

ABSTRACT OF CAPSTONE

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March 31, 2022

PROJECTXPREP.NET: THE DEVELOPMENT OF A
PROJECT-BASED LEARNING RESOURCE WEBSITE

Abstract of Capstone

A capstone submitted in partial fulfillment of the
Requirements for the degree of Doctor of Education in the
Ernst and Sara Lane Volgenau College of Education
At Morehead State University

By

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Committee Co-Chairs: Dr. Lenora J. Justice, Associate Professor
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Project-Based Learning has been a heavily debated topic in education for several years. The most recent push from multiple education departments highlights the need for a user-friendly online database. Although the Internet is filled with sites that provide many different instructors' options to develop or implement a Project-Based Lesson, there are not any websites specific to Kentucky educators.

ProjectXPrep.net is a website designed to assist instructors and students with developing and implementing a project-based lesson. This website provides a single resource and information point for the instructors and students to collaborate. The resources available on this website have been compiled from various sources and websites that focus on project-based lessons in classrooms in Area Technology Centers in Kentucky.

KEYWORDS: Project-Based Learning (PjBL), teacher-first approach, developing websites, implementing

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DEDICATION

This capstone is dedicated to my best friend and most generous supporter, my beautiful wife. From the initial thought of starting this journey, she has been there, encouraging and supporting me every step of the way; during this multi-year endeavor, she has remained firm in her belief in me and my ability to complete this program. She has taken on so many extra tasks around the farm on top of working two jobs and taking care of anyone in need.

Tammy, your love and support mean more to me than you will ever know. There are no words that can honestly describe my love and admiration for you. You have always been there as my most generous supporter and friend. I love you, baby, Chris.

ACKNOWLEDGEMENTS

Many people deserve acknowledgment for their role in my doctoral journey. First and foremost, my wife has been my rock during this endeavor. Tammy, words cannot express my thankfulness to you for the support and time you have given me to pursue and accomplish this goal.

I cannot say thank you enough to my doctoral committee. Dr. Sean Bailey, Dr. Ian Levstein, and Dr. Daryl R. Privott, your generous gifts of time and advice are very much appreciated. To my doctoral chair, Dr. Lenora J. Justice, who is not only my doctoral chair but has become a dear friend and mentor. Your ability to mold students into doctoral candidates is impressive. I honestly cannot thank you enough for the encouragement and support that has pulled me through this program. You are a hero to me, and I thank you. I would also like to mention the late Dr. Shane Shope. Your loss during this journey has affected me very deeply. I know that I was very blessed to have had a chance to work with you on my capstone.

To my doctoral cohort "Platoon," Thank you to each of you for your support during this journey. To the ragtag group "Power Rangers," Wow, you have been the greatest. Each of you brings something different to the table, and I know that you all will accomplish great things. One day I will be able to say, "I know that person" because you all are change-makers.

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Executive Summary

What Is the Core of the Capstone?

Project-Based Learning (PjBL) is not unlike a capstone. It is not about a single task or lesson. Rather, it is a method of teaching that engages students in real-world projects, where students are challenged with questions or problems that involve problem-solving and critical thinking (Wardani et al. 2020). This method of teaching can improve students' academic performance, give students real-life experiences, and help build problem-solving skills. However, many teachers are not equipped with the tools or information needed to successfully implement project-based learning in their classrooms.

The core of this capstone project is the research-based development of ProjectXPrep.net, a Project-Based Learning (PjBL) website that will promote the use of PjBL in schools and classrooms in Area Technology Centers in Kentucky and, potentially, other schools across the nation. The project combines PjBL learning resources in one central website, accessible to teachers, students, and administrators. Teachers will have a resource to refer to for best practices on PjBL implementation. Students will have a new medium through which they can learn essential workplace skills, such as communication and managing deadlines. School administrators will have the ability to monitor the progress of each project. In addition, given that research shows that an open channel of communication with low-performing students helps with project success (Susumago, 2019), the website includes a chat feature for

teachers, students, and administrators to quickly communicate during the course of a project. Finally, this Creative Commons tool for K-12 teachers and administrators includes resources that are essential to developing and effectively using PjBL in the classroom, including training staff on PjBL best practices. Once implemented, a database to archive PjBL projects and best practices can be created to store and share PjBL with teachers for future reference.

