. A recent analysis provided by Common Sense Media, Education Superhighway, and the Boston Consulting Group (BCG) presented key findings regarding this nationwide problem. “Approximately 15 million to 16 million K-12 public school students, or 30% of all public K-12 students, live in households either without an internet connection or device adequate for distance learning at home... (Common Sense).” This has proven disruptive to RL efforts nationally. An internet search provided a wealth of articles relating to the emotional impact that overshadows RL. Teachers and students are frustrated by inter-

ruptions caused by the pandemic. There is a rush to push education to online platforms, yet the analysis provided in the Common Sense Media report identified that students lacked baseline technology requirements, including reliable high-speed internet, and sufficient data plans... (Chandra).” In addition to other technical considerations for RL, these could potentially derail any solution.

Stories from many teachers in the field during this recent period have provided a source of experience that needs to be understood. Using this secondary data effectively was a critical piece of the process of clearly identifying and defining the problem and designing this solution to meet the needs of the most disadvantaged learner regarding this project, which can be both the teacher and student. Historically, education is not known as the leading source for technology trends. When you stop to think about it, the modernization of classroom learning has slowly adopted technology while traditional education practices move on. Classrooms still have a teacher in the front of the room, and students still sit at desks while listening to expertly crafted presentations. This has to evolve for future success in education.

One initial solution I envisioned would involve interactive .pdf files. However, this solution would require tools which have been around for years, most of which have reached the end of their shelf-life. Interactive .pdf files have been a workhorse for many fields. They allowed for the use of interactive elements and text which could be delivered through email or by download from a school website. As technology advanced, many programs that once used interactive .pdf files have evolved to incorporate newer technology, or have been completely discontinued. This quickly identified an issue that utilizing these tools would not be viable for a solution.

In order to solve an identified technological shortfall, by using technology, consideration was given to a number of factors. The most significant factor considered for the solution was how to deliver education to students learning remotely without internet connectivity, or with limited access, in their home learning environment. Creation of the proposed solution merged the design processes of UX/UI and product design merging elements of the two approaches. The solution is an interactive application prototype, or app, created using Adobe XD.

By creating the prototype for an interactive application in Adobe XD, the solution provided access to lesson materials and course tools on a learning platform without the need for internet connectivity. This app can include videos, images, sounds, and text engaged with interactive functionality. Elements were designed to engage the learner and provide easy to use directions for the prototype. It can be stored on a portable drive for use, or for download directly to a computer, or even a tablet or mobile device's local storage drive when internet access is available. The app will store saved application data and assets that are entered interactively within the lesson module.

“Approximately 15-million to 16 million K-12 public school students, or 30% of all public K-12 students, live in households either without an internet connection or device adequate for distance learning at home...”

~ Common Sense Media
2020

PERSONAS

Once a solution was defined, gaining an understanding of the potential users was the next step. Returning to the research provided an opportunity to learn about their perspectives. While it would be difficult to capture every persons' point of view, the research provided similar themes that were used to create personas for six fictional users. The primary users identified for this solution are teachers and students. The personas created include three teachers and three students. These were important tools to build unique perspectives. Their characteristics also provided the opportunity to empathize with the users' needs and goals.



SAMPLE STUDENT PERSONA

Student 1: 3rd Grade

Name: Jared

Residence Type: Jared resides in a 2 bedroom apartment which is part of a multi-family apartment building in Citytown, Pennsylvania.

Backstory: Jared resides in a single parent household and is the youngest of four children in the home. All children attend school remotely. Jared's PLE consists of the following options for learning, living room couch, kitchen table, or a bedroom. There are two Chromebooks in the residence, each Chromebook is shared between two siblings to do their schoolwork. The internet access is provided throughout the apartment building and is intermittent. When the internet is active, the download speeds are extremely slow making access to the school portal for online learning nearly impossible.

Obstacles for Jared:

- Shared computer access with a sibling
- Video chats are not an option due to internet limits and laptop sharing
- Access to any multimedia through the school web portal is extremely slow
- Wi-Fi connection to the internet is shared in the apartment complex, it is slow, and intermittent

MIND MAPPING

This technique was used to help visualize what potential users might need from a solution.



MINDMAPPING: TEACHERS



MINDMAPPING: STUDENTS

RESEARCH IDENTIFICATION STANDARDS

Through research I found there were no national or state level design standards for identification of subjects in the education system. Color psychology is used to generally relate to students' age, and subjects, i.e., green for earth science.

COMPETITIVE DESIGN STUDY

Identifying the competition for this project was difficult for many reasons. Most significantly is that school systems are comprised by districts, which are like local franchises. Unlike franchises that have a governing headquarters, the districts administer learning and education within their capabilities while following state guidelines. Locating other RL solutions that were functional without internet access was tough to do. There are many companies that offer web solutions which could offer some benefit however, none of which I found were free to use past a short-term trial. Most solutions require schools host a license for a product, or a substantial subscription commitment. I was able to glean concepts from several websites that were similar to those in my proposed solution (see fig. 1 through fig. 4).

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Fig. 1. Mood board image from competitive website, <http://site.school-pages.com/>.

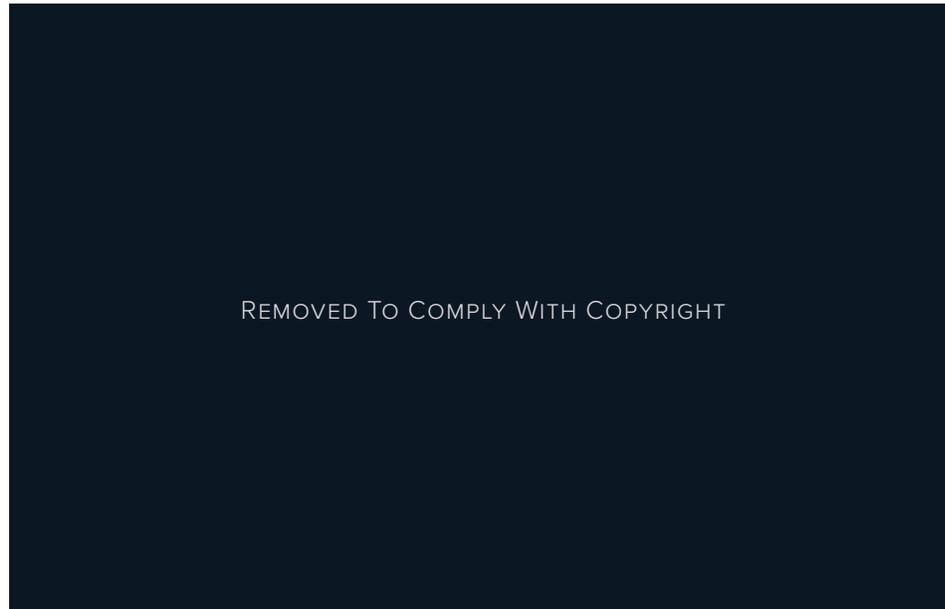


Fig. 2. Mood board image from competitive website, www.classkick.com.

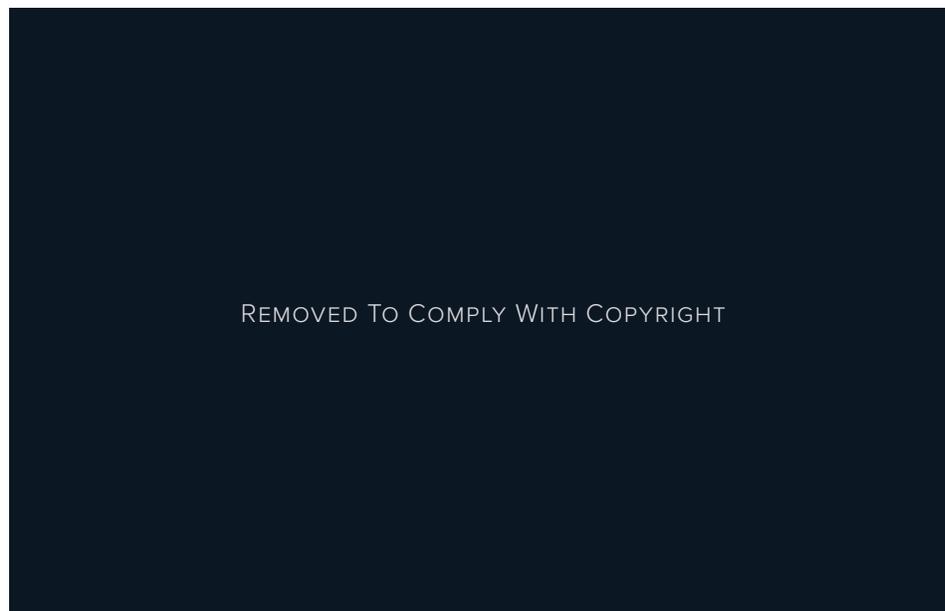


Fig. 3. Mood board image from competitive website,



REMOVED TO COMPLY WITH COPYRIGHT



Fig. 4. Moodboard images from competitive educational applications, <https://www.behance.net/gallery/74788757/Yellowstone-Forever-Learning-Portal>.

LESSON MATERIAL

Lastly, I identified the need for content that could be presented in the prototype. I researched free-use lesson plans for this project. These included lesson text, and assets, that replicated what a teacher might adapt from classroom learning for RL using this prototype.

I gathered three lesson plans for three different grade levels. All three of the lessons studied provided a further understanding during the ideation phase, journey mapping, and empathizing. I have ample content provided from the Boston Tea Party lesson used in the prototype. There is additional content from a second lesson plan on the American Revolution. The third lesson, not utilized, was of the Cherokee Trail of Tears. With Imagery provide by the Library of Congress Gallery.



Fig. 5. Boston Tea Party Print, Library of Congress Gallery, <https://www.loc.gov/item/2002719851/>.



Fig. 6. Boston Tea Party Lesson, Boston Tea Party Museum.

It took the Sons of Liberty three hours to destroy all of the 340 chests of tea. They used ropes and pulleys to haul the heavy chests up out of the cargo holds of the three ships. Once the chest was on deck, they used hatchets to crack through the wooden lid. After that, all that could be heard was the hissing sound of the tea leaves mixing with salt water. Over one thousand

people turned out to cheer them on from Griffin's wharf as they emptied the chests of tea into Boston Harbor. On their way home, they took special care to wipe the burnt cork off of their faces, and remove the feathers from their hats. They knew if the redcoats caught them destroying the tea, they would be thrown in jail.



Fig. 7. George Washington Print, Library of Congress Gallery, <https://www.loc.gov/item/2003679770/>.



VISUAL RESEARCH/SYSTEM DESIGN

Moving forward in the design phase, I felt it necessary to create a system that provided an authentic school or classroom feel without visually stifling the capabilities web platforms provide. This involved more brainstorming, which included gathering examples of webpages in use by schools and teachers.

Primarily, school websites show unsystematic or inconsistent use of design principles. Some sites would often link to other pages that had different design systems, requiring different methods of interacting, logins, and other page differences. Many school websites felt like corporation pages, and required several interactions before locating a page where a student would get to a teacher's site. Of course, this all leads to users not having a rewarding experience and lends credibility to the fact that a consistent design system would be needed.

Pinterest seemed to deliver many corporate sponsored ads for education. Those were followed closely by examples of inspiration using arts & crafts supplies to organize home learning. The link below leads to an online collection. Behance proved the most relevant and current inspiration for visual research. Following that are visual representations provided from web searches.

The Boston Tea Party made King George and Parliament really angry. They wanted to punish Boston for destroying the tea. It took Parliament only one day to pass the Coercive (Intolerable) Acts. Boston would be punished until they paid for the tea that was dumped into the ocean. Nobody in Boston was willing to pay. Instead, they gathered as many guns as they could and hid them from the redcoats to prepare for a fight. In Concord, Massachusetts, the colonial militiamen collected a huge supply of weapons to fight the British army. The redcoats marched out to Concord on April 19, 1775 to take those weapons from the colonists, but on their way, they were stopped at Lexington Green where the first battle of the American Revolution began. The battle of Lexington-Concord was the first battle of American Revolution. Once the tea was thrown into Boston Harbor, it was clear to the Patriots there would be no turning back.

