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Advantages and Challenges of Online Project Based Learning

Peter Alex Kow Amissah
paa2385@rit.edu

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ADVANTAGES AND CHALLENGES OF ONLINE PROJECT BASED LEARNING

By Peter Alex Kow Amissah

A Capstone submitted in partial fulfillment of the requirements for the degree of Master of Science in Media Arts and Technology in the School of Media Sciences in the College of Art and Design of the Rochester Institute of Technology.

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Capstone Advisor: Professor Gregory S. D'Amico

Abstract

The purpose of this research is to outline the advantages and challenges of online project-based learning. Becoming knowledgeable about online project-based learning (PBL) is crucial at a time when there is an increased demand for education. The discussion presented here will assist faculty in the teaching of online PBL. The researcher conducted a comprehensive review of the literature and developed an open-ended interview schedule based upon his findings, which was used to interview experts in the field. The experts' views confirmed the advantages and challenges found in the literature and brought up other factors that were not discovered in the literature.

Keywords: *Online PBL, Online Learning, Project-based Learning, Problem-based learning, teaching and learning methods.*

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CHAPTER 1

INTRODUCTION

Education, simply put, is the acquisition and application of knowledge. Education is important to the world since it brings a form of development to humanity. Before the educational reform in the 1800's, education was for the rich and wealthy; today education is accessible by almost every person across the world, including people with disabilities. ("Education - Reform Movements," n.d.). The invention of the World Wide Web has even brought education to the doorsteps of people in the comfort of their homes through Online Learning (Harasim, 2000). While there are studies on facilitation of lecture-based learning in an online platform, there is insufficient research on the facilitation of project-based learning (PBL) in an online platform. It will be a benefit to the education sector to have an effective facilitation method for project-based learning in an online platform.

The purpose of this research is to identify the advantages and challenges in online Project-Based Learning.

1.2 Significance of the Research

Coming from a Graphic Design background and having completed projects and critiques on designs and art works, the researcher wants to know how PBL can be effective in an online platform for easy accessibility of education. Specifically, the study accomplishes the following:

1. It should provide additional research on PBL facilitation, specifically in the online platform.

2. The study should help stakeholders in online PBL better understand its advantages and challenges in every stage
3. It should contribute to the knowledge about methods of teaching.

CHAPTER 2

LITERATURE REVIEW

Project-Based Learning

Pannabecker (1995) states that PBL is a pedagogical approach which has been in existence since the 1590's. This method was first used in Italian Architecture schools and later adopted in the United States engineering schools after it became well known (Tongsakul, Jitgarun, & Chaokumnerd, 2011). PBL is a method of practical teaching that is seen as effectual and potent in juxtaposition with the long-established lecture-based learning. Unlike lecture-based learning, the PBL method of delivery results in students having more interactions with each other while the instructor becomes a coach or a facilitator. In turn, instructors support and guide the students through a successful project (Zainuddin, 2017).

PBL is also seen as an innovative and extremely thorough way of learning since every student is required to make a significant contribution to the process; it is more student-centered than lecturer-centered. PBL encourages students to make meaningful arguments and develop ways of solving real-world related issues (Hunter, Laursen, & Seymour, 2007). In a previous study, Tongsakul et al. (2011) indicates that PBL is characterized by setting the students on edge to learn, with instructors serving as guides motivating students to understand subjects by combining knowledge and execution. They further mention that there is a plan of execution and the students learn from each other through interaction.

Developmental feedback and assessment are also some main characteristics of PBL; it is again defined as the cautious layout of evaluation and analysis that integrates formative responses, particularized directions and multiple sentiments. It extends the acquisition of knowledge and skills through investigation and challenge to invigorate development and ascendancy of expertise. The method is seen to be focused more on the student (Markham, 2011).

In this light, this study defines PBL as the practical acquisition of knowledge and skills through effective direction from an instructor and the response to feedback from students to solve real life issues through a group setting.

Project-Based Learning and Problem-Based Learning

Project-based learning and problem-based learning are two pedagogical approaches which people find difficult to differentiate. Both approaches are referred to as PBL, and they have close similarities which tend to cause confusion between the two. Despite their similarities, there are some distinctions between these two approaches. This section explains the differences between project-based learning and problem-based learning.

Project-based learning, as defined in the previous section, is the practical acquisition of knowledge and skills through effective directions from an instructor and the response to feedback from students to solve real life issues through a group setting. On the other hand, problem-based learning is a pedagogical approach which presents problems as a medium to further the progress of students' acquisition of problem-solving knowledge, skills and abilities.

In this pedagogical approach, problems presented may not be associated with real life situations, and students are not required to deliver a physical product. Problem-based learning typically follows established steps; it is a subset of project-based learning. Both pedagogical approaches play a very important role in today's educational system. The following are some differences between the two PBLs outlined by Savery (2006)

- Project-based learning has its goals structured in the process of teaching. On the other hand, outcomes of problem-based learning are often shared, and the goals jointly set by the students and the teachers.
- Project-based learning involves real-life problems while problem-based learning uses scenarios or cases such as mathematical problems generated by the teacher.
- Project-based learning follows a more general procedure while problem-based learning uses a specific or laid down procedure.
- Project based learning is often multidisciplinary and takes a longer time. On the other hand, problem-based learning is more related to one subject and takes a shorter period.

A conclusion is therefore drawn from the definitions and similarities between project-based learning and problem-based learning that one is the subset of the other, that is, both approaches provide a solution to a problem, whether it is fictitious or a real-life problem. The main difference between the approaches is the scope and the outcomes (Savery, 2006).

Assessment

Assessment is the central part of teaching and learning that gives the teacher an opportunity to know more about the students and their progress in class, and helps plan for further activities.

The long-established lecture-based learning employs a variety of testing modus operandi such as multiple-choice tests and closed tests; these forms of assessment may not be appropriate in a PBL delivery since in PBL, students are mostly engaged in groups to work, and there is a wide range of interlaced activities to work on.

In assessment, PBL employs the technique of combining the evaluation of the outcome of the whole process and reviewing the quality of individual participation and contributions to the project. The review of the quality of input is done by peer assessment and also by the tutor monitoring while the project is in progress (Celinšek & Kuštrin, n.d.). In some cases, students are given the chance to self-assess their performance on the project.

In their research, Chanpet, Chomsuwan, & Murphy, (2018) mention that PBL relies on formative assessment during the process and interactive response to help achieve a constructive outcome, and summative assessment which is done after the process. The two techniques of assessment are combined in PBL assessment.

Online Learning

Online learning, a subset of distance learning, is simply the acquisition of knowledge via the internet with the help of computers. (“What is Online Learning? - Frostburg State University,” n.d.).

In an online platform, there are two main forms of delivery: the live session is the method that allows students and lecturers to meet on the platform at the same time where course material is delivered and possible discussions or chats to take place; this process is also termed synchronous instruction. The method uses a wide range of communication channels such as live chatting and video chatting. Asynchronous instruction is the method that countenances students to access course material and lectures at their preferred time. In this case, the lectures may be recorded and saved on the platform for access, and students can revisit the lecture and the material at any point in time. (“Online Teaching Methods - Instructional Methods for Online Learning,” n.d.).

