Integrating Gamification into Preschool Concepts: A Developmental Approach

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Abstract

The study titled 'Integrating Gamification into Preschool Concepts: A Developmental Approach' has explored the effect of gamification books on preschool children's learning at Kalamassery, Ernakulam, Kerala, India. The sample for the study was selected using a purposive sampling method. The sample for the study included 70 children belonging to the age group of 3-5 years and 15 teachers. The study investigated the impact of gamification in learning numeracy, literacy, fine motor skills, and social interaction among the preschool children. The results revealed a significant improvement in learning outcomes, engagement, motivation, and social interaction among children, with positive feedback from the teachers. The approach using gamification showed enhanced understanding of educational concepts, fostering improved communication skills, creativity, and self-expression. The result concludes that the gamification approach is a promising tool for preschool education which in turn would help in creating a positive impact on the development of children in early childhood education.

Keywords: Gamification, Early Childhood Education, Developmental approach, Preschool curriculum, Learning outcome

Introduction

Gamification is the use of concepts and aspects of game design elements in non-gaming environments. It has created significant focus in recent years and is used as a strategy to engage and motivate individuals to attain specific goals. In 2002, Pelling suggested that by incorporating game-like elements such as challenges, levels, badges, points, and rewards, gamification ensures more engaging and enjoyable experiences. Often the traditional teaching methods lack the capacity to gain the complete attention of the learners. However, this gamification approach has proven very effective in educational settings.

Early Childhood Education (ECE) is considered to be a crucial stage in a child's development that lays the foundation for lifelong academic success and overall well-being. During this period, children absorb information rapidly. This period is ideal for interventions and enrichments. High-quality ECE programs are linked with numerous benefits, including enhanced socialisation, problem-solving skills, and emotional regulation (Brown, 2020). Development of ECE has long

term benefits like reduced healthcare costs, lower crime rates and increased productivity among workers (Johnson et al., 2021).

The traditional learning method lacks motivation, creativity, and innovation as it relies more on theoretical instruction than practical application. As a result, the retention of concepts and content taught becomes limited among the learners. In contrast, play-based learning, when supported by recent technologies in cognitive science and educational neuroscience, offers a promising change in the capacity to learn. This approach focuses on attention, active engagement, feedback, and consolidation that acts as key factors for effective learning (Lamrani, 2020).

Gamification, when incorporated with ECE, can make learning much more interactive and enjoyable. Teachers can integrate game activities into daily routines thereby creating stimulating environments. This encourages children to actively participate and explore. For example, low-structured game materials can develop creativity and guided exploration in science areas can promote scientific thinking (Zheng, 2022). The high-quality preschool education sets the stage for lifelong learning and enhances cognitive, linguistic, and socio-emotional development.

The integration of gamification into ECE can contribute to the education field and can significantly enhance motivation, engagement, and learning outcomes. By enhancing the motivational power of games, teachers can create more effective and engaging learning environments that are suitable to meet the diverse needs and interests of young learners (Hamari et al., 2015).

Relevance of the study

Modern teaching and learning techniques must be integrated into the quickly evolving educational landscape of today's scenario in order to satisfy their various needs. Recently there has been a growing recognition of the importance of early childhood education in laying the foundation for lifelong learning, active participation and development in different areas of domains. However young children are hard to hold and engage with when using traditional teaching methods which leads to low learning outcomes and disengagement. This is where gamification, a tactic that uses the excitement and drive that comes from playing games to improve learning becomes relevant. The creation of a gamification manual is highly relevant in the preschool education context where establishing a love of learning and fundamental skills is crucial. Preschoolers' learning experiences could be revolutionised by such a manual which offers teachers useful advice and resources for incorporating gamified components into the curriculum. Gamification can foster curiosity, encourage active engagement and develop critical thinking, problem-solving and teamwork skills through interactive exercises, challenges and reward systems. However, gamifications value in developing preschool curricula goes beyond its ability to improve student performance. In an increasingly digital and technologically advanced world children are growing up surrounded by interactive media and digital devices. By meeting kids where they are and taking advantage of their familiarity with technology, teachers can design meaningful and captivating learning experiences through gamification. Additionally, given the state of educational practices today creative solutions that accommodate students' unique learning preferences

