A Study on the Application of Google Classroom for Problem-Based Learning

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문제중심학습을 위한 구글크레스룸 활용 방안 연구

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Abstract Problem-based learning (PBL) appears to be a superior and effective strategy to train competent and skilled practitioners and to promote long-term retention of knowledge and skills acquired during the learning experience. This study concerns the implementation of PBL in the online environment and face-to-face PBL. An online environment allows participants to communicate with one another, view presentations or videos, interact with other participants, and engage with resources in work groups. Nowadays, education is accessible everywhere with the use of digital devices. Educational institutions subscribe to GSuite for Education, and Google introduced its Google Classroom as an e-learning platform. This study aims to analyze Google Classroom and to design PBL for Mongolian students taking Korean courses. The main objective of this paper is to identify the usability and evaluation of Google Classroom. The result of this study will be a proposed e-learning platform for Dornod University, Mongolia, which is initially needed in the Natural Science and Business Department.

요 약 PBL은 유능하고 숙련된 실무자를 훈련시키고 학습 경험 중에 습득한 지식과 기술을 장기적으로 보유하도록 하기 위한 우수하고 효과적인 전략으로 보인다. 본 연구는 온라인 환경에서의 PBL과 면대면 PBL에 관한 것을 대상으로 하고 있다. 참가자가 서로 의사소통하고, 프레젠테이션 또는 비디오를 보고, 다른 참가자와 상호 작용하고, 작업 그룹의 자원에 참여할 수 있도록 해 주는 온라인 환경이다. 오늘날, 교육은 디지털 기기의 사용으로 어디서나 접근할 수 있다. 구글은 교육 기관을 위한 이러닝 플랫폼으로 구글 크레스룸을 소개했다. 구글 크레스룸은 무료로 신청할 수 있고, 사용하기 쉽고, 배움에 유연한 온라인 환경을 제공한다. 본 연구는 구글 크레스룸을 분석하여 이를 바탕으로 PBL을 설계하고 한국어를 배우고 있는 몽골 학생들을 대상으로 한 구글 크레스룸 기반 PBL의 유용성과 평가를 파악하기 위한 것을 목적으로 하였다. 연구의 결과는 몽골 도로노드 대학교 자연 과학 및 경영학과에 필요한 이러닝 플랫폼으로 제안될 예정이다.

Keywords : communication, Educational Instruction, E-learning, Google Classroom, PBL

1. Introduction

The classical definition of Problem-based learning (PBL) is the learning that results from the process of working towards the understanding of a resolution of a problem. The problem is encountered first in the learning process[1]. For PBL, Google Classroom is designed in this study. Google Classroom is meant to help instructors manage the creation and collection of students' assignments in a paperless environment, basically leveraging the framework of Google Docs, Drive and other Apps. The objectives of this study is

to identify the usability of Google Classroom in PBL for Dornod University, Evaluate Google classroom based on the feedback from the instructors, and lastly identify the usability and features of the tool based on Mongolian Students taking up Korean Courses. The study was conducted during the Midyear of 2018 in a Korean Course class at H University. This study contains Research needs in Chapter 1, Review of the literature, the methodology in Chapter 2 and the summary in Chapter 3.

2. Main body

2.1 Learning Environment in Mongolia

Mongolia's educational system has undergone major changes in the 20th century. The educational reforms during communist times were a stark break with traditional education that was often religious and esoteric. Mongolian's demand for information technology (IT) goods and services boomed as its young and adaptable population embraced IT products for personal and professional uses. Initial distance learning methods were radio and TV classes, covering the contents of reference books, publication, and related materials. Currently, due to the rapid development of information and communication technologies, lecture contents are being delivered by CD, DVD, online lectures and video lectures[2].

2.2 PBL instructional design process based on Google Classroom

PBL refers to an instructional and curricular student-centered approach that empowers students to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem[3]. It has since been employed successfully, in teaching various subjects at all levels of school from elementary to tertiary[4]. Google Classroom is a program for instructors to create a digital classroom for students to communicate with their instructors and peers. It is a free application that integrates e-mails and documents to save into storages. Instructors can upload files, videos, links, announcements and assignments for students to retrieve and view. Document files can be edited in class and shared with peers to learn collaborative skills. An instructor can keep all files save in the Google Drive and grade, attach you tube or any link for instructional purposes.

Analysis

Analysis related to the effectiveness of PBL in education revealed that PBL has positive effects on student's satisfaction in training and skills development. Another review of learning curriculum on the effects of PBL on developing students' critical thinking showed a positive relationship between the implementation of PBL as an instructional model and improvements in critical reasoning. Learning curriculum, student and learning environment were analyzed[5].