Online PBL

Research has shown that, while the traditional classroom has seen a tremendous reform with PBL, it seems difficult to incorporate PBL in an online classroom, (Lokey-Vega & Bondeson, n.d.). In his research, Gohmann, (2017) states that there is a challenge in moving PBL from the traditional classroom setting to an online setting; most of the times students lose out on finishing projects in groups. Similarly, Lin, (2018) also states that in online PBL, teachers find it difficult to effectively assess competences of students’ projects instantaneously. However, the results in an experiment conducted to investigate the role of technology in PBL showed that students in the online environment exhibited higher understanding as opposed to the face-to-face environment. Assessment and comments on individual and group performance were easy to capture for further review and reflection (Chanpet et al., 2018). Another research conducted by

Samsudin, Harun, Nordin, Haniza, & Abdul-Talib, (2014) indicated that online PBL has a revealing effect on students' positive attitude towards learning.

Also, an Online PBL environment has proven to support self-efficacy which is a key element for students' success in the online environment (Lin, 2018).

A Model of PBL

Every pedagogical approach has a conventional model to follow in order for it be successful. Models of teaching refer to the delivery of instructional and learning material in a structured and sequential order (Wilson, 2018).

Just as other pedagogical approaches, online PBL also has its conventional models; however, the online PBL model is not different from the traditional classroom model, only the environment changes. Researchers and educators have presented a variety of PBL. In their research Peffers, Tuunanen, Rothenberger, & Chatterjee (2007) present a lesson structure model for PBL which was used to classify the advantages and challenges identified. Figure 2.1 shows the Lesson structure for online PBL.

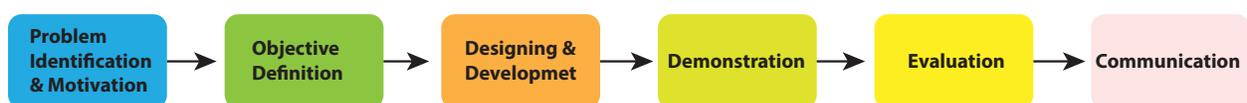


Figure 2.1: Project-Based Lesson Structure Model (Peffers et al., 2007)

Model Explained

The PBL model presented by Peffers et al. (2007) focuses on the order of occurrences leading to the execution and completion of PBL. The following are the six stages in the model:

Problem identification and motivation

The model begins with finding a real-life problem that drives the project. The problem identified should be is a definite or clear expression to introduce the question and to justify the value of a solution. The instructors, in this instance, may introduce the hook and driving question in many ways as suitable. This is the part of the model that moves the students' interests and eventually results in quality and authentic solutions.

Objective Definition

Defining the objectives is the second part of the model. Here, the instructor sets the rubrics of the project and makes students aware of the path they should take throughout the project, that is, milestones are set. This is the stage where formative assessment starts and continues through to the next stage. Knowing the level of understanding the students have on the content and the project is critical in the process.

Designing and development

At this stage learners get involved with the content and get to know more about the project. This is also the stage where learners start to build or work to produce their solutions and

determine the functionality of the artefact. The instructor monitors and assesses students' progress on the course.

Demonstration

At this stage students demonstrate and test how their artefact will be used to solve the problem. This stage is intended to give the learner the opportunity to test their results and also to make changes to suit the situation if the need be. The students mostly do this demonstration by video recording. Formative assessment and peer evaluations also occur here through discussion forums, collaborative web software, synchronous or asynchronous meeting.

Evaluation

The activities in this stage involves the class measuring how well their outcome supports the solution to the problem and revisiting the rubric and objectives to make sure of all requirements were met. This is the stage of the model where students submit draft projects and receive feedback from the peers and instructor before finally completing the project.

Communication

This is the final stage of the model where student submit and present the importance, novelty and effectiveness of the artefact to the problem. Again, this is mostly done through video recordings. Finally, the instructor grades and gives feedback on the whole project to teams and individuals.

This concludes the explanation of each stage of the PBL model used.

CHAPTER 3

RESEARCH QUESTIONS AND OBJECTIVES

The objective of the research is to identify the advantages and challenges of online PBL and determine where each advantage and challenge fit within each stage of an established instructional model. The research addresses the following questions:

1. What are the advantages of Online PBL?
2. What are the challenges of Online PBL?
3. How does each advantage and challenge fit within an established instructional design model?

CHAPTER 4

METHODOLOGY

The objective of the research is to identify the advantages and challenges of online PBL and determine where each advantage and challenge fit within each stage of an established instructional model.

The researcher examined the established viewpoints on the advantages and challenges in online PBL through a comprehensive review of the literature. Scholarly articles were searched based on the following categories:

1. Each article must contain the keyword “Project Based-Learning” or its equivalent.
2. Each article must contain the keyword “Online Learning” or its equivalent.

In addition to a comprehensive review of the literature, professionals in the field of PBL and online learning were asked to define PBL and Online learning in their own way and also comment on each of the advantages and challenges. Participants were also asked to identify any other advantages and challenges in online PBL based on their experiences.

An open-ended interview questionnaire was developed based upon the advantages and challenges. Open-ended interviews allow participants to give in-depth answers to the questions being posed, hence the reason for the researcher’s choice for this method. The questions for the interview were structured to evoke the participants’ prevalent ideas about the effective assessment of PBL in the online platform. With this technique, the researcher had a laid down set of questions to guide the process and asked follow up questions based on the response of the interviewee (Valenzuela & Shrivastava, 2002). Due to the geographical location of the

researcher and the ease of reaching participants, the study sought to recruit participants from Rochester Institute of Technology.

Population

The participants in this study were selected through a purposive sampling. This method ensures that individuals are selected based on certain characteristics and the purpose of the study (Wu Suen, Huang, & Lee, 2014). The researcher recruited four participants in all. They included:

1. A female instructional design and research consultant with experience in online course development, digital communication tools, social media, web usability and content management, and assisting faculty with creating and revising course-level student learning outcomes. Before joining Teaching and Learning Services (TLS) at RIT in August 2014, she worked as an instructional technologist at a large research university and was in charge of providing training on iPad integration, academic continuity, and assessment;
2. A female instructional technologist who currently works on edX initiatives for RIT. Before joining RIT TLS, she was an instructional faculty member in RIT's School of Individualized Study. She has experience in communications, instructional design and training, accessibility, and usability;
3. A male manager for instructional design in RIT TLS. He is responsible for the coordination and tracking of new online programs through the design and implementation

process. He also tracks instructional design initiatives and projects. With a background in human-computer interaction and accessibility technology, he is especially interested in improving the online course experience for all learners; and

4. A male Professor of Photography who has some experience with online learning, both in terms of taking online courses and creating content for them, as well as having some formal training in its creation.

The interview guide was developed based on the advantages and challenges found in the literature. Each of the interviews lasted from twenty to forty minutes.

Data collection and analysis

The data were collected through a face-to-face interview. The interviews were captured by audio recordings and analyzed using the narrative analysis approach. The narrative approach gathers information from the recordings by analyzing and finding meaning from each of the recordings. It measures their similarities and differences to create a meaningful link among all recordings (Rucker, 2016). The audio recordings allowed the researcher to have the exact words of the participants and also to have a fresh view of the data collected. They also provided an opportunity for the researcher to listen to the interview repeatedly until there was a conclusion about the recording and some meaningful information derived from it. Patterns within the data were identified and examined.

Facts and viewpoints from the literature were compared and fitted to the PBL model. In this study, Peffers' instructional model for PBL was used.

CHAPTER 5

RESULTS

This section presents the data collected in the research. A total of eleven variables were found from the literature, of which six were advantages and the remaining five were challenges. From the interviews, there were seven new variables found, four of these variables are advantages and the remaining three are challenges. The findings are presented in three subsections. The first subsection presents the variables found in the literature, the second presents the interview data on each variable, and the third presents the new variables found during the interview.

