Developing science learning activities using online gamification

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Abstract. The developing science learning activities using online gamification is a method of teachers instructional to students for effectiveness learning. This become a documentary study and interview with the key informant of science teachers to collection data for analyzed factors and learning strategies. Five key factors included gamification, collaborative learning, scaffolding learning, assessment, and learning resources. And, learning strategies of 5th steps include activation, arrangement, adventure, approval, and assertion.

Keywords: Developing science learning activities, online gamification.

1. Introduction

Teaching development to effective education system, process, skills and competencies, knowledge-based society living with moral and harmony for learning management to students of learning successfully. Educational movement for Thailand 4.0, in the 2th National Economic and Social Development Plan A.C.2017-2021 (B.E. 2560-2564) states the strategies a major guidelines to adjusting values have to the moral, ethics, disciplined and the public minds, desirable behaviors, developing potential regarding knowledge, skills and capacities a well-being, shifting quality of education and life-long learning. Education is regarded as a key success factor in driving Thailand 4.0 especially the human capital building and development [1]. Vision that all Thai’s are deserved for quality education and life-long learning, living with happiness being aligned with the sufficient-economy philosophy and 21st century changes. Requires systematic management of used of the education-driven planning to the successful and can be converted to the practice as a procedure for problem solving and development [2]. Social change flows that occurring in the 21st century to teachers affecting be alerted and prepare for learning management to enhancement of the students were readiness in living skills, learning skills, and life skills. Education quality development to continuous an important mechanism for affecting to enhancement of educational to a pace with changes in 21st century of the knowledge integrated, including specialized skills and expertise [3], [15].

Learning skills were knowledge abilities of self, various techniques and methods based on analytical process and decisions, accessed of technological in learning to effectiveness. The changing due to technological advanced for driven of knowledge data system and innovation, so that the peoples with knowledge and skills in dealing with the changes that have occurred, able to adapted for new situations therefore will be successful [4]. Collaborative learning were the students skills by teachers must be encouraged students, effectively communicate of a new ideas, open mind, accept opinions and new worldviews, include the leader in jobs creation [5]. Encouraging to students for learning and working with others were instructional models for enhancing to achievement motivation and learning relationship, role play and participation in the learning activities, the learning experiences
consistent, include learning challenges of students having to compete harder than ever for students’ attention against cool social media sites, mobile apps, video games, web surfing, messaging, etc., teachers are struggling to find new ways to motivate and engage learners.

Gamification offers a promising framework for educational interventions that can increase students’ motivation and engagement. Gamification of learning refers to making learning experiences. Increasingly attracts the interest of teachers due to promise a foster motivation and behavioral changes in learning contexts [6]. Learning management technical for students supporting as developed a collaborative behaviors and achievement motivation was learning management of “Gamification” was the concepts and mechanics of arranging the gaming environments to adapted for activities in real world. Gamification were the scores, levels, badges, virtual, gifting, trading for instructional of teaching designs can be the motivated and learning interested of the students. A organizing of the learning activities with “Gamification” able to students have the ideas exchange and discussion with groups to highest. Developing science learning activities using online gamification on learning management for students to effectiveness.

Research Objective: The main in the objective/goal was to Analyzed the developing science learning activities using online gamification on a factor and learning strategic for teaching.

2. The literature review

2.1. A Developing Teacher Learning to Leadership

Is widely accepted that the school principal pays a crucial role in organizing and supporting the professional development of teachers. Indeed development of professional learning community, learning culture [7]. Since teachers have the most direct, sustained contact with students, as well as considerable control over what is taught and the climate for learning, that is reasonably assumed for improving teachers’ knowledge, skills and dispositions is one of most critical steps to improving student achievement.