and styles are desperately needed. Gamifications adaptability and flexibility present a promising solution as classrooms become more diverse containing students with a range of backgrounds and abilities. Gamification can meet the individual needs of every child by offering a variety of learning pathways and personalised experiences thereby fostering equity and inclusivity in education practice. Gamification of the preschool curriculum has enormous potential in Kerala where resources for early childhood education are plentiful and education is highly valued. Kerala can improve the standard and inclusivity of early childhood education and guarantee that every child has access to stimulating and productive learning opportunities by adopting cutting-edge teaching and learning methodologies. Kerala's culturally and linguistically varied environment also offers exceptional chances for the creation and application of gamified educational resources that are in line with regional customs and values. An additional supportive environment for the implementation of gamification in education is Kerala's long history of technological innovation and digital literacy. Teachers in Kerala can use gamified book manuals to enhance classroom instruction, encourage active learning and provide students the tools they need to become self-directed learners as they have more access to digital devices and online resources. To conclude, creating a book on gamification for preschool curricula is essential and pertinent given the changing demands and difficulties of early childhood education. Through the adoption of gamification educators can establish dynamic immersive and efficacious learning environments that stimulate curiosity, nurture creativity and establish a foundation for lifetime learning and achievement. The incorporation of gamification offers new opportunities for preschool education by illuminating the intricacies of education in the twenty-first century.

Objectives

The main objectives of the study are as follows.

1. To develop a comprehensive book manual integrating gamification principles into the preschool concepts.

2. To assess the effectiveness of the gamification book.

3. To assess engagement, motivation, social interaction, acceptance and learning outcomes among preschool-aged children through the implementation of gamified educational activities.

4. To provide educators with practical guidelines and instructions for incorporating gamification into preschool teaching methods and evaluation of books by the teachers.

Literature Review

Nair and Menon (2019) investigated the use and efficacy of gamification strategies in Kerala India's preschool curriculum. Through a thorough analysis of multiple preschools, they looked into how game elements could be incorporated into a variety of learning activities. The purpose of the study was to evaluate how gamification affects learning outcomes, motivation and student engagement. The study's conclusions demonstrated that gamification strategies increased student engagement and promoted an engaging and interactive learning environment. Furthermore, when it came to learning tasks that were gamified, students showed increased motivation and excitement. The study also showed that gamification enhanced learning outcomes as students showed

higher levels of participation in class activities and enhanced retention of concepts. All things considered, the study demonstrated how gamification can be used as a powerful teaching tool in early childhood education settings especially when it comes to raising student engagement and learning objectives.

In 2020, Kumar and Pillai investigated how early literacy skill development in Kerala preschools are affected by gamification. Kumar and Pillai look into the use of gamification strategies to improve young learners' literacy acquisition through observations, interviews and activity analysis. The findings of this study demonstrate how well gamification can be incorporated into preschool curricula. Teachers can use game components like rhyming games, interactive reading sessions and storytelling to get kids excited about reading. The results imply that in addition to raising student's engagement and motivation, gamification promotes the growth of critical early literacy abilities like comprehension, vocabulary, acquisition and phonological awareness. Furthermore, the research emphasises how crucial it is to include culturally appropriate activities and content in gamified literacy training to guarantee its efficacy in Kerala's heterogeneous educational environment. In summary, this study highlights the potential of gamification as a useful instrument for fostering early literacy abilities in preschool environments. It also provides useful information for educators and policymakers looking to implement creative approaches to early childhood education in Kerala.

Menon and Kumar, (2022) examine how gamification affects preschoolers' social and emotional development in Kerala. They measured how gamified activities affect different facets of young learners' social and emotional competence through a mixed-methods approach that includes surveys, interviews and observations. The study shows that preschoolers' social skills—such as cooperation, communication and empathy—are positively impacted by gamification. In the classroom, gamified activities that encourage prosocial behaviour and improve peer interactions include cooperative games, role-playing scenarios and storytelling. Furthermore, the results imply that gamification aids in the development of emotional regulation abilities since gamified experiences teach students how to express their feelings, handle frustration and overcome obstacles. In general, the study underscores the potential of gamification as a useful instrument for fostering preschoolers' holistic development providing insightful information for teachers and other professionals who aim to facilitate social and emotional learning in Keralan early childhood education settings.