Table 5.1 and Table 5.2 respectively show the advantages and challenges by author respectively.

Advantages of Online PBL from the literature

From the literature a total of six advantages were found and are presented as follows:

1. *Promotes academic achievement and problem-solving*: Since students in this process learn by doing, they tend to have an in-depth understanding of the learning outcomes and goals. This is reflected by the expanse of information and skills that is gained at the end of the process. Also, with the help of milestones built within the design, the students have an idea of what the outcome should be, which serves as a guide throughout the project. There is a high tendency of content retention after the learning activities. Research has proven that students learn and understand better when they are involved in a hands-on

project. The real-life issues confronted by the students help them develop the problem-solving skills as they find solutions (BIE, 2013).

2. *Improves project management:* students have the opportunity to work with groups or on their own; they make sure the project is on time through to the end. In the process there is shared or sole responsibility depending on the type of project being done to ensure that all deliverables and objectives are met successfully and on time (Aslanides, Kalfa, Athanasiadou, Gianelos, & Karapatsias, 2016; “Project-based learning | Planning & Teaching Strategies,” n.d.).
3. *Develops equity collaborative skills:* In a PBL setting, students mostly work in groups which gives the chance of sharing responsibilities amongst group members for the project and help ensure success. In doing this, students on the team are assigned an equal amount of the task based on their expertise and strengths. During this process, students have to work in collaboration with other team members to successfully finish the process. (Biasutti, 2015; Biasutti & El-deghaidy, 2015; Lin, 2018)
4. *Promotes motivation and self-confidence:* During the PBL process students have the responsibility to meet deadlines and milestones in groups. Each member of the group is assigned a task which they are expected to deliver on time. At the end of the project the students become proud of the work they have delivered (Biasutti & El-deghaidy, 2015; Mihić & Završki, 2017).

5. *Promotes teacher satisfaction and reward:* Teachers are satisfied at the end of the project knowing that the students have gained new knowledge and skills. The formative assessment helps the students stay on track and also build upon their weakness. This helps students achieve a better result making the teacher feel accomplished (BIE, 2013).

6. *Allows revisiting feedback and making comments:* During an online collaboration, systems and technology that are used store the comments and activities performed by each participant. This gives students the opportunity to revisit feedback and comments and build upon them. Depending on how the technology is set up to store information students may have access to the feedback any time after the course and may even have the opportunity to print the feedback (Chanpet et al., 2018).

Table 5.1 provides a summary matrix of advantages as identified by authors.

Table 5.1: Advantages of Online PBL from the literature

Author	Advantages					
	Promotes academic achievement and problem solving	Improves project management	Develops equity and collaboration skills	Promotes motivation and self-confidence	Promotes Teacher satisfaction and reward	Allows revisiting feedback and making comments
(BIE, 2013).	X				X	
("Project-based learning Planning & Teaching Strategies," n.d.)		X				
(Aslanides et al., 2016)		X				
(Biasutti & El-deghaidy, 2015)			X	X		
(Biasutti, 2015)			X			
(Lin, 2018)			X			
(Mihić & Završki, 2017)				X		
(Chanpet et al., 2018)						X

Challenges of Online PBL from the literature

A total of five challenges were found from the literature and are presented as follows:

1. *Lack of teacher preparation:* In the process of instructing an online PBL, some instructors do not prepare all the necessary material and milestones necessary to carry out the project successfully. This occurs mostly as a result of the instructor being new to the PBL process, the online platform or both. Also, some of the instructors are not aware of

the right tools and technology to be used, thus jeopardizing the process (Lasauskiene & Rauduvaite, 2015).

2. *Lack of student preparation:* This depends largely on the teacher who is responsible to foster students' understanding the essence of the project and to motivate them. The teacher unpreparedness and ready for the process affects the students' attitude greatly. The instructors are responsible for making tools available for the project and the necessary technology or software to be used (Lasauskiene & Rauduvaite, 2015; Tally, 2015).
3. *A shift in focus:* When instructors do not set the necessary milestones and rubric for the project, students tend to lose focus because they are not properly guided. Wrong milestones can also affect students greatly in their journey through the project. Also, the instructors themselves are bound to lose focus when they are not following any rubric. This situation is capable of making the process longer or unsuccessful (Tally, 2015).
4. *Difficulty in finding a driving question.* Finding a driving question is the beginning and most important part of the PBL process. The teacher will have to derive a question that is meaningful and relevant to the course and the students, and wide enough to allow students to collaborate and form their own questions. This process becomes difficult especially for teachers who are new to the process (Ertmer & Glazewski, 2018).
5. *Difficulty in assessment.* Teachers find it difficult to put together meaningful and precise feedback for students other than the regular "Good Job!" and "Great!" comments on

students' projects. The challenge for instructors not seeing the students in real time hinders them from seeing the actual progress of the work being done. The instructor will have to depend on the group reports and students' self-assessment to assess the student, which is sometimes not accurate (Alves et al., 2016).

Table 5.2 provides a summary matrix of challenges as identified by authors.

Table 5.2: Challenges of Online PBL from the literature

Author	Challenges				
	Lack of teacher preparation	Lack of student preparation	A shift in focus along the line	Difficulty in finding a driving question	Difficulty in assessment.
(Lasauskiene & Rauduvaite, 2015)	X				
(Tally, 2015)		X	X		
(Ertmer & Glazewski, 2018)				X	
(Alves et al., 2016)					X

Data from the interview (advantages)

The comments from interviewees on the advantages found in the literature are presented below.

Promotes academic achievement and problem-solving

From the interview, three of the four interviewees mentioned that the projects will always have things to overcome and that helps with building the students' problem-solving abilities and time management. One out of the three remarked that this variable relates strongly to helping improve project management. The other participant, although agreed to the fact that it promotes academic achievement, said "it is a little hard to make an absolute statement but we can say yes, it does promote achievement and problem-solving if done properly"

Improves project management

Two participants fully supported this variable with one mentioning that it ties strongly to the promoting of academic achievement and problem-solving. The other participant also agreed by saying: "the instructor will give the parameters but they often won't say, first you do x and then you do y and then you do z, and so, a lot of it is self-directed, managing of your tasks" The other two participants were skeptical about this variable saying that the creation of the PBL content includes setting up all the tasks and steps for the students to follow which does not really allow students to create their own path for the outcome.

Develops equity and collaborative skills

All of the four participants agreed with this variable, stating that it will only happen if the design of the project allows the formation of teams. One of the participants also mentioned that working in smaller groups in this case helps the process since some group members may be redundant when there is a larger group.

Promotes motivation and self-confidence

One participant said if the students are not self-motivated, they would not think of taking a PBL online. Therefore, PBL helps improve motivation but not self-confidence, unless the students are guaranteed to get feedback on how well they are doing. Another participant also mentioned that it is possible depending on the structure of the process. However, the other two participants concurred to the advantage without protest. One of them stated that this variable tie strongly to improvement of self-directed learning and project management.

Promotes teacher satisfaction and reward

There was a congruent response from all participants saying that every teacher is delighted when they succeed in delivering their material to their students. So, this factor is only valid, again, when the process is well structured and well done.

Allows revisiting feedback and making comments

There were two participants who stated that this factor is true in all forms of learning due to the technological advancement today. The other two participants also mentioned that depending on

how the system is built the students can only visit the project only while they are still enrolled in the course or could visit the feedback even when the course has ended: “You will have access to the course for as long as you're a student and you can look at that feedback.” And “I've seen some that have let you walk back and I've seen some that you can't go back.”