Whom Is the Capstone Meant To Impact?

This capstone is meant to impact teachers, students, and administrators. More specifically, the development of ProjectXPrep.net is intended to help instructors, students, and school administrators in Area Technology Centers in Kentucky and beyond understand and use PjBL. The PjBL website, ProjectXPrep.net, can help teachers manage PjBL lessons and store past lessons in a central shared location. Teachers implementing PjBL lessons often rely on partnerships with business and industry contacts. By working with these partnerships, the application of PjBL helps to strengthen the relationship between the programs, business and industry. It also draws potential employers to communities, and could possibly help programs gain much-needed support through donations of funds and items.

Exposing students to PjBL opens them up to an experience that can help them to succeed. The researcher has had positive results using PjBL in my classes. It was exciting to witness increased student motivation and participation with the implementation of PjBL. Duke et al. (2020) suggested that PjBL can improve student

learning and motivation by exposing students to real-world projects. An empirical study of graduates from Worcester Polytechnic Institute (WPI, 2020) provides evidence of the effectiveness of PjBL in lifelong professional and personal benefits. These long-term benefits include, but are not limited to, having different perspectives when addressing issues, strong personal character, and problem-solving skills (Lifelong project impact, n.d.).

As a career and technical education instructor, one of the most challenging tasks is assisting students in finding a career path where they can succeed. Students with experience with PjBL have had the opportunity to gain knowledge and skills that are needed in the 21st century, such as critical thinking, communication, and a positive work ethic (Swartz, 2020). D'Antoni (2019) stated that students report seeing essential connections between the skills students learn from PjBL lessons and what is needed by business and industry. These connections help students make informed decisions about life after high school.

Incorporating PjBL into schools gives the administrators a great opportunity to invite community members to participate in the PjBL lessons through the chat page. School administrators can use the website to monitor the progress of PjBL lessons in their schools. Administrators can also use the site to train new teachers about PjBL.

Plan for Implementation

The preliminary design for the ProjectXPrep.net website has been completed. Upon successful defense of the capstone, the site will be built-out and flight-tested with a group of previously trained PjBL teachers, school administrators, and officials from the Kentucky Department of Education/Office of Career and Technical Education (KDE/OCTE). This test group will create a rubric to critique the website for ease of use and visual appeal. When this critique is completed, an administrator from KDE/OCTE and a PjBL trainer will review the suggestions and recommendations, and work with the test group to discuss, respond to, and prioritize the findings.

Once the modifications are completed, the website will be launched for use at all Kentucky Area Technology Centers and locally-operated Career and Technical Centers. As PjBL lessons are added to each category in the database, it is expected that the use of the website will increase.

Tentative Implementation Timeline

Completed:

- January 2020 thru August 2020
 - Researched various PjBL formats and standards
 - Compiled technical documentation for PjBL
 - Researched various PjBL websites
- August 2020 thru August 2021

- Researched various website and application building programs/software
- Decided on Google Sites for the website platform
- August 2021 thru January 04, 2022 - The design and development of the initial version of ProjectXPrep.net were completed.

To be completed after successfully defending the capstone:

- Site test. A pilot test will be completed by teachers, school administrators, officials from KDE/OCTE, and PjBL trainers.
- Site evaluation. A focus group consisting of an administrator from KDE/OCTE and a PjBL trainer will provide feedback on changes needed before the website is published for use.
- Website revision. All changes recommended will be made at this time.
- Full website launch. The website will be launched for public use by instructors and students within KDE/OCTE. Over time, the site will be improved based on feedback, and hopefully, be available to more schools in the future.

Why Was This Capstone and Related Strategies Selected?

Project-Based Learning

Many scholars credit John Dewey as the founder of Project-Based Learning (Pieratt, 2010). Dewey's philosophy on learning promoted the idea that learning happens when students are involved in real-world tasks. Dewey (2017) suggested that

the philosophy he proposes supports a “fundamental unity in the idea that there is an intimate and necessary relation between the process of experience and education” (p. 216).

The origins of PjBL can be traced back to 1969 when McMaster University School of Medicine created an educational experience for 20 students known as problem-based learning (Servant-Miklos, 2019). Although the terminology (“problem-based learning” and “project-based learning”) has slight variations, the concept and philosophy remain the same. Wardani et al. (2020) defined (PjBL) as a method of teaching that engages students in real-world projects, where students are challenged with questions or problems that involve problem-solving and critical thinking skills; it is not a single task or a lesson. Project-Based Learning can improve students’ academic performance, give students real-life experiences, and help build problem-solving skills.

