mLAC Journal for Arts, Commerce and Sciences (m-JACS)
Volume 2, No.3, September 2024, P 7-12
ISSN: 2584-1394 (Online)

INTEGRATING GAMIFICATION INTO CURRICULUM DESIGN: ENHANCING ADOLESCENT STUDENTS' DECISION MAKING, PROBLEM SOLVING AND CRITICAL THINKING CAPACITIES

Shaikh Sara Nazneen [*1]
[1]Research Scholar, Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
*** Corresponding author email address**: shaikhshara8@gmail.com

DOI: https://doi.org/10.59415/mjacs.v2i3.202

Abstract

According to research, the new age student, Gen Z, differs from his or her predecessors, and educators must develop new age pedagogical interventions to cater to this set of learners. With the changing manner the new generation learns, the education system must be revamped to include tools that meet the learner's demands. Gamification is an effective learning technique for today's generations, who are accustomed to using digital media. Gamification may also help students build critical thinking, decision-making, and problem-solving abilities by immersing them in dynamic and immersive learning experiences. Thus, the current study attempts to find out if incorporating the usage of gamification might promote critical thinking, decision making, and problem-solving capabilities in adolescents.

Keywords: Gamification, Decision Making, Problem Solving, Critical Thinking, Adolescent

1. Introduction

Contemporary students belonging to Generation Z exhibit distinct behaviors, thought patterns, and learning approaches compared to previous generations. Their extensive reliance on mobile phones and screens has brought about noticeable changes in their brain structure. Consequently, educators have come to recognize that conventional teaching techniques and methodologies, often rooted in traditional practices like lectures, concept repetition, and memorization, are proving ineffective. This realization highlights a disconnect between the current teaching methods employed by professors and the learning preferences and capabilities of today's students.

As our world gets more complicated and uncertain, schools and universities are looking into new methods to engage students in activities that will help them learn. Students must be able to use their knowledge in real life, solve issues, think critically and creatively, and obtain meaningful information from the vast amount of information available in the digital era in order to make judgements in new scenarios. According to the New Education Policy (NEP), decision-making, problem solving and critical thinking are 21st-century abilities that students must master. The NEP emphasises a comprehensive and interdisciplinary approach to education, with the goal of instilling fundamental abilities like as creativity and problem-solving.

Gamification is defined as 'the application of game design principles in nongame environments'. Gamification of education is an approach for improving engagement that incorporates gaming aspects into a learning environment. The idea is to achieve levels of participation comparable to what games can often induce. The primary objectives of gamification encompass enhancing particular skills, setting meaningful learning objectives, fostering student engagement, optimizing the learning process, facilitating behavior change, and promoting social interaction. Stimulated by the impacts that gaming features may cause, numerous academics have examined the impact of gamification in an educational setting, with positive outcomes including increased engagement, user retention, knowledge, and cooperation.

Critical thinking involves the adept examination of any subject matter or situation, wherein the thinker enriches the quality of their thinking by skillfully managing the inherent structures of thought and applying intellectual standards to them. Critical thinking emphasises analytical abilities and teaches students how to analyse, follow, or build a logical argument, figure out the solution, remove wrong routes, and focus on the proper one. The development of critical thinking is a vital step towards fulfilling the aims of holistic education, not only by assisting students in acquiring information, but also by ensuring that they think properly.

To put it simply, decision-making is the process of selecting one of several possibilities in a given scenario. A choice provides two or more possibilities from which the decision-maker can pick, either easily or not. To make the optimal decision, the decision-maker must choose amongst these possibilities or develop a new one.When determining which alternative to choose, being aware of one's current condition, gathering information about the possibilities, evaluating the options, and questioning about the circumstances are all closely tied to the decision's appropriateness. Choices we make in our everyday lives from among possibilities might be minor or pivotal in shaping our lives.