Data from the interviews (challenges)

Below are the comments of participants on the challenges found in the literature.

Lack of teacher preparation

One participant remarked, “This means that, they perhaps have not done enough work.” To other participants also agreed to this variable stating that some teachers end up redesigning the projects midcourse. They also stated that this mostly happens when the teacher has never taught the course online or is not comfortable with the process online. One of them recommended that teachers could design the process and have their peer teacher review it before they deliver the course to ensure accuracy.

Lack of student preparation

Comments on this variable from all four participants indicated that this variable is strongly tied to the teacher not being prepared. They mentioned that if the teacher is not prepared to drive the project along, they will not be in the best position to motivate and prepare the students for the

project. Another factor that was mentioned was that a student who had no experience at all with PBL will find it difficult to get prepared to take the course online.

A shift in focus

During the interviews, one participant mentioned that since the process is taking place in a virtual environment there is a very high possibility that both the students' and the teacher can be distracted by the factors around them. The other three participants said that although this is a challenge of online PBL it is also evident in other forms of learning.

Difficulty in finding a driving question

While all four participants agreed that teachers find it difficult to establish a question to start out the project, one added that this problem is not peculiar to the process being online but, rather, a general PBL problem.

Difficulty in assessment

Three of the participants affirmed this variable of which one said that this could mean that the assessment is not the correct level or the right type of assessment for the project was not met. Another participant also mentioned that teachers find it difficult having group members grade each other especially when they are not aware of the available tools for grading. However, one participant remarked there would be no problem with assessment if the process is well-structured.

New advantages found during the interview

Below are the advantages that were exhumed during the interviews:

- *The Process is done remotely.* Students in online classes do not have to be in the classroom or in a particular environment to participate in the learning process. The only things needed are the tools and software required for the project to be completed. This gives the advantage of students working in their comfort zones.
- *Metacognitive skills are built.* Metacognitive skills are the ability to look at the rubric of a project and predict the average time needed for the project. This skill is developed as milestones a set for the project. Looking at the milestones, students develop the ability to know the amount of work and time needed to meet the dead line.
- *Students construct their own knowledge.* This is developed as students work on the hands-on project and try to find solutions to the problems at hand. Since the instructor does not give the specific answers to the students, the students are required to come up with their own possible solutions to the problem.
- Students experience increased retention. Research has proven that students are able to retain more information when they have a hands-on project and figure out how to go about it by themselves or with little guidance.

New challenges found during the interview

During the interview, participants mentioned some additional possible challenges that were not discovered in the literature. They include:

- *Lack of understanding of the tools available for the process.* This normally occurs when instructors are new to the whole process of online PBL. In this situation both students and instructors are affected since the instructor is the one to introduce the students to the tools and software available.
- *Difficulty in grouping students.* This happens because students taking the course work remotely each in their separate space. This makes it difficult for the instructor to get them together to work towards a specific goal since they may be far apart from each other.
- *Problem of working from different time zones.* Difference in time zones makes it difficult to deliver content which affects working in groups. People working in different time zones will have to go an extra mile to be present on the platform according to the time given. This happens especially when the class is synchronous. With the synchronous system all the students enrolled in the course will have to be engaged at the same time. This becomes difficult when the students find themselves in different time zones.

The advantages and challenges found both in the literature and interview are fitted to a six stage PBL model in Table 5.3 to establish where each variable could possibly occur during the process.

Table 5 3: Advantages and Challenges fitted to an instructional model

Advantages					
Problem identification and motivation	Objective definition	Designing and development	Demonstration	Evaluation	Communication
		Promotes academic achievement and problem solving			Promotes teacher satisfaction
		Improves project management			Allows revisiting feedback and making comments
		Promotes motivation and self-confidence			
		Promotes equity and self-confidence			
	Metacognitive skills are built	Students construct their own knowledge			
		The process is done remotely			
			Enhances students' retention of information		
Challenges					
Problem identification and motivation	Objective definition	Designing and development	Demonstration	Evaluation	Communication
Lack of teacher preparation		A Shift in focus		Difficulty in assessment	
Lack of student preparation	Difficulty in grouping students				
Difficulty in finding a driving question					
		Problem of working from different time zones			
Lack of understanding of the tools available					

Discussion

This section presents the discussion and meaning of the data collected.

All four participants found all the advantages presented to be relevant and factual even though some were skeptical about a few variables. Interestingly, the obvious advantage of online learning which allows students to work remotely was not mentioned by any author as an advantage of online PBL; rather, one of the experts referred to it as an advantage. This could be that scholars overlooked it since they felt anyone who knows about online learning will have the idea of that advantage.

The data from the interview showed that while all the advantages and challenges appeared to be true, they were also evident in all other forms of learning. Some of the variables were strongly tied to each other; for example, it was revealed that lack of teacher preparation greatly affected the students' preparation and both the students and the instructor missing the focus of the project.

The advantage of being able to work remotely and at any time is at a point seen as a challenge in the process because of the difficulty in grouping students in different time zones and getting them to work on the same project. Other factors that were said to be closely related were teacher satisfaction and difficulty in assessment. If the instructor is unable to give meaningful feedback to students, it implies that students did not have a solid ground to build upon what they had already done, which is very likely to lead to a failure of the process or dissatisfaction with project.

The matrices shown in Figure 5.1 shows a majority of the advantages occurring during the design and development stage, indicating that most of the benefits are gained when the actual solution is being designed or produced.

Commenting on the challenges found in the literature, the participants mentioned that there would not be problems if the process was well structured and the right tools were used, giving the reason that most of the problems were as a result of instructors being new to the process and the environment. The challenge of instructors not being aware of the tools could be alleviated by instructors seeking technical advice from experts in online PBL. The matrices shown in Table 5.2 indicates that a majority of the challenges occur at the early stages of the process, which could confirm the experts' assertion that there would not be problems if the process was well structured and the right tools used.

The interview discovered other advantages and challenges that were not found in the literature; this provided additional literature on PBL facilitation, specifically in the online platform.

Comments of the participants are coded and presented in appendix B

CHAPTER 6

SUMMARY AND CONCLUSIONS

The objective of the research was to identify the advantages and challenges of online PBL and determine where each advantage and challenge fit within each stage of an established instructional model.

The data collected in this research presented ten advantages and eight challenges of online PBL. Also, throughout the interviews, experts reported that all the challenges could be overcome if the process was well structured and well done. This indicates that when carrying out an online PBL, the process is more likely to succeed than to fail. This statement is however, based on the fact that all participants were experts in online learning and had much knowledge of the processes and tools involved at its core.

The variables fitted in the established model should help stakeholders and new content creators be aware of the possible challenges they may face when they are getting involved in this process.

The research was limited by focusing on variables found only in the literature and the views of four experts. Future researchers might conduct a quantitative study targeting students and professors who are engaged in online PBL with a questionnaire for both groups based upon the findings of this study.

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APPENDIX A: PROTOCOL AND CONSENT FORM

Advantages and Challenges of Online Project-Based Learning: A Review of the Related Literature

Thank you for agreeing to participate in this interview. The Purpose of this research is to identify the advantages and challenges of online project-based learning. In this research, your views about online project-based learning will be solicited. The interview will take approximately 40 minutes. Your comments and views will be recorded using an audio recorder. Please feel free to ask any question before the interview starts.

