



TEACHERS' APPLICATION OF GAMIFICATION TOOLS FOR CURRICULUM IMPLEMENTATION IN SPECIAL EDUCATION CENTERS IN IMO STATE

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ABSTRACT

The study examined special education teachers' application of gamification tools for curriculum implementation in special education centres in Imo State. Four research questions guided the study and three null hypotheses were tested at the 0.05 level of significance. The study adopted a descriptive survey research design. The population comprised all fifty-three (53) teachers in the five special education centres in Imo State, made up of thirty-six (36) teachers in urban centres and seventeen (17) in rural centres. Because the population was small and manageable, a census approach was adopted, and all fifty-three teachers were involved in the study without sampling. The instrument for data collection was a researcher-developed structured questionnaire titled Teachers' Level of Application of Gamification Tools (TLAGT), made up of three clusters corresponding to teachers of learners with hearing impairment, visual impairment, and intellectual disabilities, and scored on a four-point scale of Very High Extent, High Extent, Low Extent, and Very Low Extent. The instrument was validated by three experts one from Curriculum Studies, one from Educational Psychology and one from Measurement and Evaluation, all from Faculty of Education, Nnamdi Azikiwe University, Awka, and its reliability, determined through Cronbach's Alpha, yielded a coefficient of 0.830. Data were analysed using mean, standard deviation, and t-test statistics. Findings showed that special education teachers are aware of gamification tools for curriculum implementation for hearing impaired, visually impaired, and intellectually disabled learners both urban and rural areas but differ in application. Urban teachers recorded a significantly higher extent of application than their rural counterparts across all three categories of learners. Based on these findings, it was recommended amongst others that government and educational stakeholders should provide continuous professional development programmes on gamification for special education teachers, improve technological infrastructure and internet facilities in special education centres, particularly in rural areas and ensure equitable provision of digital instructional resources to facilitate the effective integration of gamification tools into curriculum implementation for learners with special needs.

Keywords: Gamification Tools, Curriculum Implementation, Special Education, Application, Teachers.

Introduction

Education remains one of the most powerful instruments for national development, human capital formation, and social transformation, equipping individuals with the knowledge, skills, and



competencies required for productive citizenship and lifelong learning United Nations Educational, Scientific and Cultural Organization (UNESCO, 2024). Within the broader educational system, special education occupies a unique position because it is designed specifically to meet the learning needs of individuals with physical, sensory, intellectual, emotional, or developmental disabilities through specialized instructional methods and individualized support services United Nations Educational, Scientific and Cultural Organization (UNESCO, 2025). The realization of educational goals in special education settings depends largely on effective curriculum implementation, which refers to the process through which planned objectives, instructional strategies, and learning resources are translated into actual classroom practice. In special education, curriculum implementation extends beyond delivering prescribed content to include adapting instructional strategies and utilizing assistive technologies that accommodate the diverse learning needs of learners with disabilities (European Agency for Special Needs and Inclusive Education, 2022).

Gamification is an instructional approach that has gained increasing attention in contemporary education because of its potential to increase learners' motivation, engagement, and participation in the teaching-learning process. Its conceptual foundation was established by Deterding, Dixon, Khaled, and Nacke (2011), who defined gamification as the use of game design elements in non-game contexts. Zeybek and Saygi (2024) explained that gamification has evolved into a pedagogical strategy that intentionally integrates motivational principles into instructional design to improve learning outcomes, while Chan and Lo (2024) observed that it transforms conventional instructional activities into interactive learning experiences that encourage active participation and sustained engagement. Gamification tools are the digital platforms, software applications, and instructional resources that enable teachers to incorporate game design elements, such as points, badges, leaderboards, quizzes, rewards, and progress bars, into classroom instruction. Pérez-Granados and Muñoz-González (2024) observed that these tools allow teachers to design learner-centred instructional activities that stimulate collaboration, problem-solving, and continuous assessment while supporting curriculum objectives.

