

Examining the characteristics and perceptions of gamification strategies for enhancing library resource exploration among information science students and professionals

Oluwole O. Durodolu

*Department of Information Science, University of South Africa,
Pretoria, South Africa*

Joshua Onaade Ojo

University of Lagos Library, University of Lagos, Lagos, Nigeria, and

Taiwo Bosede Ajayi

*University Library, Lagos State University of Science and Technology,
Ikorodu, Nigeria*

Abstract

Purpose – The purpose of this study is to examine the characteristics and perceptions of gamification strategies as a means to enhance library resource exploration among information science students and professionals.

Design/methodology/approach – The study utilized a descriptive survey research design with a two-stage sampling method. It focused on four universities in the North Central and South West regions of Nigeria, representing both private and public institutions. The population consisted of 296 Library and Information Science students, from which a purposive sample of 198 was drawn. Data collection was conducted via a self-designed questionnaire on Google Forms, achieving a 66.89% response rate suitable for analysis. The questionnaire was distributed through WhatsApp, with research assistants in each department overseeing the completion process.

Findings – The data highlights the essential role of academic libraries in supporting student learning and research, underscoring their impact on LIS students' information-seeking behaviors. A strong emphasis on information technology reflects the field's digital transformation, though limited interest in archives, preservation and public libraries points to a need for broader exposure to these areas. Most students use digital resources regularly, underscoring the importance of digital literacy, but some face barriers like awareness and usability. Additionally, a knowledge gap regarding gamification suggests potential challenges in effectively incorporating it into library services, despite its perceived benefits.

Originality/value – This research is original and valuable as it explores the innovative application of gamification in enhancing library resource exploration among information science students and professionals. Its findings contribute to the existing body of knowledge in library science, inform practical strategies for improving user engagement and pave the way for future research in this evolving field.

Keywords Academic libraries, Digital transformation, Information literacy skills, Gamification, Digital infrastructure, Library experience, Technology adoption

Paper type Research paper

Introduction

In the contemporary era, the needs of library users have shifted significantly, necessitating libraries to adapt and evolve in order to remain relevant and sustainable. Historically, libraries



functioned as primary information hubs, with librarians acting as gatekeepers of knowledge. However, with the proliferation of easily accessible information through digital means, the traditional role of libraries is being challenged. Consequently, libraries must reassess their purpose and redefine their objectives to align with the changing demands of the communities they serve (Woodward, 2009), (Durodolu and Isibor-Mamudu, 2020). In a world that is progressively becoming digital, libraries as a knowledge institution must be acquainted with the changing needs of their numerous users. One pioneering method for enhancing library activities is gamification, which can be defined as the application of game-like elements (e.g. points, badges, leaderboards) in a non-playful approach to encourage involvement and motivation (Deterding *et al.*, 2011). Therefore, gamification in libraries has the capacity to stimulate an interactive and entertaining environment, altering the traditional library setting into a more vibrant, user-centric experience. Libraries may apply the game mechanism to strengthen instructive goals, making the knowledge acquisition process more entertaining and effective (Hamari *et al.*, 2014a, b). For instance, digital literacy programs can incorporate interactive puzzles or tests, allowing users to undergo assessment in a fun, low-stakes environment.

Gamification in libraries refers to the integration of game elements to enhance user engagement, foster emotional connections and encourage behavioral changes. It bridges the gap between physical and digital spaces, using computer games to provide immersive visual and auditory experiences. Through storytelling and problem-solving, games enhance critical thinking, language skills, and literacy. Educational games support reading, writing, and vocabulary development, especially for children and parents, while also offering a cathartic outlet for emotions in a virtual environment. This trend, common in industries such as marketing and education, aims to counter declining library patronage by offering innovative approaches to service delivery and user satisfaction (Muhammad and Saleh, 2022).

Gamification refers to the deliberate integration of game design elements and principles, such as dynamics and mechanics, into systems, services, and activities typically outside the realm of games. Its primary objective is to foster user motivation and engagement by replicating the immersive and rewarding experiences commonly associated with gameplay. Within the library context, gamification can be strategically employed to enhance user interaction with library services, promote information literacy, and encourage the active participation of patrons in library programs and learning activities. By applying these game-like features, libraries can create more dynamic and engaging environments that motivate users to explore resources and develop skills in innovative ways (Deterding *et al.*, 2011).

