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Research Article

Digital media development activities with agile software development and online classroom management system to promote students teamwork skills

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Abstract

The objectives of this study were to create and find the activities effectiveness for teamwork skills assessments and assess students' opinions during the digital media development activities with agile software development and online classroom management system. The samples group was 18 students from the Animation and Digital Media department. The research instruments were digital media development activities plan, online classroom management system, student's teamwork assessments form, teamwork observation form and feedback assessments form. Data was analyzed using mean, standard deviation and E1/E2. The research methodology used agile software development, which focuses on interpersonal communication to solve the problems quickly by working under the scrum framework, consisting of backlog, sprint phase, daily scrum meeting, sprint review meeting and retrospective meeting. Then applied with digital media development activities through an online classroom management system. The results found that the efficiency of the activities was at a high level. The quality evaluation results from the samples group was more efficient than the specified criteria. The students' teamwork skills were at a high level, lecturer observation for the students' teamwork skills was high, and the students' feedback was at a high level, which means these activities were suitable for apply in learning management.

Keywords

Agile Software, Digital Media Development, Online Classroom, Promoting Teamwork

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Introduction

From studying primary information about the problem occurred in Animation and Digital Media classroom, we found that the students lack of teamwork skills, obviously when noticed working in their group, affecting on non-coordination and non-data transmission also individuals think and work in their method without listening to the opinions of other students in the group. This affects produced works and the students when they enter into animation industries. The researchers interested in creating the activities through digital media development activities system following agile software development concept together with online classroom management system to support students' teamwork skills in department of Animation and Digital Media for using it as method in solving problem and limitation of the discovered studying. Researchers use agile software development concept together with online classroom management system to integrate with the students' studying and supporting the students' teamwork. Moreover, this method leads to develop quality and efficient studying in Bachelor's degree continuously. Research objectives as follows. (1) To create and find out efficiency of digital media development activities system following agile software development concept together with online classroom management system to support teamwork skills for students in department of Animation and Digital Media. (2) To evaluate teamwork skills in the students of department of Animation and Digital Media to create digital media development activities following agile software development concept together with online classroom management system to support teamwork skills in the students. (3) To evaluate opinion of the students in department of Animation and Digital Media during studying to digital media development activities following agile software development concept together with online classroom management system to support teamwork skills for the students. Hypothesis of the study as the following. (1) E1/E2 through digital media development activities system following agile software development concept together with online classroom management system to support teamwork skills in the students in department of Animation and Digital Media meets criteria 80/80. (2) The result of teamwork skills evaluation of the students in Bachelor's degree from creating digital media development activities following agile software development concept together with online classroom management system to support teamwork in the students is in high level. (3) The result of opinion evaluation of the students during studying to digital media development activities following agile software development concept together with online classroom management system to support teamwork skills in the students is in high level. Scope of the study as follows. (1) Scope of content: This research was the studying of using activities through digital media development activities following agile software development concept together with online classroom management system to support teamwork skills. Video editing course consists of 5 units including: theory and practical content: Unit 3 producing video procedure; Unit 4 Scene, color, light, sound in producing video; Unit 5 script writing and storyboarding; Unit 6 composition of pictures and sound; Unit 7 ordering pictures, editing sound and image. (2) Scope of population: Population were 39 students in department of Animation and Digital Media, Faculty of Science and Technology, Bansomdejchaopraya Rajabhat University who registered Video editing subject in academic year 2/2018. The samples group was 15 students in department of Animation and Digital Media, Faculty of Science and Technology, Bansomdejchaopraya Rajabhat University who registered Video editing subject in academic year 2/2018 from specific selection. Experimental group was the students in department of Animation and Digital Media, who registered Video editing subject in academic year 2/2018 who weren't the sample. Experimental group can be divided to personal experimental group, 3 students; small experimental group, 9 students; large experimental group, 12 students to try out the studying activities. Research instruments as the following. (1) Digital media development activities plan following agile software development concept together with online classroom management system passed IOC value from 0.80 to 0.95 and E1/E2 was 80.44/80.67 to test with the sample group. (2) Online classroom management system name "ClassStart". (3) Quality evaluation form from the experts passed IOC value from 0.80 to 0.95. (4) Evaluating studying achievement form passed seeking difficulty and easiness which has the value from 0.37 to 0.79 has discriminant index from 0.23 to 0.66. Analyzing whole evaluating achievement form has reliability equal to 0.83. (5) Evaluating students' teamwork skills form which passed IOC value from 0.80 to 0.95
6. Observation teamwork skills form which passed IOC value from 0.80 to 0.95
7. Students' opinion evaluation questionnaire with 5 rating scale passed IOC value from 0.80 to 0.95

