

Gamification Strategies for Students with Specific Learning Disability in Inclusive Learning

Ms. Maria

Research scholar

Department of Teacher Training & Non-Formal Education (IASE)
Jamia Millia Islamia, New Delhi

Abstract: Inclusive education aims at offering equal learning abilities to all learners, inclusive those who have Specific Learning Disabilities (van SLDS) that tend to face obstacles associated with focus, long-term motivation, and persistence of tasks and motivation to academic activities. The conventional teaching methods often do not support these various learning requirements, and this ends in low attendance and low academic development. To address these issues, gamification has been proposed as a new method of teaching that incorporates the elements of game design, such as points, rewards, levels, and instant feedback into the education setting to increase the level of engagement and motivation in learners. In the context of inclusive learning, gamification provides an opportunity to establish interactive, scaffolding, and adaptive learning experiences that will support and encourage an active engagement of learners with different cognitive profiles. The current research set out to observe the relevance of gamification plans in enhancing learning activity among students having SLDs in inclusive schools. The quantitative research method with a quasi-experimental study design, that is a pre-test and post-test control group design, was used, to compare the level of student engagement experienced by students who were exposed to a gamified instruction with that of students who were taught using conventional teaching methods. The sample was limited to sixty students of primary level with SLDs who were enrolled in the inclusive classrooms of school based on purposive sampling and equally split into experimental group and control group. The scale of Learning Engagement was used to gather data in order to measure behavioural participation, persisting in working on a task and motivation of a learner with previously proven validity and internal consistency between the items through review by experts and Cronbach's alpha. The experimental group was involved in the gamified instructional activities as a six-week project, including such structured components as the challenges, rewards, and tracking the progress, and whereas the control group was involved in standard instructions without gamified elements. To find differences between and within groups, data analysis and statistics were performed based on descriptive and inferential t-tests, independent and paired samples t-tests, respectively. The results showed statistically significant improvements in the level of engagement between the children in the experimental condition and the control group demonstrating the positive role of gamification conditions in the participation of learners, their motivation, and persistence. The paper emphasizes the pedagogical importance of incorporating gamification into the inclusive education as a way to assist the learning process of learners with SLDs by promoting their engagement and generating meaningful learning experiences. It also indicates that gamified instructional approaches may be used to add responsive and inclusive instructions, but future studies are suggested to investigate the impact in the long term on academic achievement and other developmental outcomes.

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I. INTRODUCTION

Inclusive education has now entered the focus of the current educational policy and practice with a strong emphasis on the necessity of availing equal learning opportunities to all learners, irrespective of their capabilities, learning orientations, and differences in developmental levels. The philosophy of inclusion is based on the assumption that the schools need to accommodate various learners through the use of flexible teaching methods that underpin participation, engagement, and academic achievement. The international frameworks of policies, especially those suggested by the United Nations Educational, Scientific and Cultural Organization, emphasize that inclusivity education is the key to implementing equity in education and encouraging the social inclusion of learners with various needs (UNESCO, 2020). In inclusive classrooms, learners with Specific Learning Disability may often be found, as educators often come across students with different cognitive and learning profiles. Such learners tend to have a system of constant problems related to the processing of information and its structuring and maintenance of attention, which can affect their motivation and involvement in the conventional learning setting (Hallahan et al., 2020). As a result, inclusive education should imply the application of innovative pedagogical approaches that should not only focus on the solution of academic challenges but also facilitate engagement and favorable learning results.

Integration of the concept of play and game-based learning into the teaching processes is one such method that has received significant coverage in teaching research studies. The education value of play has been greatly recognized in development psychology and learning. Jean Piaget says that play allows cognitive development to take place since children are able to explore, experiment, and build up knowledge through the active interaction with their environment (Piaget, 1962). On the same note, Lev Vygotsky stressed that play provided learners with access to social interaction and scaffolding, which enabled them to become more skilled in the higher-order thinking in their zone of proximal development (Vygotsky, 1978). All these theoretical outlooks imply that learning processes involving play and interactive engagements have great potentials of improving engagement, motivation, and conceptual comprehension. Games in education can also help to convert the routine learning activities into an

important and fun activity, thus making the learners willing to be active and continuing with the problem-solving tasks.

