

Proposal of Learning Support SNS Utilizing Gamification

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Abstract. Recently, a learning support system using the internet is often used in the field of education. However, many of them focus only on improving academic ability and communication among students. Also, as education problem in Japan, there is a lack of voluntary and learning motivation. In this research, we aim to propose a system to promote student's self-learning motivation to learn and establishment of learning habits. The proposed system enables well communication not only among students but also between students and teachers. We also utilize gamification for the proposed system. We believe that propose system can effectively promote student's self-learning motivation and establishment of learning habits. Finally, we describe an experiment plan using the propose system.

Keywords: E-learning · Gamification · Social networking service Motivation management

1 Introduction

Recently, as a problem of education in Japan, it is often mentioned that voluntary and sustained learning motivation is lacking [1]. Lack of voluntary and learning motivation leads to a decrease in motivation for self-learning. Currently, there is "assignment" as a method for cram schools and schools to participate in self-learning at home. However, with "assignment" alone, it is not possible to solve the problem of a decrease in motivation for student's self-learning. In this situation, junior high school and high school students who are using social networking services (SNSs) such as Twitter and Instagram for self-learning are on the rise. From the survey by the school corporation Takamiya Gakuen Yoyogi Seminar, 57% of preparatory students have shown that they use SNSs for self-learning (Fig. 1) [2]. According to a questionnaire survey conducted by Asahi Student Newspaper in 2017, the main reason why junior high school students and high school students use SNS for self-learning are "information gathering" and "solving unknown things". Besides that, "Increase motivation" accounts for about 50%

(Fig. 2) [3]. From these surveys, it is common for junior high and high school students to use SNSs for self-learning. Moreover, it can be seen that SNSs functions not only as a solving unknown things and information gathering purpose but also as a system for increasing motivation. Besides SNSs, there are many researches on systems aiming at learning support [4–7]. However, many of these systems are often focused on improving academic ability [4]. We think that improvement of academic ability is the result of improvement of motivation for self-learning and establishment of self-learning habit. Therefore, in this research we propose a system focusing on improvement of motivation for self-learning habits for student.

This paper is organized as follows. In Sect. 2, we describe the purpose of our research. In Sect. 3, we introduce the previous research and gamification. In Sect. 4, we describe preliminary surveys for teachers who are instructing junior high school students and clarify more detailed subjects. In Sect. 5 we explain the outline of SNSs



Fig. 1. Question about effectiveness of SNSs for self-learning [3]



Fig. 2. Purpose of utilizing SNSs for study (multiple answers) [3]

utilizing the gamification propose in our research. In Sect. 6, we explain the outline of experimental design using proposed system. Finally, we describe conclusion and future works with Sect. 7.

2 Purpose of Our Research

In this research, we propose a system to increase student's motivation to self-learning and establishment of self-learning habits. The system is created based on gamification methods and SNSs elements. We explain gamification methods in Sect. 3.1. First of all, we conduct questionnaire survey for teachers on the proposed system and problems. Next, we propose a system. Finally, we propose an experimental plan for junior high school students.

3 Previous Researches Related to Our Research

In this section, we introduce previous researches related to this research. Hatsugai and Iyoda developed an application that utilizes gamification such as giving experience points by solving question [4]. They conducted experiments from junior high school students to college students. In the experiment, they verified the effect on computing capacity by using the proposed application. The result gained educational effect, such as improvement of correct answer rate in calculation test.

Sasaki and Sasakura examined whether learning opportunities and student satisfaction are improved by introducing SNS into university lessons [5]. As a result, learning opportunities and satisfaction of students improved by using SNS. However, the problem of the gap between teacher's burden and merit became clear.

Hanes and Fox compared the motivation and academic achievement in the university class with the group using gamification and the group not using it [6]. Results were showed effect in the group utilizing gamification. However, there were cases where the game elements did not lead to essential motivation and the satisfaction degree was lowered in some cases. The conclusion suggested that it is necessary to use appropriate game elements according to the purpose.