Interview Question

1. Please tell me a little bit about your background in online learning
2. Please tell me a little about project-based learning in general
3. Do you distinguish between project-based learning and problem-based learning? If so, how?
4. Tell me about the processes in online project-based learning
5. How is assessment done in an online project-based learning class?
6. Are you aware of any online project-based learning models?
7. Based on the research I have done, here are some of the advantages of online PBL:

Please comment on each

- a. Academic achievement and problem solving
- b. Project management
- c. Equity and collaboration
- d. Motivation and Self Confidence
- e. Teacher Satisfaction

are there any other advantages that were not mentioned?

8. Based on the research I have done, here are some of the challenges of online PBL:

Please comment on each

- a. Lack of student preparation
- b. A shift in focus
- c. Lack of teacher preparation
- d. Difficulty in finding a driving question
- e. Difficulty in assessment

are there any other challenges that were not mentioned?

9. Thank you for your time!

Consent Form

The Title of the Study:

Advantages and Challenges of Online Project-Based Learning: A Review of the Related Literature

Description:

The Purpose of this research is to outline the advantages and challenges of online project-based learning. In this research, you will be interviewed to gain your inputs about online project-based learning. Your comments and views will be recorded using an audio recorder.

Risks and Benefits:

Your responses will be reported in the writeup and shared with the academic platforms and there is no obligation for you to participate in the interview. There is no guarantee or promise that you will receive any benefits from this interview. However, there is the hope that you will find it interesting to contribute your knowledge about the methods relevant to online Project-based learning.

Tine:

Your participation will take approximately 40 minutes.

Participant's Rights:

If you have decided to participate in the study, please read the information below. Your participation is voluntary, and you have the right to withdraw your consent and stop the interview at any time without penalty.

I agree to participate in the interview conducted by Peter Amissah in partial fulfilment of his MS. Media Arts and Technology degree at Rochester Institute of Technology, School of Media Sciences under the supervision of Prof. Gregory D'Amico.

I understand that participation in this interview is voluntary, and I agree to immediately raise any concerns or areas of discomfort during the session with Peter Amissah.

I agree to have anything that I say recorded and my name associated with it.

I agree that any personal information I share is voluntary and that I was aware that I had the option to withhold my information.

Please sign below to indicate that you have read and understand the information on this form and that any questions you might have about the session have been answered.

Date: _____

Please print your name:

Please sign your name:

Thank you!

Your participation is appreciated.

APPENDIX B: INTERVIEW DATA

Participant 1

Interviewer	Interviewee
<p><i>Please tell me about your background in online learning</i></p>	<p>I am an instructional designer and I came to instructional design. the first part of my career, I was a freelance writer and a book editor working in Educational Publishing. And so, early experience with writing, learning outcomes and aligning instruction and outcomes and assessment and all of that stuff.</p> <p>Then got a job as I was getting a master's degree. I'm doing lots of things, but part of the job was reviewing online courses and that felt very familiar to me because it's, it's just in a different modality. You still have to align instruction, and then I started working with faculty to help them develop online courses. Um, in the meantime, I was working on a doctorate in instructional design, and we moved away from my home institution. So, I ended up having to complete my coursework online largely, which was amazing.</p>
<p><i>Please tell me about how you view PBL</i></p>	<p>I don't mean this to sound like I try to dissuade faculty from doing project-based learning. I really just want to make sure that it's grounded in that it's authentic to the situation. There is a whole bunch of reasons that are important points to consider when you are teaching undergraduates in particular. They need to feel a part of a community. That's kind of working together to achieve the goal, which is great for project-based learning.</p> <p>They need to feel like even though something is challenging and you are there to support them and you believe that they can succeed. You're there, I mean, you as an instructor, they need to be able to make some choices that mattered to them. But they also need to do work that feels like real work and not abstract stuff. Yeah. Well not like, Oh, you're making me do a project and hey projects, it just seems like you're adding on busy work. You don't ever want to have anything feel like busy work.</p> <p>So the students will bail on you if they don't feel like the project is meaningful and relevant and</p>

	<p>right. So yeah, that would be my only caution as you're dreaming up this project-based learning project</p>
<p><i>Do you distinguish between project-based learning and Problem based learning? If yes, how?</i></p>	<p>What I understand about problem-based learning is that, the intent of it is a little bit different that it's a bit freer. I mean, you've got a problem, you're trying to figure out how to address the problem and the method for addressing the problem may be kind of open. Project based learning I think feels more um, structured. Yeah. Structured ahead of time. So, it's, it's really incumbent upon the instructor to come up with a framework for this. You need to display that you have a sort of competency in this set of skills. The topic is up to you. You can do whatever you want to make me a book or make me something. Yeah. Um, but the problem-based learning, at least the way I describe it to myself is more here's a problem.</p> <p>However you want to solve it is kind of up to you. You can still make a book, but I'm not dictating how you form that. I think that's how I explain it to myself.</p>
<p><i>Tell me about the processes in online PBL</i></p>	<p>Not many faculty will come in and say, I want to do project based learning in my online course. It tends to come out of here's this course, here are my students, here's what they need to know by the end of it.</p> <p>They could read a textbook, can do multiple choice quizzes every week, but it's not really going to make anybody too happy. you're sort of looking for opportunities to help students experience real work and depending on the class. So, we have a lot of backward design conversations here. Backward design. So tell me what your students need by the end of the class. Okay. All right. Whether it's a set of skills or, knowledge about topics or something and we'll figure out how to get them there. Um, and maybe that's project-based learning.</p> <p>And so once you identify a set of experiences and assessments that you think will help students to arrive at, at the, the goal with all of their fancy skills and knowledge, then you start figuring out, okay, well if they need to have a project at the end of the class, let's figure out the stages of this project and backup from the last day of class to</p>

	<p>whenever they need to be starting I call them benchmarks, you call them milestones. let's figure out when these milestones need to happen and how to support students to sort of do well on those milestones.</p>
<p><i>How is assessment done in an online PBL?</i></p>	<p>Depends on the project. I mean it absolutely. I've got no, there's no sort of easy answer that, so I was working with dawn Carter, who's in the College of Science and actually the school of life sciences. And she, um, she developed a course called science in the garden for online, which is interesting. What was a bit of a challenge is that science and the garden when it's on campus means that students go out and work in the garden on at RIT. So, there's lots of students doing co-ops in the summer or who go away during the summer who just want to take this class, but it's always full. So, she decided that she would have one of the major projects in this class.</p> <p>Students would keep a journal, they would grow a thing, some kind of vegetable or flower, whatever, and keep a journal. Okay. Photos and measuring and weather and all of this. Right. Um, so that kind of project is straight forward. Okay. You need to keep a journal. So that's what you were going to ask this. And, and so in the journal you need to have photos, you need to have some set of data. You need to have a reflection on how this current, set of sunshine, whether, plants you chose, um, that's easy, right? By week three you should probably have three entries by week six, six entries It's your time. But for other things where students sort of working on something that doesn't come to full fruition until the end, again, it's trying to figure out, well, what are the first things they need to sort out, whether it's identifying a problem or we're just doing some research and then trying to sort out about how long that would take before they're able to go to the next milestone. And then you need to decide what success looks like. Um, for complicated projects, I usually talk to faculty about rubrics because they're a great way of just kind of laying it out there, what your expectations are for either the entire assignment or this milestone. Okay. Um, I occasionally get some pushback on rubrics. some saying that, but it quashes creativity. Um, no</p>