Menon et al. (2018), examines how parents in Kerala's urban areas feel about the gamified preschool curriculum. Menon and colleagues investigate the views, worries and satisfaction levels of parents regarding the incorporation of gamification techniques into preschool education through surveys and parent interviews. According to the study's findings, parents generally have positive opinions of gamified preschool curricula and see it as a creative and interesting way to teach young children. Parents recognise the potential of gamification to improve skill development and school readiness and they are appreciative of their children's increased motivation and enthusiasm for learning activities. However, a few parents voice worries regarding screen time overstimulation risks and the necessity of striking a balance between traditional and gamified learning opportunities. Overall, the study emphasises how critical it is to address parents' concerns and include them in conversations about

gamification in preschool education in order to successfully implement and accept gamified curricula in urban Kerala.

Skaržauskienė and Kalinauskas (2014), demonstrated how gamification may promote group creativity by raising the enjoyment of activity engagement. Their study shed light on the ways that gamification techniques could boost participants' pleasure and engagement in tasks creating an atmosphere that is favourable for brainstorming and creative thinking in groups. In their investigation, Skaržauskienė and Kalinauskas looked at how gamification strategies affected group dynamics and artistic output. They sought to increase participants' intrinsic motivation and excitement for the task by incorporating game elements like points, levels, challenges and rewards into cooperative tasks. According to their research findings, gamification does in fact significantly contribute to the development of group creativity. Participants were more likely to actively contribute ideas, consider alternate solutions and work well with others when the activity was made more fun and interactive. Group members felt more comradery and were inspired to think creatively to accomplish common objectives thanks to the competitive and cooperative elements gamification brought in. Additionally, Skaržauskienė and Kalinauskas emphasised how crucial it is to create gamified experiences that complement the particular aims and objectives of the group activity. Teachers and facilitators can ensure meaningful learning outcomes while boosting creativity and engagement by customising gamification mechanics to the participants preferences and the situation at hand. Their research taken as a whole shed light on how gamification might be used to foster group creativity and idea generation. Educators and organisations can create

dynamic and stimulating environments that inspire creativity and problem-solving among participants by utilising game elements to increase enjoyment, motivation and collaboration.

Using gamification Mårell-Olsson (2021) assisted students in developing skills and abilities relevant to the twenty-first century. These abilities usually cover a wide range and are becoming more and more necessary for success in the modern world such as critical thinking, creativity, teamwork, communication and digital literacy. Gamification has the potential to enhance student engagement, active learning and skill development in the classroom. Through the incorporation of game elements into educational activities educators can craft immersive learning environments that inspire students to investigate, test and solve problems. A more student-centred approach to education can be promoted by gamification which can also offer chances for individualised learning feedback and self-assessment. Students are encouraged to investigate challenging issues to try out various solutions and work with peers to accomplish common goals through gamified experiences. Because gamification is interactive and offers instant feedback students can evaluate their progress, pinpoint areas for development and refine their methods. Additionally, through the simulation of real-world problems and scenarios gamification can aid in bridging the gap between conventional classroom instruction and practical applications. Through the use of gamification and immersive learning environments students can gain practical skills and competencies that they can apply to their future academic and professional endeavours.

Chen and Wang (2020), explored how preschoolers' motivation and engagement are affected by gamified learning environments. Their study

looks into how adding different game features—like challenges, rewards and feedback mechanisms—affects kids' attitudes about learning and how engaged they are in gamified activities. Chen and Wang use a mixed-methods approach to investigate how gamification affects preschoolers' motivation and engagement in various educational settings. They obtain information on children's experiences with gamified learning environments and their opinions of the game elements used through observations, questionnaires and interviews. Preschoolers' motivation and engagement in educational activities can be improved through gamification as the study reveals. Gamified learning environments encourage children to actively participate in learning tasks by incorporating elements like rewards and challenges which in turn stimulates their intrinsic motivation. Children are further motivated to interact with the material when they receive timely and constructive feedback in gamified activities which also creates a sense of accomplishment and progress. Chen and Wang also investigate how gamification might encourage preschoolers to collaborate and socialise. They draw attention to the ways that gamified activities can foster peer cooperation, communication and teamwork all of which enhance the creation of a positive and lively learning environment.