Fig. 8. Boston Tea Party lesson text, Boston Tea Party Museum, <https://www.bostonteapartyship.com/lesson-plans>.



Fig. 9. The Destruction of Tea at Boston Harbor, Print, Library of Congress Gallery, <https://www.loc.gov/item/91795889/?&loclr=reclink>.



[VISUAL MOOD BOARD LINK](#)

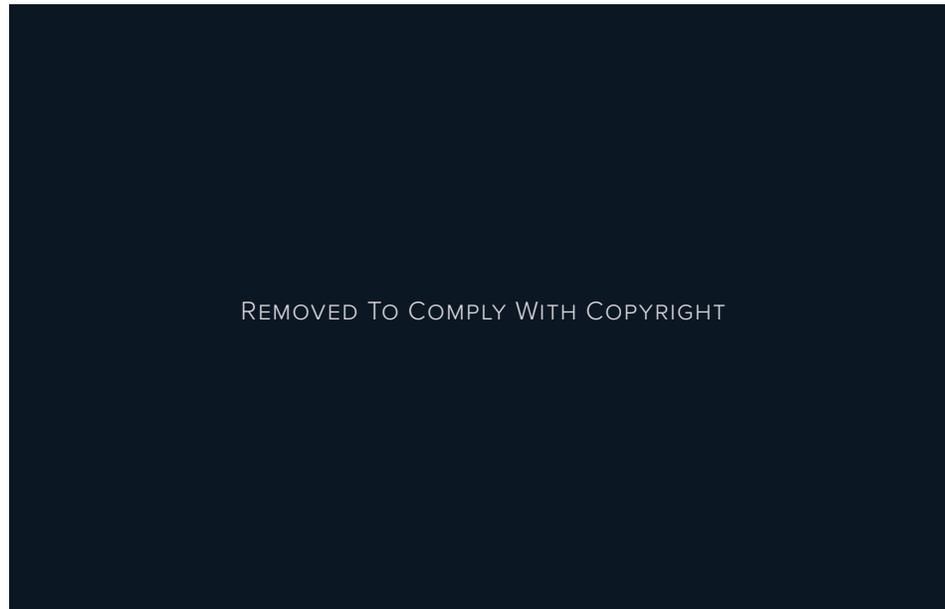


Fig. 10 Screenshot of competitive educational web platform, <https://academyhacker.com/?src=teachable-examples>.

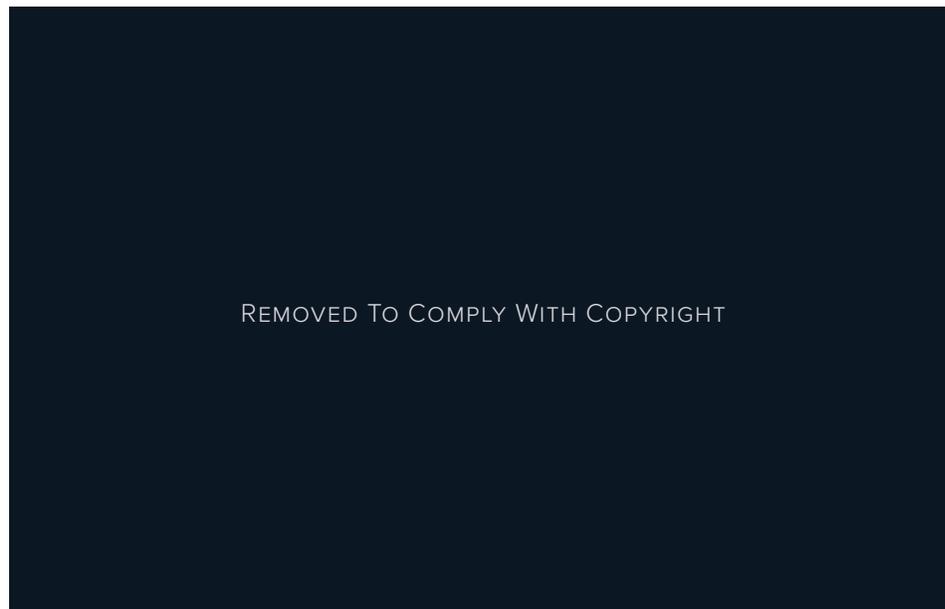


Fig. 11 Screenshot of competitive educational web platform, <https://allinonehighschool.com/>.



Fig. 12 Screenshot of competitive educational design, <https://graphicriver.net/user/rrgraph>.

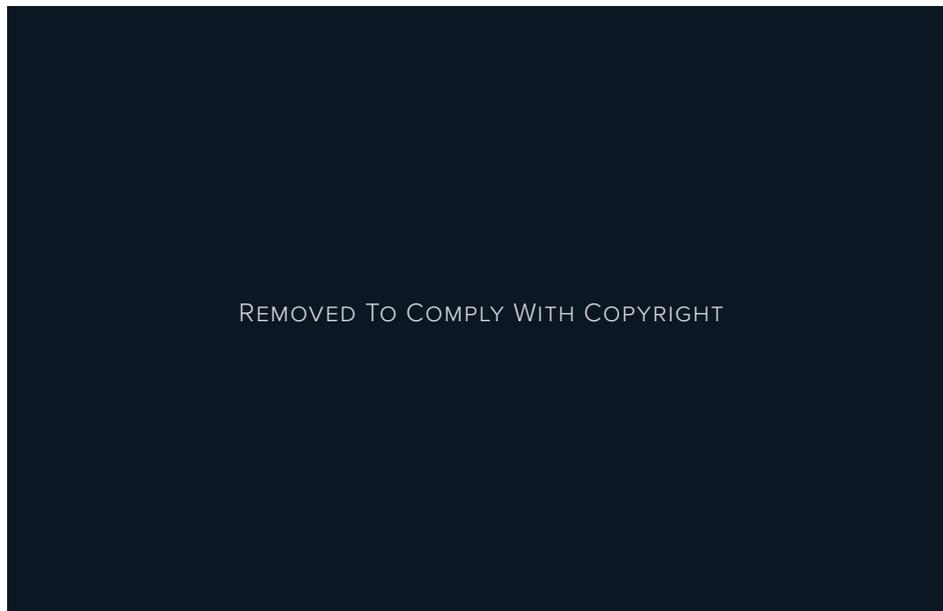


Fig. 13 Screenshot from competitive educational website, <https://bookunitteacher.com/>.



Fig. 14 Screenshot of competitive educational website, <https://trello.com/education>.

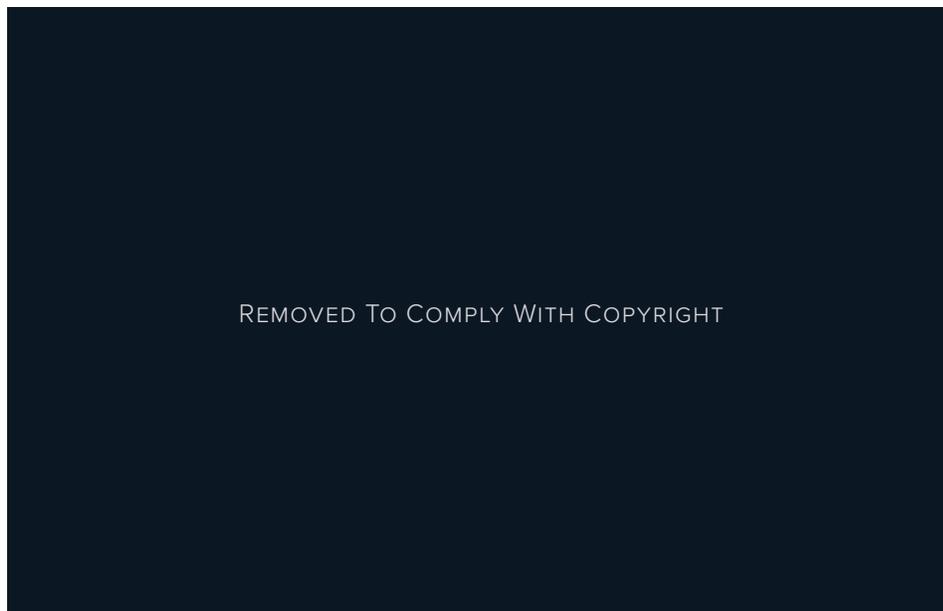


Fig. 15. Screenshot of educational application for mobile device, <https://www.behance.net/gallery/85692375/Estudio-Educational-Mobile-App-UI-Kit/modules/496074209>.

USER FLOWS/JOURNEY MAPPING



In addition to the personas previously created, basic user stories were constructed by using a journey mapping process. This was done to provide an overall framework of the situations facing each individual user. Journey mapping was key to inserting myself in the user's place, where the solution would be used, and under what circumstances, as well as an understanding of potential emotions and actions.

Goal: Select an Activity



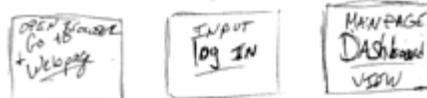
Print a note page



Problem
Go to school
no internet

USER FLOW
Student

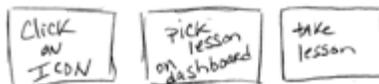
Log ID to main page



OR



TAKE A LESSON



Complete lesson

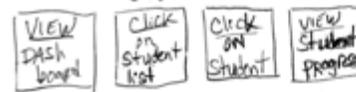


USER FLOW
Teacher

VIEW Dashboard



Check student Progress



MANAGE Lesson/Add/delete





STUDENT USER FLOW

Actor – Jared

Scenario and expectations – Jared will have to attend 3rd grade remotely through a shared Chromebook with one of his siblings. He has the handouts the teacher printed for class. He can not be online for the live teacher lesson, so he has to watch the recording later.

Phases

1. Arrange a time to watch his teacher's lesson video and complete the material provided for class in his folder:

Actions – Jared tries to watch the video, but it won't play from the school page.

Mindsets – Why isn't this working? What happened to the computer? I'll go do something else.

Emotions – Uncertainty, distraction.

2. Jared is able to borrow his other sibling's Chromebook to watch the video, but it isn't until 9:30 Pm that night.

Actions – Jared watches the video and partially completes his assignment and emails it to the teacher.

Mindsets – I'm tired, this is good enough.

Emotions – Tired, stressed, distracted, careless.

3. Attend the next class.

Actions – Jared is able to watch most of the video before his internet goes out. He completes his paperwork and is unable to submit his work until the next day.

Mindsets – I'm going to get in trouble for not submitting my work.

Emotions – Frustrated and upset.



TEACHER USER FLOW

Actor – Mrs. Davis

Scenario and expectations – Mrs. Davis is using lesson plans she created for classroom learning and adding them to her classroom website provided by the school so she can teach her students remotely. She expects this will be a rough process since the majority of the plan includes printed documents and printed visual aids posted in the classroom as well as what she writes on the dry erase board during class.

Phases

1. Gather and prepare lesson documents for tech support:

Actions – Mrs. Davis scans all course related student handouts to .pdf files. She takes photos of the posters hanging on the classroom wall. She copies address for the website she uses to show a video during the course. She writes an introduction of the course and a timeline of the lessons.

Mindsets – This is ridiculous. Why do I need that? How come this is needed? How am I supposed to do that? I don't like this. I don't understand. How are they supposed to make this work?

Emotions – Frustration, confusion, exhaustion, concern

2. Add to website:

Actions – Mrs. Davis relies on tech support from the single technology worker on the school staff. She puts everything she gathered on a thumb drive and has to wait behind other teachers to get their assets uploaded. She receives the message her uploads are complete. First remote presentation is tomorrow, she prepares quickly.