What are the characteristics and documentation of good PjBL? To answer this, we must first understand the difference between PjBL and a class project. Students have been working on projects in classes for decades. It is a model well-embedded in our educational system, where a teacher instructs students on how to solve a problem or build an item. The focus is usually on the problem or the final product. Generally, students complete these projects individually, and the project remains in the “school” world (Revelle et al., 2019).

A key difference with PjBL is that it is student-driven as opposed to teacher-driven. The students must “inquire” about a project and use critical thinking skills to

develop solutions. The focus is usually on the product and the process. The project has to have real-world context and application, and the results or projects are shared beyond the classroom with a public audience, including members of the business sector. ("Doing a project" vs. project-based learning, n.d.).

In my previous role as a career and technology educator, I was hesitant to try PjBL because I did not think that it would be worth the effort. However after I implemented PjBL, I was unquestionably impressed by the positive outcomes. I witnessed individual student growth, as well as growth while the students were working in groups. The students enjoyed being challenged by a project instead of just learning a task. It was exciting to watch how they enjoyed taking on different roles or duties that were part of any project. Each role encompassed various skills, such as management and teamwork. Some students completely changed their career aspirations because they discovered and fell in love with a new career during a PjBL lesson. They were much more engaged and motivated whenever I taught a PjBL lesson. As a teacher and administrator, this motivated me to seek out better methods and resources to use during my PjBL lessons. Ultimately, PjBL has changed my teaching philosophy because I have personally witnessed the positive effects that it has on students' lives. Resources such as lesson plan templates, PjBL rubrics, and example PjBL lessons will make incorporating PjBL into the classroom much easier for the teacher.

Barriers

As I experienced, teacher motivation is one barrier that administrators face when introducing PjBL in schools. This motivational barrier is directly due to a lack of resources and examples available to teachers (Moore, 2019). Since PjBL is a new concept, there is a lack of PjBL practical models in many program areas for teachers and administrators. While discussing PjBL issues with fellow educators, they agreed that the majority of resources currently available are overwhelming and complicated. Teachers and principals have complained that the format and application are too confusing and time-consuming for students and teachers.

In my own experience, as a teacher trying to incorporate PjBL lessons into my classroom, it was difficult to locate resources such as teaching templates, rubrics, and examples. Many of these resources are spread across different websites. One of the most frustrating barriers was the lack of example projects in specific content areas. Ultimately, whenever I decided to teach a PjBL lesson, I had to create it. If a database or archive of models had been available, I could have modified a project to meet my specific requirements.

In my current role as a Principal of an Area Technology Center, I observed (and empathized with) the added stress that teachers experienced when trying to implement a PjBL lesson. While I was in the process of creating the website, I kept that stress in mind, as I reflected on the problems and issues that I had discussed with fellow educators and administrators. In the hope to alleviate stress, it has been my goal to create and implement something that was expandable and easy to use.

How Was the Capstone Created?

Website development is a combination of technology and art. Today, it is easy for a person to create a website using a content management system (CMS). You no longer need a third party like a webmaster to post content for you, which is a huge step forward in web development (Kumbhar, 2020). With just a few little clicks, an organization, team, or department can collaborate, post, and edit a website. In particular, Google Sites provides numerous options to make one's site customized and unique. A majority of businesses and institutions use Google Sites to build and manage their intranets and internal project sites. They are able to create secure web pages with Google Sites, which have the capacity that ranges from customer extranets, intranets, or team projects.

Another benefit of Google Sites is that one does not require web design experience or HTML coding to get his/her site up and running. These features are required in other website platforms, making a lot of people opt to use Google Sites. With Google Sites, I might use its cloud-centered capability to centralize my spreadsheets, presentations, slideshows, document, and videos (Lindoo, 2009). Google Sites have Google business applications that are fully hosted. One does not require servers to maintain or software to deploy.