2.2. The Technological Literacy for Teaching

Technological literacy for teaching to students throughout the world by ensuring educators are using technology in every aspect of their teaching. More students are familiar not only with learning about technology but learning with technology, the more they will be prepared to use technology to improve their lives. The framework has been used worldwide to develop ICT in education policy, teacher standards, assessment criteria, curriculum design. In their classrooms when providing ICT education [8] were to, a) describe and demonstrate the basic tasks and uses of word processors, such as text entry, editing text, formatting text and printing, describe and demonstrate the purpose and basic features of presentation software and other digital resources, b) describe the purpose and basic function of graphic software and use a graphic software package to create a simple graphic display, c) Describe the Internet and the World Wide Web, elaborate on their uses, and describe how a browser works and use URL to access a website, use a search engine, d) Create an email account and use it for a sustained series of email correspondence, using common to communication and collaboration technologies, such as (email), text messaging, video conferencing, and web-based collaboration and social environments, e) using networked record keeping software to take attendance, submit grades, and maintain student records, f) the locate off-the-shelf packages, tutorial, drill and practice software and Web resources for their accuracy and alignment with Curriculum Standards and match them to the needs of specific students. Technological literacy is related to digital literacy in that when an individual is proficient in using computers and other digital devices to access the Internet, digital literacy gives them the ability to use the Internet to discover, review, evaluate, create, and use information via various digital platforms, such as web browsers, databases, online journals, magazines, newspapers, blogs, and social media sites.
2.3. Gamification For Instructional

Gamification was defined as the use of game design elements in nongame contexts. The first gamified learning systems were created by introducing game mechanics for incentives, immediate feedback, and rewards to the classroom of an instruction [9]. More recent implementations are incorporating game-like elements, choice systems, narratives, progress bars, that gamification systems are still commonly associated with points, badges and leaderboards. Online gamification for instructional is about transforming the environment and regular activities into the students of game. It is about creating a game out of things that are not normally thought of that way, reinforces content, but also has the potential to profoundly impact classroom management, about collaboration and teamwork. Sometimes students are battling each other, and sometimes they are working together, but they are always learning, a long-term, consistent series of events that require quite a bit of prep work by the teacher, but has the potential to reinforce content and engage all learners in new ways.

3. Research methodology

3.1. Data Method

The research employed a qualitative, multi-sit case study design. Asserted, Case study is used to gain in–depth understanding replete with meaning for the subject, focusing on process rather than outcome, on discovery rather than confirmation. The method used a multi- sit research design because evidence from multiple case is often considered more compelling, robust, instrumental than a single- site case study of the data method.

3.2. Sampling

Employed purposeful sampling designed to information-rich case whose study will illuminate the questions under study. Fifty science teachers in ten school were identified that had been deemed to be effective in the secondary education service area office of the basic education committee office, Thailand. The participants was multi stage random sampling of the data.

3.3. Data Collection

This the qualitative data employed a review of documentary and drawn from semi- structure interviews, open-ended questionnaire with science teachers that focused on teachers’ needs and motivations as well as the developing science learning activities using online gamification. In order to gain future details and check on what had been reported in the interviews of the instrument on current to learning management of classroom, the problems in learning management of classroom, the needs in learning management, using technology digital media to study the factors, and training to teaching activities of online gamification with science teachers to study the learning strategies in data collection.

3.4. Data Analysis

The data analysis for developing science learning activities using online gamification was analyzed by using three main stages, i.e., data reduction, data organization, data interpretation to conclusion.

4. The Findings

The findings of developing science learning activities using online gamification on the factors and learning strategies to shown on figure 1.
4.1. Factors on Developing Science Learning Activities Using Online Gamification:

1. Gamification: The designs and determine in learning management environments of gamification. Which a design under a gamification principle were to games mechanism in rating and interaction rules of system (e.g., points accumulation, tracking the ability of learners, bonus points, the success levels of the learners and teams), games action (e.g., chronology to responses of the learners, scores, competition, responding to other learners, activities collaborative), aesthetics creating (e.g., lessons system designing to suitable of learners groups, color, beauty, ushering interface), social motivations to a social networks between learners, groups targeting in learners of learning activities subjects, and objectives determination for clearly and can be evaluated.

2. Collaborative Learning: A factor for supporting of learning cooperation for role controlled and duties of the learners include personnel and group members, and tools supported for team work in process management and facilities of computer network communication to team management form classifying the students in teams of collaborative learning online gamification a description (e.g., basic knowledge level of measurement with the testing, teams management from dividing the learners by assortments), communications to synchronous of communicate between messenger to occur in simultaneously, and asynchronous of communicate between messenger to occur is not happening at the same time.

3. Scaffolding Learning: Is helping and supporting for promotion of images in students learning according a strategic to modeling is part of the training camps, which allows students for understanding in processes and procedures of the lessons instructional which the steps have rules, an experience accumulations, and vocabulary showing the contents of the learning missions, think - aloud is teachers followed students learning on making a learning missions.