	<p>they don't, not if you write a good rubric. So, it really depends on the form of the thing to know how to assess it.</p>
<p><i>Are you aware of any online PBL models</i></p>	<p>I'm almost sure we have one on project-based learning and it won't be in model form, but it's, it's kind of a little package of information for faculty who were interested in implementing project-based learning in their class. Because the form of the project dictates so much what it ends up sort of looking like. And because the form will likely vary wildly depending on discipline instructor, I'd have a hard time imagining sort of coming up with a generic model</p>
<p><i>Please comment on each of these advantages</i></p>	<p><i>There's academic achievement and problem solving.</i> So, have you heard of the term metacognition? It's a good term. So, metacognition is just thinking about your own thinking. And it's a vital skill and it's a set of skills actually that students need to become good students. Right? So, it's, um, the ability to look at a rubric for the final project and say, oh my gosh, I'm going to need to start work on this like six weeks earlier to be able to get that done. That's a hugely important skill. Um, that sort of grouped in them, this sort of metacognitive skills. Um, and I certainly, it took me forever as an undergraduate develop that skill.</p> <p><i>Equity and collaboration.</i> Ideally, you'd want equity in a team project, wouldn't you? So, we've got advice on our website about small group work and what you need to do. I mean, cause there's a lot, a lot of work, a lot of administrative work for instructors to help students do well at this, and so it's everything from how you form the groups too. How do you help the groups work well together? So, some people do a kind of ground rules. Group should develop a set of ground rules before they start working. Um, so there's, there's, yeah, there's a teaching element on small group work on our website. And I can even if I know, uh, I will send you some useful links.</p> <p><i>Teacher satisfaction</i> maybe. Um, so yeah, I guess if things, if everything is happy and everybody does great, Yeah, you'd want the teachers to be happy.</p>

	<p><i>Peer assessment</i> is tricky again to do well. Students sometimes have a hard time trying to figure out how to give critical feedback. And so modeling that for students can be really important. Like doing a doing a critique of something.</p> <p>Walking students through how that's done and the rubrics are huge because they see the criteria and they can say, well, um, as far as the composition of this, um, I'm not sure that you've got, it's balanced for me.</p> <p>So just trying to figure out how much support students are going to need to do all of these things successfully, that's a lot of work.</p> <p><i>students can revisit feedback or comments</i> I mean; you could do that in a face to face class too. Right? So, that's the kind of funny thing about these digital tools is they don't have to be in an online space. You can still have a kind of asynchronous critique. Yeah. Right. Um, and so have the advantage of sort of retaining the information without having to go fully online.</p>
<p><i>Are there any others that were not mentioned?</i></p>	<p>You can just hit if it's done well, let's just put that at the beginning of everything I'm about. Yeah. Right.</p> <p>so, a couple of different elements to student engagement. One is the authentic assessment. So, if it's a good project-based learning project, it's going to feel authentic. Students likely have some choice, which is important. So, it, it gives them the advantage of, that's one of the elements of student engagement and I guess of universal, maybe you run into universal design for learning.</p> <p>They get to work on their metacognitive skills scheduling.</p> <p>Self-assessment. If you build that in to the milestones, um, you know, learning how to work with peers is important.</p> <p>Becoming successful. I mean really becoming successful at online group work because so many people are working for, did we call them</p>

	<p>distributed companies or whatever? Where you're just kind of off in your kitchen and you're talking to somebody who's in Germany and in their kitchen or whatever. so it's great experience.</p>
<p><i>Please comment on each of these challenges</i></p>	<p><i>lack of teacher preparation</i>, that means that they perhaps have not done enough work.</p> <p>if students buy into this and if they earnestly do the work right, then it should be a successful experience for them.</p> <p>So, students got to spend some time on it and there's stuff that teachers need to do first to kind of have an opportunity right. For them to be successful</p> <p><i>Shift in focus</i> so I would suggest that that would have to do with possibly student motivation, but then also maybe the right milestones weren't in place.</p> <p><i>Difficulty in finding a driving question.</i> Yeah. I mean that's, true.</p>
<p><i>Are there any others that were not mentioned?</i></p>	<p>I would just say the challenge of group work online also. I mean that's huge. It's just harder to get all of your cats herded in the right place when you're online.</p> <p>You take online courses often for flexibility and so that, that word is going to mean something different for different people. Maybe it means that our work nine to five and I need to be able to do my work in the evenings. Cool. But maybe someone else has taken online because they broke their leg. Right, and they don't like to work at night</p> <p>if you need a good digital space for collaboration, probably choosing the right tool is another important thing.</p>

Participant 2

Interviewer	Interviewee
<i>Please tell me about your background in online learning</i>	so that's my, my primary job here at RIT. so I help instructors build courses for the Edx platform, which is a massive open online course on our platform. So, all of that is online and remote, and then I also help faculty develop their RIT online courses, which are the regular RIT catalog courses just offered online instead of on campus. I've done a lot of work with that and my master's degree is actually in online learning So, I'm qualified to talk on this job.
<i>Please tell me about how you view PBL</i>	so, project-based learning in general is kind of a hot trend right now, because there's a lot of evidence that having people do a project or a hands-on activity enhances their retention of the information more than if they just did an exam. So, a lot of people are moving towards more project-based things. It's also really helpful because in the real world you're not going to take a test. Mentioned you were a graphic designer; you actually make layouts and graphics and images and the only way to become good at that is to do it. You can't answer questions about like what should the line weight be? That's not going to help you. You have to do it. Nearly all professions nowadays are doing professions, they're not regurgitating back professions. Um, and so doing those project-based activities in a course will help people be better in the job market later.
<i>Do you distinguish between project-based learning and Problem based learning? If yes, how?</i>	There might be a distinction though. I don't know that I would very often like want to make a hardline distinction. I think if you give someone a real problem to think about whether they do a hands-on activity or whether they just maybe discuss it like a thought experiment, I think you have a lot of value in doing either one of those. Maybe project based is more, you're doing an activity and problem based doesn't necessarily

	<p>mean you do a hands-on thing. You could do some other activity, whether it's a discussion or maybe answer some questions like a case study might be a good problem-based thing cause you're given a problem and you answer multiple choice questions about that problem. Speaker So one could be a subset of the other.</p>
<p><i>Tell me about the processes in online PBL</i></p>	<p>so usually how you see these things implemented. Is there some sort of instructions document? So, like setting up what is the project I want you to do, why are we even doing this project? What are the expectations for the project? And so that can be a word document, a pdf, it could be an html page. So that comes in many different forms. But the instructor setting up kind of the parameters of that project. Are you working in teams or as this individual, what kind of tools do you need to do this project? Do you need to go and use a certain software or a certain plastic or what, what do you need to do this project? Um, especially in the online space, the students then go off and do, so you're not likely doing the project on the platform that the instructions were given to you. so you might go off on your own personal computer and use the software or you might go to a maker space and make a thing or you might go to a coffee shop and collaborate with a team somewhere. it's a go off and do and then there's usually some sort of documentation of the project work involved. So that could be a write up of your project work that could be capturing deliverables So if you are doing a graphic design one, you might have your different, um, you know, samples that you gave the client to pick from and discuss the different options for this particular graphic. You're making. And that could be a deliverable asset that you would include in your writeup. Um, you might have a reflection on the experience, so you write up what you felt happened that was good and what you felt happened that could be improved on. Um, and all of that would then be submitted back to the instructor to grade somehow. And so, the instructor, um, can graded many different ways. So, if it's a team assignment, you might have</p>