One has a full documents safety control integrated system by using Google Sites. My data remains protected and Google has pledged to respect the confidentiality of information kept in their systems. This website operating system provides end-users the ability to manage website sharing permission across different

users and authors might revoke and share file admittance at any time, which assists keep information safe compared to other services. Also, Google Sites site-level protection controls and functionality with the system is Google's safety objective made with a multi-layered protection strategy that offers controls at numerous levels of data transfer, storage, and access.

Google values the availability of data, privacy confidentiality, and integrity which is vital to its users. According to Pjanic et al. (2013), the Google cloud structure might be used to host information facilities needed to operate higher education institutions. The default cloud services in Google Sites are powerful to be used for managing college courses. If convention aspects are needed for a certain website, they might be advanced and executed using Google Application Engine or Google App Scripts. These options are not offered by other sites making a majority of learning institutions use Google cloud infrastructure to manage their online course.

Google Sites' ability to labor across operating systems is another reason why the researcher choose it instead of other services. Google Sites have the adjustability to work with a web application. Everything is synced, which enables one to access similar data from any functioning system (Joey, 2013). Google's Android-based OS allows a person's business to have a uniform feel and look across the various devices one might have from different manufacturers and calendar, contacts, and other data of workers become properly synchronized. A nice feature offered by Google Sites is the capability to make a site and portion it as a guide to the domain. For example, if a team creates a project website, they might save it in template form and reclaim it by

making a novice site centered on the original. Google Sites users might also create a file cabinet. They may use this to upload files, create hyperlinks, and documents link in Google Drive.

This capstone is a website created for instructors, students, and administrators in career and technical education. The website is a central location to access resources used for PjBL lessons. The goal was to make this website easily accessible to students and teachers on multiple devices, such as laptops, smartphones, and tablets. A 2019 study states that more and more teachers are disseminating information to students by mobile devices (Padmo et al., 2019).

The process of creating the website followed recommendations from a study that focused on content and ease of use. Khlaisang (2016) provided general information for making a content-focused and user-friendly website. Based on the recommendations, the following steps were used in creating the website, research and analysis, planning and strategy, designing, content, development, testing and quality assurance, deployment, and maintenance. Creating the website required the use of specialized technology such as software or website creating programs, and included technical documentation that is specific to PjBL.

Technology

The website ProjectXPrep.net uses Google Sites. Other website creating platforms were available; Google Sites was chosen for its popularity among school districts, accessibility, and cost-effectiveness. Drive Uploader was selected to use

along with Google Sites because it enables users to upload and save files to remote folders in a Google Drive and because of the compatibility with Google Sites.

The site chosen to host the chatroom is discussionchatroom.com. This site can be linked through Google Sites. There are other chatroom-hosting sites available; however, the benefits of discussionchatroom.com are the login features and ease of use. There is a widespread belief among educators that students are more motivated and creative when they use technology to make their own content (Carter, 2017).

Technical Documentation

The technical documentation for the website comes from widely accepted sources such as KDE, the Buck Institute, and pblworks.org. The majority of the requirements come from KDE because the target audience for the application are career and technology educators in Kentucky.

The technical documentation for this application consists of a standardized project planner, a PjBL rubric that can be used for all lessons, and a template for the study. The technical documentation follows the PjBL format from that KDE/OCTE because the website's intended users are Area Technology Centers in Kentucky, with the possibility of expanding the usage of ProjectXPrep.net to more schools in the future. The functionality requirements of the application follow best practices and research drive design methods (*What is PBL?*, n.d.).

The essential project design elements for a gold standard PjBL have seven crucial elements, according to Larmer (2015). These gold standard elements are incorporated into the documents available on the website/application.

1. **Challenging Problem or Question.** This is the focus point of the project. This problem or question requires the students to think and use various problem-solving methods to develop possible solutions.
2. **Sustained inquiry.** The problem or question should require in-depth research. The goal is to direct the students to sustained research to give depth to the project.
3. **Authenticity.** This element requires the problem or question to have a real-world application or a tangible impact on others outside of the school atmosphere.
4. **Student Voice and Choice.** The students should be allowed to explore different options to solve the problem or question with minimal guidance from the instructor.
5. **Reflection.** This element is essential because it helps students solidify what they have learned so that they might be able to apply it later in life.
6. **Critique and Revision.** This element is used to teach students how to give and receive constructive criticism from peers and outsiders. This element also gives the project or problem a real-world point of view.
7. **Public Product.** This element is essential for gold standard PjBL because it helps to motivate the students to produce high-quality work. The final

result can be actual products or presentations to professionals or individuals outside of the school atmosphere.