Literature Reviews

The Scrum team is a cross-functional team consisting of multi-disciplinary individuals and unclear designated positions. It means that team members must perform many tasks in both functional and aptitude areas toward a common goal. Team members should have enough skill set to do their work and help the team achieve its goals. The study categorized the necessary skills into three categories: technical skills, people or soft skills, and attitudes. The study revealed that soft skills and attitude are essential for Scrum's development team members (Hidayati, Budiardjo, & Purwandari, 2020). In Khmelevsky, Li, and Madnick (2017) study, students are given a mini-project supervised by two lecturers as the supervisors. The project involves developing Agile software using the Scrum method. Various Scrum techniques are used during the course, including sprint, planning poker, stand-up meeting, and retrospective meeting, stand-up meeting and retrospective meeting. The study found that students and stakeholders are satisfied with the project and willing to use Agile software development in future projects. Teamwork is important and useful for working (Lantz, Ulber, & Friedrich, 2019). In addition, it's helpful for systematic work, enabling researcher to have concepts in applying principal of development agile software under popular framework called "scrum" framework. The concept will cause the students to express opinion about what they desire to learn by themselves, learn from experience and take action in teamwork condition, exchange the knowledge among their team. Furthermore, this is the motivation generating knowledge integration to build new knowledge and discovers problem solving procedure by themselves accurately and efficiently. The learning activities which created through online classroom management system channel is the activities management emphasizing on seeking knowledge together with using information technology in interaction to concatenate the students. The activities have several tools in order to facilitate sharing internet connection focusing on creating online community for the group that want to exchange their interesting information and activities or whoever searching others' information that have the same interest Casal (2019) called online classroom management system in which the lecturer provided and applied problem solving procedure by seeking information technology to teaching procedure consistent that achievement and satisfaction from using online social community as a tool found that learning achievement after learning was higher than before learning because the students had done their interesting activities following learning plan that quickly receive information and knowledge Liangpanit (2012) also they have courage to exchange opinion, inquire and have enthusiastic to study by themselves through using supporting education tool. Orazbekuly (2021) Preparing future teachers to independently address the tasks related to introducing ICT in the inclusive educational process. Formation of students' readiness for information of the educational process in a particular educational institution and educational sphere as a whole. In the course of practical training, 4th year students must address the following tasks within the framework of a special school: (1) to organize students' independent work with the use of information tools; (2) to monitor the students' success of using ICT in the process of practical or creative activities; and (3) to determine the applicability of using the material from the Internet to prepare the lesson and present information.

Methodology

In this research methodology, we had divided into 3 steps.

A. Step 1 was creating and seeking E1/E2 following agile software development concept together with online classroom management system to support teamwork in the students in department of Animation and Digital Media. This step has following procedure.
1) Studied and analyzed creating activities plan from related document and research both in Thailand and foreign and apply it to create activity management plan.
2) Studied the form of creating the activities both Thai research and foreign researches in order to apply it in creating studying by activities because principle of agile software development is the method which giving an opportunity to the students to participate in learning procedure by themselves and take part in the team. This creates responsibility and discipline in work and integrates knowledge by themselves and working team so that they can generate knowledge to themselves and team, emphasizing on interpersonal communication, and able to quickly solve problem together under scrum framework.
3) Studied and analyzed content, element of the lesson, scope of the content of the activities together with online classroom management system ClassStart in order to support teamwork. We

