

# A Study on Active Student Learning Through Gamification in A Learning Management System

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## Abstract

Communication between teachers and students is not limited to the physical classroom but has shifted to include the online classroom. A learning management system can aid in providing online teaching and learning. The purpose of this research is to build a Learning Management System which features gamification. Gamification motivates students to learn and makes it easier for teachers to provide materials and give assignments to students. Learning through a Learning Management System can lead to a lack of focus, reduced classroom efficiency, and a feeling of boredom for the learners. One answer to this difficulty is to use gamification like rankings or points, badges, and leader boards to enhance active learning. This study uses a mixed-methods approach and data from monthly reviews and forum discussions, questionnaires, and data students' interviews to assess the implementation of gamification elements in an LMS. The data from the questionnaires were analysed using descriptive statistics, and the data from student interviews were analysed using general inductive analysis. The results show that gamification in an LMS had a positive influence on active learning. The students have also provided positive feedback on the rated monthly review activity. The badges and leader board were also positively accepted by most students. Awarding points for activities was also found to improve students' performance in class. Badges were found to increase students' active participation, and the leader board motivated students to participate actively in online classes. The paper combines the characteristics of gamification with learning and shows the possibilities of use in practical. This study could provide guidance to teachers or institutes to implement gamification in a Learning Management System.

**Keywords:** Learning, learning management system, gamification, active learning, rating, points, badges, leader board

## 1. Introduction

Widespread use of new technologies, such as the Internet, social networks and mobile phones, affects the processes of education at universities. Technology has an important impact on education, making possible both a better communication and the implementation of the newest information systems, useful for learning. It supports individual learning, collaborative learning, learning content management, learning activity management, formal learning, informal learning, and workplace.

Gamification has many elements, including points, badges, leader boards and performance graphs. These elements can be implemented in a Learning Management System. Increasing the efficiency, effectiveness, motivation and engagement of students in e-learning can be achieved by gamification. The use of gamification in the field of learning is growing and gaining in popularity. Barata et al. (2013) suggest that points and badges that can be earned by students may eliminate intrinsic motivation. Davis et al. (2018) analysed active learning strategies to determine the most appropriate ones for digital learning environments and investigated the effectiveness of these strategies. For their study, they combined simulation and gamification into a single category rather than separating them into different categories.

If the teacher gives assignments in the textbook, then students must collect assignments by collecting textbooks that has been given so that students cannot learn further materials at home. It is felt not effective. students are easily

bored with learning that monotonous, so they do not have more motivation to learn.

Based on some of these problems Learning Management System is one of the technological developments that can be used. One of the important components of the teacher's role is to operate student motivation. That is, to increase the level of motivation with the aim of producing positive results, such as tenacity, excellence and outstanding performance. Gamification is the application and use of elements game design into a non-game context. The purpose of this research is to build Learning Management System with Gamification Features, that can make students active to learn and make it easier for teachers to provide material and assignments to students. Active learning is a crucial component of the learning process, as learners should be actively engaged during sessions. Active learning is an approach whereby students participate in the learning process by building knowledge and understanding. Active learning is a broad concept that generally encompasses student-centred learning methods and activities led by a teacher.

The concept of active learning has been around since the early '90s. Although the term covers a broad spectrum of different approaches, its main point is 'learner-centricity.' Active learning's main drive is to put the responsibility of learning at the hands of the learners themselves. Active learning methods, on the other hand, designate the role of facilitator to the teacher. Instead of merely a lecturer, the teacher acts as a guide. The facilitator's task is to let the learners learn on their own through the use of different active training activities.

There are a number of features of active learning, such as developing students' skills involving students in high order

thinking (analysis, synthesis, evaluation), engaging students in activities (reading, discussing, writing), and encouraging students to explore their own attitudes and values. Therefore, in general, active learning is not a learning concept but a teaching concept.

Active learning can include setting questions in an online forum, concept sketching and mapping, and case studies. Whereas Student engagement can be categorized into three components: behavioural engagement, emotional engagement, and cognitive engagement. Gamification is one of the most effective learning strategies for promoting active learning. This study aims to evaluate the impact of the gamification elements points, badges, and a leader board on student learning. Various perspectives can be used to analyse the motivational strength of game elements, including emotional, cognitive, and behavioural perspectives, traits, interests, and self-determination. Research by Khan et al. (2017) showed that active learning strategies often encourage student engagement and have a significant impact on student learning when applied effectively throughout a course.

It is found that gamification can improve motivation and performance. Gamification provides visible benefits in several non-game settings, such as the fields of health and learning and is one of the most effective learning strategies for promoting active learning.

### Data Collection and Analysis

This study uses a mixed-method approach. For this study, the research method and data presentation were separated into three stages due to time limitations, which required that the experiment be carried out in a single semester of lectures.

A points system was implemented in the form of a monthly review. Points were also chosen because they can motivate students to actively participate in monthly reviews by establishing a clear relationship between participants' efforts and their performance. When

implemented, the points system was received positively by the students as a way of increasing active learning.

Badges were introduced. These were earned by students who participated in discussion forums and monthly reviews. Badges were also chosen because they can be awarded as prizes to motivate students to participate more actively in monthly reviews and forum discussions. Badges also received a good response from students and improved active learning.

Leader board was implemented. A leader board was chosen because it can inspire students to maintain their performance and continue to participate in monthly reviews and forum discussions. The leader board also received positive responses from students and increased active learning.

Data on the implementation of the gamification element is taken from replies to monthly reviews and forum discussions, questionnaires, and student interviews. Data from questionnaires and replies were analysed using the descriptive statistics mean and standard deviation. The average (mean) can provide an overall picture of the data set, while the standard deviation shows how scattered the data is by revealing how far each observed value is from the mean. Data from interviews were analysed using general inductive analysis.