Mindsets – I only have one day to prepare. I know this material, but I can't get to it quickly. Will the kids be able to see this? Where is the website when I click the link? How come my pictures look so small on the screen?

Emotions – Uneasiness, concern, panic, frustration, confusion, optimism, excitement

3. Teach Class:

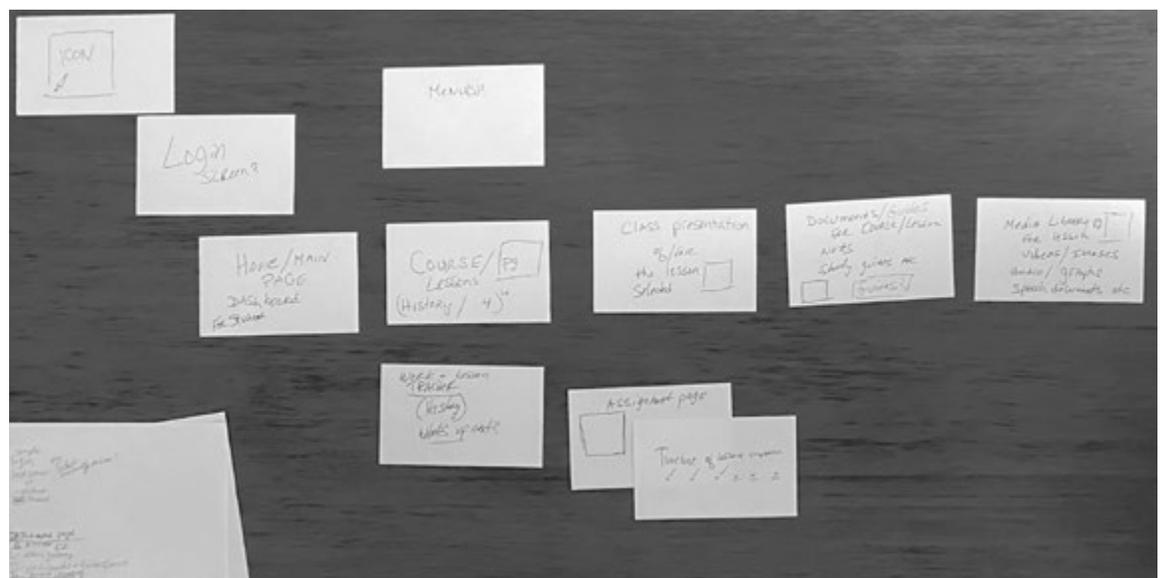
Actions – Mrs. Davis starts her 10 am class five minutes late. She was using the incorrect password. 18 students are present and there are four that do not have web cams so they she can only hear them. She provides the lesson lecture live and records it for students that are not present to view later. She speaks while overcoming student interruptions, intermittent student connections and distractions at their homes. She was unable to cover the topic handout and question sheet with detail but directed the students on how to print it at home. She uploads the video recording to the school page.

Mindsets – I can't believe I forgot my password! Hello students, so good to see most of you! It's ok, as long as you can see me. Can you all see this image? Do you have any questions? Don't forget you can message me for help. We can make it through this together.

Emotions – Stressed, anxious, wondering, concerned, relieved, determined.

WIREFRAMING

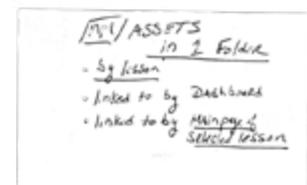
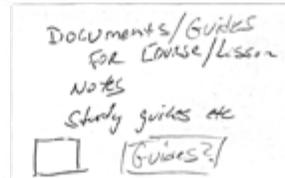
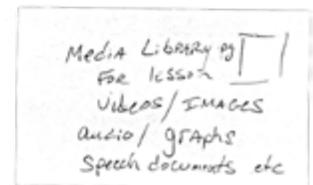
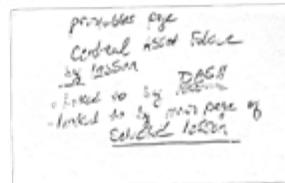
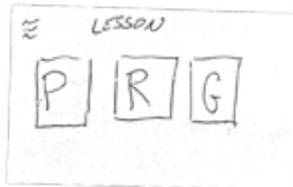
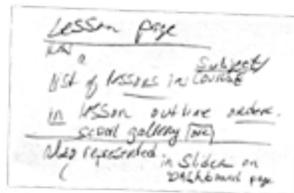
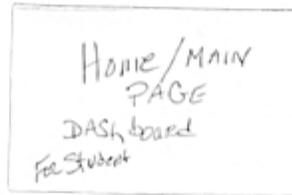
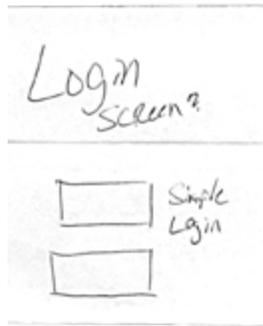
The next task was to create a basic layout of a wireframe, no specific styles, colors, or images etc. This is to ensure the ideas generated during the conception phase make sense. Index cards were used to create the information architecture. Sections of a virtual course were written on index cards and arranged for sorting in a logical order. This helped refine the information architecture and to identify elements, placement of items, terminology and even terms that would become components of the final application. Using paper prototypes allows for quick modifications and changes without interrupting the creative thought process. Continuous sorting of the index cards not only optimizes the IA, it lets the designer walk through a user flow and identify obstacles. An analogy here that I've heard other designers use is that it's important to understand the whole machine before designing an individual piece.



EARLY CARD SORTING FOR INFORMATION ARCHITECTURE



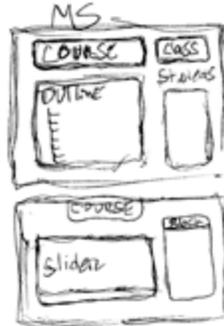
EARLY USER EXPERIENCE CART SORT



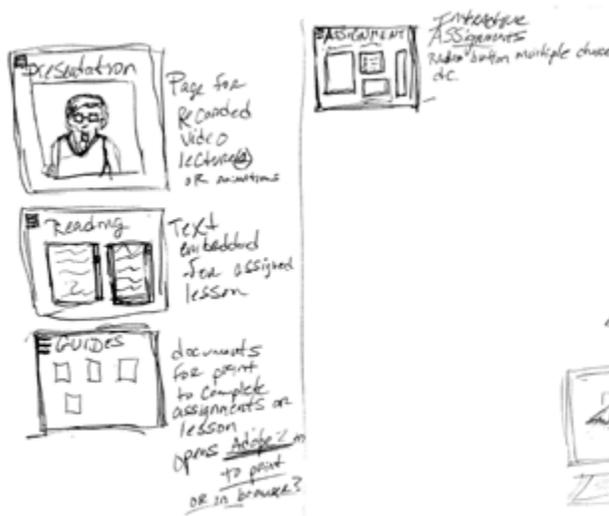
IDEATION/SKETCHES

Rough sketches and ideation of screen layouts and element placement including menus and general functions.

Single topic browser based learning module



- Instructions page - "How to's"
- Model page - print items
- Message board - Student/teacher
- Course outline page



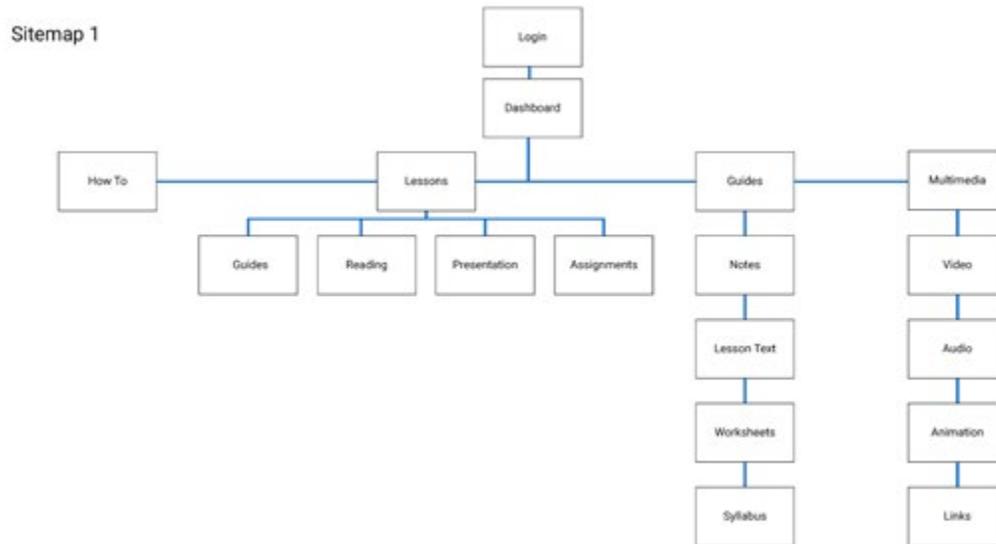
Take a lesson



ROUGH SCREEN SKETCHES

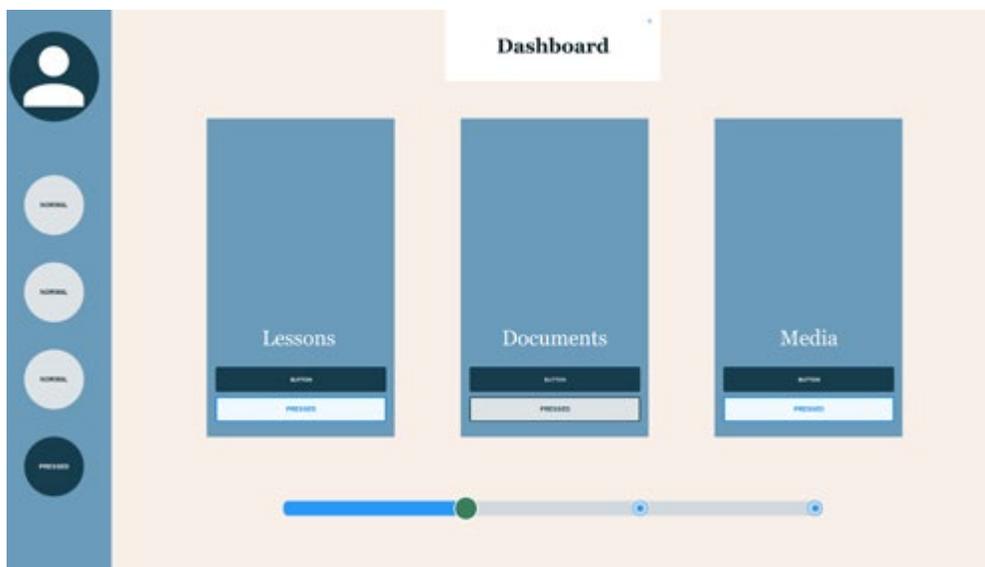
SITEMAP

The initial sitemap was created after the index card sorting and the information architecture was outlined.