Smith and Johnson's (2018) research is based on understanding that social interaction is essential to the process of early childhood development. The researchers want to investigate how gamification can act as a catalyst for improving social interaction among young learners given that the preschool years are crucial for children's development of social skills. The research uses a mixed-methods approach to thoroughly evaluate the effect of gamification on social interaction by fusing quantitative measurements with qualitative observations. Scientists watch as gamification strategies are incorporated into regular preschool activities and record instances of peer engagement, communication, cooperation and competition. Smith and Johnson examine the dynamics of social interaction in gamified learning environments through structured observations and interviews with teachers and students. They investigate the ways in which game features—like points, prizes, cooperative missions and team-based tasks—affect kids' conduct and relationships with their classmates. The study's conclusions show a favourable relationship between gamification integration and improved preschoolers' social interaction. As kids cooperate to accomplish shared objectives, gamified activities foster cooperation problem-solving and communication skills. Additionally, healthy peer relationships are fostered by competition within a supportive environment which promotes cooperation over division.

Kuo-Wei Lee (2023), conducted a study to assess the effectiveness of gamification in early childhood education and explained as gamification has an intriguing influence on learning and could be a useful teaching approach to improve learning. The term "gamification" refers to the application of game design aspects outside of gaming environments. These elements may include competitiveness, fun failure, levels, badges, goals, feedback, competition, and challenges. Only since 2010 has gamification become widely used. Studies on "gamification in education" are still in their infancy. Additional empirical data is required to fully understand how gamification affects student learning. Several research investigations have endeavoured to validate if gamification enhances learning. The positive

outcomes have increased hopes for how gamification in education will progress. Gamification has been linked to higher levels of student motivation, emotional involvement, and enjoyment, according to several research.

According to Garcia, Smith, Johnson, and Patel, (2019), preschoolers' social skills are developed through play and their study looked into how well gamified learning activities can do this. In order to encourage social interaction, empathy and conflict resolution skills in young children, the researchers created a set of gamified activities that would be incorporated into the preschool curriculum. Preschoolers from a range of socioeconomic backgrounds ages 3 to 5 made up the study's sample. The individuals completed a variety of gamified learning activities aimed at addressing particular social skills over the course of six weeks. Participatory storytelling sessions, cooperative games and group challenges that promoted peer cooperation and communication were some of these activities. To evaluate the effect of the gamified activities on the development of social skills the researchers used a mixed-methods approach. Through pre and post-intervention assessments, quantitative data on improvements in social interaction empathy and conflict resolution skills were gathered. The participants' experiences and opinions of the gamified learning activities were revealed by the qualitative data that was gathered through observations, interviews and student reflections. Preschoolers who engaged in the gamified learning activities showed notable gains in social skills according to the study's findings. The participants exhibited better conflict resolution skills, greater empathy for their peers and improved communication skills. Additionally, both students and teachers found the gamified activities to be well-received with many expressing high levels of motivation, enjoyment and engagement. The researchers came to the conclusion that gamified learning activities have potential as useful resources for fostering the development of social skills in young children. Teachers may design dynamic and interactive learning environments that support young children's healthy social interactions and peer relationships by utilizing game elements like cooperation, competition and storytelling.