Gamification is a component of the persuasive system design that integrates game mechanics to enhance user engagement (Hamari *et al.*, 2014a, b), improve organizational productivity, facilitate knowledge retention, and support learning (Hamari *et al.*, 2014a, b). It has been applied in various domains such as crowdsourcing (Morschheuser *et al.*, 2016), employee recruitment and evaluation, and even in addressing social issues like voter apathy (Furbert, 2017), public attitudes toward alternative energy, and traffic violations (Rai and Beck, 2016). Within the context of libraries, gamification can play a significant role in improving the ease of use of digital platforms, promoting knowledge sharing, and fostering sustained user engagement with library resources (Koivisto and Hamari, 2015). For libraries, this implies that while gamification strategies can be highly effective in engaging users and enhancing the learning experience, their success may depend on specific user groups and institutional contexts. Therefore, careful consideration must be given to how game design elements are implemented in library systems to ensure their effectiveness and relevance across diverse user populations (Hamari *et al.*, 2014a, b), (Durodolu *et al.*, 2020).

Problem statement

The innovation of digital technologies has a considerable influence on how students and staff relate with library resources. In the contemporary world where information is readily available

and accessible but sadly not utilized to the optimum, libraries are gradually employing pioneering ways to stimulate the use of library resources. Gamification, which is the use of game specifically design as a possible strategy for enhancing users' performance (Hamari *et al.*, 2014a, b). Nevertheless, there is a dearth of research investigating the efficiency of gamification within the context of the library environment, mainly among Information Science students and professionals, who are expected to have a higher degree of information literacy and technological competence.

Extant literature advocates that gamification has a positive effect on learning outcomes by stimulating resource usage (Deterding *et al.*, 2011). Regardless of this perspective, many libraries are faced with challenges in embracing these approaches due to perceptions about the relevance of gamification, especially among librarians and their patrons (Dichev and Dicheva, 2017). Furthermore, the characteristics of effective gamification schemes, especially within the context of the library environment, have not been fully explored, leaving a lacuna in understanding the elements that foster engagement and learning in this domain.

In view of the above, this research set out to fill the gaps by scrutinizing the features and perceptions of the gamification method for augmenting library resource exploration among Information Science students and professionals. The research focused on identifying key gamification elements that contribute to effective engagement, as well as analyzing how these strategies are perceived by different user groups in terms of their relevance, effectiveness, and potential for sustained use in academic and professional settings.

Significance

This research holds considerable significance as it makes substantial contributions to the existing body of knowledge in three key areas. A comprehensive review of pertinent literature on gamification strategies and the application of gamification in library services was conducted, with the objective of presenting novel insights, identifying research gaps, and critically analyzing and evaluating existing studies to highlight the strengths and weaknesses within this field. Secondly, it offers a series of recommendations designed to enhance Library and Information Studies (LIS) practices, specifically regarding the integration of gamification strategies and their application within library services. Additionally, the study provides insights that may inform potential policy changes, a notable contribution given the typically lengthy and complex process associated with policy reform. By offering a framework for these changes, this research facilitates advancements in LIS practice outside the constraints of government bureaucracy.

Aims of the study

To Examine the Characteristics and Perceptions of Gamification Strategies for Improving Library Resource Exploration Among Information Science Students and Professionals.

Research questions

- (1) What are the characteristics of respondents involved in gamification strategies for encouraging library resource exploration?
- (2) What are the varying levels of familiarity with the concept of gamification in library services among library patrons and professionals?
- (3) How do perceptions of gamification influence its effectiveness in enhancing library resource exploration?
- (4) How do users perceive gamification in libraries, and what factors influence their participation in gamified activities or challenges in both physical and digital library settings?

Hypotheses

- (1) There is a significant difference in the level of familiarity with the concept of gamification in library services among library patrons and professionals based on their academic level.
- (2) The level of familiarity with the concept of gamification in library services varies significantly among library patrons and professionals, and this variation is influenced by their primary area of study or specialization within Library and Information Science.

Methodology

The study adopted a descriptive survey research design using a two-stage sampling method. The study areas are the North Central and South West Nigeria where four (4) universities from library and information science schools were randomly selected consisting of private and public universities. The population consisted of 296 students (both graduates and undergraduates), while a sample size of 198 was drawn using a purposive sampling technique. A self-designed survey questionnaire was used for data collection with the aid of Google Forms, which yielded 66.89% of the total population which was found useable for data analysis. WhatsApp was used to administer the questionnaire, with a research assistant in each of the library and information science departments monitoring the filling of the Google forms.