This website is accessible online at ProjectXPrep.net. The website's resources are free to use but are mainly focused on educational purposes. The promotion of the website will be through word of mouth and social media, after the site is launched, with plans of promoting the website at various teacher conferences and professional development seminars and developing a brochure or flyer to distribute.

Business and Industry

Although the website is created primarily for the education sector, future plans for the website it to also make it available to business and industry. With resources such as project planners and a chat page for teams to collaborate about a project, this website could be very useful to project managers and teams. There are several project management software and sites for a cost, this website would be free to those who want to use it.

Intended Impact of the Capstone

Technology

Since the website was created using Google Sites, it can be viewed on multiple platforms such as computers, tablets, and smartphones. Future plans are to transform the website into an application that can be downloaded and used offline. With the increased usage of mobile learning applications, students and instructors can benefit from learning not restricted by time and location. Toperesu et al. (2018) suggest that learners can expect to engage with these applications while away from the traditional classroom environment.

Technical Documentation

The intended effect of the website is to facilitate the implementation of PjBL lessons in the schools. It is intended to help guide new and seasoned instructors through the process while offering an engaging platform for students. The actual impact would be better measured after the application has been fully released. PjBL lessons can help teachers differentiate instruction and combine several tasks into one lesson related to a real-world application. Also, PjBL can help students with disabilities learn rigorous subjects (Bargerhuff, 2013).

Having a website where all of the tools and resources are centrally located can lead to more PjBL in schools, which can help more students realize their dream careers. With the differentiation built into PjBL, more students can discover the talents that they have as individuals.

A resume is a very important document when trying to get an interview for a job. The website could also be used as a resume builder for students. School projects could show potential employers the skills and experience that students have gained by participating in a PjBL lesson. Being able to show experience on a resume could help give a student an advantage toward getting the job (Indeed Editorial Team, 2020).

Business and Industry

The website could potentially be beneficial not only to schools but also businesses and industries since the suggested resources included there, the website could become a valuable tool for project managers. Khan (2018) stated that mobile project management tools have become essential to a project management team dealing with the complexity and changing needs in the construction industry.

A new project management paradigm and a greater focus on the concept of collaboration have emerged in business and industry; therefore, the website could provide a central base to collect information for projects that can help to kindle collaboration and encourage constructive thinking among project managers and their teams. Business and industry groups such as project managers, research and development engineers, and corporate managers could use the website as a tool to track progress and collaborate from various locations around the world (Larsson & Larsson, 2020).

Limitations of the study

With the proposed features and resources available on the website, the main goal is to enhance PjBL lessons in schools. Some significant concerns may come from student access to mobile devices and connectivity. This could prove detrimental to the application's success due to the lack of connectivity (McCoy, 2020). Another limitation of this study is students from non-English-speaking countries or those who do not have sufficient Internet coverage. The website can also be challenging to understand if the user is unfamiliar with PjBL.

Another limitation of the study is the acceptance and use of the website by educational institutions. Teachers and administrators are worried about mobile devices causing distractions within a teaching classroom. Having research that proves the effectiveness of mobile learning could inspire teachers to integrate them into their classrooms (Alhassan, 2016). PjBL lessons are very adaptable for most content areas. However, this type of instruction may not work in every program or class.

Reflections

At the beginning of my capstone experience, I imagined an application or website that would be a "solve-all" for creating and implementing a PjBL lesson. I thought it would be a simple task; however, I understand that research is needed to validate processes and findings.

PjBL is more complex than I previously realized. There are many different philosophies and theories on the subject. I hope that this capstone project and

dissertation can help educators better understand the importance of PjBL and motivate them to incorporate more lessons into their classes.

Looking back, I wish that I had placed a greater focus on the business and industry side of PjBL and project management. In fact, this project has sparked my interest in finding the weaknesses and strengths of project management in business and industry.

Capstone Project

Home Page

The home page is the main page where users interact with most site options (See Figure 1).

Figure 1

Home Page



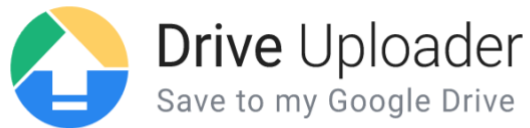
This page includes links to the following pages.