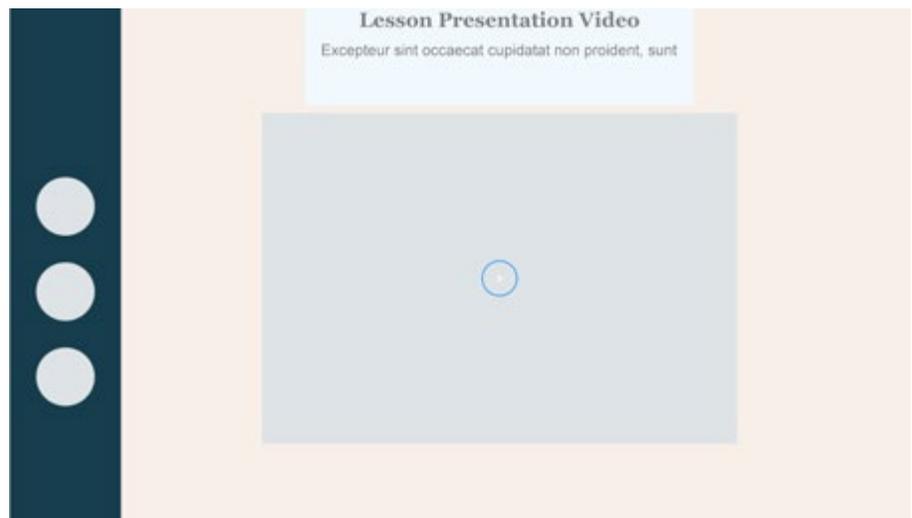
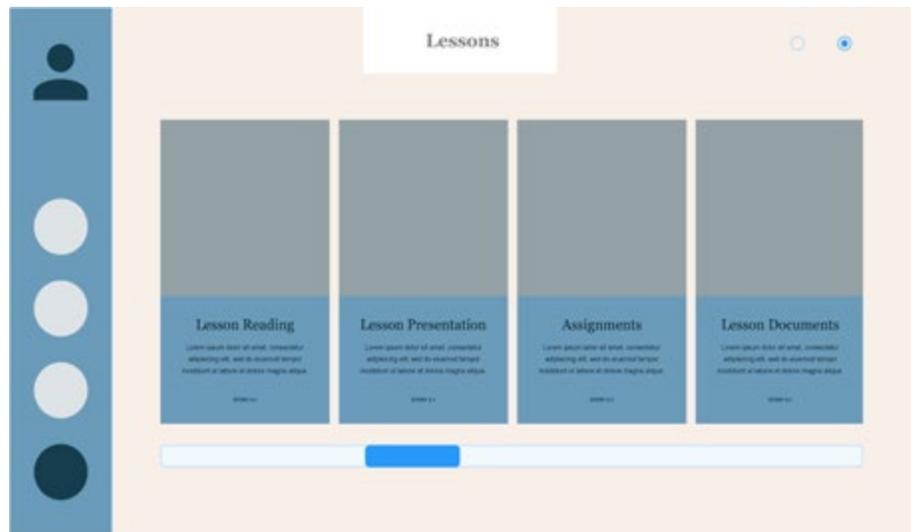
INITIAL WIREFRAMES

Initial digital wireframes created in XD





INITIAL WIRE FRAMES



SYSTEM DESIGN

Returning to the visual research from earlier in the ideation phase, a system design for the prototype was developed using Adobe Illustrator. The font study resulted in a pairing of two typefaces that are suited for display purposes. Playfair for headline, and Proxima Nova for sub headings and copy. Playfair Display is a free-use display type available from Google Fonts.

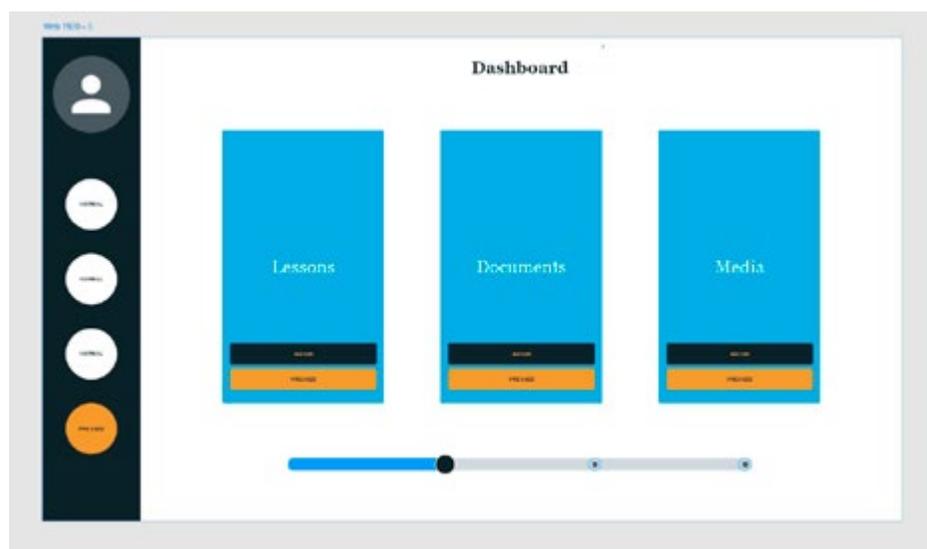
“Playfair is a transitional design. In the European Enlightenment in the late 18th century, broad nib quills were replaced by pointed steel pens as the popular writing tool of the day. Together with developments in printing technology, ink, and paper making, it became to print letterforms of high contrast and delicate hairlines that were increasingly detached from the written letterforms.”

This typeface provides a familiar text feel similar to early academic writings. Playfair Display paired best with Proxima Nova in several combinations. Proxima Nova is an evenly weighted sans serif type which I felt provided strong readability in various weights and sizes on screen. Proxima Nova was installed from Adobe Typekit.

The color scheme was developed based on the color blue with a compliment of orange. Blue is a strong and peaceful color that provides stability to a design. Blue is also considered an informative color that can engage a viewer. The complimentary color of orange is a friendly color that is a comfortable opposite to the strength of blue. Orange can positively affect a person’s level of confidence.



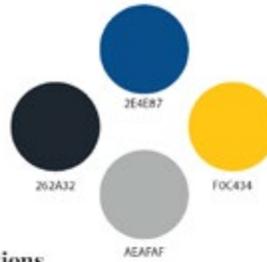
INITIAL SYSTEM DESIGN



Style Tile

Playfair
Headline
Sub Headline H2
Sub Headline H3
Sub Headline H4
Sub Headline H5

Proxima Nova
Copy



following directions

CLEAR directions

course destination

Engaging Colors

interactive solutions

text flow

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Table of Contents

Glossary

Lesson Outlines



SYSTEM DESIGN V.2

Design System

Playfair
Headline
Sub Headline H2
Sub Headline H4

Proxima Nova
Copy



Primary

Secondary

CLEAR directions

course destination

Engaging Colors

interactive solutions

text flow

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following directions

Table of Contents

Glossary

Lesson Outlines

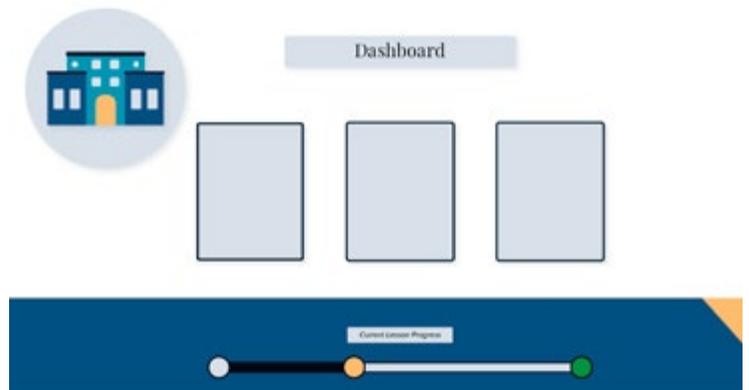


SYSTEM DESIGN V.3

REFINE PROTOTYPE, USABILITY TESTING, UPDATES

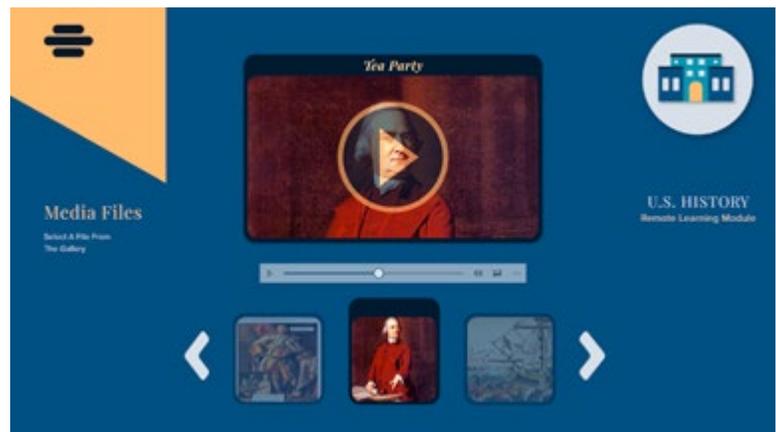
PROTOTYPE V1

The initial user interface presented the opportunity to develop the information architecture alongside its visual elements.



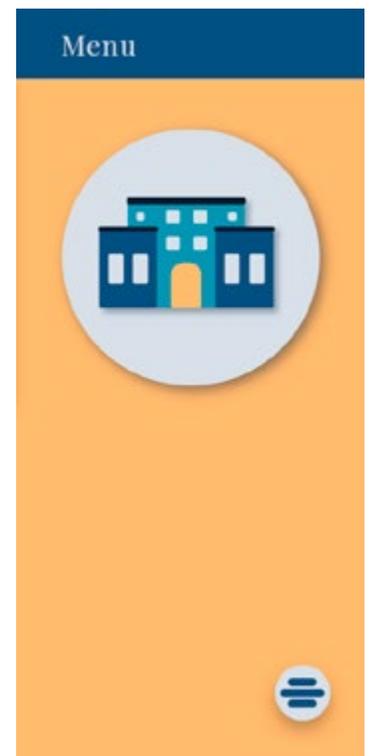
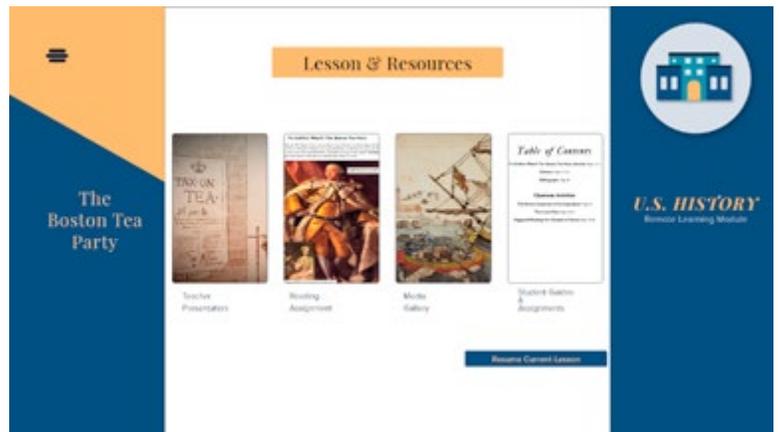
PROTOTYPE V2

The second iteration of the application brought a simplified interface. It introduced assigned text reading within the application, and also slider functionality in the media gallery and lesson selection pages.



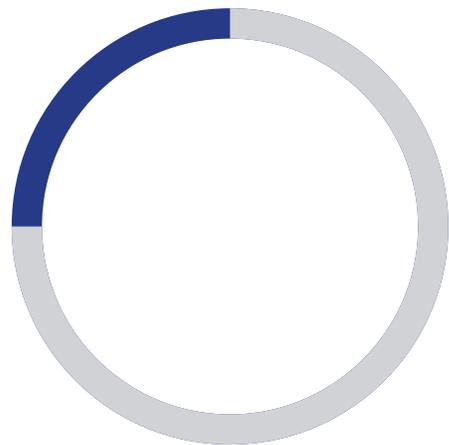
PROTOTYPE V3

The third iteration of the application evolved to include a responsive prototype for use on tablet screens and mobile phone screens. The top two images on the right are representative of this iteration's desktop platform. The bottom two images represent a pull down menu from the mobile platform.



CHAPTER FOUR

Visual Solution



FINAL SOLUTION

The solution presented within the following pages is the result of extensive research and design decisions made to present an application that will help teachers deliver educational lessons to students in a remote learning environment. The screenshots and imagery of the application is based on a fictional school's use of the app for a course in U.S. History.