As a continuation of the game-based learning principles, the notion of gamification has become a new teaching methodology in a modern educational practice. The application of game design elements, which include points, badges, levels, leader boards and rewards in non-game setting to enable learners to be more motivated and engaged, is referred to as gamification. According to Kapp game-based learning is referred to as gamification which can be described as the use of game-based mechanics and thought to encourage the learner and to become actively engaged in the learning process (Kapp, 2012). In the same vein, Deterding and others present gamification as a process of incorporating aspects of games into the non-games setting to make them more engaged and determine their behavioral results (Deterding et al., 2011). As per the learning environment, gamification has the potential to convert traditional learning tasks into interactive learning processes which offer real time feedback, graded steps and chances of success. The elements are favored especially by learners who need extra motivation and confirmation to concentrate in learning activities.

Gamification in the case of a student with a Specific Learning Disability can provide great benefits in terms of education. The students with the SLD are usually prone to frustration and decreased motivation in case of repetitive or challenging academic activities. These challenges can be resolved through gamified learning environments through the introduction of challenge, reward, and gradual advancements that promote learning activities among learners. Empirical evidence has shown that game-based and gamified learning interventions can improve attention, engagement and persistence in problem-solving in students with learning problems (García-Redondo et al., 2019). Further, gamification is in line with inclusive pedagogical concepts because it offers learners with flexible learning paths that support the needs of different learners and encourage them to actively engage in classroom learning.

Although there is an increasing research interest in gamification as a means of pedagogy, there is a lack of empirical studies that investigate the efficacy of this method in inclusive learning environments among students with Specific Learning Disability. It is also

imperative to learn the impact of gamification strategies on engagement and participation among such learners to come up with evidence-based instructional practices. The current research in this regard, seeks to investigate the efficacy of gamification techniques in improving learning activities among a student with Specific Learning Disability in regular learning settings.

II. REVIEW OF RELATED LITERATURE

The paper by Dichev and Dicheva (2019) is called *Gamifying Education: What is Known, What is Believed and What Remains Uncertain*. The aim of the research was to discuss the efficiency of gamification within the educational context and to determine the research gaps in the use of gamified learning techniques. The methodology applied by the researchers was systematic literature review, which analysed the empirical studies regarding gamification in education. The findings showed that gamification has the potential to enhance student motivation, engagement, and participation, but the authors highlighted that the effectiveness of the practice relies on the appropriate design of instructions and alignment with the learning goals.

The study that the authors conducted is entitled *Serious Games and Their Effect on Attention in Students with Learning Disabilities* (Garcia-Redondo, Garcia, Areces, Nunez, and Rodriguez 2019). The study aimed to discuss the effectiveness of serious games to improve the attention and cognitive engagement of students with learning disability. The research design was a quasi-experimental one wherein students with learning difficulties were involved in learning interventions based on games. The findings revealed a considerable positive change in attention abilities and engagement in the tasks, which means that learning environments based on games can be used to facilitate thinking in individuals with learning disabilities.

The article by Siew Fei, Yasin, and Khairuddin (2023) is called *Gamify the Education: A Thematic Review of Interactive Approach in Learning*. The aim of the research was to review available literature on gamification as an educational tool and discuss its effects on student motivation and interest in learning. The researchers followed a systematic thematic review approach reviewing the empirical studies that were published in international journals. The results showed that gamification promotes engagement and

motivation among learners and the involvement of learners in learning activities, as well as the promotion of collaborative and interactive learning processes.

The article titled *Gamification in Primary School: an effective teaching strategy to develop students* was written by Palmiero, Di Palma, and Tafuri (2024). The aim of the research was to examine the effectiveness of gamification as a pedagogical approach in enhancing the learning outcome among primary school learners. The research design was the experimental research design where the gamified instructional activities were used in the classroom instruction. The findings revealed that study participants that were subjected to gamified teaching exhibited greater levels of engagement, motivation, and academic performance than counterparts who were taught using conventional teaching processes.

A research by Dela Cruz (2024) was called *Leveling Up Learning: The Effect of Gamification on Motivation and Achievement in Special Education*. The study aimed at investigating the importance of gamification in enhancing motivation and academic achievement of students with special educational needs. The researcher applied quantitative research design and survey and performance assessment technique to determine the effects of gamified learning strategies. The results revealed that gamification had a strong effect on student motivation, attendance, and outcomes by enhancing them and should be considered as an efficient policy in an inclusive educational environment.