Analysis of results

The discussion focuses on the research questions highlighted at the beginning of this paper.

- RQ1.* What are the characteristics of respondents involved in gamification strategies for encouraging library resource exploration?

Data analysis and interpretations

Table 1 details the demographic information of 193 respondents, and the majority are undergraduates, numbering 168 individuals (87.00%). There are 16 graduate students (8.30%) and 9 PhD students (4.70%). Regarding primary area of study within Library and Information Science, 88 respondents (45.60%) focus on academic libraries, while 83 respondents (43.00%) specialize in information technology. A smaller number of respondents concentrate on archives and preservation (10, or 5.20%), public libraries (7, or 3.60%), and other areas (5, or 2.60%). Regarding the frequency of use of digital library resources for academic purposes, 60 respondents (31.10%) use them daily, 33 respondents (17.10%) use them weekly, and 64 respondents (33.20%) use them occasionally. Only 5 individuals (2.60%) use these resources monthly, while 31 respondents (16.10%) use them rarely.

The implication of the above findings is that while gamification strategies have the potential to enhance engagement, especially among undergraduates and frequent users of digital resources, there is a need to target occasional and rare users more effectively. Moreover, diversifying the gamification approach to appeal to various specializations within Library and Information Science could lead to broader participation and improved exploration of library resources.

- RQ2.* What are the varying levels of familiarity with the concept of gamification in library services among library patrons and professionals?

Data analysis and interpretations

Table 2 provides a snapshot of varying levels of familiarity with the concept of gamification in library services among library patrons and professionals. The data reveals that 52 individuals

Table 1. Demographic details ($N = 193$)

Parameters	Details	Frequency	Percent%
What is your current academic level?	Undergraduates	168	87.00
	Graduate student	16	8.30
	PhD Students	9	4.70
What is your primary area of study within Library and Information Science?	Academic Libraries	88	45.60
	Public Libraries	7	3.60
	Archives and Preservation	10	5.20
	Information Technology	83	43.00
	Others	5	2.60
	Daily	60	31.10
How often do you use digital library resources for academic purposes?	Weekly	33	17.10
	Monthly	5	2.60
	Occasionally	64	33.20
	Rarely	31	16.10

Source(s): Durodolu *et al.* (2020)

Table 2. Descriptive statistics showing varying levels of familiarity with the concept of gamification in library services among library patrons and professionals

Parameter	Frequency	Percent
Not familiar at all	52	26.9
Slightly Familiar	86	44.6
Moderately familiar	29	15.0
Very familiar	21	10.9
Extremely Familiar	5	2.6
<i>Total</i>	<i>193</i>	<i>100.0</i>

Source(s): Durodolu *et al.* (2020)

(26.9%) are not familiar at all with gamification. A larger segment, comprising 86 people (44.6%), is slightly familiar with the concept. Fewer respondents are moderately familiar (29, or 15.0%) or very familiar (21, or 10.9%) with the concept. Only 5 individuals (2.6%) are extremely familiar with gamification. The cumulative percentages indicate that a significant portion of the respondents has some degree of familiarity with gamification, with only a small fraction being highly familiar with the concept.

The implication of the above suggests a need for increased education and outreach on the concept of gamification within library services. The low familiarity levels could mean that patrons and professionals may not fully recognize the potential benefits that gamification could bring to enhancing engagement and improving library experiences. By bridging this knowledge gap through training, workshops, and resources, libraries could foster a more informed community that can effectively leverage gamification strategies to enrich library services and user experiences.

RQ3. How do perceptions of gamification influence its effectiveness in enhancing library resource exploration?