4. Assessment: Used to authentic including formative assessment from tracking the answers in each steps of instructional, learning activities to feedback effecting, the process by self-assessment of students.
5. Learning Resources: Is the data collection, learning contents, learning documentary, and various types of media used to support the learning missions, and defined problem situations.

4.2. Learning Strategies on Developing Science Learning Activities Using Online Gamification:

1. Activation: A step to stimulate interest using media related to the situation found in real life, consists of two steps were to clarifying learning target is step to clarification of learning objectives, contents overview, basic learning skills and target skills, learning missions, conditions for receiving experience fee, bonus, badges, life energy, levels promotion, and teams ranking, engagement is a step to review the previous knowledge in contents for learning of students through activities of bill work by using media that is consistent with the objectives to presented the students.

2. Arrangement: A step that the learners analyzed and create ideas for solving problems for used as basic information into problem solving with teams, consists of three steps were to considering problems, a step that the learner faces, problems, and assess solutions, the something that the learners has already knows and to learn a hardly, by using the views and experiences of individual learners, meeting informations, a step that learners on learning a new knowledge in contents of learning medias, revising answers, a step that the learner summarizes the way to do the mission, which is the results of the solution in basic missions to combined with new knowledge that studies, improved the answers of self.

3. Adventure: A step that each teams makes a decision for dividing members into the sub-groups and working for a successful, consists of two steps were assigning, a step each team of learners receives a learning missions, then share the responsibility of members to level skills of difficulty, b) achieving task, a step that learners in the sub-groups, together for learning missions in assigned, by using cooperation process of learning.

4. Approval: Process for presenting of team's solution to leads the successful in classroom, together summaries to solution on the most effective, consists of three steps to presentation, evaluation, and discussion.

5 Assertion: A review process of learning, mission practices and summary of learning (e.g., reviewing achievement, assessing overall practices).

5. Discussions
Developing science learning activities using online gamification for instructional in a “Key” of 5th factors were to gamification, collaborative learning, scaffolding learning, assessment, and learning resources, and learning strategies into a “Step” of 5th steps include activation, arrangement, adventure, approval, and assertion. Is about transforming the environment and regular activities into the students has the potential to profoundly impact classroom management, about collaboration and teamwork to sustainability. According, Garfield [10] the answer boards, sending messages short (SMS), and electronic mailing (email). Fernandez- Luna [11] gave suggestions through online teaching, using the questions, prompts and clues is giving advice and method of troubleshoot between learning workload in sub-groups, by this help will be stopping when students is able to absorb the planning and the steps are successful [12]. Zimbrick [13] discussed creating an interesting to learning environment and linking content to evens of learning management on gamification can be supported and enhancing to the student for learning activities of effectiveness. Summative assessment from the final achievement assessment after completed the learning process also,
teams experience will be grading of leaderboard, which is a source of information provided for students to study independently, there should be in the form of online documents and that link to other external sources via internet search to discusses creating an interesting to learning environment and linking content to evens of learning management on gamification can be supported and enhancing to the student for learning activities. Fernandes et al. [14] added that teaching and learning using gamification, the students have a higher ability to work as teams. And it helps a penetrate issues of interesting, and alternatives introduction of students for learning activities as linking knowledge and ideas to the problems solving of learning, adapting instructional materials, dividing skills to sub skills, break challenge levels of learning missions for students have a chosen to practice.

6. Conclusion
Developing science learning activities using online gamification was to the conceptual framework for instructional of science teachers on teaching to students have to education successful into the factors of gamification, collaborative learning, scaffolding learning, assessment, and learning resources, and learning strategies including activation, arrangement, adventure, approval, and assertion. In the activities through learning with online gamification for ability development including the motivation, learning attachment, learning skills, responsibility for learning missions, and achievement, collaborative learning, learning environment of gamification to application for learning management in a key elements as game mechanism, game operation, aesthetics, social motivation, target, and objective gamification system into a “Key” of 5th factors were to gamification, collaborative learning, scaffolding learning, assessment, and learning resources. And learning strategies into a “Step” of 5th steps were to activation, arrangement, adventure, approval, and assertion.

The developing science learning activities using online gamification for learning management must be ready for the instructors, learners, basic structure, information technology and communication.

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