The application of gamification tools for curriculum implementation refers to the practical integration of these digital and non-digital game-based elements into classroom teaching to facilitate the achievement of curriculum objectives. Rather than serving as entertainment, gamification tools are intentionally employed by teachers to present lesson content, reinforce learning, assess learners' understanding, and sustain motivation throughout instruction. Dehghanzadeh, Fardanesh, Hatami, Talaei, and Noroozi (2024) emphasized that effective application of gamification requires teachers to align game elements with curriculum content, learning outcomes, and learners' characteristics, while Pérez-Granados and Muñoz-González (2024) maintained that successful implementation depends on teachers' pedagogical planning and ability to select appropriate elements that enhance rather than distract from learning objectives. Within special education centres, the application of gamification tools is particularly valuable because it provides flexible, individualized, and visually engaging learning experiences that accommodate the diverse needs of learners with disabilities.



School location, classified as urban or rural, may also influence the extent to which teachers apply gamification tools in classroom instruction. Urban schools are generally characterized by greater access to modern educational technologies and continuous teacher training, whereas rural schools frequently experience shortages of instructional resources and technological infrastructure (Luo, Zuo, & Wang, 2022). In the context of special education, MacSuga-Gage, Kaplan, Batton, Ellis, and Gage (2022) observed that educational outcomes for learners with disabilities vary across rural and urban settings due to differences in available resources and instructional support. These disparities suggest that school location may influence the extent to which teachers apply innovative instructional approaches such as gamification tools for curriculum implementation.

Despite the recognized benefits of gamification, evidence suggests that the integration of innovative digital instructional strategies in many special education settings in Nigeria remains limited on account of inadequate technological infrastructure and insufficient professional development opportunities (UNESCO, 2024; Opara, Ibeabuchi, Makam, & Omerekpe, 2024; Ohiri, Okonkwo, & Kanayo-Egwuonwu, 2024). Although several empirical studies have examined gamification and technology-enhanced instruction, none has specifically investigated the extent to which teachers apply gamification tools for curriculum implementation in special education centres in Imo State. Existing studies have largely concentrated on digital transformation and inclusive education practices without examining the practical classroom application of gamification tools or whether school location influences this practice. It is this gap in knowledge that necessitated the present study on teachers' application of gamification tools for curriculum implementation in special education centres in Imo State.

The main purpose of this study, therefore, was to examine special education teachers' application of gamification tools for curriculum implementation in special education centres in Imo State. Specifically, the study sought to:

1. Examine the extent to which special education teachers apply gamification tools for curriculum implementation for learners with hearing impairment in special education centres in Imo State.
2. Examine the extent to which special education teachers apply gamification tools for curriculum implementation for learners with visual impairment in special education centres in Imo State.
3. Establish the extent to which special education teachers apply gamification tools for curriculum implementation for learners with intellectual disabilities in special education centres in Imo State.
4. Establish the extent to which special education teachers apply gamification tools for curriculum implementation in urban and rural special education centres in Imo State.

Research Questions

1. What is the extent of special education teachers' application of gamification tools for curriculum implementation for hearing impaired learners in special education centres in Imo State?
2. What is the extent of special education teachers' application of gamification tools for curriculum implementation for visually impaired learners in special education centres in Imo State?



3. What is the extent of special education teachers' application of gamification tools for curriculum implementation for intellectually disabled learners in special education centres in Imo State?
4. What is the extent of special education teachers' application of gamification tools for curriculum implementation in urban and rural special education centres in Imo State?

Null Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

1. There is no significant difference in the extent of application of gamification tools among urban and rural special education teachers who teach hearing impaired learners in special education centres in Imo State.
2. There is no significant difference in the extent of application of gamification tools among urban and rural special education teachers who teach visually impaired learners in special education centres in Imo State.
3. There is no significant difference in the extent of application of gamification tools among urban and rural special education teachers who teach intellectually disabled learners in special education centres in Imo State.