Data analysis and interpretations

Table 3 explores how perceptions of gamification affect its effectiveness in enhancing library resource exploration. The majority of respondents (85 individuals, or 44.0%) agree that

Table 3. Descriptive statistics showing how perceptions of gamification influence its effectiveness in enhancing library resource exploration

Parameter	Frequency	Percent
Neutral	60	31.1
Strongly Disagree	9	4.7
Disagree	7	3.6
Agree	85	44.0
Strongly Agree	32	16.6
<i>Total</i>	<i>193</i>	<i>100.0</i>

Source(s): Durodolu *et al.* (2020)

gamification positively influences resource exploration, while 32 respondents (16.6%) strongly agree with this view. A significant portion (60 respondents, or 31.1%) remain neutral on the matter. Fewer individuals disagree (7, or 3.6%) or strongly disagree (9, or 4.7%) with the notion that gamification enhances resource exploration. Overall, the data suggests a positive perception of the role of gamification, with a notable number of respondents endorsing its effectiveness.

The general implication of the above is that a majority of users perceive gamification positively, supporting its potential as an engaging strategy to enhance library resource exploration. However, the neutral response rate also indicates room for improvement, possibly through enhanced gamification features or better communication about its benefits.

RQ4. How do users perceive gamification in libraries, and what factors influence their participation in gamified activities or challenges in both physical and digital library settings?

Data analysis and interpretations

Table 4 examines users' perceptions of gamification in libraries and the factors influencing their participation in gamified activities. It shows that 38 respondents (19.7%) positively perceive gamification, while a significant majority (134 individuals, or 69.4%) do not see its value or are not interested in participating. Additionally, 21 respondents (10.9%) are unsure about their perception. The data highlights a general skepticism or lack of enthusiasm towards gamification in libraries among users.

These findings imply a general skepticism or ambivalence towards gamification within library environments. This could be due to a variety of factors, such as unfamiliarity with gamified concepts, perceived lack of relevance, or potential concerns about the effectiveness of gamification in enhancing their library experience. The results suggest that libraries may need to reconsider how they implement gamification strategies, possibly by conducting further

Table 4. Descriptive statistics showing how users perceive gamification in libraries, and what factors influence their participation in gamified activities

Parameter	Frequency	Percent	Valid percent	Cumulative percent
Yes	38	19.7	19.7	19.7
No	134	69.4	69.4	89.1
Not Sure	21	10.9	10.9	100.0
<i>Total</i>	<i>193</i>	<i>100.0</i>	<i>100.0</i>	

Source(s): Durodolu *et al.* (2020)

research to understand user needs, preferences, and the specific barriers to participation. Additionally, educational initiatives could help raise awareness about the potential benefits of gamification, aiming to shift perceptions and foster a more engaging and interactive library environment.

Research hypotheses

H1. There is a significant difference in the level of familiarity with the concept of gamification in library services among library patrons and professionals based on their academic levels.

Table 5 presents the ANCOVA results, indicating the effects of different academic levels on familiarity with the concept of gamification in library services. The corrected model has a significant effect with an *F*-value of 4.148 and a *p*-value of 0.017, suggesting that academic level significantly influences familiarity with gamification. The intercept is also highly significant, with an *F*-value of 305.451 and a *p*-value of 0.000, reflecting the overall mean effect across all groups. The multiple comparisons further reveal that undergraduate students differ significantly from graduate students in their familiarity with gamification, with a mean difference of -0.6548 and a *p*-value of 0.014. However, the differences between undergraduates and PhD students, as well as between graduate students and PhD students, are not statistically significant, indicating a nuanced impact of academic level on gamification familiarity.

The general implication of the research highlights the significant role that academic level plays in determining familiarity with gamification in library services. This finding has

Table 5. ANCOVA showing differences in the level of familiarity with the concept of gamification in library services among library patrons and professionals based on their academic levels

Source	Type III sum of squares	df	Mean square	<i>F</i>	Sig.
<i>Tests of Between-Subjects Effects</i>					
Corrected Model	8.534	2	4.267	4.148	0.017
Intercept	314.255	1	314.255	305.451	0.000
Academic Level	8.534	2	4.267	4.148	0.017
Error	195.476	190	1.029		
Total	1118.000	193			
Corrected Total	204.010	192			

Note(s): *R* Squared = 0.042 (Adjusted *R* Squared = 0.032)

Multiple comparisons

(I) Academic level	(J) Academic level	Mean difference (I-J)	Std. error	Sig.	<i>F</i>
Undergraduates	Graduate student	-0.6548^*	0.26538	0.014	4.148
Undergraduates	PhD Students	-0.5714	0.34704	0.101	
Graduate students	Undergraduates	0.6548^*	0.26538	0.014	4.148
Graduate students	PhD Students	0.0833	0.42263	0.844	
PhD Students	Undergraduates	0.5714	0.34704	0.101	
PhD Students	Graduate student	-0.0833	0.42263	0.844	

Source(s): Durodolu *et al.* (2020)

practical implications for libraries aiming to enhance user engagement and education through gamified approaches. By recognizing these differences, libraries can better tailor their services and educational initiatives to meet the diverse needs of their patrons, ultimately leading to a more enriched library experience. Further research and strategic implementation of gamification could significantly improve engagement and learning outcomes for all academic levels.