Project Upload Page

This screen could include resources such as lesson plan templates, helpful PjBL links, and websites for instructors. The Tool Box screen for students contains resources such as links to pictures, videos, and documents related to the project. The instructor will populate these items (See Figure 2).

Figure 2

Project Upload Page



Project Database

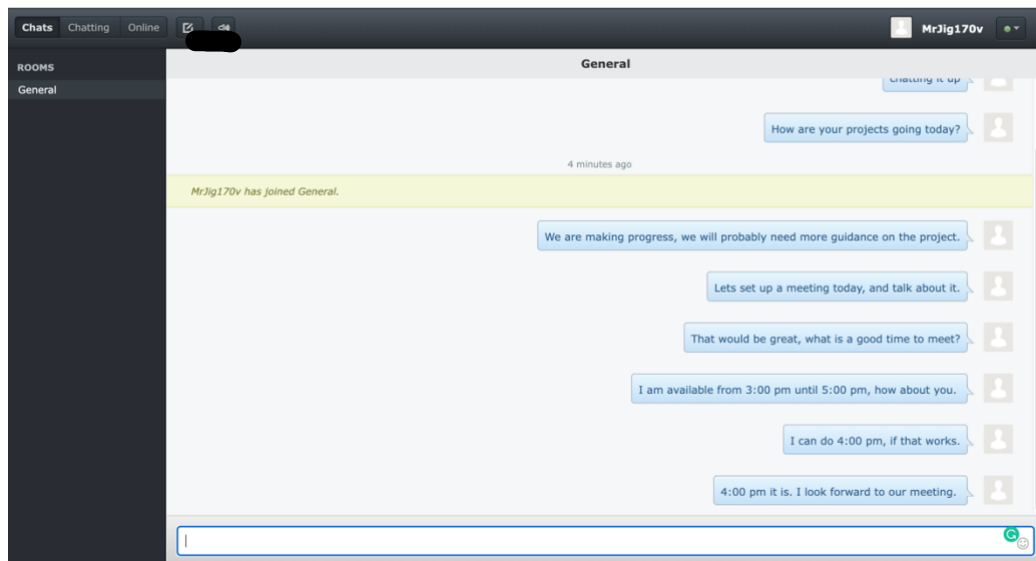
Chat Page

Both instructors and students can use this screen or page. This option serves as a central location for the students to communicate about the project. This option allows the students to share ideas about the project outside of the classroom environment and promotes critical thinking and problem-solving skills through communication.

Instructors can use this page to keep track of the students' progress. The instructor can also help the PjBL process by inserting ideas and strategies into the conversation for the students to use (See Figure 3).

Figure 3

Project Chat Page



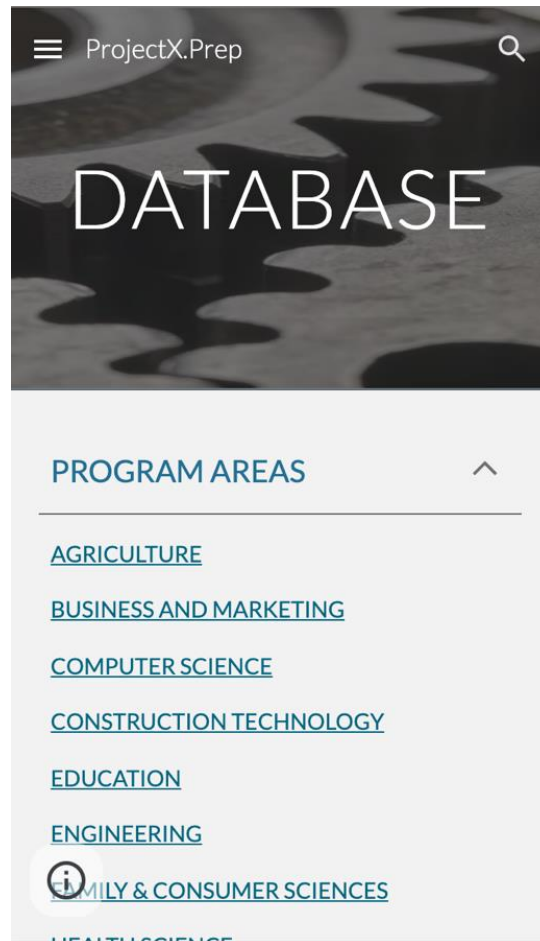
Database Page

This screen/page includes areas for each of the 16 career clusters defined by the U. S. Department of Education, the Office of Vocational and Adult Education in 1996 (“Career clusters,” n.d.)