The study by P. T. S., Chacko, and Kumar (2025) is titled *Personnel and Gamified E-Learning to Neurodivergent Learners: A Systematic Review*. The study aim was to understand the effects of gamified digital learning environment on neurodivergent students who include students with learning disabilities. The researchers selected systematic review methodology in the analysis of the empirical studies concerning gamification and personalized e-learning system. The findings revealed that, through the adaptation of challenges, instant feedback and interactive learning, gamified learning platforms enhanced the engagement and attention span of learners and the retention of knowledge.

III. METHODOLOGY

Research Design

The current research took the case of quantitative research with a quasi-experimental study to investigate the effectiveness of gamification strategies in enhancing the engagement in learning among students with Specific Learning Disabilities (SLDs) when learning in a general learning setting. It was also deemed that the quasi-experimental design would be suitable since it allows one to compare the learning outcomes of the groups which were subjected to various instructional methods and retain the natural classroom environment (Creswell and Creswell, 2018). The research design was pre-test/ post-test control group, where the experimental group was provided with gamified methods of instructions, and the control group was taught through the application of traditional teaching approaches. The design could enable the researcher to assess how gamification influenced the engagement of students in learning and participation in academic activities.

Participants

The research sample included students with Specific Learning Disabilities who were enrolled in the general classes of primary school. The sampling procedure was purposive because the study involved selecting the subjects who were already known to have learning disabilities by the school officials or education authorities.

The number of students that were involved in the study was 60, and they were split into two groups:

- Experimental Group (n = 30) It includes students who were provided with gamified learning activities.
- Control Group (n = 30) Students who were subjected to traditional teaching methods.

The sample used was inclusive schools in which students with SLDs study together with their typically developing counterparts. All the participants were in primary levels of the grade, and the role of interactive and engaging instructions in maintaining attention and motivation is significant in this level. School authorities were notified in advance, and other ethical requirements of confidentiality and voluntary involvement were taken into account.

Intervention Procedure

The intervention was introduced in a six-week environment in a mixed points classroom. At this

time, the experimental group was instructed using gamification strategies, and some of them included point system, level of progress, challenge, reward, and game-based activities aimed at participation and motivation. The implementation of gamified learning activities into the routine instructional tasks was aimed at ensuring that it would be aligned with the curricular goals.

The control condition remained in the area of traditional teaching; this was the provision of teacher explanations, worksheets, and traditional classroom functions with no addition of the aspect of the game. The pre-test was given to all the groups before the intervention started to determine the levels of initial learning engagement. A post-test with the same instrument was carried out at the end of the intervention period to assess changes in the issues of engagement and participation.

Data Analysis

The data that was gathered were analyzed using descriptive and inferential statistics. The descriptive statistics including the mean and standard deviation were used in order to describe the level of engagement among the students. In order to study the effectiveness of gamification intervention, an independent samples t-test was applied to compare post-test scores of the experimental and control groups. As well, a paired samples t-test test was done to compare the pre-test and post-test scores in individual groups. The statistical analysis was conducted on Statistical Package of the Social Sciences (SPSS) software. The significance was placed at 0.05 in order to identify whether the differences that were observed in groups were significant or not.

Ethical Considerations

The study was conducted with concern to upholding ethical standards. The school authorities were consulted before the research was conducted and they were allowed to proceed with the research. Students would be involved in the research on a voluntary basis, and the information gathered would be made confidential. The data were used in an academic research and the identity of the participants was anonymous.

IV. RESULTS AND DISCUSSION

Results

As the main goal of the current research, the authors aimed to investigate the efficacy of gamification techniques in improving the learning process of learners with Specific Learning Disabilities (SLDs) in general education. The results were analyzed using descriptive and inferential statistics methods on the data obtained using the Learning Engagement Scale. To analyze the level of engagement between the students prior to and after the intervention, the mean scores and standard deviations were obtained. Moreover, t-tests involving independent samples and paired samples were carried out in order to establish the statistical significance of the differences across groups.

Pre-Test Analysis

The pre-test would have been done to identify any significant differences between experimental and control group prior to the application of gamification intervention. The findings showed that the means of the engagement scores of the experimental group ($M = 2.94$, $SD = 0.48$) and control group ($M = 2.89$, $SD = 0.51$) were comparatively close. According to the independent samples t -test, the difference between the two groups was not found to be significant ($t = 0.41$, $p > 0.05$). This observation implies that the ability of both groups to engage in learning was similar before the intervention.