The prototype application in its final iteration is uploaded to the Adobe Cloud and shared for critique and evaluation. The course content is included. During the iterative process, I was fortunate to have a group of my son's friends involved. They are in 11th grade. I had them sit with the application prototypes and watched them navigate through the interface. This helped to identify minor issues.

Structural changes to the current version of the interface required rewiring in the final prototype before completion. I am confident this prototype will meet or exceed the expectations I set for the project.

The application is capable of presenting a student with access to lessons, each with their own requirements. These include audio and video presentations, assigned text for reading, essay questions, student activity responses, multiple choice questions, true or false questions, and access to related documents that are viewable on screen or printable for home completion.

[*HYPERLINK TO ADOBE XD DESKTOP PROTOTYPE*](#)

[*HYPERLINK TO ADOBE XD TABLET/MOBILE PROTOTYPE*](#)

IDENTITY AND DESIGN SYSTEM

The following identity package was created to represent a school imagined from data recorded in the research phase which will be used to display the final proposal. The fictional school's branding guide and logos are simply to provide a visual identity for application purposes, and were created using Adobe Illustrator.

The color system used in the application represents the school district colors of Citytown, PA. This is a fictional school was created as part of the education scenarios in the design process. The applica-

tion will allow for adoption of school color systems, or colors assigned to the curriculum subject in their respective district. As outlined in the design chapter, the typography chosen for the application is a pairing of two typefaces that are suited for display purposes. Playfair for headlines, and Proxima Nova for sub headings and copy. Playfair is a transitional design and Proxima Nova is an evenly weighted sans serif type which provides strong readability.

Design System

Primary Colors:



#2d527f



#ebb875

Secondary Colors:



#162132



#ecc99d



#d9dfe8

Type Selection:

Playfair Display

H1

Proxima Nova

H2 H3

Proxima Nova
Copy

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt

FINAL PROTOTYPE



FICTIONAL SCHOOL WEB PAGE

The opening screen introduces the viewer to the identity and design feel for the application. Together with the school's information and course subject included in this particular application, which is U.S. History. The large school logo is the button that launches the application dashboard.



APPLICATION LANDING PAGE

The Dashboard is a central hub that guides users through the elements of the course within the application. Users choose sub-sections to navigate to a lesson, print a document or watch a particular video.



DASHBOARD PAGE

A pull down menu with additional navigation links expands from the hotdog menu button and an action button to return the student to their place they left off. Also, if the student is connected to the internet, they can reach their school's main page.



NAV MENU OPEN

The lesson selection screen contains a scrolling galley to access any lessons placed in the app. Minimal functionality here allows selection of a lesson, or returning to the dashboard. The UX decision for limited navigation was made to limit confusion in user wayfinding.



LESSON SELECT PAGE

When the user selects a lesson from the slider they are directed to the Lessons & Resources landing page. Here is where users access the elements of the selected lesson for completion.



SELECTED LESSON MAIN PAGE

REMOVED TO COMPLY WITH COPYRIGHT



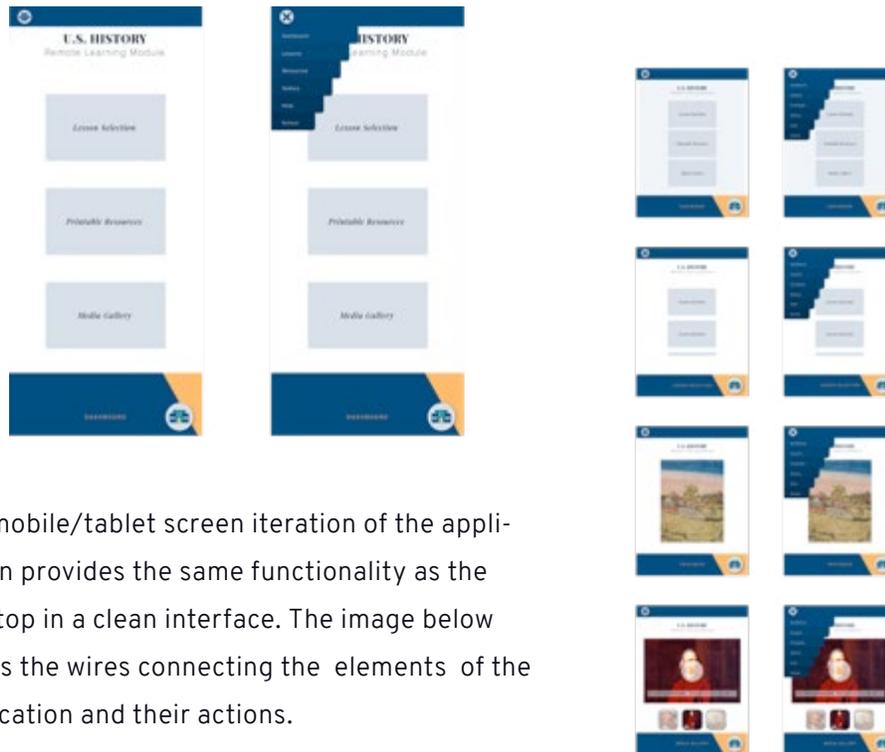
VIDEO WITH SUMMARY RESPONSE

REMOVED TO COMPLY WITH COPYRIGHT

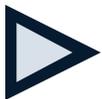


ESSAY RESPONSE PAGE

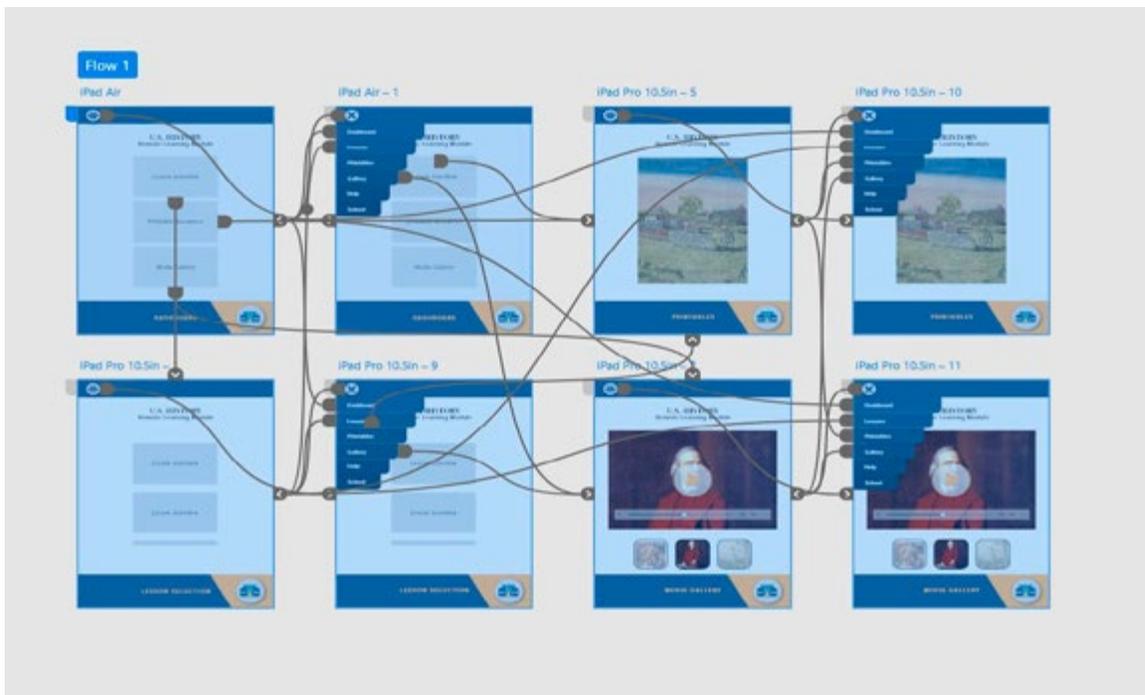
TABLET IDEATION



The mobile/tablet screen iteration of the application provides the same functionality as the desktop in a clean interface. The image below shows the wires connecting the elements of the application and their actions.