Data collection was carried out. An online questionnaire was distributed via a link, which was shared with the batch wise students. The total response of 171 respondents were studied.

Respondents also felt that rating monthly reviews increased active participation in the reviews which is supported by the number of responses on the discussion forum. The use of points was also found to increase respondents' willingness to participate in the reviews, which is evident from the number of forum replies. Likewise, the points system improved students' concentration during online classes because they wanted to earn high points when participating in monthly reviews.

Table 1: Results of the data analysis

Code Deviation	Question	Average	Standard Deviation
Q1	I feel that I have good interaction with lecturers and teaching assistants in the rated monthly review activities.	3.70	0.86
Q2	I feel more involved in the class by participating in the rated monthly review.	4.10	0.74
Q3	I feel that using ratings increases active participation in the monthly review.	3.99	0.91
Q4	Using ratings increases my willingness to participate in the monthly review.	3.95	0.94
Q5	To perform well in the rated monthly review, I concentrate more during online classes.	3.83	0.9
Q6	I feel it is important to get badges.	3.88	0.88
Q7	I love getting badges.	4.08	0.86
Q8	I feel motivated because of badges.	3.93	0.92
Q9	I am happy that other fellow students can see my commitment to the course with these badges.	3.67	0.92
Q10	I find badges interesting.	4.00	0.86
Q11	I am trying to get to all possible badges.	3.91	0.98
Q12	Badges can get me to try an activity.	3.95	0.90
Q13	I will engage in activities if I can earn badges for doing so.	3.43	0.98
Q14	I like to compare the badges that I have got with those of my fellow students.	2.88	1.17
Q15	I find the leader board makes for a great learning environment.	3.64	1.01
Q16	I feel motivated because of the leader board.	3.72	0.99
Q17	I feel motivated to study in class so that my ranking on the leader board is high.	3.70	1.00
Q18	I feel more confident when I get good rankings on the leader board.	3.92	0.89
Q19	I feel that the leader board, badges, and monthly reviews with ratings increase my involvement in the classes I participate in.	3.94	0.81
Q20	I feel that the leader board, badges, and rated monthly reviews increase my productivity in class.	3.73	0.95
Q21	I feel that the leader board, badges, and monthly reviews with ratings increase my motivation to continue attending the classes.	3.72	0.95

Based on the results shown in Table 1, it was concluded that integrating points into monthly reviews can increase active learning. Therefore, based on the findings, it was decided to add a new gamification element, namely badges to the LMS to further promote active learning. The criteria for earning badges include participating in the monthly review, which is rated. This means that students are more motivated to complete the monthly review. Respondents indicated that the badges increased their motivation which is evident from the level of activity in monthly reviews and discussion forums, which is a criterion for earning badges. The respondents also considered the badges interesting. They felt that getting badges was important. The students liked receiving badges and were happy that their fellow students could see their commitment to the course when they received a badge. The use of badges was also found to improve respondents' willingness to try an activity and to engage in activities that would earn them a badge. This explains their initial willingness to participate in the discussion forums and monthly reviews.

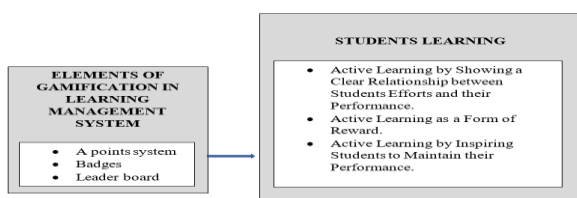


Figure 1: Elements of gamification in learning management system

Figure 1 Presents the sequence of the elements of gamification in learning management system and its effect on Students learning. The sole purpose of implementing gamification in classes was to improve active student learning, which was explained by the lecturers at the beginning of each class. Data from questionnaires and replies were analysed using the descriptive statistics mean and standard deviation. The average mean can provide an overall picture of the data set, while the standard deviation shows how scattered the data is by revealing how far each observed value is from the mean.

This study shows that lecturers can use gamification elements on an LMS to improve active learning in their classes. The results show that ratings points were motivated more than 50% of students to complete monthly reviews almost every month. Badges were also found to increase active participation, which can be seen from the number of replies to the forum discussions and monthly reviews. Finally, the results of the analysis found that the leader board had an impact on active learning in the LMS. The leader board motivated students to participate actively in class and to engage in forum discussions and monthly reviews.

This study contributes to research in the field of gamification and learning, especially in relation to the design of gamification elements and analysis of the effects of gamification on active learning in LMS applications. This study enriches the research in this

field and contributes to the application of gamification elements in LMS.

The study also found that points have the most visible impact on active learning, followed by badges, and finally the leader board. Factors such as the ability and motivation of students to participate in these learning activities need to be studied when designing gamification components for implementation in an LMS. Accessibility should also be a consideration for LMS managers because students should not feel burdened by gamification. Therefore, LMS managers should focus on the various components of gamification that will be applied in the LMS and their positive and negative aspects.

## 2. Conclusion

This study proves that gamification applied in an LMS had a positive influence on active learning in the sample considered for this study. This influence can be seen in the replies to the forum discussions and monthly reviews. Points were found to be motivating, as they provided a clear link between students' efforts and their performance. Badges were also found to be motivating, as the participants wanted to obtain them and increased their active participation or learning to do so. The leader board was also motivating, as it made students try to maintain their performance.

Future research could examine other gamification components, such as avatars, progress bars, and levels, to test whether they improve active student learning.

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