Problem solving is commonly defined as dealing with and evaluating problems in order to find a solution. Problem solving may be described as providing a solution or an idea to a troublesome issue. Problem-solving abilities are vital talents in the educational field since a healthy community or nation can only survive by adapting to changing circumstances through problem-solving abilities. Problem-solving abilities are essential in all aspect of life in order to live a happy and healthy existence.

2. Review of Literature

Sera İyona Asigigan, Yavuz Samur.(2021). investigated how gamified STEM practices impact the intrinsic motivation, critical thinking disposition, and perception of problem-solving skills among third and fourth-grade students. It aimed to assess the effects of these activities on children's motivation, problem-solving skills perception, and critical thinking disposition. Quantitative data included scales measuring problem-solving skills perception, critical thinking disposition, and intrinsic motivation, while qualitative data were gathered from activity worksheets, field notes, and student interviews. Following an 8-week implementation period, quantitative analysis revealed significant differences between pre-test and post-test results for students' critical thinking disposition. The study indicated an improvement in students' perception of problem-solving ability, though not statistically significant. Moreover, students displayed high levels of intrinsic motivation, attributing it to the engaging, competitive, and exciting nature of the gamified STEM activities. Additionally, students found the rewards and badges received upon completing tasks to be motivational.

Muhammad Kamarul Kabilan et al.(2022). A mixed-method study conducted at a Malaysian public university explored the integration of gamification through technology from the perspective of university academics. The research examined the practices, objectives, and challenges associated with this approach. The results suggest that there is room for improvement in academics' gamification techniques. Pedagogical considerations revolve around five main themes: encouraging student learning, enhancing critical thinking and problem-solving skills, promoting student engagement, facilitating interactions, and achieving specified teaching and learning objectives.

3. Statement of the problem

The objective of this study is to investigate whether the integration of gamification into curriculum design can improve the critical thinking, decision-making, and problem-solving abilities of adolescent students.

4. The objectives of the study are as follows

1. To check the level of Critical thinking, Decision making, and Problem solving skills of adolescent students.
2. To evaluate the influence of gamification strategies on academic performance metrics, such as test scores, among adolescent students.
3. To compare the effectiveness of gamification strategy on adolescent students.

5. Methodology

The study employed an experimental research design to examine the impact of integrating gamification

strategies into curriculum design on enhancing, decision-making, problem-solving and critical thinking capacities among adolescent students. The sample consisted of 150 students selected from a college of Aurangabad city. Prior to the intervention, both the control group and the experimental group underwent a pre-test assessment to establish baseline levels of critical thinking, decision-making, and problem-solving abilities. Following the pre-test, the participants were randomly assigned to either the control group or the experimental group.

In the control group, traditional teaching methods were employed, adhering to conventional instructional approaches commonly used in educational settings. Conversely, the experimental group received instruction utilizing gamification strategies integrated into the curriculum design. The gamification strategy implemented several key points like -

1. The incorporation of game elements such as points, levels, challenges, and rewards aimed at enhancing the engagement and interactivity of the learning process,
2. Narrative and Storytelling to capture students' interest and immerse them in the learning experience,
3. Progress Tracking and Feedback in which real-time feedback was provided to reinforce positive behaviors and guide students toward achieving learning objectives, and
4. Collaborative and Competitive Elements were integrated into the gamified activities, encouraging peer interaction, teamwork, and healthy competition among students. This social aspect aimed to foster a supportive learning community and enhance engagement.

After the intervention period, both groups underwent a post-test assessment to measure any changes in critical thinking, decision-making, and problem-solving abilities. Statistical analyses, such as t-tests was conducted to compare the performance of the control group and the experimental group, determining the effectiveness of the gamification strategy in enhancing the targeted cognitive capacities. Moreover, for the validity and reliability of the findings, appropriate measures were taken to control for potential confounding variables, such as prior knowledge or demographic factors. Ethical principles were adhered to throughout the research process, including informed consent from participants, confidentiality of responses, and protection of participants' privacy rights.