Design and Development

Google Classroom can be easily deployed in the URL classroom.google.com, instructor can set up classroom in minutes and create contents for students. It is free for schools, best -in -class security is also included without cost for plan holders. The platform is also integrated with other Google tools to help educators provide instant feedback and track student's progress to improve performance, it has also a mobile application for easy access anytime and anywhere.

Implementation

In order to determine the usability of Google Classroom as an online learning environment, Students were asked to sign up for Google account or use their existing Gmail account. The class code was given to the students to enter the online classroom. After testing, a self-made questionnaire was used to determine the usability based on the perception of students.

Evaluation

The Evaluation Design Phase used to develop evaluation tools and items that determines whether students achieve learning objectives or not. Evaluation is done to acquire learning objective and close relation, o PBL evaluation standards and objects are based on PBL objective[6].

Modification

Modification phase with content made from formative evaluation phase. Modified PBL is improved method version by combining self and co-students evaluation of the learning program. Problems are modified during developing process but the problem will be ready after finishing the final revision.

2.3 Google Classroom model Design

An instructor can keep all the files save in the Google Drive and grade, attach you tube or any link for instructional purposes[7]. From Google Classroom, an instructor can send mail to all students at the same time. Janzen, M. (2014), points out the following benefits of using Google Classroom[8].

Easy to use - It is very easy to use. "Google Classroom's design purposefully simplifies the instructional interface and options used for delivering and tracking assignments; communication with the entire course or individuals is also simplified through announcements, email, and push notifications."(Janzen, M. 2014)

(1) Saves time

Google classroom is designed to save time. It integrates and automates the use of other Google apps, including docs, slides, and spreadsheets, the process of administering document distribution, grading, formative assessment, and feedback is simplified and streamlined. Chehayeb, A. (2015), Google Classroom Software Engineer mentions that they built classroom "to save time". He claims that Google is launching some features like export grades to Google Sheets, easier to

update grade point scale, keyboard navigation for entering grades, sort by name on grading page etc to save instructors' time.

(2) Cloud-based

Google Classroom presents more professional and authentic technology to use in learning environment as Google apps represent "a significant portion of cloud-based enterprise communications tools used throughout the professional workforce." (Mary, 2014)

(3) Flexible

This app is easy to use and accessible to instructors and students in both face-to-face learning environment and full online environment. This enables educators to explore and influence "flipped instructional methods more easily as well as automate and organize the distribution and collection of assignments and communications in multiple instructional milieus." (Mary, 2014)

(4) Free

Google Classroom in itself is not necessarily available to students without access to an educational institution. Can access to all the other apps, such as Drive, Docs, Spreadsheets, Slides, etc. simply by signing up for a Google account.

(5) Mobile-friendly

Google Classroom is designed to be responsive. It is easy to use on any mobile device. "Mobile access to learning materials that are attractive and easy to interact with is critical in today's web connected learning environment. "(Janzen, M 2014) Keeler, A. (2014) also mentions several other benefits of using Google Classroom. She mentions how Google Classroom ensures streamline counseling only by posting an announcement. Crawford, A. R. (2015) states that Google Classroom facilitates collaborative learning. Here, the instructor can upload materials and give feedback to students. Students can also upload

materials and make personal comments. Moreover, students can collaborate with each other. They can share their documents and assignment thus, they can come up with their best assignment or work. The Google Classroom model focuses on the components in ensuring the effectiveness of the PBL<fig1>. Description of each of the elements found in PBL components are as follows: Firstly, instructor gives instruction about learning objectives, class teaching methods, assessments, evaluation, criteria and features of PBL in an off-line environment.

(1) Stream and Announcement

Use them to give notices to students. Announcements are shown at the top of the class stream. In this part, prepare the problem for PBL. Identify the learning objectives and pose questions on it. Instructor presents a problem on Announcement in PBL.

(2) Discussion board

Students can have online discussions with Google Classroom using Google+ Community, Forum and Assignment.

(3) Google Drive and Gmail

Students can access store files anywhere and keep all documents in one place with a shared team folder including scan documents and images as PDFs with phone. In Gmail instructor and students can send professional email to each others.

Classroom weaves together Google Docs, Drive and Gmail to help teachers create and organize assignments quickly, provide feedback efficiently, and communicate with classes with ease.

And it lets students organize their work, complete and turn it in, and communicate directly with their teachers and peers[9]. This section helps self-regulated learning, planning, writing solution easily in PBL process.