researched detailed information; analyzed the studying content from manuals, teaching documents, books, and website including; and asked for advice from the content experts.
4) Determined the studying activities following designed activities together with ClassStart and then presented it to 9 the experts with quality evaluation form. The mean mustn't be less than 3.50 and if there're any comments from the experts, must improve by editing and present it again.
5) Tested with the individual experimental group, small experimental group, and large experimental group which weren't the sample and applied it with 15 students of the sample to determine E1/E2 passed digital media development activities system following agile software development concept together with online classroom management system: ordering pictures, editing digital media in order to support teamwork.
6) Gathered information and analyzed information with mean and standard deviation.
B. Step 2 was evaluating teamwork skills of the students from creating digital media development activities following agile software development concept together with online classroom management system to support teamwork. This step has following procedure.
1) Prepared the sample and instrument of the experiment and created the activities.
2) Set up studying following creating activity plan with the sample group, 15 students: divided into 3 groups each group had 5 students per group, spending 6 weeks in the experiment.
3) At the end of the experiment, we let the students do teamwork measurement form. The lecturer evaluated by observing teamwork skills.
4) Gathered data and brought it to analyze the result by using mean and standard deviation
C. Step 3 Evaluating students' opinion toward digital media development activities following agile software development concept together with online classroom management system to support teamwork as follows:
1) After creating activities experiment, we distributed opinion evaluation form to the students.
2) Gathering opinion evaluation form and analyzing data by using mean and standard deviation.

Results and discussions

The research result were as follows:

The result of creating and finding E1/E2

1. The result of creating activities plan, compose of the followings: (1) Backlog activities: mission which have to act on team's need then the product owner will be the judge who brings the mission into Sprint by priority. (2) Sprint phase: consignment which has to achieve in each round. Members of the team have to report progression. (3) Daily scrum meeting: members of the team have to inform trouble, problem solving method, working progression to the team every day. (4) Sprint review meeting: on the due date of consignment, it has to match with the determined activity mission. (5) Backlog retrospective meeting: altogether consider the mistake of work and improve in order to bring it to next round of Backlog. Online classroom management system used was ClassStart, we determined to use it as channel of teaching management which composes of 4 activities: (1) Orientation activities was used to present rules and learning suggestion; (2) Pre-test activities created link to connect with online pre-test; (3) Learning exchange activities and summary of determining channel to submission of work according to schedule; and (4) Interaction between lecturers and students, and evaluation of using channel activities. Creating studying activities was for setting up digital media development activities following agile concept. Researchers applied developing team concept of Tuckman (1965) to teamwork part. It was consists of 5 steps: combination, thinking combination, mutual agreement, working together, and team disintegration.

2. The result of E1/E2 shows that the result of quality evaluation of the experts was at high level ($\overline{\mathbf{X}}$ = 4.23, S.D. = 0.64), and evaluation efficiency with the sample 15 students, has efficiency 80.44/80.67, according to determined criterion 80/80. This shows that they can apply organizing learning activities to the studying as shown in table 1 and table 2.

Table 1
The result of E1/E2 by the experts (N=9)

Topics	avg. (SD)	interpret
Expecting studying results		
1. Expecting studying results of creating activities plan following agile concept has clearance	4.33 (0.50)	high
2. Expecting studying results of creating activities plan has possibility and value enough to practice	4.22 (0.44)	high
3. Expecting studying results of creating activities plan has suitability with the students	4.22 (0.67)	high
4. Expecting studying results of creating activities plan has character that integrate with the students	4.11 (0.78)	high
average	4.22 (0.59)	high
Developing media activities		
5. Digital media development activities following agile concept has possibility to make the students achieve expecting learning results	4.22 (0.44)	high
6. Digital media development activities following agile concept mainly abided by the students and used teaching method which emphasized on the students as the center	4.11 (0.60)	high
7. Digital media development activities following agile concept has consistency with evaluation form	4.56 (0.53)	high
8. Digital media development activities following agile concept has diversity	4.11 (0.78)	high
9. Determined time proper with digital media development activities following agile concept	4.33 (0.71)	high
10. Applied online classroom management system has good interaction with the students	4.22 (0.83)	high
11. Online classroom management system has the activities that suit to the students	4.00 (0.50)	high
average	4.22 (0.63)	high
Measure methodology and evaluation		
12. Measure and evaluation methodology matched with expecting studying results	4.33 (0.71)	high
13. Measure and evaluation methodology covered expecting studying results and content structure	4.00 (0.71)	high
14. Measure and evaluation methodology emphasized on real condition assessment	4.22 (0.83)	high
15. Measure and evaluation methodology used diversity procedure	4.56 (0.71)	highest
average	4.22 (0.63)	high
Knowledge document		
16. Knowledge document has complete accurate content	4.22 (0.67)	high
17. Knowledge document has continual content	4.11 (0.60)	high
18. Knowledge document has content which suits for determined time	4.22 (0.83)	high
19. Knowledge document has content that corresponds with expecting studying results	4.56 (0.53)	highest
Total average	4.23 (0.64)	high