6. Analysis and Interpretation

The study was conducted on students for a period of one week. Statistical measures such as Mean and t-tests were employed to compare the scores of both the control and experimental groups. In the controlled group, which received traditional teaching methods, the Mean scores for critical thinking, decision-making, and problem-solving were found to be 11.07, 11.01, and 12.36 respectively. Conversely, in the experimental group, which was taught using gamification strategies, the Mean scores for critical thinking, decision-making, and problem-solving were observed to be 13.85, 14.6, and 15.7 respectively.

	Mean of Controlled group	Mean of Experimental group
Critical Thinking	11.07	13.85
Decision Making	11.01	14.6
Problem Solving	12.36	15.7

Table 1 reflects the mean score of Experimental group as higher on all dimensions. It indicates that the academic performance of the experimental group is better to that of the control group.

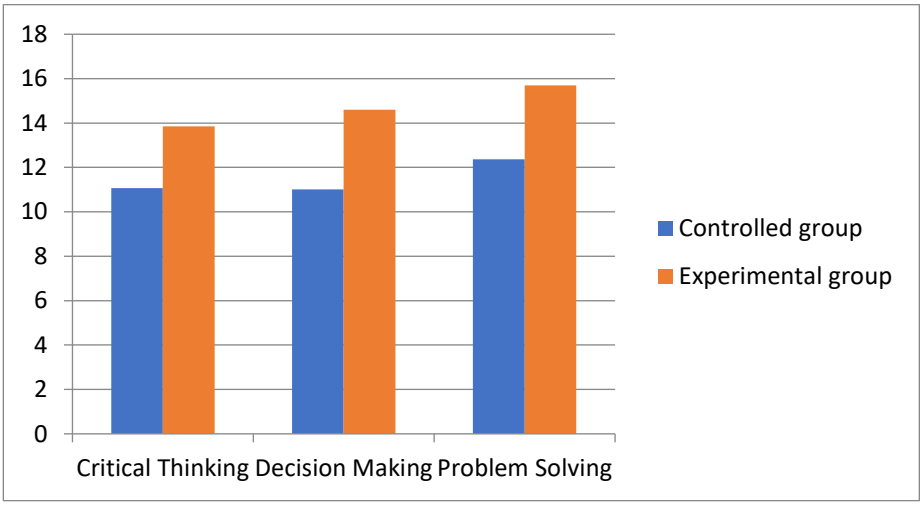

Fig. 1 Graphical representation of the mean scores of Controlled and Experimental groups.

The t-test analysis revealed significant differences between the Mean scores of the two groups for critical thinking ($t = 10.75$, $p < 0.05$), decision-making ($t = 8.75$, $p < 0.05$), and problem-solving ($t = 10.75$, $p < 0.05$). These results suggest that integrating gamification strategies into curriculum design can positively impact the cognitive abilities of adolescent students, leading to enhanced critical thinking, decision-making, and problem-solving skills compared to traditional teaching methods.

Critical thinking	N	Mean	t value	Difference between means
Pre-Assessment	150	11.07	10.75	The obtained t-value exceeds the critical table value of 1.98 at the 0.05 significance level. Hence, there exists a significant difference between the means of the pre and post-test scores.
Post-Assessment	150	13.85		

Table 2 indicates that the mean value of the pre-test is 11.07, while the mean value of the post-test is 13.85. The obtained t-value of 10.75 exceeds the critical table value at the 0.05 level of significance. Thus, there exists a significant difference between the mean scores of the pre-test and post-test in the critical thinking dimension. This suggests that the gamification strategy is more effective in fostering critical thinking compared to the traditional method of teaching.

Decision Making	N	Mean	t value	Difference between means
Pre-Assessment	150	11.01	8.75	The obtained t-value exceeds the critical table value of 1.98 at the 0.05 significance level. Hence, there exists a significant difference between the means of the pre and post-test scores.
Post-Assessment	150	14.06		

Table 3 displays that the mean value of the pre-assessment is 11.01, whereas the mean value of the post- assessment is 14.06. With an obtained t-value of 8.75, which surpasses the table value at the 0.05 level of significance, a significant difference between the mean scores of the pre-test and post-test on the decision-making dimension is evident. This suggests that the gamification strategy is more effective in cultivating problem-solving skills compared to the traditional method of teaching.