Methods

The study adopted a descriptive survey research design, considered appropriate because it allows for the collection of data on current instructional practices directly from respondents (Nworgu, 2015). The study was carried out in Imo State, located in the South-East geopolitical zone of Nigeria, which has five special education centres, three urban and two rural. The population of the study comprised all fifty-three (53) teachers in the five special education centres, thirty-six (36) in urban centres and seventeen (17) in rural centres. Because of the relatively small and manageable size of the population, a census approach was adopted whereby all fifty-three teachers were included in the study without sampling.

The instrument for data collection was a researcher-developed structured questionnaire titled Teachers' Level of Application of Gamification Tools (TLAGT), designed as part of a broader instrument that also measured teachers' awareness of gamification tools. The application section of the instrument was structured into three clusters based on the categories of learners with special needs, namely learners with hearing impairment, visual impairment, and intellectual disabilities. The response format was a four-point Likert scale of Very High Extent (VHE = 4), High Extent (HE = 3), Low Extent (LE = 2), and Very Low Extent (VLE = 1). The use of a self-developed questionnaire was necessary because existing instruments on gamification are not specifically tailored to teachers of special-needs learners within the Nigerian context.

The instrument was subjected to face and content validation by three experts, two from Curriculum Studies and one from Educational Psychology, all from the Faculty of Education, Nnamdi Azikiwe University, Awka. Their observations and corrections were incorporated into the final copy of the instrument before administration. The reliability of the instrument was established by administering it to ten special-needs teachers in a school outside the study area. Using Cronbach's Alpha, a reliability coefficient of 0.830 was obtained for the application section of the instrument,



which, according to Hair, Black, Babin, and Anderson (2019), indicates acceptable internal consistency for a coefficient of 0.70 and above.

The questionnaires were administered directly by the researcher with the assistance of a research assistant who is a special educator conversant with sign language. An introductory letter and official permission were obtained before administration, and respondents were assured of the confidentiality of their responses. Data collected were analysed using mean and standard deviation to answer the research questions, and t-test statistics to test the hypotheses at the 0.05 level of significance. The extent of application of gamification tools was interpreted using the boundary limits of 3.50-4.00 (Very High Extent), 2.50-3.49 (High Extent), 1.50-2.49 (Low Extent), and 1.00-1.49 (Very Low Extent). A null hypothesis was rejected whenever the p-value was less than or equal to 0.05, and retained otherwise.

Results

Research Question 1: What is the extent of special education teachers' application of gamification tools for curriculum implementation for hearing impaired learners in special education centres in Imo State?

Table 1: Mean and Standard Deviation Scores on the Extent of Special Education Teachers' Application of Gamification Tools for Curriculum Implementation for Hearing Impaired Learners in Special Education Centres in Imo State (N = 53)

Application of Gamification Tools	Mean	SD	Remark
Duolingo during curriculum implementation	2.85	.969	High Extent
Kahoot during curriculum implementation	2.94	.929	High Extent
Class craft during curriculum implementation	3.15	.794	High Extent
Quiz maker during curriculum implementation	2.19	.683	Low Extent
Seesaw during curriculum implementation	2.98	.909	High Extent
JotForm during curriculum implementation	2.83	1.051	High Extent
Quizlet during curriculum implementation	2.48	.730	Low Extent
Animated storytelling during curriculum implementation	3.08	1.016	High Extent
Infographics-based quizzes during curriculum implementation	2.85	1.026	High Extent
Gesture-based games during curriculum implementation	2.70	1.011	High Extent
Leaderboard to know learner progress	2.21	.578	Low Extent
Point system to motivate my learners	2.72	.988	High Extent
Reward system to motivate and reward learners	2.79	.948	High Extent
Charts as non-digital gamification tool	2.92	.937	High Extent
Sticker as non-digital gamification tool	3.06	.886	High Extent
Cards as non-digital gamification tool	2.94	.989	High Extent
Grand Mean	2.79	.903	High Extent

Table 1 shows the extent of application of gamification tools for curriculum implementation for hearing impaired learners by special education teachers in Imo State. The respondents rated Class craft, animated storytelling, stickers, Seesaw, Kahoot, cards, charts, Duolingo, infographics-based



quizzes, JotForm, reward system, point system, and gesture-based games high extent, while leaderboard, quiz maker, and Quizlet were rated low extent. On the whole, the grand mean score of 2.79 (SD = .903) reveals that special education teachers apply gamification tools for curriculum implementation for hearing impaired learners in the state to a high extent, and the standard deviation shows homogeneity in the respondents' ratings.