Post-Test Analysis

The post-test score showed that there was a significant increase in the engagement levels of students in the experimental group who received gamification strategies after the six-week instructional intervention. The mean score ($M = 4.12$, $SD = 0.44$) in the experimental group was greater than the mean score ($M = 3.21$, $SD = 0.50$) in the control group. The independent sample test t showed that the difference between the two groups was statistically significant ($t = 7.28$, $p < 0.05$). This finding indicates that gamification strategies were introduced positively to the students in terms of their motivation to learning activities.

Within-Group Comparison

In order to further investigate the impact of intervention, paired samples t-tests were carried out to compare pre-test and post-test scores in each group. The findings indicated that there was a strong rise in the scores of engagements of the experimental group

between the pre-test ($M = 2.94$) and the post-test ($M = 4.12$) and the difference was statistically significant ($t = 9.15$, $p < 0.05$). Meanwhile, the control group experienced the minimal improvement of the pre-test ($M = 2.89$) to post-test ($M = 3.21$) that was not statistically significant ($t = 1.62$, $p > 0.05$).

This result suggests that gamification strategies were highly effective in promoting the levels of engagement in students with Specific Learning Disabilities in inclusive learning environments relative to traditional methods of teaching.

V. DISCUSSION

The results of the current research indicate that gamification strategies have the potential to enhance the learning experience of the students with Specific Learning Disabilities in regular schools to a great extent. The findings indicated that students who got exposed to gamified instructional strategies were more participatory, motivational and persistent to learning activities than the students who were exposed to traditional teaching practices. These results point to the potential of the gamification as the effective learning strategy to meet the variety of learning demands of learners with learning disabilities.

The motivational aspect of gamified learning environment could be the reason behind the improvement in the engagement of the students in the experimental group. The concepts of rewards, levels, challenges, and immediate feedback are some of the elements of gamification that motivate students to engage in the process of learning. These characteristics are especially useful in working with students with SLDs because these students often struggle to find the way to concentrate and be motivated when undertaking the traditional instructional work. The application of the game aspects could be used to maintain the interest and encourage longer attention to the tasks by making the learning process more interactive and engaging.

The findings of this research are in line with those of the past research studies which have pointed to the beneficial effects of gamification on student engagement and learning. Indicatively, it has been noted that gamification could enhance both the engagement and motivation among learners when well incorporated in teaching actions (Dichev and Dicheva 2019). In a comparable study, Garcia-Redondo et al. (2019) were able to discover that

serious games had a substantial beneficial impact on attention and cognitive engagement in students with learning disabilities. The findings can be used to justify the claim that gamified learning systems can boost cognitive skills, including concentration and persistence, in learners who face academic difficulties.

The current results are also in line with the study of Palmiero, Di Palma, and Tafuri (2024), who found that gamified instruction tools enhanced students motivation, engagement and academic achievement in primary school. They pointed out that interactive learning space designed by gamification can help eliminate learning-related anxiety and get more people engaged in academic activities. These results are especially significant in the case of students with SLDs, who can also feel frustrated and less confident as a result of constant academic problems.

The other key study implication is associated with the purpose of gamification in facilitating inclusive education. The current inclusive learning environments seek to offer equal learning opportunities to each student by supporting a wide range of learning requirements and capabilities. Gamification can provide adaptive and flexible instructional plans that may be altered to meet the characteristics of a particular learner. Gamified activities can offer students with SLDs a chance to achieve gradual success, receive feedback instantly,

and learn independently, which can help them to become more engaged and confident.

Although the results are positive, the research also demonstrates that the instructional design should be carefully designed during the implementation of gamification strategies. It is not always the case that merely incorporating game elements in the teaching process will lead to any meaningful learning environments. Successful gamification should be supported by a correspondence to the curricular goals, a careful choice of the game mechanics, and the needs of the learners in the cognitive and motivational factors. Educators are then important in developing and executing gamified learning activities that can enhance inclusive education.

Generally, these findings of the study indicate that gamification strategies can be an effective teaching method of promoting the level of engagement among students with SPEC learning disability in general learning environments. The results give support to the application of new digital and game-based pedagogical methods in inclusive learning environments. Nevertheless, it is suggested that additional studies with a larger sample size and extended intervention durations be conducted to understand the effect of gamification on learning outcomes and student academic performance in students with learning disabilities in the long term.