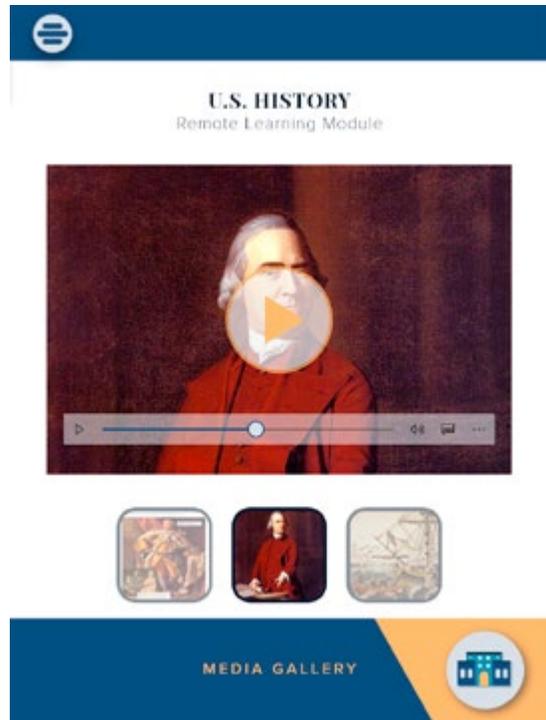


WIREFRAMES OF MOBILE PROTOTYPE





TABLET SCREENS



TABLET SCREENS



REMOVED TO COMPLY WITH COPYRIGHT

TABLET PROTOTYPE

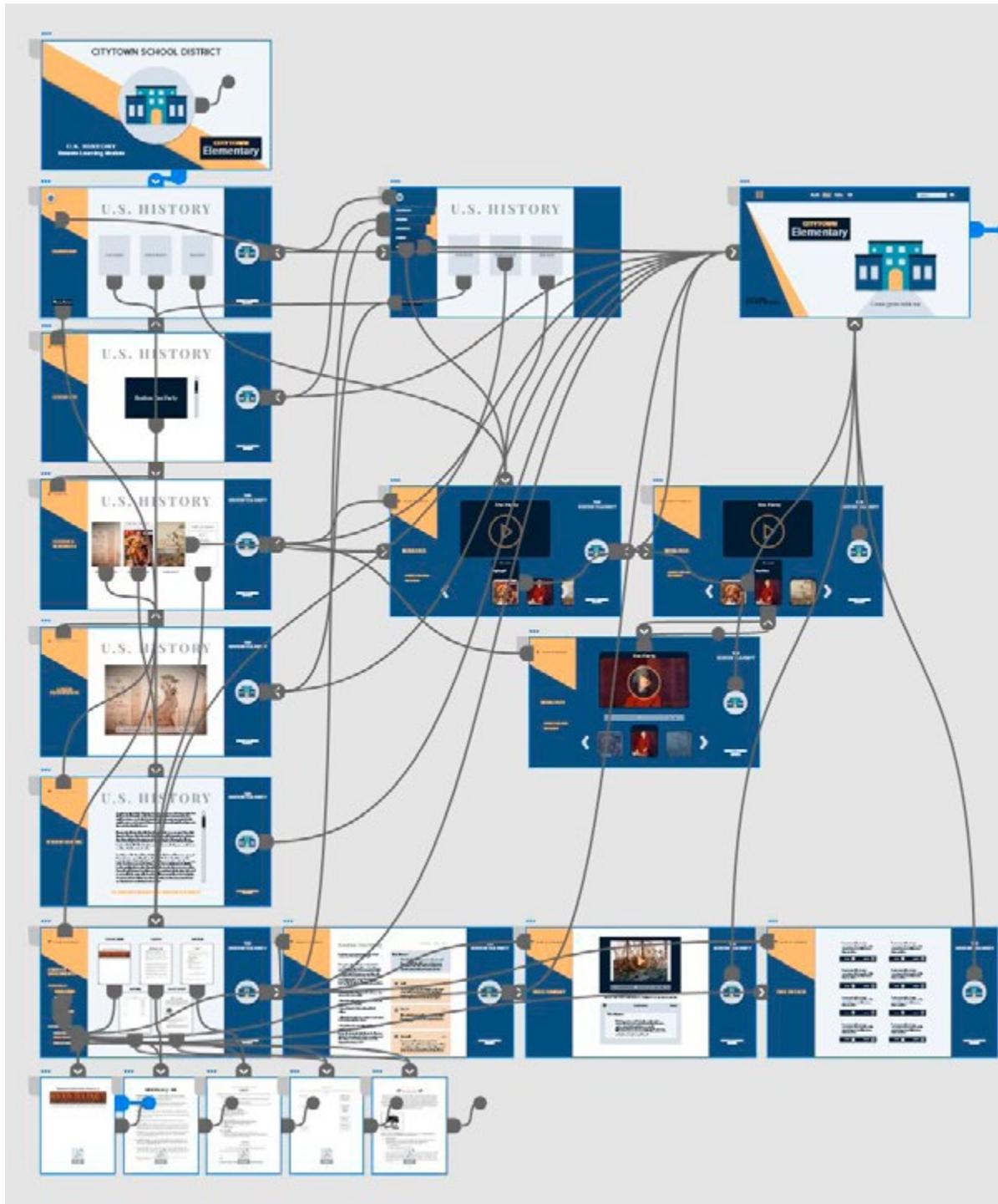


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MOBILE PROTOTYPE

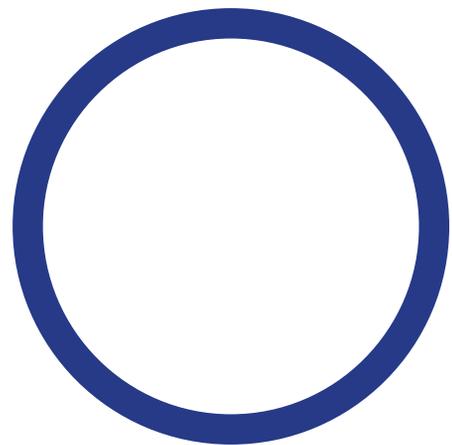
DESKTOP PROTOTYPE

An Image of the wiring diagram from the desktop prototype.



CHAPTER FIVE

Conclusion



CONCLUSION

Applications have become the primary method in creating and delivering content to users. We live in a period of time where we not only have apps on our phones and computers, but we also have them on our televisions, our washers, and even our refrigerators. Applications can reach users in ways never before imagined.

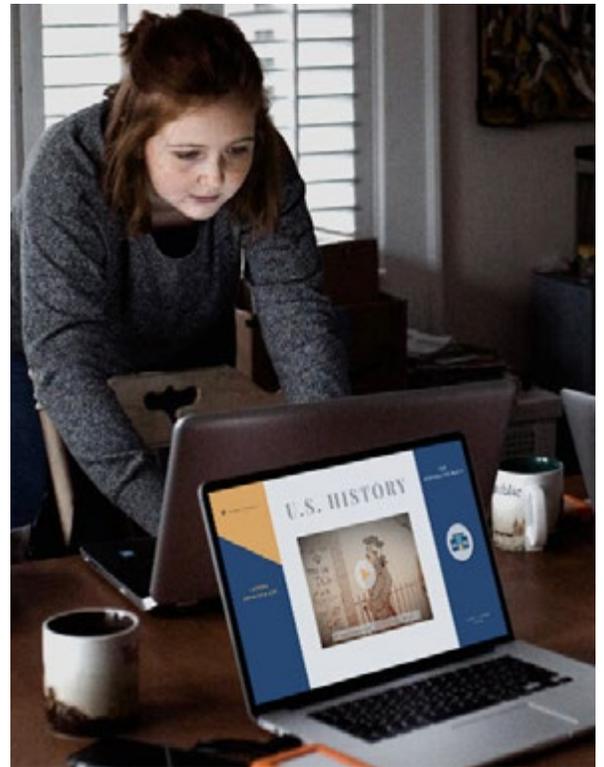
The creative process for designing an application is catered to the purpose it will serve. In this case, that purpose is remote learning. The app is a viable option for teachers to deliver an education plan during periods of remote learning. The portable format of an application allows for delivery of lessons to students with inadequate or no internet connectivity. It can be distributed physically on storage devices or downloaded to devices while internet access is available. Future integration of this solution could provide for many sudden school interruptions such as snow days, power outages, high heat days, and others.

There are several areas that were beyond the scope of this project. In the future, research and development should explore Accessibility, usability improvements, enhancements for voice and text to speech, browser specific variations, and even operating system specific versions.

In closing, having spent much of the past 8 months researching and reading educational

theory, I feel the body of knowledge is stuck. The focus should not be on using traditional course design methods as a guide to create something for use in a field that is filled with rapidly advancing technology. It appears to me as if the physical constraints of traditional classroom pedagogy and written textbooks has handcuffed academia's creativity in many aspects.

In many ways this project took on a life of its own, which I was told would happen during the process. While this prototype is one way to solve the issues identified from the research, I hope this process inspires others to pursue, and improve upon, this approach.



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APPENDIX A

Qualitative Content Analysis

Utilizing the collaboration of stories published by Ferdig, a conceptual content analysis plan was developed. The purpose was to generate a situational perspective of the stories. A search for single words from the story text would provide data used to create a general understanding of RL during the pandemic (2020). The total was fixed at 3 searches of 6 terms for a total of 18 terms. An option for additional terms was left available but not used.

The publication was initially refined deleting all images, blank pages, reference lists, and pages with less than five lines of text. It was further refined by removing glossaries, index pages, annex pages, and any pages with text already used in their respective stories. The study results were taken from the text of the authors' stories describing the environment they perceived dealing with the emergency paradigm shift. This allowed for explicit terms identified to reveal any the existence of patterns or themes in the text.

The bias for this study is based on the researcher having two children in high school who are RL at home displaying elements faced during the emergency period.

Initial 6 terms were selected to begin with to analyze word sense. Table 1 shows the term and the return "hits" totaled in the search result.

TERM	HITS
New	494
Change	226
Transition	244
Emergency/Emergent	213
Support	1024
Remote	467

Additional 6 terms selected based on the context of the terms in search 1. Table 2 shows the additional terms and the "hits" totaled in the search result.

TERM	HITS
Problem	146
Solution/Solve	107
Need	951
Help	514
Implications	234
Success	195

Additional 6 terms selected based on the context of the terms in search 2. Table 3 shows the additional terms and the "hits" totaled in the search result.

TERM	HITS
Train/Training	299

PERSONAS

TEACHER PERSONA

Mrs. Davis

age:48

residence: Citytown, PA

education: Masters Degree

occupation: Elementary School Teacher

marital status: Married

A teachers role is to instill self-discipline in young learners and build confidence.

Mrs. Davis is a veteran educator that has been teaching elementary school for nearly 20 years. Her classroom pedagogy has been refined throughout her career. The course materials and lesson plans she has created reflect a thorough and precise course layout for the students in her classes.

Mrs. Davis does not enjoy using a computer to teach and was the last teacher to receive a video projector for her classroom.

**Comfort With
Technology**
INTERNET

SOME SOFTWARE

Criteria For Success:

Mrs. Davis feels successful when her students use the tools available to become successful.

Needs

- To work independently
- Continuity of processes

Values

- Hardwork
- Personal attention to learning methods
- Routine and systematic design in daily tasks

Wants

- To continue her utilizing her pedagogical method and refined educational plan without change from the school system.

Fears

- District oversight
- Cut and paste curriculum development
- Technology

TEACHER PERSONA

Mrs. Tester

age: 37

residence: Gerhobany, ME

education: Highest level of education or training

occupation: Job or primary way of making money

marital status: Married | 2 children

A student's growth comes from a personalized learning system.

Mrs. Tester is 37 and is technologically literate, although self-taught. She has been teaching social science and history for 13 years in a rural Northeast town. Her traditional 11th grade history lessons are being adapted for use with technological resources and being developed for student access through the internet.

Comfort With Technology

INTERNET

SOFTWARE

MOBILEAPPS

SOCIAL NETWORK

Needs

- Obvious impact of her teaching efforts
- To be engaged in student development

Values

- Time management
- Professional development
- Process improvement

Criteria For Success:

To reach all of her students through education on a level they can individually benefit from.

Wants

- Practices that doesn't take long to learn
- Educational technology that integrates with current curriculum plans and material

Fears

- Loss of student engagement
- Utilizing tools that don't actually improve her education process
- Lack of access to educational resources

TEACHER PERSONA

Mr. Conoche

age: Actual age or range

residence: Middletownberg, NE

education: Highest level of education or training

occupation: Job or primary way of making money

marital status: Married | No children

An adaptive learning environment makes education fun and accessible.

Mr. Conoche is 29 and is part of a technologically adept generation of teachers. He has been teaching history for 5 years. Mr. Conoche recently moved to the Midwest and is now teaching history to junior high level students. Mr. Conoche is in his first school year and adjusting to the rural district's traditional classroom lessons and methods while trying to adapt them for use with current technology.

Comfort With Technology

INTERNET

SOFTWARE

MOBILEAPPS

SOCIAL NETWORK

Needs

- Measurable impact of technology in classroom education

Values

- Student growth
- Task management and tracking
- Educational aids that easily fit into his current workflow

Criteria For Success:

To see his students take advantage of the resources and capabilities of technology in class.

Wants

- Web accessible classrooms
- Curriculum that integrates with technology

Fears

- Paper assignments that cut into already sparse free time
- Using something that isn't doesn't actually improve student learning

STUDENT PERSONA

Student 1: 3rd Grade

Name: Jared

Residence Type: Jared resides in a 2 bedroom apartment which is part of a multi-family apartment building in Citytown, Pennsylvania.

Backstory: Jared resides in a single parent household and is the youngest of four children in the home. All children attend school remotely. Jared's PLE consists of the following options for learning, living room couch, kitchen table, or a bedroom. There are two Chromebooks in the residence, each Chromebook is shared between two siblings to do their schoolwork. The internet access is provided throughout the apartment building and is intermittent. When the internet is active, the download speeds are extremely slow making access to the school portal for online learning nearly impossible.

Obstacles for Jared:

- Shared computer access with a sibling
- Video chats are not an option due to internet limits and laptop sharing
- Access to any multimedia through the school web portal is extremely slow
- Wi-Fi connection to the internet is shared in the apartment complex, it is slow, and intermittent

STUDENT PERSONA

Student 2: 7th Grade

Name: Alycia

Residence Type: The student resides in a single family home on 50 acres in the rural town of Middletownburg, Nebraska. Alycia's home sits in a low valley between rolling hills.

Backstory: Alycia student resides with both parents and a younger sibling also attending school remotely. Alycia's PLE consists of the following options for learning, at a desk in her bedroom, or the kitchen table. Each household student has their own laptop for school. Due to the terrain surrounding the residence, there is no cable internet. Internet access is provided by a mobile hotspot through a local cellular service which is capped at 20 Mbps. This is shared between everyone in the household.

Obstacles for Alycia:

- Slow cellular internet access at home is shared with younger sibling
- Video chats are not an option due to internet limits
- Limited internet makes access to resources & multimedia through the school web portal extremely slow

STUDENT PERSONA

Student : 11th Grade

Name: Isaiah

Residence Type: Isaiah lives with his parents in a rural single family home in a heavily wooded and mountainous town of Gerhobany, Maine.

Backstory: Isaiah lives at home in rural area where no cable internet access is available. Internet access is through satellite access only which provides 10-15 Mbps and has a data cap of 10gb per month. Isaiah's PLE consists of the following options for learning, a desk in the family room, the kitchen table, or his bedroom. Isaiah is learning remotely while his mother works from home. The satellite internet data speeds and download cap cause Isaiah to be online when his mother is not using it for work.