Table 2
The result of E1/E2 (N=15)

List	N	Full score	Total score	E1/E2
Procedure efficient (E1)	15	30	362	80.44
Result efficient (E2)	15	30	484	80.67

Table 3
The result of evaluating students' teamwork skills (N=15)

Topics	avg. (SD)	interpret
1. Determining purpose and expectation clearly	4.07 (0.49)	moderate
2. Determining role and responsibility clearly	4.40 (0.83)	high
3. Having the documents that specified rule and concept which have to abide by clearly	3.73 (0.59)	high
4. Having opened communication circumstance which is reliable and respectful among the team	3.67 (0.72)	high
5. Having learning and continual developing required skills	3.60 (0.51)	high
6. Having conflict management, patience, and well supporting cooperation	4.00 (0.85)	high
7. Rewarding or praising both individuals and team	3.47 (0.74)	moderate
8. Desire to improve, and develop continuously	4.33 (0.82)	high
9. Members in the team can get along well, no one exaggerate or make the problem	3.27 (0.70)	moderate
10. When most of members in the team agreed with the same resolution, every one willingly supports it	3.47 (0.74)	moderate
11. Members in the team are flexible, generous and dependable	3.80 (0.41)	high
12. Members in the team feel that "we are in the same boat"	4.80 (0.56)	highest
13. Members in the team proud in being the member of the team	3.80 (0.41)	high
14. Members in the team immediately helped each other when the critical incident happened without any request from the member	4.07 (0.46)	high
Total average	3.85 (0.76)	high

Table 4
The results of evaluating teamwork by observation from the lecturer, 5 groups.

Topics	avg. (SD)	interpret
1. Attention of the students	4.20 (0.45)	high
2. Opinion expression of the students	3.60 (0.55)	high
3. Answering question of the students	3.40 (0.55)	moderate
4. Acceptance of other's opinion of the students	4.00 (0.71)	high
5. Working intention of the students	4.20 (0.45)	high
6. Working as assigned of the students	4.40 (0.55)	highest
7. Participation in discussion of the students	3.80 (0.45)	high
Total average	3.94 (0.59)	high

The result evaluating teamwork in the students

The result of evaluating teamwork skills in the students during learning shows that the students' opinion during learning toward learning activities was at high level ($\bar{x}$ = 4.16, S.D.= 0.70) as shown in table 5.

Table 5
The results of evaluating teamwork of the students (N=15)

Topics	avg. (SD)	interpret
Studying management		
1. Circumstance of studying opened the chance to the students to participated in doing the activities	4.07 (0.59)	high
2. Circumstance of studying made the students have responsibility to themselves and the group	4.40 (0.74)	high
3. Circumstance of studying opened the chance to the students doing the activities independently	4.13 (0.64)	high
4. Circumstance of studying made the students think in various way	4.20 (0.77)	high
average	4.23 (0.68)	high

Topics	avg. (SD)	interpret
Studying activities		
5. Studying activities appropriated with the content	4.13 (0.64)	high
6. Studying activities supported the student to exchange their knowledge and opinion	4.07 (0.80)	high
7. Studying activities supported thinking and decision	4.13 (0.64)	highest
8. Studying activities made the students dare to think and answer	4.40 (0.74)	high
9. Studying activities made the students have a chance to express their opinion	4.13 (0.83)	high
10. Studying activities made the students understand the content increasingly	3.93 (0.88)	high
11. Studying activities supported learning together	4.00 (0.53)	high
average	4.21 (0.63)	high
Acquired benefit		
12. Studying management made the students understand the content easily	4.33 (0.62)	high
13. Studying management made the students remember the content for a long time	3.87 (0.52)	high
14. Studying management helped the students create knowledge, understanding by themselves	4.20 (0.41)	high
15. Studying management made the students apply learning method to other courses	4.07 (0.59)	high
16. Studying management made the students develop thinking skills to higher level	4.13 (0.83)	high
17. Studying management helped the students make a decision reasonably	4.20 (0.86)	high
18. Studying management made the students understand and know more friends	4.33 (0.82)	high
19. Knowledge document has content that corresponds with expecting studying results	4.27 (0.70)	highest
average	4.18 (0.68)	high
Total average	4.16 (0.68)	high