Kim, Lee, Park, and Choi, (2022), addresses the importance of social interaction in preschool settings and aims to explore innovative approaches to promote positive peer relationships and social development. Acknowledging the potential of gamification as an engagement and learning tool the researchers look into how gamified learning environments can improve preschoolers' social interactions. In order to assess how gamified activities affect social interaction the study uses a mixed-methods research design that combines quantitative and qualitative measures. Kim et al. collected data through surveys observations and interviews with teachers and students. evaluate the impact of different gamification techniques on preschoolers' prosocial empathy and communication skills. In order to encourage social interaction, the researchers investigate a variety of gamified learning activities. These activities include collaborative games, virtual simulations and group projects that encourage children to work together, communicate effectively and empathise with their peers. Gamer's engagement and motivation are increased by integrating game elements like avatars, storylines, narratives, points and rewards. The study's conclusions show that preschoolers' social interaction improves in gamified learning environments. Through participation in

gamified activities children demonstrate improved communication skills, greater empathy towards others and increased willingness to collaborate and share with their peers. Gamifications immersive and interactive features encourage children to participate in meaningful social interactions and foster a sense of community within the classroom.

Chen and Kim, (2021), conducted an in-depth examination of teacher perspectives regarding gamified learning within high school environments. The researchers hope to obtain a thorough grasp of how educators view the incorporation of gamification into their teaching practices by using a case study methodology. They investigate a variety of topics including attitudes toward gamification, perceived advantages and difficulties, implementation techniques, effect on student engagement, and learning outcomes through observations, interviews, and surveys. The study provides insights into the special opportunities and challenges related to gamified learning at the secondary education level by concentrating on high school settings. Rich contextualised insights into teacher perspectives on gamified learning and its implications for high school instructional practices are provided by the findings which add to the body of knowledge already in existence.

According to research by Kwon and Özpolat (2021), gamification in the classroom might not have the desired effect and might even backfire. For instance, Kwon and Özpolat discovered that gamification dramatically lowered student satisfaction, topic knowledge, and overall course experience in an undergraduate course. The findings of the study underscore the importance of carefully considering the design and implementation of gamified interventions in the classroom. Even though gamification is highly popular not all students may find that having game-like components in the classroom enhances their learning experience. Students' opinions and attitudes toward gamification can be influenced by a variety of factors including their individual preferences, learning preferences and past experiences in gamified environments. Several factors could contribute to the negative outcomes observed in Kwon and Özpolats study. Poorly designed gamified experiences, unclear instructions, intense competition or a mismatch between the game mechanics and learning objectives can all compromise the effectiveness of gamification and the overall learning experience.

Furthermore, too much reliance on artificial or forced gamification strategies or extrinsic rewards may cause students to become disengaged and frustrated. The results of the study by Kwon and Özpolats show that gamification in education requires a nuanced and evidence-based approach. When using gamification in the classroom, educators should consider the possible advantages and disadvantages carefully and keep in mind the opinions and experiences of their students. Gamified interventions must also be continuously evaluated and enhanced in order to minimise unintended consequences and optimise learning outcomes.

Methodology of the study Selection of area

The study was conducted in Ernakulam district, Kerala, India, a major educational area. The district's urban centres like Kalamassery stand out in particular for the concentration of early childhood education centres and other educational facilities that serve the needs of kids from different communities and backgrounds.

Sample

The study involved 70 preschoolers aged 3-5 from Ernakulam district, specifically 58 from four *Anganwadis* and 12 from preschool in Kalamassery. Purposive sampling was used to select participants based on age, enrolment, and availability. Feedback was collected from 15 teachers (8 from *Anganwadis*, 7 from the preschool) for evaluating the integration of gamification.

Tools

1. Self-designed gamification book for preschool curriculum:

   The "Fun and Learn" book uses gamification to improve preschool education. It provides games that align with developmental needs and curriculum goals and offer clear guidelines for educators. The book mainly aims to improve engagement, motivation, and learning, while supporting social and emotional growth.

2. Self-designed questionnaire for children's demographic details:

   The self-designed questionnaire was developed by the investigator to understand the demographic details of the sample. The questionnaire helps to collect the details about the age, gender of the children. The questionnaire included multiple choice questions.

3. Self-designed questionnaire to assess performance before and after gamification:

   The questionnaire is divided into five sections that evaluate preschoolers' engagement, motivation, learning outcomes, acceptability, and social interaction with game-based learning. The questionnaire consisted of 10 questions across five areas of assessment. The test was designed as per Likert rating scale as follows: Totally agree(5),Agree(4), Neutral(3), Disagree(2) and Totally disagree(1) .

