Promoting Teamwork Skills Among Thai Pre-service Teachers Through Gamification on Cloud Technology

Siripon Saenboonsong, Phranakhon Si Ayutthaya Rajabhat University, Thailand
Akarapon Poonsawad, Phra In Sueksa (Klom Sakun Uthit) School, Thailand

The Asian Conference on Education & International Development 2023
Official Conference Proceedings

Abstract
Given that gamification has been applied in the classroom to stimulate students' participation for successful learning, this study investigates the extent to which cloud-based gamification promotes undergraduate students' teamwork skills. Thirty-one first-year pre-service teachers majoring in physical education at Phranakhon Si Ayutthaya Rajabhat University in Thailand worked in groups of three or four to produce instructional media in physical education using cloud-based gamification and graphic design in a semester-long educational innovation course. At the end of the course, teacher-, peer-, and self-assessments of student teamwork skills were conducted using a holistic teamwork skills evaluation covering five evaluation categories, i.e. participation, task achievement, peer interaction, responsibility, and students' use of resources. In addition, teamwork skills were also assessed by the researcher through classroom observation. Results showed that the scores of the participants' teamwork skills were over 75%, showing a high level of student participation while completing the assigned tasks. Further results revealed that learning activities integrating gamification on cloud technology promote not only teamwork skills among students but also student-teacher interaction and student learning achievement. It can be concluded from the present study that gamification is a useful tool for teachers to design innovative learning activities that promote students' innovation, cooperation and problem-solving in the classroom.

Keywords: Teamwork Skills, Gamification, Cloud Technology

Introduction

Guidelines for education in the 21st century, instructors need to adjust their learning approach which must make learners love lifelong learning. The goals for learning are to develop life skills, thinking skills and IT skills that learners have practiced or experimented on their own (Adkins, 2002). The findings of an appropriate and accepted teaching theory of the expected standard in Thai higher education are the concepts of constructivism or cooperative learning (Inthachot, Sopeerak, & Rapai, 2013). This teaching divides learners into small groups where learners work together, help each other and seek knowledge that is beneficial to themselves and the group, thereby fostering cohesion among members and fostering interaction between learners where the goal is the success of all members (Nuraini, Faaizah, & Naim, 2014).

Using of computers to support collaborative learning is the application of computer network technology to support group work, which helps organize learning environment outside the classroom for students with cloud computing (Siegle, 2010). Users of cloud computing can determine their needs for services over the internet and can access resources simultaneously and at any time (Vockley, 2007; Nevin, 2009; Buyya et al., 2009). Collaboration is an essential for the 21st century learner skills that encourages learners to have teamwork skills (Sullivan et al., 2015). Developing students' teamwork skills requires training everyone to work together towards the same goals and objectives, have a working system and having good interactions with each other according to the desired goals.

Gamification is a marketing tool widely used in every country by using game techniques and mechanics to create motivation and encourage interaction between organizers and participants (Inchamnan, 2018). Gamification has been used in education to help stimulate learning and engage learners in fun learning by using game mechanics as simple operators (Huang & Soman, 2013; Swacha, 2021). The basic principles of game mechanics design such as points, levels, rewards, leaderboards, competition are applied to learning by simulating a gaming environment.

In this study, the researcher focused on gamification learning with cloud tools to enhance teamwork skills of undergraduate teacher students in Innovation and Information Technology for Educational Communication. and learning. Learning management uses game mechanics as a learning environment in which students work together to create works according to specified problems. with cloud technology tools. works created as graphic media in the form of still images and animations that contain knowledge of physical education. The production of work is created as graphic media in the form of images and animations that contain knowledge of physical education. Then, the instructors observed individual students' participation behavior in group work and promoted a positive attitude towards learning that aimed to learn by thinking and doing in order to overcome obstacles and achieve goals including having a concrete work that can be used for real which will develop young learners in the new era continually and sustainably.

The objective of this study was to investigate the extent to which cloud-based gamification promotes undergraduate students' teamwork skills. It specifically answers the following:

1. What is the learning with gamification with cloud tools that foster teamwork skills in students?
2. What is the student's attitude towards gamification learning level?