3.1 Gamification

Gamification is method that induces voluntary and sustainable behavioral change. Gamification is defined as "to use gaming elements, such as concept, design, and mechanics of a game, for social activities or services other than the game itself" [7]. This method has been drawing attention since around 2010. The following seven methods are included as the Gamification [7].

- Honorific badges or titles are given according to achievements
- · Names and scores of competitors are displayed on a real-time basis
- The graphic interface shows the progress of each task
- · Virtual currency is introduced to promote purchases of virtual goods
- Rewards such as coupons or gifts are provided

- Assignments that encourage users to collaborate together are presented
- Simple games are prepared between activities in order to keep users from being bored

Gamification is now applied in a wide range of fields including marketing and education. Foursquare is a representative service using Gamification [8]. Foursquare is a web service based on location information that allows registered users to connect with friends and update their locations. There are few Gamification such as badge, which is given when checking in to a specific place (Fig. 3). Foursquare makes users compete with badges and scoring points. This has triggered the user to visit various places.



Fig. 3. Foursquare's play screen showing the specific place

4 Preliminary Survey

In order to clarify current problems about student's self-learning, we conducted questionnaires to 16 teachers who are teaching at junior high school. The question items are shown in Table 1.

Question	Contents of question	
1	Do you think self-learning is necessary?	
2	How do you feel about students' awareness of self-learning?	
3	Do you think students are studying hard while they are in a cram school?	
4	What is the reason why students can study hard while in a cram school?	
5	Are students working hard to self-learning?	
6	What do you think is the reason why students do not self-learning hard?	
7	Can you able to grasp and manage the student's learning situation outside the	
	class?	

Table 1. Questions for preliminary survey

From the results of questionnaires, 87.6% of teachers answered that "Strongly Agree" or "Agree" in response to the question "Do you think self-learning is necessary?" (Fig. 4). However, no one answered that "Very high" or "High" in response to the question "How do you feel about students' awareness of self-learning?" (Fig. 5). From the result, we think that there is a present situation that students are not positively working on self-learning which is thought to be necessary.



Fig. 4. Result of question 1: Do you think self-learning is necessary?



Fig. 5. Result of question 2: How do you feel about students' awareness of self-learning?

No one answered "Disagree" or "Strongly Disagree" in response to the question "Do you think students are studying hard while they are in a cram school?" (Fig. 6). Also, in response to the question "What is the reason why students can study hard while in a cram school?", About 50% of teachers answered "teacher encouragement" or "teacher's commentary for study" for the reason. From this result, we think that prompt feed-back from the teachers on learning can be considered as a reason for studying hard in the cram school. On the other hand, only 31.3% of teachers answered "Agree" response to the question "Are students working hard to self-learning?" (Fig. 7). The



Fig. 6. Result of question 3: Do you think students are studying hard while they are in a cram school?



Fig. 7. Result of question 5: Are students working hard to self-learning?

answer to the question "The reason why the students are not working hard to self-learning" is that "Students do not think that have to study", "Students cannot see other students studying", "Students cannot enjoy self-learning".

31.3% answered "Not be both", 62.5% answered "Only grasping" in the question "Are you able to grasp and manage the student's learning situation outside the class?" (Fig. 8). It is difficult for the teachers to make appropriate guidance in the class in a situation where students' self-learning is not grasp and manage.

Based on these results of questionnaires, there are four problems at present such as "motivation for self-learning is weak", "No prompt feedback for self-learning", "situation other than self cannot be grasped" and "The teacher cannot grasp/manage the student's self-learning". In this research, we propose a system to solve these problems.



Fig. 8. Result of question 7: Can you grasp and manage the learning situation of the students outside the class?

5 Outline of Proposed System

The system proposed in this research mainly consists of the following five functions. A detailed explanation of the five functions will be described later.