4. Self-designed questionnaire to gather teacher feedback:

   The questionnaire had three sections: (i) pre-implementation feedback on teachers' initial perceptions and expectations, (ii) evaluation of gamification integration and its perceived benefits, and (iii) overall feedback on teachers' experiences with gamification.

Conduct of the study

Phase I: Development and Testing

- Created "Fun & Learn," a gamification book with activities for the preschool curriculum.

- Developed pre and post-tests that cover areas like numeracy, alphabet recognition, language, and fine motor skills.

- Administered questionnaires for children's performance and teachers' feedback.

Phase II: Implementation and Observation

1. Introduced gamification book to the teachers and provided classroom instruction.

2. Designed and implemented gamified learning exercises.

3. Observed and adjusted teaching methods based on children's engagement and performance.

Phase III: Evaluation and Feedback

- Analysed pre-test and post-test results to assess changes in children's performance.

Analysis and Interpretation

The results of assessment done were interpreted using percentage analysis and parametric t- test.

Result and Discussion

Table-1: Assessing the Effectiveness of the Gamification Book- Pre-test Score Distribution among Children

Item(s)	Percentage of children achieved specific scores				
	5	4	3	2	1
Numeracy	0	0	12.8	44.2	44.2
Alphabetics	0	0	30	42.8	27.1
Language	0	0	35.7	45.7	18.5
Fine motor skills	0	0	20	42.8	37.1

Table-2: Assessing the Effectiveness of the Gamification Book- Post-test Score Distribution among Children

Item(s)	Percentage of children achieved specific scores				
	5	4	3	2	1
Numeracy	0	20	62.8	14.2	2.8
Alphabetics	0	15.7	67.1	17.1	0
Language	0	18.5	52.8	28.5	0
Fine motor skills	0	20	55.7	24.2	0

To assess the effectiveness of the gamification book, pre-test and post-test was done on children that were structured around numeracy, alphabetics, language and fine motor skills. Table 1 and 2 show the percentage of children who achieved specific scores in pre-test & post-test that indicated a higher score in post-test compared to the pre-test that in turn implies that gamification book has got positive effectiveness.

To check the effectiveness of the book in improving the learning outcome, a paired sample t-test was conducted where the pre-test and post-test is taken into consideration.

Table-3 :Comparison of means on numeracy, alphabets, language and fine motor skills before and after introducing the gamification book

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Numeracy pre-test	1.7000	70	.68841	.08228
	Numeracy post-test	3.0000	70	.68101	.08140
Pair 2	Alphabet pre-test	2.0286	70	.76084	.09094
	Alphabet post- test	2.9857	70	.57717	.06899

		Mean	N	Std. Deviation	Std. Error Mean
Pair 3	Language pre-test	2.1714	70	.72174	.08626
	Language post- test	2.9000	70	.68419	.08178
Pair 4	Fine motor pre-test	1.8143	70	.72817	.08703
	Fine motor post-test	2.9571	70	.66889	.07995

Table-4: Paired t-test to assess the effectiveness of the gamification book introduced to the children

		Mean	Paired Differences					T	df	Sig.(2-tailed)
			Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
Pair 1	Numeracy pre test -Numeracy post test	1.30000	.93793	.11210	-1.52364	-1.07636	- 11.596	69	.000
Pair 2	Alphabet pre -test– alphabet post-test	-.95714	.95456	.11409	-1.18475	-.72954	-8.389	69	.000
Pair 3	Language pre-test- Language pre-test-	-.72857	.93128	.11131	-.95063	-.50651	-6.545	69	.000
Pair 4	FINE motor pre-test - Fine motor post-test - FINEPOST	1.14286	.88932	.10629	-1.35491	-.93081	- 10.752	69	.000