Hypothesis One: There is no significant difference in the extent of application of gamification tools among urban and rural special education teachers who teach hearing impaired learners in special education centres in Imo State.

Table 2: t-test Summary on Mean and Standard Deviation Scores in the Extent of Application of Gamification Tools among Urban and Rural Special Education Teachers who Teach Hearing Impaired Learners

Source of Variation	N	Mean	SD	df / t	Remark
Urban	36	49.28	3.622	df=51	Sig.
Rural	17	40.29	3.917	t=8.212	

Data presented in Table 2 show that urban teachers (Mean = 49.28, SD = 3.622) and rural teachers (Mean = 40.29, SD = 3.917) differed significantly in their extent of application of gamification tools for hearing impaired learners, $t(51) = 8.212$, $p < .05$. The null hypothesis was therefore rejected, indicating that urban teachers demonstrated a significantly higher extent of application than their rural counterparts.

Research Question 2: What is the extent of special education teachers' application of gamification tools for curriculum implementation for visually impaired learners in special education centres in Imo State?

Table 3: Mean and Standard Deviation Scores on the Extent of Special Education Teachers' Application of Gamification Tools for Curriculum Implementation for Visually Impaired Learners in Special Education Centres in Imo State (N = 53)

Application of Gamification Tools	Mean	SD	Remark
Duolingo during curriculum implementation	2.77	1.012	High Extent
Audio storytelling games during curriculum implementation	2.89	1.068	High Extent
Talking books during curriculum implementation	2.74	.984	High Extent
Audio quizzes during curriculum implementation	2.72	.968	High Extent
Quizlet during curriculum implementation	2.92	.978	High Extent
Braille flashcards during curriculum implementation	2.66	1.037	High Extent
Educational puzzle during curriculum implementation	3.08	.997	High Extent
Point system to motivate my learners	2.79	.968	High Extent
Reward system to motivate my learners	2.85	.969	High Extent
Grand Mean	2.82	.998	High Extent



Table 3 shows the extent of application of gamification tools for curriculum implementation for visually impaired learners by special education teachers in Imo State. The respondents rated educational puzzle, Quizlet, audio storytelling games, reward system, point system, Duolingo, talking books, audio quizzes, and Braille flashcards high extent. On the whole, the grand mean score of 2.82 (SD = .998) reveals that special education teachers apply gamification tools for curriculum implementation for visually impaired learners in the state to a high extent, reflecting teachers' reliance on audio-based and tactile gamification tools.

Hypothesis Two: There is no significant difference in the extent of application of gamification tools among urban and rural special education teachers who teach visually impaired learners in special education centres in Imo State.

Table 4: t-test Summary on Mean and Standard Deviation Scores in the Extent of Application of Gamification Tools among Urban and Rural Special Education Teachers who Teach Visually Impaired Learners

Source of Variation	N	Mean	SD	df / t	Remark
Urban	36	26.97	2.432	df=51	Sig.
Rural	17	22.12	3.462	t=5.900	

Data presented in Table 4 show that urban teachers (Mean = 26.97, SD = 2.432) and rural teachers (Mean = 22.12, SD = 3.462) differed significantly in their extent of application of gamification tools for visually impaired learners, $t(51) = 5.900$, $p < .05$. The null hypothesis was therefore rejected, indicating that urban teachers demonstrated a significantly higher extent of application than their rural counterparts.

Research Question 3: What is the extent of special education teachers' application of gamification tools for curriculum implementation for intellectually disabled learners in special education centres in Imo State?