Discussions

The results found that this learning plan has efficiency following set up hypothesis also shows that we can apply this digital media development activities plan to digital media development studying. That because we applied agile software development concept under Scrum framework which compose of following activities: Backlog, Sprint phase, Daily scrum meeting, Sprint review meeting, and Retrospective meeting that following the result of evaluating teamwork which

hypothesis had been set up. The researchers found that the sample group had improved teamwork skills in better direction since digital media development activities following agile software development concept is the activities that making the student work together as group following assigned work. The students defined duties in the team that need to exchange knowledge from interaction in the team every day. The students receive motivation, suggestion, and problem solving from the lecturer consistent with the research result of Sakulviriyakitkul, Sintanakul, and Srisomphan (2020) and Jalinus, Syahril, Nabawi, and Arbi (2020) with apply developing team procedure 5 step of Tuckman (1965) combination, thinking combination, mutual agreement, working together, and team disintegration to develop the team. This made teamwork in the students is in good criteria. Applying online classroom management system ClassStart to communication tool, data transmission, and data storage made communication among the team and between the student and the lectures can consult easier, quicker, and more comfortable than regular channel. This causes better working within the team, consistent with the research result of bin Nordin, Iqbal, and Bajwa (2021) about studying activities by team learning procedure that using the problem as base through online connection also found that we can apply it widely in online academic matter society. The students can learn through studying activities which happen during interaction in society. Interaction procedure in society generates knowledge, skills and attitude which can be observed. Team can learn from studying various situations which occurred from social studying in order to improve, develop teamwork and cause teamwork in the end. The result of opinion evaluation of the students during studying toward digital media development activities following agile software development concept together with online classroom management system to support teamwork of the student in department of Animation and Digital Media. The overview result of the students was at high level, consistent with set up hypothesis. In addition, we asked the students and found that the students had knowledge in the course increasingly. The student saw the importance of teamwork and saw that they had higher teamwork skills, accepting others' opinion, controlling emotion, seeing teamwork was useful and can apply to daily life (Boyles, 2012). We found that satisfy rate in creating the activities through online system was at high level because we designed challenged studying plan which meets the students' need. This caused the students especially interested in it corresponding (Hidayati et al., 2020). Moreover, applying Scrum framework to work as group efficiently, corresponding with Khmelevsky et al. (2017) finding that they satisfied with special studying management for the exchanged students by using agile software development concept and project management in Scrum framework.

Conclusion

The study of digital media development activities with agile software development and online classroom management system to promote students teamwork skills, researchers use agile software development concept together with online classroom management system to integrate with the students' studying and supporting the students' teamwork. Moreover, this method leads to develop quality and efficient studying in Bachelor's degree continuously. In the methodology, we had divided into 3 steps as follows. (1) Creating and seeking E1/E2 following agile software development concept together with online classroom management system to support teamwork in the students in department of Animation and Digital Media. (2) Evaluation of teamwork skills of the students from creating digital media development activities. (3) Evaluation students' opinion toward digital media development activities. The result of E1/E2 has efficiency 80.44/80.67. The result of the students' opinion during learning toward learning activities was at high level.

Suggestions for the study

Suggestions in applying research result

1. The lecturer should have to well prepare, have time, have patience to look after the learning activity and need to have good knowledge of organizing system in order to be a consultant providing convenience and rapidity. Creating orientation in the students before entering to the activities was used for providing knowledge and understanding in online classroom management system ClassStart very well. Because if the students lack of knowledge and mentioned ability,

provided studying activities won't able to support teamwork of the students or it may be obstruct or problem in studying, causes tardiness, and carries out the activities which not following the specified procedure.
2. The lecturer applied research result to other studying courses in order that the students have knowledge, create studying experience, and able to develop and support the students to study by themselves. It opens the opportunity to the students to choose working in interested topic and accept choosing team's interested topic.

Suggestions for further study

1. Should compare the result of student in 2 groups: controlled group and regular group
2. Should create digital media development activities which affecting to skills development and desirable attribute of the students in 21st century
3. Apply research result to support learning of the students in everywhere, every time, generating studying continuously in whole life.

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