From Table 3 and 4, paired–samples t-test was conducted to compare the means on numeracy skill, alphabetics, language, fine motor skills with and without introduction of the gamification book (pre-test and post-test).There was a significant difference in the scores of the paired samples t- test showed that the children's level of performance in numeracy increased from pre-test (M=1.700, SD=.68841) to post-test(M=3.000,SD=.68101; t= -11.596, p=.000).The knowledge alphabetics in the pre-test (M=2.0286,SD=.76084) to post-test (M=2.9857,SD=.57717; t= -8.389,p=.000).The knowledge of the respondents on the language skill in the pre-test (M=2.1714,SD=.72174) to post- test (M=2.900,SD=.68419; t=-6.545,p=.000).The fine motor skill of the respondents from pre-test (M= 1.8143,SD=.72817) to post-test(M=2.9571,SD=.66889;t= -10.752,p=.000). Hence the null hypothesis is rejected. These results suggests that there is a definite effect of the developed gamification book for improving learning outcome among pre-schoolers.

Table-5: Assessment of children's responses to gamification in learning through observation

Question(s)	Respondents %				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Engagement level					
During gamified activities, the child actively participates and shows interest.	0	0	7	34	58
The child becomes excited when presented with new gamified learning tasks.	0	0	6	36	58
Motivation level					
Gamified activities in preschool motivate the child to learn.	0	0	13	41	46
Gamified educational activities in preschool help to sustain the child's interest and attention for longer periods.	0	0	13	40	47
Learning outcome					
The child demonstrates improved understanding of educational concepts through gamified activities.	0	0	6	40	54
Gamified learning in preschool enhances the child's problem-solving skills	0	0	14	24	61
Social Interaction					
Feel that playing games with the class-mates helps to become better friends.	0	0	20	29	51
Feel encouraged to communicate and share ideas with others while playing games.	0	0	16	36	49
Acceptance					
The child liked the idea of playing games as a way to learn new things in preschool.	0	0	7	34	59
Believed that gamified activities should be part of our regular preschool curriculum.	0	0	7	23	70

Table 5 indicates the engagement level, motivation level and learning outcome responses of the children via observations. The findings revealed that 58 percentage (strongly agree) of the children that participated showed engagement in the gamified activities.

It was noted that 46 percentage of children showed motivation in learning through game-based activities. Of the respondents showed high levels of motivation in gamified activities. Therefore, a significant majority of participants demonstrated a positive inclination towards learning when engaged with game-based approaches, highlighting the potential effectiveness of gamification in fostering intrinsic motivation.

More than half of the sample indicated high levels of learning outcome by using gamified activities. The outcome indicates that 60 per cent of respondents strongly agreed, 24 per cent agreed, and 10 per cent remained neutral regarding the enhancement of their child's problem-solving skills through gamified learning in preschool.

Continuous assessment and modification will be essential as gamified learning in preschool education develops to guarantee that it is beneficial in fostering young learners' holistic and cognitive development. through gamification of learning can be attributed to its potential to enhance motivation, curiosity and retention of educational content.

The majority of respondents, i.e., 51 per cent strongly agreed that playing games with classmates fosters better friendship.

It appears that a sizable majority—93 per cent —strongly agreed or agreed with the statement that the child found it enjoyable to use games as a way to learn new information while in preschool. This implies that a large proportion of participants believe the child has favourable attitude toward playing educational games in a preschool environment. 7 per cent of the respondents expressed neutrality meaning they were undecided about the statement. This may suggest that there is a lack of consensus or ambiguity in this groups thinking about the preschooler's attitude toward the use of games for learning.

Table-6: Teacher's feedback based on pre-implementation evaluation

Question(s)	Respondents %				
	Very poor	**Poor**	**Neutral**	**Good**	**Very good**
Before introducing game-based learning, how would you rate the overall academic performance of children in our classroom?	**0**	0	46.7	46.7	6.7
How engaged were the children during traditional learning activities prior to the introduction of gamification?	0	0	80	20	0

Table 6 indicates that before game-based learning, only 7 per cent of respondents rated student performance as very good, while 46.7 per cent rated it as neutral to good, indicating modest achievement. These results suggest that gamification, through techniques like incentive challenges and interactive modules, could enhance engagement and improve academic performance.