Problem Solving	N	Mean	t value	Difference between means
Pre-Assessment	150	12.36	10.75	The obtained t-value exceeds the critical table value of 1.98 at the 0.05 significance level. Hence, there exists a significant difference between the means of the pre and post-test scores.
Post-Assessment	150	15.07		

Table 4 reveals that the mean value of pre test is 12.36 and mean value of post test is 15.07 respectively. Obtained t value is 10.75 which is more than the table value at 0.05 level of significance. Therefore, there is significant difference between the mean scores of pre test and post test on problem solving dimension. It means that Gamification strategy is more effective in developing decision making skill than the traditional method of teaching.

7. Conclusion

At every moment, management and educators are thriving to make education more interesting so that the learners can learn without getting bored. Educators are exploring a range of new tools and techniques to enhance the quality of learning, and gamification is among them. Also cultivating critical thinking, decision-making, and problem-solving abilities in students is essential for preparing them to navigate the complexities of the modern world, excel academically and professionally, and contribute positively to society. Through gamified activities, students are presented with challenges that require them to think critically, make decisions, and solve problems in a dynamic and motivating environment. Game elements such as points, levels, challenges, and rewards provide immediate feedback and incentives, encouraging students to assess situations, analyze information, and strategize effectively to achieve their goals. Additionally, gamification often incorporates collaborative and competitive elements, fostering teamwork, communication, and healthy competition among students, which further enhances their problem-solving and decision-making abilities. By integrating gamification strategies into curriculum design, educators can create engaging learning opportunities that not only reinforce academic content but also promote the development of essential cognitive skills necessary for success in academic, professional, and real-world contexts.

8. References

1. Asigigan, S. I. & Samur, Y. (2021). The effect of gamified STEM practices on students' intrinsic motivation, critical thinking disposition levels, and perception of problem-solving skills. International Journal of Education in Mathematics, Science, and Technology (IJEMST), 9(2), 332-352. https://doi.org/10.46328/ijemst.1157

2. BRENDA WILSON.(2012). An Experiential Approach to Improving Students' Critical-Thinking and Problem-Solving Skills. Retrieved from, https://aejmc.us/prd/wp-content/uploads/sites/23/2014/11/tpr83sp12.pdf

3. Belgin Bal İncebacak, Esen Ersoy.(2016). Problem Solving Skills of Secondary School Students. Vol. 15, No. 6, 275-285 doi: 10.17265/1537-1514/2016.06.002

4. Işıner Severa,, Ali Ersoy.(2019). Investigation of Decision-Making Skills of Fourth Grade Students According to Student and Teacher Opinions. International Electronic Journal Of Elementary Education. Volume 12, Issue 2, 167-182. Retrieved from, https://files.eric.ed.gov/fulltext/EJ1240234.pdf

5. J. Villagrasa orcid, Salvador, et.al.(2022). Gamification And 'Gen Z' University Students: How To Effectively Motivate Them Through Montessori Methodology. IATED Digital Library. Retrieved from https://library.iated.org/view/VILLAGRASA2022GAM

6. Kyvete Shatri, Kastriot Buza.(2017). The Use of Visualization in Teaching and Learning Process for Developing Critical Thinking of Students. European Journal of Social Sciences Education and Research. Volume 4, Issue 3. Retrieved from, https://revistia.com/files/articles/ejser_v4_i3_17/Shatri.pdf

7. Muhammad Kamarul Kabilan et al.(2022). Practices, purposes and challenges in integrating gamification using technology: A mixed method study on university academics. Education and Information Technologies. https://doi.org/10.1007/s10639-023-11723-7

8. Rodrigo Smiderle, Sandro José Rigo, et al. (2020). The impact of gamification on students' learning, engagement and behavior based on their personality traits. Springer Open. Retrieved from https://slejournal.springeropen.com/articles/10.1186/s40561-019-0098-x