Methodology

This research is experimental research using the one-group posttest-only design with details as follows.

1. Participants

The sample group used in this research was selected as undergraduate students who enrolled in the Innovation and Information Technology for Education Communication and Learning course in the first semester of the academic year 2022, Phranakhon Sri Ayutthaya Rajabhat University, Thailand, which has five majors/classrooms. After that, it was simply randomized using the classroom as the random unit, which received 31 students from the major of Physical Education, Faculty of Education, Phranakhon Sri Ayutthaya Rajabhat University, Thailand. This study has adjusted the assessment criteria to be a holistic rubric, 5 levels per item, worth 25 points.

2. Measuring Tool

This study used a teamwork skills assessment form based on the work of Saenoonsong (2018) who studied the effects of project-based learning on cloud computing to enhance collaboration skills for 30 undergraduate students in the course Innovation and Technology for Science Teachers. The collaborative skills assessment form used consisted of 5components, 15 questions, with a confidence value of .83, with a high level of confidence. The components are as follows: 1) The willingness and commitment to work, 2) The goals of the work, 3) The interaction within the group, 4) Responsibilities, and 5) Shared resources. This study has adjusted the assessment criteria into a 5-level holistic assessment, totaling 25 points.

3. Learning process

This study was conducted with physical education undergraduate teachers in the Innovation and Information Technology for Education Communication and Learning course in a normal classroom format by using gamification and cloud technology as follows:

3.1 Gamification Learning

Gamification learning is a teaching activity without playing a game. It is an application of techniques of playing games to motivate them to achieve objectives in learning activities (Kirillov et al., 2016). Gamification environment can enhance motivation, satisfaction, participation in activities, teaching efficiency and learning achievement. Game mechanics such as scores, levels, challenges, badges, virtual goods, leaderboards are related to human needs which can change human behavior work (Poonsawad et al., 2022). The main incentive strategy is to reward players for completing missions. Students are required to complete assignments by gathering information from previous experiences or new knowledge to solve problems creatively (Dreimane, 2019). This is a practice to understand problems and focus on solving problems, resulting in effective solutions. The gamification components used in this research are as follows:

1) Points It is the accumulation of points for trying to answer questions set by the teacher both individually and in groups, which students will receive different points.

2) Level It is the score range of students specified by the instructor. In this research, there are 6 levels, consisting of Bronze, Silver, Gold, Platinum, Diamond, and Conqueror, which are used to motivate students to answer questions to earn points and increase their level.
3) Badge It is a symbol of behavior and success that students can achieve according to the goals, including responsibility. Involvement, punctuality, cooperation with the team, honor and assistance.
4) Leaderboard It is a summarizes the order of points, levels, and badges earned through learning that encourage students to collect their own scores to be at the top of the board.
5) Mission It is an assignment that a teacher gives students to create a team or individual project.

3.2 Cloud Technology Tools

Nowadays, teachers need to integrate existing technologies to facilitate teachers and benefit students' learning by considering the appropriateness of application for maximum benefit. Cloud technology is not only a modern trend of effective use of information and communication technologies in professional activity, but also a proven tool for educational activities (Fedorenko, 2020). Cloud computing has great potential for application in education, research and application development, as well as distance learning (Elmurzaevich, 2022). This research is based on Cloud Technology Tools, which are Internet-based technology tools that serve users to share their resources and can be accessed whenever and wherever they want. There are many tools for cloud technology but for this research we have used Gamiplus tool which is an add-on application from google classroom that has structured gamification environment. Teachers can create their own gamification environment and easily use the information available in google classroom. The researchers also recommended other cloud technology tools for students to use to create their team's work: CANVA website for creating graphics, Powtoon website for creating media presentations with animated cartoons, Google Sites for creating web pages like easy Google Workspace for Education; Classroom, Drive, Gmail, Calendar, Docs, Sheet, Slides and Meet, and YouTube video presentations.