Impacts and obstacles:

- Internet speeds are slow and data usage is capped at 10gb, after which speeds are reduced
- Mother works from home and has various video and group chats throughout the day
- Video chats are not opportune due to mother's work schedule and internet limitations
- Limited internet access to resources & multimedia through the school web portal

USER SCENARIOS

Education Scenarios

In all scenarios, the respective school districts were required to begin remote learning in March of 2020. The decision was forced due to a global pandemic and left minimal time to prepare for anything past a short term closure of schools. Today, schools are still in full remote, or a hybrid schedule that requires partial remote and in-person learning. Connectivity remains a problem for many students. The use of online resources requires a stable connection. This has become a barrier to educational access during remote learning.

Scenario 1

Citytown Pennsylvania is one of the largest inner-city school districts in the country. During the initial shutdown, teachers working in Citytown were required to provide all the learning materials to their students in the form of hard-copy. Educators had to prepare their lectures using notebooks and papers. Internet access in the district was only available to 80% of the student population. Another 30% of students with access did not have adequate connectivity to access the school online consistently.

Scenario 2

Middletownburg Nebraska is a central school in a rural area of the state that houses K-12 grade in one building. The school district is vast, and some students have an hour bus ride each way. Rolling hills and wide open spaces impact the internet connectivity of the students that live in district outskirts. The school is in the process of modernizing its infrastructure and delivery methods for curriculum to include an online portal for learning access. Each classroom has a computer for the teacher to interact with parents and students when away from school.

Scenario 3

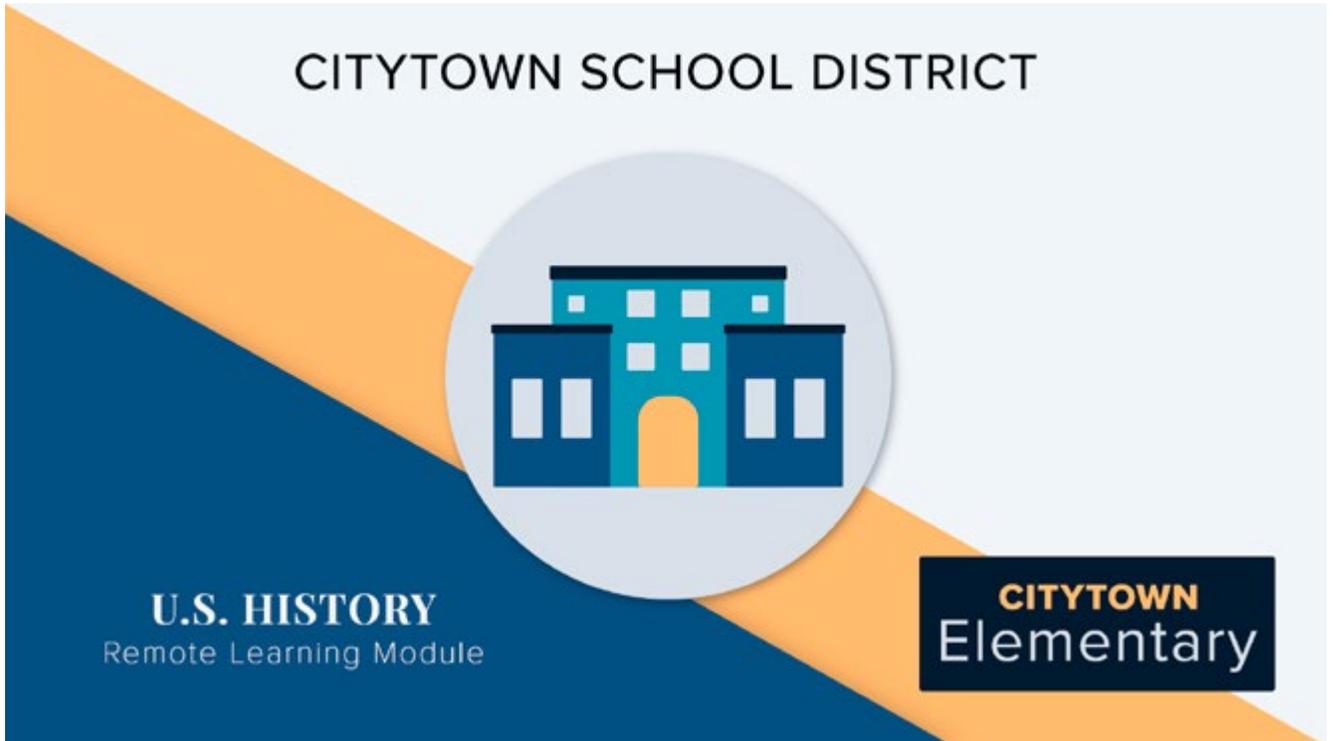
Gerhobany Maine is a rural school district located in a heavily forested mountain region. The high school classrooms have modern technology, and each class has an online page maintained by the teacher. Students can access the class page through a school portal. Class pages have message boards, downloadable documents, course images, and links to educational videos.

PROTOTYPE SCREENS

SCHOOL HOME PAGE



APP LAUNCH PAGE



DASHBOARD



DASHBOARD MENU



LESSON SELECT PAGE

← Dashboard

LESSON LIST

U.S. HISTORY

Boston Tea Party



REMOTE LEARNING MODULE

LESSON RESOURCES PAGE

← Lesson List

LESSONS & RESOURCES

U.S. HISTORY

Teacher Presentation

Reading Assignment

Media Gallery

Student Guides & Assignments

THE BOSTON TEA PARTY

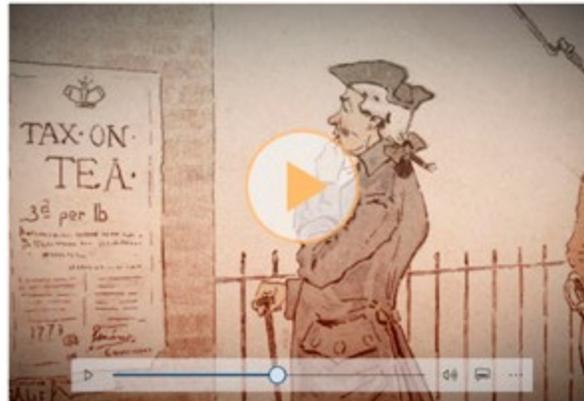
REMOTE LEARNING MODULE

TEACHER PRESENTATION

← Lessons & Resources

LESSON PRESENTATION

U.S. HISTORY



THE BOSTON TEA PARTY

REMOTE LEARNING MODULE

TEXT READING PAGE

← Lessons & Resources

STUDENT READING

U.S. HISTORY

The colonists were fed up. 340 chests of tea were on their way to Boston on three ships, the *Beaver*, the *Dartmouth*, and the *Eleonor*. People in Boston were upset that they would have to pay a tax for their favorite drink. They were even more upset that they would have no say in the matter. Parliament and King George III would force them to pay the tax whether they liked it or not.

Many people in Boston did not like King George III or his taxes very much. They called themselves Patriots. They believed that King George and Parliament had no right to tax the colonies without asking permission of the colonies first. Other people in Boston believed that King George and the British army of redcoats protected them during the French and Indian War. They thought paying a few taxes to the King was a small price to pay. They called themselves Loyalists.

Sam Adams and the Sons of Liberty led the protest. The Sons of Liberty was a group of Patriots that were against King George III and all of his laws. Sam Adams was their leader. He told people that King George III would keep taxing them unless they stood up to him. Sam Adams even tried to tell everyone that tea was bad for their health! The Loyalists would not listen to him. They told him that it was his duty to pay taxes to King George III and Parliament. Sam Adams knew that something had to be done. So he tried to convince British customs officials working in Boston to send the tea back to London. The customs officials told him it was their job to make sure that everyone paid the tea tax. They refused to send the tea back to London.

TO GRIFFIN'S WHARF! THE BOSTON TEA PARTY

THE BOSTON TEA PARTY

REMOTE LEARNING MODULE

MEDIA VIEWER/GALLERY

← Lessons & Resources

MEDIA GALLERY

Select a File from the gallery








THE BOSTON TEA PARTY



REMOTE LEARNING MODULE

LESSON GUIDES & ASSIGNMENTS

← Lessons & Resources

GUIDES & ASSIGNMENTS

PRINTABLES

- Lesson Outline
- Glossary
- Questions
- Matching
- Secret Society

ASSIGNMENTS

- Short Answer
- Video Summary
- True or False

Lesson Outline

Glossary

Questions









THE BOSTON TEA PARTY



REMOTE LEARNING MODULE

ESSAY QUESTIONS/SHORT ANSWER

← Guides & Assignments

SHORT ANSWER

Boston Tea Party

RESPONSES SHARE MORE

Read the passage below and write a brief summary in the space to the right.

Outraged and determined not to let what they considered an act of rebellion and vandalism go unpunished, the British Government decided to get tough. The Parliament (even members who considered themselves friends of the colonists) united and passed a series of four laws that targeted the Bostonians. Known as the "Coercive Acts" or "Intolerable Acts" by the colonists, these acts:

- Closed the Port of Boston until such time as the destroyed tea was paid for.
- Revoked the Massachusetts colony charter and restricted public assembly.
- Forced colonial civilians to house British soldiers.
- Allowed British officials accused of capital crimes to be tried outside the colonies.
- Placed Massachusetts under rigid British military control.

In sum, the aftermath of the Boston Tea Party was the British clampdown that further inspired united the colonies and accelerated the start of the American Revolution in 1775.

Write a Response...

Clearly the British Government underestimated the power of Adobe XD, even used in its most rudimentary form. The colonists would benefit from the power of effective layout tools that...

Jim R 11 ago

Both the angel on my left shoulder and the devil on my right are eager to go to the next board meeting and say we're ditching the business model. High turnaround rate win-win organic.

Halley D 11 ago

We need to future-proof this race without a finish line, yet streamline, yet I don't want to drain the whole swamp.

Trayvon M 11 ago

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut enim labor et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco

THE BOSTON TEA PARTY



REMOTE LEARNING MODULE

VIDEO ESSAY RESPONSE

← Guides & Assignments

VIDEO SUMMARY

THE BOSTON TEA PARTY



Watch The Video And Write A Summary In The Block Below.

RESPONSES SHARE

Write a Response...

Both the angel on my left shoulder and the devil on my right are eager to go to the next board meeting and say we're ditching the business model. High turnaround rate win-win organic growth, so catalyst. We need evergreen content powerPointless put it on the parking lot yet single wringable neck.

THE BOSTON TEA PARTY



REMOTE LEARNING MODULE

PRINTABLE LESSON PAGES

Elementary School Packet (Grades 3-5)



By Sean Lawler, the Education Program Coordinator of the Boston Tea Party Ships & Museum



1

Glossary

- Boston Massacre:** On March 5, 1770 British Regulars in Boston were attacked by patriots that were throwing axes, stones, and wooden bats. After hours of this, the British fired their muskets at them leaving five patriots dead.
- Boycott:** The effect of a group of people to refuse to buy or sell goods from a shop or country. Patriots in Boston led a boycott against goods that were being taxed by Parliament.
- British:** People from England or any part of the world that was controlled by England.
- Colonist:** A person who leaves their native country and settles in another land that is still ruled by its native country.
- Convict:** A loyalist merchant that was handpicked by Parliament to sell the tea.
- Customs Official:** A person that was appointed by the crown to enforce rules and laws in British ports. These men would usually count the cargo aboard each ship once it arrived in harbor and calculate how much the ship owner would have to pay the crown in taxes.
- Declaratory Act:** A law passed by Parliament in 1766 right after the repeal of the Stamp Act. This Act announced that Parliament had the right to tax colonists without their permission whenever they pleased.
- East India Company:** A company that traded goods from many different parts of the world. In 1773, Parliament granted them a monopoly to sell tea in the colonies. Most of this tea had been expired for four years!
- French and Indian War:** A war fought between the French and the British in North America from 1754 to 1763. It had cost so much money that British colonists should pay for some of it.
- Goods:** Things that were being sold by merchants or shopkeepers. This is what Parliament wanted to tax.