INPUT (Google Classroom)	Process	Roles	Outcome
Traditional classroom	Short lecture -Introduction of PBL based on Google Classroom	Instructor	Decision
Stream -Announcement	Present Problem – Analyze the problem	Instructor	
Discussion board - Forum - Assignment - Google+ Community Post	Cooperative learning space used to find a solution	Student to Student	
Google Drive and Gmail	Self-regulated learning	Student	
	Ruminate in Planning to solve problems	Student	
	Write solution	Student	
Google Forms	Present solution and Evaluation	Student – Instructor	
	Arrangement and reviews	Student	
	Write reflective journal	Student	
	Submission of reflective journal	Student	
	Feedback of reflective journal	Instructor	

Fig. 1. Google Classroom mode

(4) Google Forms

With Google forms, it manages event registrations, create a quick opinion poll, and much more. Create and analyze surveys right in mobile or web browser, no special software is required. Get instant results as they come in. And, can summarize survey results at a glance with charts and graphs. Presenting solution and Evaluation, Arrangement and reviews, Writing reflective journal, Submission of reflective journal and Feedback of reflective journal take place in Google forms. It gives the result of PBL process using Google Classroom. And shows the advantages and gaps of using Google Classroom application in PBL. Students can share and discuss the report using Drive Presentation easily.

2.4 Role of instructor

Instructor needs a well-structured plan and implement scaffolding activities in a way that it will help the students better understand and thus better

perform the tasks they participated in. Activity of Instructor is composed of presenting the problem, checking the problem solving process, upload classroom materials, feedback and arrangement in Problem Solving process. Instructor can interact in assignment, group chat, classroom folder, About, Assignment of Google Classroom<Fig2>.

Where	What to do	Who
Assignment	Present problem	Instructor
Group chat	Check the problem solving process	Instructor
Classroom folder	Upload classroom material	Instructor
Group chat	Feedback	Instructor
About	Feedback to Uploaded materials of students	Instructor
Assignment	Arrangement of Problem Solution Set	Instructor

Fig. 2. Activity of Instructor in Problem Solving process

2.5 The Role of student

Students work in teams to complete the project, resolve the problem, and accomplish the learning objectives. The student's role come into play after the context, domain knowledge and problem statement had been developed, reviewed and refined[10]. After the group agreed on a view of the problem, students in the group worked to outline individual learning goals and set a schedule to refer to as the group members proceeded in the problem-solving process.

3. Implementation

This study was conducted on 18 Mongolian students taking up Korean courses. Of the 18 students, 5 were male and 13 were female. Their ages ranged from 17-33. In terms of language background, participants were fairly homogeneous; all of them were native Mongolian speakers and few had experiences living in

Russia and other Chinese-speaking country. The students were divided into 6 groups. All groups took the face-to-face course every week. After each class they were required to review what they had learned in the class and to answer the exercises in the textbook. For the review activity, groups were asked to use Google Classroom for online discussion, interaction, and sharing information with each other, while those in the control group were asked to do their assignment and review the course content offline and individually. The course is one of the element design courses that was offered in the first semester and was newly introduced in the current year. For the development of such teaching-learning environment, Google Classroom was used. The research was carried out for 11 weeks. The course' objective is to improve the Korean knowledge and its application in everyday use. The classes meet for 90 minutes in a day and were taught entirely in Korean. Google Classroom automatically marks an activity completed based on criteria, which can be specified depending on the activity. Students were able to evaluate and gave feedback on their performance in getting the appropriate information, gave ideas and opinions and developed teamwork as well as evaluation of the other team members. Google Classroom is easy to use and communication is comfortable too.

4. Conclusion

This study investigated the effectiveness of using Google Classroom application in PBL. The findings of this study demonstrated that the adoption of the Google Classroom as an online environment in PBL is successful and effective in developing students' knowledge. This new attempt could help enhance and improve the quality of learning instruction by breaking the monotony of the traditional classroom, and opening a new avenue for learning. Google Classroom based PBL extended learning opportunities beyond the

traditional classroom since it can overcome the restrictions of time and space. Accessibility, and easy-to-use communication tools of online environment increased students' participation and involvement in learning process. In addition, effective and convenient collaborative learning is possible because students could interact and communicate with one another whenever and wherever they want even after the class. PBL based on Google Classroom was perceived positively by students and most of the students agreed to its effective contribution to their development. More rigorous research is needed to further examine the effects of PBL on student learning outcomes and performance in both academic and workplace situations.

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