Table 5: Mean and Standard Deviation Scores on the Extent of Special Education Teachers' Application of Gamification Tools for Curriculum Implementation for Intellectually Disabled Learners in Special Education Centres in Imo State (N = 53)

Application of Gamification Tools	Mean	SD	Remark
Charts as non-digital gamification tool	2.92	.937	High Extent
Sticker as non-digital gamification tool	3.06	.886	High Extent
Cards as non-digital gamification tool	2.94	.989	High Extent
Kahoot during curriculum implementation	3.08	.978	High Extent
Seesaw during curriculum implementation	2.85	1.026	High Extent
Picture-based quizzes during curriculum implementation	2.83	1.069	High Extent
Colour-coded learning games during curriculum implementation	2.91	1.079	High Extent
Avatars during curriculum implementation	2.83	1.069	High Extent
Educational puzzles during curriculum implementation	3.13	1.075	High Extent



Drag-and-drop games during curriculum implementation	2.68	1.034	High Extent
Picture-based matching games during curriculum implementation	2.89	1.103	High Extent
Quizlet (basic mode) during curriculum implementation	3.09	1.024	High Extent
Point system to motivate my learners	2.81	1.001	High Extent
Reward system to motivate my learners	3.13	.962	High Extent
Charts as non-digital gamification tool	3.04	.876	High Extent
Sticker as non-digital gamification tool	3.15	.841	High Extent
Cards as non-digital gamification tool	2.96	.940	High Extent
Grand Mean	2.96	.993	High Extent

Table 5 shows the extent of application of gamification tools for curriculum implementation for intellectually disabled learners by special education teachers in Imo State. The respondents rated stickers, educational puzzles, reward system, Quizlet (basic mode), Kahoot, charts, cards, Seesaw, colour-coded learning games, picture-based matching games, point system, picture-based quizzes, avatars, and drag-and-drop games high extent. On the whole, the grand mean score of 2.96 (SD = .993) reveals that special education teachers apply gamification tools for curriculum implementation for intellectually disabled learners in the state to a high extent.

Hypothesis Three: There is no significant difference in the extent of application of gamification tools among urban and rural special education teachers who teach intellectually disabled learners in special education centres in Imo State.

Table 6: t-test Summary on Mean and Standard Deviation Scores in the Extent of Application of Gamification Tools among Urban and Rural Special Education Teachers who Teach Intellectually Disabled Learners

Source of Variation	N	Mean	SD	df / t	Remark
Urban	36	40.69	3.404	df=51	Sig.
Rural	17	33.82	3.661	t=6.696	

Data presented in Table 6 show that urban teachers (Mean = 40.69, SD = 3.404) and rural teachers (Mean = 33.82, SD = 3.661) differed significantly in their extent of application of gamification tools for intellectually disabled learners, $t(51) = 6.696$, $p < .05$. The null hypothesis was therefore rejected, indicating that urban teachers demonstrated a significantly higher extent of application than their rural counterparts.

Research Question 4: What is the extent of special education teachers' application of gamification tools for curriculum implementation in urban and rural special education centres in Imo State?



Table 7: Mean Scores on the Extent of Application of Gamification Tools for Curriculum Implementation in Urban and Rural Special Education Centres in Imo State

Location	Grand Mean	Remark
Urban special education centres (n = 36)	3.03	High Extent
Rural special education centres (n = 17)	2.55	High Extent
Combined weighted mean	2.79	High Extent

Table 7 shows that both urban and rural special education teachers applied gamification tools for curriculum implementation to a high extent, with urban teachers recording a grand mean of 3.03 compared to 2.55 for rural teachers, and an overall combined weighted mean of 2.79. This indicates that although both urban and rural special education teachers apply gamification tools to a high extent in curriculum implementation, urban teachers demonstrate a consistently higher level of application than their rural counterparts across virtually all the gamification tools examined.