	<p>individual grades and also team grades. Um, if it's in an individual assignment, you might have a grade that's specific to your deliverables versus a grade that's specific to your reflection or your write up about your process. Um, often instructors will have rubrics, so they'll score these different assets on the rubrics. If you have a team assignment, uh, team members might be asked to fill out a survey to grade each other, um, in grade participation that way. Um, there's opportunity for people to do self-assessments so you could fill out a survey where you grade yourself and your own work. Um, so many different ways to graded. Um, hopefully the instructor's giving you some sort of written feedback beyond just a score so that you can then improve that type of work for the next time you do that type of work. Um, and you know, you might have someone who has, you do this work as a draft, then get some feedback and then submit another draft and get some feedback and maybe you're working with different teams at different times or you're working individually and then as a team and then individually again or something. So there's many different configurations for what goes on in the middle. That's kind of the general arc of how things might go. Okay, good. It's about how</p>
<p><i>How is assessment done in an online PBL?</i></p>	
<p><i>Are you aware of any online PBL models</i></p>	<p>I don't know of any model, which doesn't mean there isn't one. It may just be that I'm not familiar with one. Um, a lot of times things get customized based on what is the project you're asking them to do. All right. So that there might be different variations. Yeah. Okay.</p>
<p><i>Please comment on each of these advantages</i></p>	<p><i>promotes academic achievement and problem solving.</i> I would say yes, especially problem solving because the projects will always have things to overcome and that helps with that. Um, and like I mentioned earlier, um, people retain information better when they're doing more hands on. So, it will help with academic achievement.</p> <p><i>improves project management</i> for sure. You know, the instructor will give the parameters but they often won't say, first you do acts and then</p>

	<p>you do y and then you do z. And so, a lot of it is self-directed, managing of your tasks.</p> <p><i>equity and students develop collaboration skills</i>, definitely for team projects. Um, you know, if it's an individual project, maybe not as much, but you will see a lot of team projects in position in this space.</p> <p><i>Motivation and self-confidence</i>. Yeah. The motivation ties strongly to the self-directed project management. Um, and the self-confidence I think comes from, doing this work and seeing the result and doing a real thing for a real reason. You know, you are given a real project, a real task to solve like you would in a job and when you realize, yes, I can do it. Yes, I know this stuff enough, then that builds the self-confidence.</p> <p><i>teacher satisfaction at the end of the project</i>. probably, I think a lot of times.</p> <p><i>student can revisit feedback or comments at any time</i>. Um, so that may be dependent on how the feedback is given. Okay. Um, so for example, with RIT's platform, my courses, you will have access to my courses for as long as you're a student and you can look at that feedback. You could also copy out or download to the feedback so you could keep it for your records. But if you didn't do that, you would lose your, my courses feedback.</p>
<p><i>Are there any others that were not mentioned?</i></p>	
<p><i>Please comment on each of these challenges</i></p>	<p><i>difficulty in assessment</i> the teacher satisfaction ties strongly to the challenge, difficulty in assessment because a lot of times the instructors struggle with how to grade and give meaningful feedback. So not just good job, you know, constructive feedback and positive encouragement on this project, so I think teachers really want to give this good feedback, but they might find it difficult to do it.</p> <p><i>lack of teacher preparation</i>. We do see this often that the teachers don't know how to do this sort of thing, especially online. They're really good at standing at the front of the classroom and saying,</p>

alright, now move the tables, get into groups and do this thing and then come up here and present it. That's really easy for them to do. But as soon as you're like, all right, well now you have to do, for example, a professional presentations course entirely online. They're like, how do we do it? and by themselves they might not feel equipped to figure that out.

lack of student preparation as well.

Depending on what high school they went to, what other courses they've taken. And if they have project-based things, they may have not done a project like this and it may be online. Yeah.

Really intimidating to try and figure out how to start, so having the teacher give some how to get started advice in that instructions document is really helpful so that people start out with at least some self confidence that they can do this.

so a lot falls back on that teacher to support the students through this project. Especially if this is, you know, high school project or an intro level course where it's not likely that students have done this.

a shift in focus along the line, yes, and I think that comes with project management. Um, so you might find that one of the students dropped to the course. So, you have to shift who's doing what. Or you have someone who goes dark online, so they're enrolled in the course but they've never participated at all. So, you need to accommodate for that person not being there and take over their work. You might also find, um, that there's dead ends. So, you're working on something and you get to a dead end. And so, if you have good project management skills, you might be able to overcome that.

difficulty in finding a driving question.

so a good example is one of the core series that I have on ad ex is called design thinking. And it's essentially the idea that you explore a problem deeply before you make a solution. Um, really simple. There's a lot more to it, but that's the gut of it.

we decided to give people problems to solve that they can then research instead of having them come up with a problem to solve. Because it is

	<p>really difficult for people to think, okay, it has to be a project in this general topic. I don't have a job. I don't know anything in this area. You know, I don't have other humans I can talk to besides the people in my class. So, it, it's sometimes hard to find something that fits the domain, but if you tell them, all right, hey, go do a project that deals with, um, for example, natural disasters were one of the ones we had in the course. Everyone either has been in a natural disaster or knows someone or has watched the news and seen a natural disaster. So, you can very easily springboard off of that project.</p>
<p><i>Are there any others that were not mentioned?</i></p>	<p>A threaded challenge that goes through all of these is, um, a lack of understanding of the tools available out there that can help you overcome these challenges and help support the advantages</p> <p>another tangential challenge is there may be too many options for you to pick from</p> <p>you always have the challenge of teams not working well together for whatever reason. And it seems to be worse when they don't meet face to face.</p>

Participant 3

Interviewer	Interviewee
<i>Please tell me about your background in online learning</i>	I have some experience with online learning, both in terms of taking it and creating content as well as having some formal training and the creation of it. I think it's a very valuable technique. I don't know how universal it is relative to all different kinds of learners because it takes a certain degree of discipline to have an interaction with a computer on my, and I was another person or even was a delayed response from another person. So, the aspect of real time versus delayed time or no feedback can result in very different effects.
<i>Please tell me about how you view PBL</i>	what I like to do for my students is I like to take them through sort of steps, incremental steps leading up to a full big project. I don't necessarily get involved in small projects. I consider each lesson the learning a chunk of the ultimate goal of a big project. So even if the big project is the completion of the semester, that's how I look at it. I'm taking increments and trying to jump the data. So that whole goal
<i>Do you distinguish between project-based learning and Problem based learning? If yes, how?</i>	Well, for project-based learning I had an ultimate goal or something and it wasn't a particular task set of learning that can be its own stand-alone topic. Okay. What I like to do though is the one I'm planning for the big project. I like to orient the individual components and sequenced them in a way that I build on skill sets. Problem-based learning is something I like to get them very unique so people get sidetracked, each problem or we'll try and isolate under some conditions so that somebody who's learning the reason to do something, they're not just a recipe to follow.
<i>Tell me about the processes in online PBL</i>	I think it's tricky. I think it takes a lot of putting someone in an isolated condition so that they can try and respect what the learner is trying to work with. Uh, so it's not necessarily an easy thing to write. Not that any lessons are easy, but I think it requires extra special attention to all the details because you have to hope you've conveyed all the