Table-7: Teacher's feedback on integration of game-based learning

Question(s)	Respondents %				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
To what extent do you believe gamification has enhanced children's enthusiasm for learning?	0	0	13	41	46
How effectively do you think gamification has improved children's retention of educational concepts?	0	0	13	40	47
Has the integration of gamification positively impacted children's collaborative skills and teamwork?	0	0	0	53.3	46.7
Do you perceive gamification as an effective tool for promoting creativity and problem-solving skills among children?	0	0	0	33.3	66.7

Table 7 represents the enthusiasm in the children that was found to be improved. The data shows that 5.3 per cent of respondents believe gamification greatly improved children's enthusiasm for learning, while 46.7 per cent think it made a significant difference. This suggests gamification is highly effective in boosting kids' excitement and participation in learning.

Gamification has significantly improved children's retention of the academic concepts, with 60 per cent of respondents finding it very effective. Additionally, 40 per cent believe it can greatly enhance retention, indicating that gamification is widely seen as a valuable tool for improving learning outcomes.

Gamification has positively impacted kids' cooperation and teamwork, with 53 per cent of respondents agreeing and 46 per cent strongly agreeing. This suggests that gamified learning activities effectively encourage collaboration.

Gamification is widely trusted to increase children's creativity and problem-solving skills, with 66 per cent of respondents strongly agreeing and 33 per cent agreeing. This shows strong confidence in gamification as a strategy for developing these critical abilities in kids.

Table-8: Overall feedback of the teachers

Question(s)	Respondents %				
	Very satisfied	**Satisfied**	**Neutral**	**Dissatisfied**	**Very dissatisfied**
Overall, how satisfied are you with the integration of gamification into the preschool curriculum?	92.9	7.1	0	0	0
Would you recommend the continuation of gamification in the preschool curriculum for future academic years?	Definitely not	Probably not	Unsure	Probably yes	Definitely yes
	0	0	0	13.3	86.7
How likely are you to explore additional gamification strategies or resources for preschool education in the future?	Not likely at all	Somewhat likely	Moderately likely	Very likely	Extremely likely
	0	0	0	0	100

From Table 9, 92.9 per cent of respondents were highly satisfied. Gamification in the preschool curriculum has been a great success, improving learning experiences and receiving strong approval from parents and teachers. Given the high levels of endorsement, with 86 per cent definitely in favour and 30 per cent probably in favour, continuing gamification is strongly recommended.

Conclusion

The present study discussed "*Integrating Gamification into Preschool Concepts: A Developmental Approach*". It analysed children's demographic details (age, class, gender) upon their knowledge level on the topic.

The study concludes that there is a general concern among the importance of game-based learning in preschool children and presents facts that improve the motivation, engagement, social interaction and learning outcome. The gamification book developed by the investigator was sufficient to provide games for actively involving in learning through concept-based games. It was found using paired t-test there was a definite positive difference in the level of learning outcome after going through the gamification book. They displayed improved motivation, attention, retention, engagement, social interaction, language development and learning outcome. These findings imply that developing children's learning through imaginative games catered to their needs is a successful strategy.

This study highlights the potential of such game strategies to empower preschool children, increase their self-confidence, self-esteem, and provide them the skills they need to effectively communicate their ideas and views. The gamification book is a useful tool for parents, therapists, and teachers who want to make understand the basic concepts that essentially needed to know at the particular age group providing them with fresh opportunities for self-expression and creativity.

Limitations

- The study was limited to Kalamassery, Ernakulam, Kerala.

- Time constraints to learn and integrate gamification into preschool concepts.

Recommendations

The study puts forward the following implications:

- The school authorities and teachers have to integrate elements of gamification such as points, badges, and leader boards, to enhance the active participation.

- Structure the gamified activities to be developmentally and age appropriate for preschool children.

- Provide special training programs for preschool teachers to effectively implement and to correct deficiencies in children.

- Pay attention to developing skills in children according to the peers.

- Make parents aware of game-based learning and provide information and resources about benefits of extended learning at home via agamified activities.

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