Data Collection and Analysis

In the study of 8 periods, students were assigned to form groups to create works in the form of teaching materials. cartoons, animations, websites, and information presentation media in the amount of 4 works using cloud technology tools to apply and create works according to the specified problems. Then, the instructor observed the participation behavior in the group work of the students individually. In addition, students were asked to assess themselves and their groupmates.

Results

The result divided into 2 parts as: 1) Teamwork Skills, and 2) Satisfaction of Students.

Table 1: Scores of the students' teamwork skills

	n	Scores	$\bar{x}$	S.D.	% of Mean	t	Sig(1-tailed)
Teamwork Skills	31	25	20.95	1.13	83.78	10.82*	0.0000

*t(.05, df 30) = 1.68

Table 1, comparing the teamwork skills of the students with the criteria of 75%, the results showed that the students had an average score of 20.95 out of 25, representing 83.78 percent. In addition, the comparison between the criteria and the mean scores of the students was presented, showing that the teamwork skill score of the students was significantly higher than the criteria at the .05 level. This finding implied that the Gamification on Cloud Technology provided a positive influence over successful in teamwork skills of students.

Table 2: The Satisfaction of Students

Factors	$\bar{x}$	S.D.	Level of meanings
1. The personality and dress of the instructor	4.64	0.56	High
2. Punctuality	4.51	0.60	Highest
3. Teaching preparation	4.57	0.59	Highest
4. Willingness and enthusiasm to teach	4.55	0.61	Highest
5. Intention and enthusiasm for teaching	4.56	0.62	Highest
6. Provide a variety of teaching and learning	4.47	0.68	High
7. Moral, ethical and social responsibility insertion	4.45	0.76	High
8. Encourage learners to think reasoned analysis	4.49	0.69	High
9. Provide information, advice, research sources for additional knowledge	4.52	0.63	Highest
10. Contents and activities are in line with the interests and aptitudes of the learners	4.52	0.67	Highest
11. Use teaching materials that promote appropriate learning	4.52	0.62	Highest
12. Multi-evaluation, learners know how to assess and participate in determining the percentage of points	4.48	0.65	High
13. The atmosphere in the classroom is warm, emphasizing cooperation and the learners are happy in learning	4.52	0.63	Highest
Overall	**4.52**	**0.64**	**Highest**

According to the table 2, the satisfaction of learners after learning with the Gamification on Cloud Technology found that the learners satisfied with the designed instruction at the highest level ($\bar{x}$ = 4.56, S.D. = 0.64), the most satisfied topic was "Provide a variety of teaching and learning" which was 4.57 of mean and 0.68 of standard deviation.

Conclusion

The results can be concluded that the use of gamification on cloud technology has a positive influence on student success because gamification motivates students to work together and solve problems by proposing different problem-solving ideas within the group. After that, the

assigned student work is reviewed at the place of work (Musa et al., 2012). Students who learn using gamification and cloud technology have good learning outcomes (Ardhyani & Khoiri, 2017). In addition, appropriate use of modern technology facilitates students to better access information. The use of cloud technology in education allows educational institutions the opportunity to use computer resources and application software services over the internet, which it can enable a more intensive and better process of development and practice whereby students and teachers can quickly and economically access various platforms, applications and resources through their preferred websites (Emelyanov & Klygin, 2016; Ercan, 2010). It can reduce the cost of the organization but increase productivity by providing teachers and students with a good learning environment. Thus, these findings suggest that practice-based student learning using gamification techniques in a cloud computing learning environment affects collaboration skills as a skill development learning is consistent with education in the 21st century.

Acknowledgement

The researchers acknowledge the Institute of Research and Development, Phranakhon Si Ayutthaya Rajabhat University, Thailand for their motivation and support in the international presentation of this research. They are likewise grateful to the dean of the Faculty of Education for allowing students from the major of Physical Education to participate in the study.

References

Adkins, S. (2002). Market Analysis of the 2002 US E-learning Industry: convergence, consolidation and commoditization. *Market Analysis Series*, 6.