15

Questions to "It's Official! What's the Issue Tea Party"

Instructions: Use the article you just read and the Glossary of terms to answer the questions below.

- What is a boycott?
 - The combined effort of a group of people who refuse to buy goods from a country or shop.
 - When friends get together and drink a lot of soda.
 - The combined effort of people to buy as many goods from a country or shop as they can.
- Why did King George III tax the colonists?
 - He needed money for a video game.
 - To pay for the British soldiers in the colonies.
 - Because he wanted to buy ice cream.
 - All of the above.
- Who are the Sons of Liberty?
 - Patriots that were against King George III and all of his laws.
 - Loyalists that supported the King and Parliament.
 - Indians.
 - All of the above.
- What is a monopoly?
 - When a lot of businesses sell the same thing at the same time.
 - When only one business is allowed to sell a good or service, and nobody else can.
 - A cheeseburger with bacon and lots of ketchup.

True or False

Circle true if the statement is correct, or false if the statement is wrong.

- Sam Adams was best friends with the American Revolution.
- The Battle of Lexington-Concord the American Revolution.

12

Match the Act!

Draw a line from the Act on the left, to the year it was passed and the goods that were taxed on the right.

Townshend Act	Passed in 1763, the Act forced colonists to drink the East India Company tea.
Stamp Act	This made it illegal for colonists to settle west of the Appalachian Mountains.
Tea Act	Passed in 1767, this Act taxed paper, lead, and glass.
Proclamation of 1763	Passed in 1763, this Act taxed newspapers, playing cards, and dice.

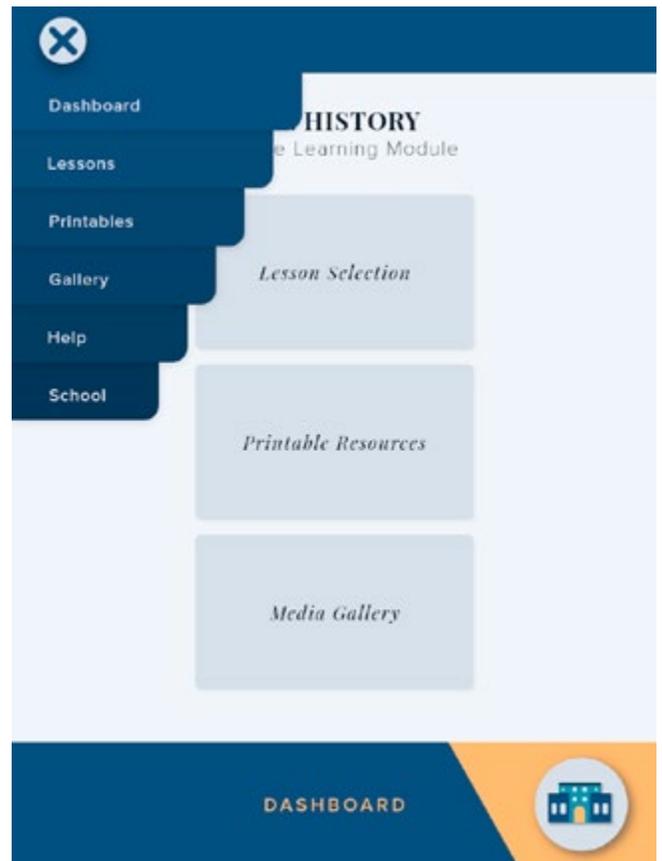


14

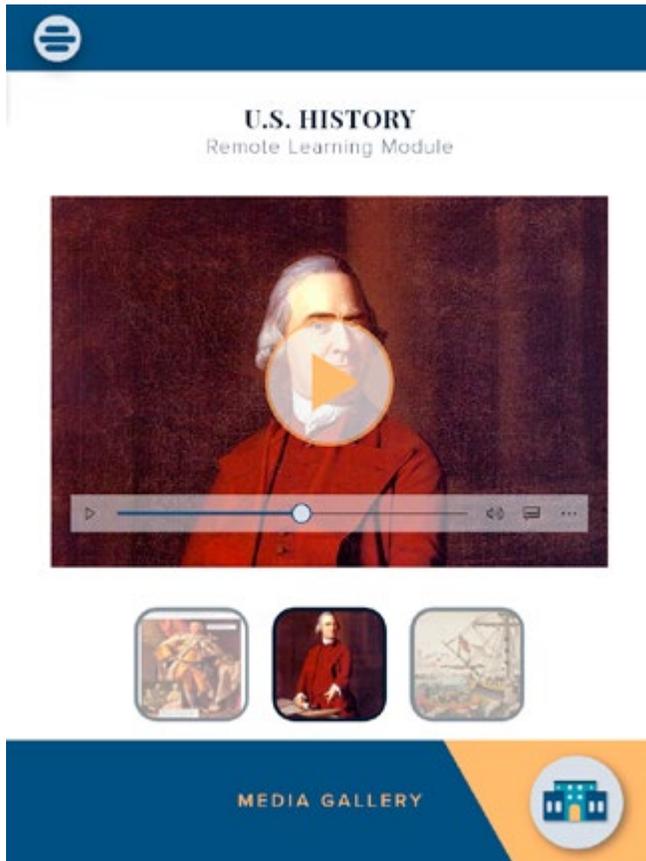
MOBILE/TABLET DASHBOARD



DASHBOARD MENU

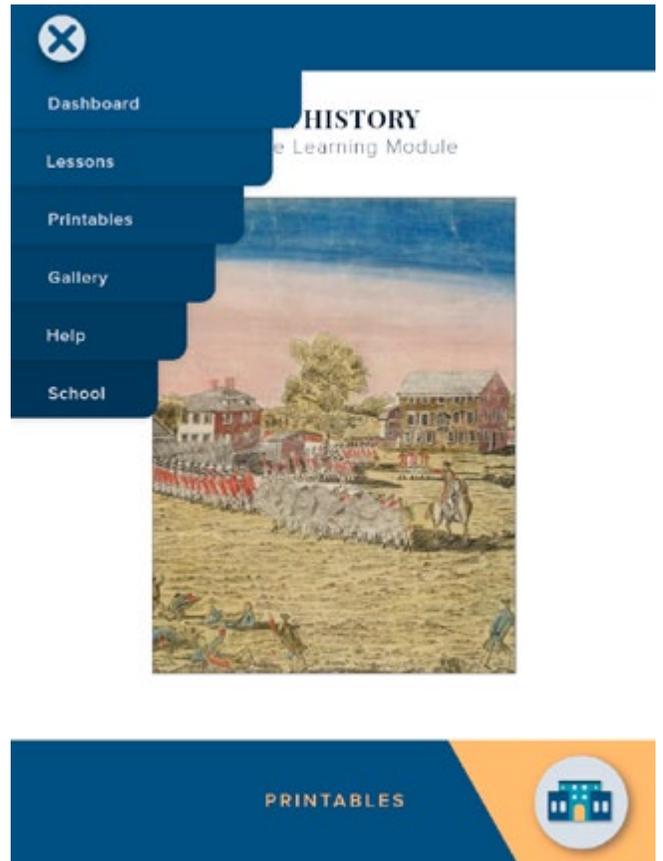


MOBILE/TABLET MEDIA VIEWER



The interface features a dark blue header with a white hamburger menu icon. Below the header, the text "U.S. HISTORY" is displayed in a bold, serif font, with "Remote Learning Module" underneath in a smaller, sans-serif font. The main content area contains a video player showing a portrait of a man in a red coat, with a play button overlay and a progress bar. Below the video are three small, square thumbnail images. At the bottom, a dark blue footer contains the text "MEDIA GALLERY" and a white circular icon of a school building.

MOBILE/TABLET PRINTABLES AND MENU



The interface features a dark blue header with a white 'X' icon. Below the header, a dark blue sidebar menu is open, listing "Dashboard", "Lessons", "Printables", "Gallery", "Help", and "School" in white text. To the right of the menu, the text "U.S. HISTORY" is displayed in a bold, serif font, with "Remote Learning Module" underneath in a smaller, sans-serif font. The main content area contains a large historical painting of a battle scene. At the bottom, a dark blue footer contains the text "PRINTABLES" and a white circular icon of a school building.

MOBILE PHONE DASHBOARD

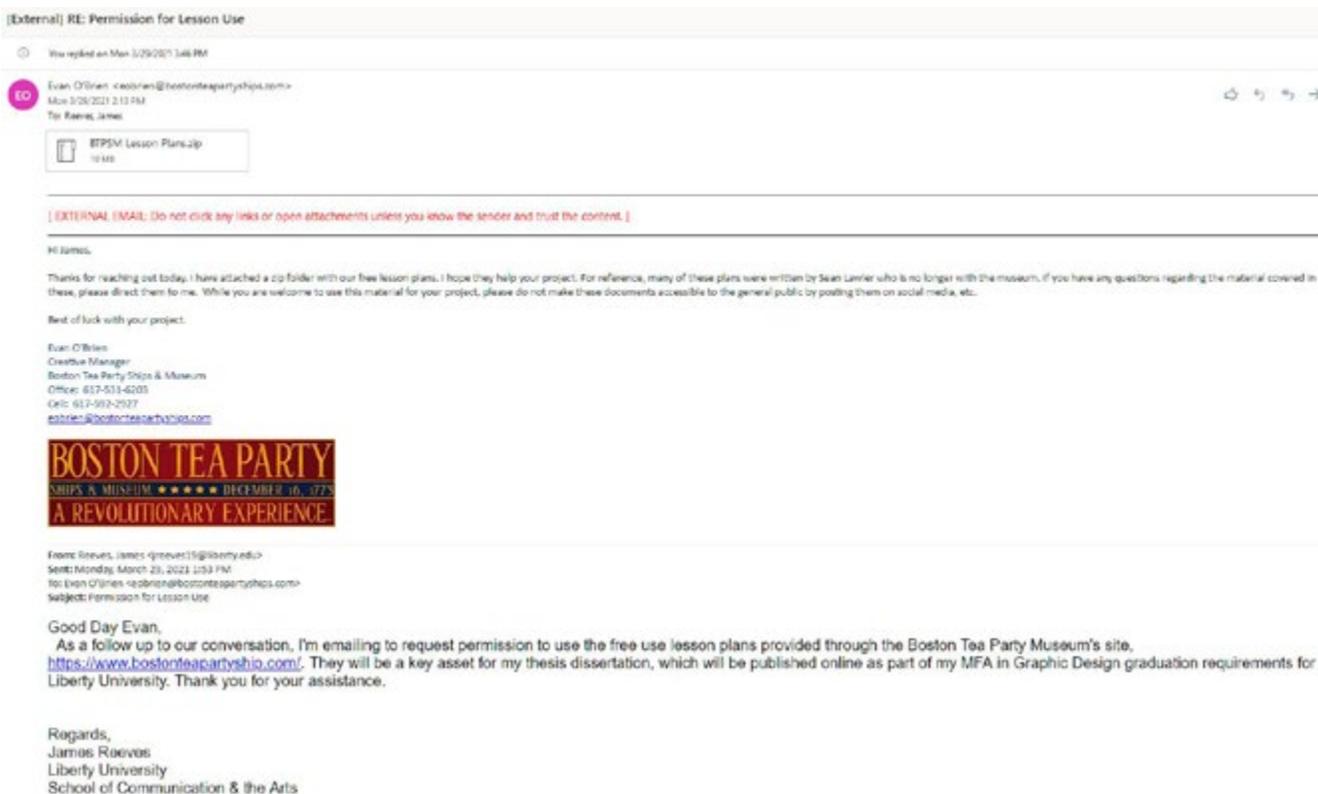


MOBILE PHONE DASHBOARD MENU



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