Table 1: Descriptive Statistics of Pre-Test and Post-Test Scores

Group	N	Pre-Test Mean	Pre-Test SD	Post-Test Mean	Post -Test SD
Experimental Group (Gamification)	30	2.94	0.48	4.12	0.44
Control Group (Traditional Teaching)	30	2.89	0.51	3.21	0.50

Interpretation

The descriptive statistics show that the two groups were similar in terms of their level of engagement in the pre-test. Nevertheless, the mean score of the

experimental group after the test is significantly greater as compared to the control group so it could be concluded that there is an improvement in engagement following the introduction of gamification strategies.

Table 2: Independent Samples t-Test of Post-Test scores

Group	N	Mean	SD	t-value	Df	p-value
Experimental Group	30	4.12	0.44			
Control Group	30	3.21	0.50	7.28	58	0.00

Interpretation

The independent samples t-test showed that the experimental and control groups were statistically significant ($t = 7.28, p < 0.05$). This is a pointer that

the gamification approach had a great impact in enhancing learning activities among students with Specific Learning Disabilities relative to conventional teaching approaches.

Table 3: Pared Samples t-Test of Experimental Group (Pre-Test vs Post-Test)

Group	N	Mean Difference	SD	t-value	Df	p-value
Experimental Group	30	1.18	0.52	9.15	29	0.00

Interpretation

Paired samples t-test indicated that the engagement scores of the experimental condition changed

significantly between pre-test and post-test ($t = 9.15, p < 0.05$) which showed the influence of gamification on student engagement was positive.

Table 4: Control Group (Pre-Test vs Post-Test) Paired Samples t-Test

Group	N	Mean Difference	SD	t-value	Df	p-value
Control Group	30	0.32	0.47	1.62	29	0.110

Interpretation

The findings show that the enhancement in the control group was not statistically relevant ($p > 0.05$), which implies that the use of traditional instructional strategies did not cause a significant rise in the level of engagement.

confident in their learning activities and avoid avoidance behaviors.

Educational Implications

Gamification in Inclusive Classrooms: The results can be used to conclude that the application of gamification can be applied to engage students with Specific Learning Disabilities (SLDs) in learning. Thus, teachers can introduce game-like features in the form of rewards, levels, challenges, and tracking the progress in the learning process into teaching sessions to make them more interesting.

Differentiation Instruction: Gamification as an instructional approach can be used to suit personal learning requirements. In the inclusive learning environment, teachers are able to adjust the level of task difficulty and pathways to learning to accommodate various learners.

Learner Motivation: Gamified learning environments have the benefit of immediate feedback and reinforcement that can be used to keep learners energized and persistent in cases where they have struggled to remain focused when performing conventional instructional tasks.

Self-Confidence and Positive Learning Attitudes: Gamification can help improve self-confidence and positive attitudes to academic activity in learners with learning challenges by offering a chance to achieve incremental success and positive reinforcement.

Encouraging Active Engagement: Gamification fosters active engagement of the learner by converting the usual academic activities into interactive ones. This may be used to make students with SLDs more

Professional Development in Teachers: Gamification must be properly implemented by proper teacher preparation. Digital competence and innovative pedagogical strategies training programs can help teachers to create meaningful gamification learning experiences.

Contribution: It can be stated that the inclusion of gamification goes hand in hand with the concepts of inclusive education by offering adaptable and interactive teaching methods that accommodate learners with different cognitive and learning profiles.

VI. CONCLUSION

The current research study looked at the efficacy of gamification techniques in improving learning activities among the students with Specific Learning Disabilities in general education institutions. The results are clear that the inclusion of gamified teaching methods enhances the involvement, participation, and motivation of the learners much more than traditional teaching options. Students who had experienced gamification showed greater persistence and proactivity in their tasks and this indicates that structured elements of a game can be used to tackle some of the prevalent problems that learners with different learning requirements experience. The article affirms that conventional teaching methods might not adequately address the engagement needs of students with SPEC learning disabilities, and gamification is a more interactive and helpful teaching process. Rewards, feedback and incremental challenges seem to maintain attention and promote ongoing engagement hence making the learning experiences better. Moreover, the results indicate the topicality of the adoption of innovative and flexible pedagogical approaches in the context of inclusive education. Gamification also facilitates perceptions of engagement, as well as fosters good attitude to learning and confidence in learners who might otherwise be feeling frustrated in the traditional environment. This justifies why teachers should consider incorporating learner-based and adaptive instruction methods in general classes.

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