- Function 1: Changing character and title according to level
- Function 2: Visualization of system usage
- Function 3: Present and share rankings by user's level
- Function 4: Sharing information on other students
- Function 5: Encourage comments from teachers and likes from other users.

The system image is shown in Fig. 9.



Fig. 9. Image of the propose system

5.1 Changing Character and Title Using Experience Points

We implemented the function that the level is improved by accumulating the experience value given by each action, and the character and title displayed on the user's My Page are changed according to the level (Fig. 10). The purpose of this function is to let the user feel visual growth as well as numerical values.

This function is expected to improve the problem of "motivation for self-learning is weak", "No prompt feedback for self-learning".



Fig. 10. Changing characters and title using experience points

5.2 Visualization of System Usage

The function to display the total number of logins and likes, the current level, my posts, posts that pushed favorites on the user's My Page were implemented in the proposed system (Fig. 11). The purpose of this function is visualization of system usage. As the



Fig. 11. Visualization of system usage

result, we think that users can obtain self-learning situation and learning situation of other students.

This function is expected to the improve the problem of "motivation for self-learning is weak" and "Studying situation other than self cannot be grasped".

5.3 Present and Share Ranking by User's Level

By competing with other users, we implemented a function that encourages users to self-learning (Fig. 12). This function is expected to improve the problem of "motivation for self-learning is weak" and "Studying situation other than self cannot be grasped".



Fig. 12. Present and share ranking by user's level

5.4 Sharing Information on Other Students

In order to reduce the sense that students study independently, we introduced the function to display posts of all other users in chronological order like Twitter timeline (Fig. 13). This function is expected to improve the problem "Studying situation other than self cannot be grasped", "The teacher cannot grasp/manage the student's self-learning".

5.5 Encourage Comments from Teachers and Likes from Other Users

We have introduced a function to "likes" each user's posts and a function to allow students to comment on posts (Fig. 14). The purpose of this function is student's user maintains motivation of self-learning by "like" from other users and encourage comments from teachers. This function is expected to improve the problem of "motivation for self-learning is weak", "No prompt feedback for self-learning".



Fig. 13. Sharing information on other students



Fig. 14. Encourage comments from teachers and likes from other users

6 Outline of Experimental Plan

We will conduct a verification experiment at a cram school using the system pro-posed in Sect. 5. We describe outline of the experimental plan. This experiment covers junior high school students. Subjects are divide into "Groups using proposed Sys-tem" and "Groups not using proposed System". This experiment carries out for 2 months. During the experiment period, subjects are gathered once a week and lecture are held face to face. The content of the lecture is as shown in Table 2.

In the first lecture, we will conduct a questionnaire survey on current learning situations and awareness of study, academic ability test, presentation of tasks during the experiment, and explanation of how to use the system. For the second and subsequent lecture, we conduct weekly tests and investigate the progress of the task. In the last lecture, we conduct academic performance test and questionnaire again.

First Lecture	2^{nd} Lecture ~ 7 th Lecture	Last Lecture
Questionnaire survey	Weekly test	Questionnaire survey
Achievement test	Check the progress of the tasks	Achievement test
Presentation of tasks		
How to use the system		

Table 2. Lecture schedule during the experiment

The task presents challenges that are difficult to finish in two months. Then, we compare the progress of task in 2 months with "Groups using proposed System" and "Groups not using proposed System".

Then, we analyze based on the experimental data and verify the effect of the proposed system. For example, we clarify the use situation of the student's system from the access log, and clarify the relation between system using situation, progress of the task and score of the academic ability test can be seen.

7 Conclusion and Future Works

In this research, we have proposed and developed a communication system aimed at improving student's motivation for learning and establishing self-learning habits. In the proposed system, we focused on four problems related to self-learning, which was clarified by preliminary survey, and implemented a function expected to solve them. we think using the proposed system, improvement of motivation for learning and establishment of self-learning habits are expected.

In the future we will proceed with the development of the system and experiment based on the experiment plan. From the experimental results, we examine the influence of the developed system on self-learning.

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