Ardhyani, S., & Khoiri, N. (2017). Project Based Learning Multi Life Skill for Collaborative Skills and Technological Skills of Senior High School Students. In *Journal of Physics: Conference Series* (Vol. 824, No. 1, p. 012010). IOP Publishing.

Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. (2009). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. *Future Generation computer systems*, *25*(6), 599-616.

Dreimane, S. (2019). *Gamification for education: Review of current publications*. Didactics of Smart Pedagogy: Smart Pedagogy for Technology Enhanced Learning, 453-464.

Elmurzaevich, M. A. (2022, February). Use of cloud technologies in education. In *Conference Zone* (pp. 191-192).

Emelyanov, A. A., & Klygin, R. A. (2016, January 15-16). *Cloud Technology in Education*: *Problems and Perspectives*. In Informatization of society: socio-economic, socio-cultural and international aspects: materials of the VI international scientific conference, Prague, Czech Republic. (Vol. 2016, p. 71).

Ercan, T. (2010). Effective use of cloud computing in educational institutions. *Procedia-Social and Behavioral Sciences*, *2*(2), 938-942.

Fedorenko, E. H., Velychko, V. Y., Omelchenko, S. O., & Zaselskiy, V. I. (2020, March). *Learning free software using cloud services*. In CTE Workshop Proceedings (Vol. 7, pp. 487-499).

Huang, W. H. Y., & Soman, D. (2013). Gamification of education. *Report Series: Behavioural Economics in Action*, 29(4), 37.

Inchamnan, W. (2018). Therapeutic strategy in gamification and game based learning for elderly people in Thailand. *Humanities & Social Sciences Reviews, 6*(1), 44-52.

Inthachot, M., Sopeerak, S., & Rapai, N. (2013). The development of a U-learning instructional model using project based learning approach to enhance students' creating-innovation skills. *Procedia-Social and Behavioral Sciences*, *103*, 1011-1015.

Kirillov, A. V., Vinichenko, M. V., Melnichuk, A. V., Melnichuk, Y. A., & Vinogradova, M. V. (2016). Improvement in the learning environment through gamification of the educational process. *International Electronic Journal of Mathematics Education*, *11*(7), 2071-2085.

Musa, F., Mufti, N., Latiff, R. A., & Amin, M. M. (2012). Project-based learning (PjBL): Inculcating soft skills in 21st century workplace. *Procedia-Social and Behavioral Sciences*, *59*, 565-573.

Nevin, R. (2009). Supporting 21st century learning through Google Apps. *Teacher Librarian*, *37*(2), 35.

Nuraini, C. K., Faaizah, M., & Naim, C. P. (2014). Personalized Learning Environment (PLE) Experience in the 21st Century. *4th World Congress on Information and Communication Technology*.

Poonsawad, A., Srisomphan, J., & Sanrach, C. (2022). Synthesis of problem-based interactive digital storytelling learning model under gamification environment promotes students' problem-solving skills. *International Journal of Emerging Technologies in Learning, 17*(5), 103-119.

Saenboonsong, S. (2018). *The Effect of Project-Based Learning on Cloud Computing to Enhance Collaborative Skills*. [Online]. [cited 2023 February. 15]. Available from: http://papers.iafor.org/wp-content/uploads/papers/cher-hongkong2018/CHER-HongKong2018_43473.pdf

Siegle, D. (2010). Technology: Cloud Computing: A Free Technology Option to Promote Collaborative Learning. *Gifted Child Today*, *33*(4), 41-45.

Sullivan, M., Kiovsky, R. D., Mason, D. J., Hill, C. D., & Dukes, C. (2015). Interprofessional collaboration and education. *AJN The American Journal of Nursing, 115*(3), 47-54.

Swacha, J. (2021). State of research on gamification in education: A bibliometric survey. *Education Sciences, 11*(2), 69.

Vockley, M. (2007). *Maximizing the Impact: The Pivotal Role of Technology in a 21st Century Education System*. [Online]. [cited 2023 February. 8]. Available from: https://files.eric.ed.gov/fulltext/ED519463.pdf

Contact email: ssiripon@aru.ac.th