Discussion

The finding that special education teachers applied gamification tools for curriculum implementation for hearing impaired learners to a high extent indicates that teachers frequently integrate these tools into classroom instruction to enhance learners' engagement, communication, and motivation. This may be because hearing impaired learners respond more effectively to interactive, visual, and activity-based instructional strategies. The finding agrees with Karunamoorthy, Tahar, and Mokhtar (2020), who found that a gamification application significantly improved the learning behaviour of students with learning disabilities, and with Elangovan and Mohd Yasin (2024), who reported that Kahoot! significantly improved motivation, participation, and academic achievement among pupils with special educational needs. Similarly, Shaltout, Amin, and Afifi (2021) found that a gamified prototype enhanced learners' engagement, attention, and language development, while Hussein, Kan'an, Rasheed, Alrashed, Jdaitawi, Abas, Mabrouk, and Abdelmoneim (2023) concluded that gamification enhances the academic, communication, cognitive, and social skills of learners with special educational needs.

The finding that teachers highly applied gamification tools for visually impaired learners, relying particularly on audio-based and tactile tools, suggests that teachers recognize the importance of assistive and interactive instructional approaches in improving accessibility for this category of learners. This is consistent with Mahmoudi, Yoo, Chandra, Cardoso, Dos Santos, Majnemer, and Shikako (2024), who revealed that gamified mobile applications improve communication and learning among children with disabilities. Likewise, the high extent of application recorded for intellectually disabled learners, particularly through repetitive and reward-based tools such as stickers, educational puzzles, and reward systems, agrees with Li, Ma, and Shi (2023), who found that gamification has a significant positive effect on teaching and learning outcomes, and with Lampropoulos and Kinshuk (2024), who established that gamification significantly enhances learners' motivation, collaboration, and overall learning experiences across different educational contexts.

The significant differences found between urban and rural teachers in the extent of application of gamification tools across all three categories of learners suggest that contextual and institutional



factors substantially shape teachers' capacity to translate gamification into classroom practice. This finding is consistent with Kusala and Lisana (2025), who found that facilitating conditions, teaching self-efficacy, and institutional support significantly influence teachers' use of educational games in inclusive classrooms, and with Sailer and Homner (2020), who established that the effectiveness of gamification depends largely on instructional context and the availability of appropriate game design elements. Similarly, Anno, Pangowen, Wayan, Aragon, and Tabon (2025) reported that although gamification positively influences learners' engagement across educational settings, its effective classroom implementation depends largely on teachers' digital competence and the availability of technological resources, while Adeoti (2025) observed that effective application of gamified instruction requires structured learning resources and supportive classroom environments. The agreement between the present study and these findings may be attributed to disparities in technological infrastructure, professional development opportunities, and institutional support between urban and rural special education centres, all of which influence teachers' capacity to apply gamification effectively during curriculum implementation.

Conclusion

Based on the findings of this study, it was concluded that special education teachers in Imo State apply gamification tools to a high extent in curriculum implementation for learners with hearing impairment, visual impairment, and intellectual disabilities. However, urban teachers demonstrated a significantly higher extent of application than their rural counterparts across all three categories of learners. This suggests that although gamification tools hold considerable potential for enhancing curriculum implementation for learners with special needs in Imo State, disparities in access to technological resources and institutional support between urban and rural special education centres must be addressed to ensure that all teachers, irrespective of location, can translate the recognized value of gamification into consistent classroom practice.

Recommendations

Based on the findings, the following recommendations were made:

1. Government and educational stakeholders should prioritize the equitable distribution of gamification resources between urban and rural special education centres, with targeted funding and provision of digital and non-digital gamification materials extended to rural centres to bridge the observed practical gap.
2. Teacher training institutions should organize regular, hands-on workshops and continuous professional development programmes on gamification tools for special education teachers, with particular attention to deepening classroom-based application among rural teachers.
3. School administrators should institute mentorship and peer-collaboration structures pairing urban and rural special education teachers to allow the sharing of practical strategies for applying gamification tools across both settings.
4. Curriculum planners should formally integrate the specific gamification tools found to be most effective, such as Class craft, reward systems, audio-based tools, and educational puzzles, into the official special education curriculum for deaf, visually impaired, and intellectually disabled learners.
5. Special education centres should establish monitoring and support systems to track the ongoing use of gamification tools in classrooms, with regular supervision and feedback to sustain and improve the extent of application, particularly in rural centres.



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