	<p>information that somebody needs to understand because the chances of them being able to ask questions are very variable and very few.</p>
<p><i>How is assessment done in an online PBL?</i></p>	<p>given a preference, I would make sure that there's some incremental interaction was full synchronous communication. Yeah. I think that the, the teacher and the learner need to be able to come together at some critical points in time. So, I think there should be at least milestones set where the situation is reviewed and if something hasn't been made clear in the normal chain of submission versus feedback, but it gives a chance before it goes too far off track.</p>
<p><i>Are you aware of any online PBL models</i></p>	<p>I actually did learn some over time but it's been many years. The names of the models kind of lost me.</p>
<p><i>Please comment on each of these advantages</i></p>	<p><i>Promotes academic achievement and problem solving:</i> I have to say it's a little hard to comment accurately because you, it does not necessarily suggest that there's a success in here. Okay. So without having some of the interim stages where you're seeing the progress being made, it's a little hard to make an absolute statement so we can say yes, it does promote if done properly, if done properly</p> <p><i>Improves project management:</i> Speaker if somebody has built this as a full project and you adhere to all the steps of the project, then that's okay. But a lot of times project management, because it is pre-formulated for the student, they don't learn the task of building the steps. So, when I teach project management, I have to have people understand to align, to set up all the tasks and then align them and then cut together a delivery time table and then start to see how the timelines all interact together. So, I'm not sure, uh, going through a project that you haven't created but are just following the steps is going to be an improvement on a product management.</p> <p>there's only <i>equity and student develop collaborative skills</i> if they have someone to collaborate with. So, it depends how it is. Y. How it's structured with, do they do work as a team or</p>

	<p>they work alone? Is there a real time feedback from the instructor?</p> <p><i>motivation</i> you have to be motivated to do something like this online. So, I would say it probably does promote motivation.</p> <p><i>self-confidence</i>. I can't comment on that really because there's, unless you're getting feedback all the time and you know that you're doing good, that's self-confidence. But if you just keep producing and you don't see anything until late in the game then I'm afraid.</p> <p><i>teacher's satisfaction</i> at the end of the project, that's kind of open. There's teacher satisfaction whenever anything is done is done well.</p> <p><i>honest and peer assessment</i> only if you build it into the project. If peers are involved in the final review, that's fine. If peers are involved in the making of the project plan to a certain degree, but hard to say.</p> <p><i>Students can revisit feedback or comments at any time</i>. That's the architecture of the project. It depends how you're building it and what kind of program you're doing and what kind of system interface you have and you know. So, I've seen some that have let you walk back and I've seen some that you can't go back.</p>
<p><i>Are there any others that were not mentioned?</i></p>	<p>certainly, the advantage of being able to work from anywhere at any time that you want.</p>
<p><i>Please comment on each of these challenges</i></p>	<p>lack of teacher preparation. That's anything. If your teachers are not prepared, it doesn't matter whether you're online or not.</p> <p>Same with the student.</p> <p>The only benefit to online or in that respect is you may not be doing it real time. So, you may have a chance to go back and catch up when you see it.</p>

	<p><i>Shift in focus.</i> very difficult to want to stay on target because there were a lot of other things to distract you because you're not in that classroom situation</p> <p><i>driving question,</i> I don't know that that's exclusive to online. I think that's pretty much basically in general.</p>
<p><i>Are there any others that were not mentioned?</i></p>	<p>if you are working in a team and you're 12 times zones, different, it's hard to coordinate.</p>

Participant 4

Interviewer	Interviewee
<i>Please tell me about your background in online learning</i>	I've had several roles in the course of my career. I started as a web developer. Um, later in life I became an anthropologist in the library looking at the ways people use study spaces and physical space. Later I became a technical coach to faculty. Um, I've worked as the assistant director of technology, so I think one of the major shifts in my own career has been from technology to design too. So today I manage the instructional design team.
<i>Please tell me about how you view PBL</i>	So as an instructional designer, you know, we start from learning outcomes and we try to make sure those are aligned with the assessments and the learning activities. So for me, project based learning is just another learning activity. It's a way to frame, to have students not just receive information, but to construct their knowledge by working on an actual project, by trying to solve actual problems. Um, and in that way, not just repeat back what they've heard but to know it because they've done it.
<i>Do you distinguish between project-based learning and Problem based learning? If yes, how?</i>	Honestly, I'm not sure what the difference is. But I guess the difference rides in the verb, the verb for a problem as you solve and for a project it's you execute the prosecutor, the project. So maybe that's the, so if you think the learning comes in solving a puzzle problem based, if you think the learning comes in doing a project
<i>Tell me about the processes in online PBL</i>	I'm a big fan of showing students the rubric for

	<p>Evaluation Upfront. You know, if you just say to a student here's an interesting problem, go solve it or here's an interesting solution space, make up a project. You have to give students some structure. So I think it's a lot of it rides on how the assignment is articulated, what, how the deliverable is specified and something a lot of instructors skip is what is the rubric for evaluation going to be so that at every step of the way the student can say, okay, my work is meeting this rubric or I need to do more to address this part so that when I'm evaluated the project, um, we'll score well on the rubric.</p>
<p><i>How is assessment done in an online PBL?</i></p>	<p>Scaffolding is a nice principle, the come to play here, you know, scaffolding, you make sure that students practice in a low stakes way before you make them perform in a high stakes way. So, you can start, I believe in rapid assessment, I mean myself, you know, don't wait until the end to assess the students' work. So some early low stakes, rapid feedback, you know, to make sure that the student is on the right path, building up into a high stakes assessment of incremental deliverables, building up into higher stakes assessment of the overall project.</p>
<p><i>Are you aware of any online PBL models</i></p>	<p>No, I'm not aware of any</p>
<p><i>Please comment on each of these advantages</i></p>	<p><i>it promotes academic achievement and problem solving.</i> That seems reasonable to me.</p> <p><i>It improves project management.</i> I questioned some of these claims when they just say that it improves project management, does it improve it just because students are in the process or does the teacher need to design in some explicit and intentional ways for this to empower them to for project management.</p> <p><i>equity and students develop the collaboration skills.</i> I think all of us have been in group projects where there is not equal distribution of effort. So, it's not enough for me to just say it magically establishes equity. I don't think it does unless you actually designed this very willfully.</p>

	<p><i>promotes motivation and self-confidence.</i> Perhaps <i>there's teacher satisfaction at the end of the project.</i> Perhaps</p> <p><i>it allows for honest peer assessment</i> perhaps and probably. although we've seen students tend to protect each other. Anytime there's a power difference and you put people in a group and somebody else has power, the people in the group are going to band together and try to help each other. And that's beautiful. That's human.</p> <p>I'm not sure students can revisit feedback or comments at any time. that's probably true in all forms of learning. So, I don't know that that makes PBL different,</p>
<p><i>Are there any others that were not mentioned?</i></p>	
<p><i>Please comment on each of these challenges</i></p>	<p><i>lack of teacher preparation.</i> Yes. Many times, we see teachers redesigned the experiment midcourse. I'm not putting even just a simple move like designing this activity and then having your peer teacher look at it and tell you what they think. I don't think enough people do that, and that's a really simple direct way to prepare and find things that you didn't anticipate.</p> <p><i>Lack of student preparation</i> perhaps. And that can be addressed by scaffolding or coaching students through preparation for this activity, not just throwing them in.</p> <p><i>There's a shift in focus along the line.</i> Again, that that's probably a consequence of, of teacher preparation.</p> <p><i>difficulty in finding a driving question</i> that is very hard. It's very hard to find an authentic, you know, question for our project.</p> <p><i>difficulty in assessment.</i> yeah, I agree. That's a challenge. that's actually a place where teachers can put a lot of intentionality and put a lot of</p>

	effort into evaluating the assessment. And that's one of the main things that instructional designers help faculty do
<i>Are there any others that were not mentioned?</i>	it allows students to construct their own knowledge