This is where participating teachers will share and modify PjBL lessons and examples (See Figure 4).

Figure 4

Database Page

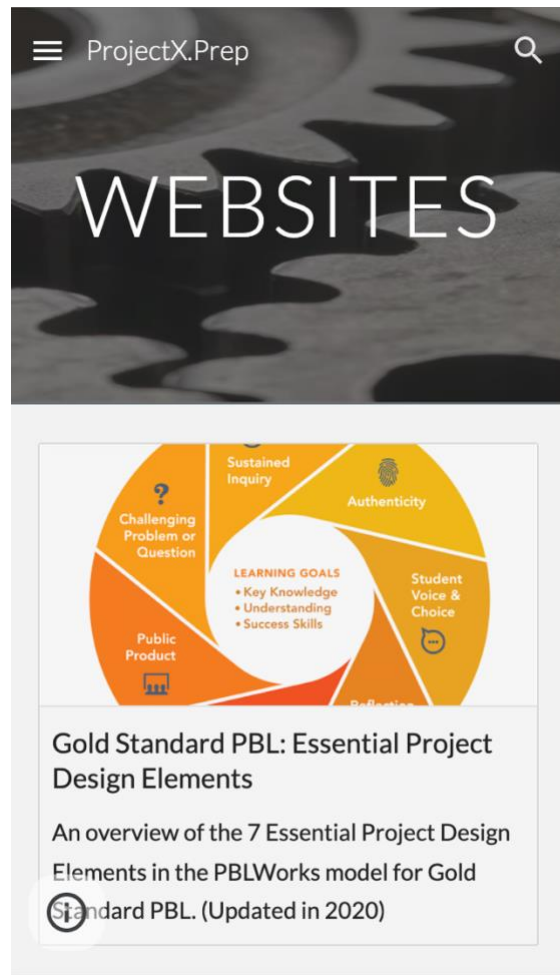


PBjL Websites Page

This page is where the students and teachers can find other resources to create the PjBL lesson. This page is expected to expand as users contribute to it and other resources become available (See Figure 5).

Figure 5

PBjL Websites Page

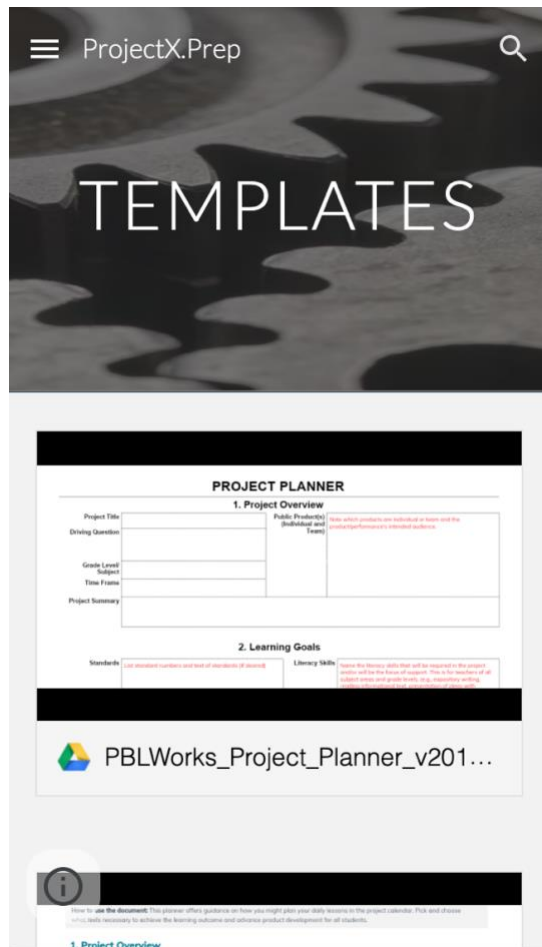


PBjL Templates Page

This page is where the teacher can find various resources such as PjBL templates and other documentation related to PjBL lessons (See Figure 6).

Figure 6

PBjL Templates Page



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