- H2. The level of familiarity with the concept of gamification in library services varies significantly among library patrons and professionals, and this variation is influenced by their primary area of study or specialization within Library and Information Science.

Table 6: presents the ANCOVA results and multiple comparisons to analyze how the primary area of study within Library and Information Science influences familiarity with the concept of gamification in library services. The ANCOVA results show that the corrected model is not significant, with an F-value of 0.422 and a *p*-value of 0.792, suggesting that the primary area of study does not significantly affect familiarity with gamification. The intercept, however, is highly significant, with an F-value of 254.656 and a *p*-value of 0.000, indicating a substantial overall mean effect across all groups. In the multiple comparisons, no significant differences were found between the various areas of study (academic libraries, public libraries, archives and preservation, information technology, and others) concerning familiarity with gamification. This lack of significant differences implies that familiarity with gamification is relatively uniform across different areas of study within Library and Information Science.

Table 6. ANCOVA showing differences in the level of familiarity with the concept of gamification in library services by area of study or specialization

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected Model	1.817	4	0.454	0.422	0.792
Intercept	273.882	1	273.882	254.656	0.000
Primary Area of Study	1.817	4	0.454	0.422	0.792
Error	202.194	188	1.075		
Total	1118	193			
Corrected Total	204.01	192			

Note(s): R Squared = 0.009 (Adjusted R Squared = -0.012)

Pairwise comparisons	Mean difference (I-J)	Std. error	Sig.	95% confidence interval
Academic Libraries vs. Public Libraries	-0.4351	0.40726	0.287	(-1.2385, 0.3683)
Academic Libraries vs. Archives	0.1364	0.34608	0.694	(-0.5463, 0.8191)
Academic Libraries vs. Information Tech	-0.0564	0.15868	0.723	(-0.3694, 0.2566)
Academic Libraries vs. Others	-0.2636	0.47678	0.581	(-1.2042, 0.6769)
Public Libraries vs. Archives	0.5714	0.51107	0.265	(-0.4367, 1.5796)
Public Libraries vs. Information Tech	0.3787	0.40817	0.355	(-0.4265, 1.1838)
Public Libraries vs. Others	0.1714	0.60724	0.778	(-1.0265, 1.3693)
Archives vs. Information Tech	-0.1928	0.34714	0.579	(-0.8776, 0.4920)
Archives vs. Others	-0.4	0.56802	0.482	(-1.5205, 0.7205)
Information Tech vs. Others	-0.2072	0.47755	0.665	(-1.1493, 0.7348)

Source(s): Durodolu *et al.* (2020)

The implication of the above hypothesis suggests that while familiarity with gamification in library services is relatively consistent across different areas of study within Library and Information Science, there remains a significant opportunity for enhancing the understanding and application of gamification practices. The non-significant differences imply a shared baseline familiarity among professionals, which can be leveraged for collaborative efforts and educational initiatives aimed at effectively integrating gamification into library services. This may ultimately lead to more engaging and interactive library environments, benefiting patrons and enhancing the overall library experience.

Discussion of findings

The majority of respondents (45.60%) indicated a focus on academic libraries, which underscores the importance of academic institutions in shaping information-seeking behaviors among LIS students. This preference is consistent with the notion that academic libraries are pivotal in supporting student learning and research, as they provide essential resources and services tailored to the needs of their users (Budd, 2010). Meanwhile, 43% of the respondents specializing in information technology suggests a growing recognition of the importance of technology in LIS, particularly in light of the digital transformation occurring across libraries worldwide (He *et al.*, 2016).

The small number of respondents focusing on archives and preservation (5.20%), public libraries (3.60%), and other areas (2.60%) could indicate a need for increased emphasis on these specialties within LIS programs. These areas play critical roles in the information landscape, and students may benefit from a broader understanding of various library functions and the skills required to navigate them effectively.

The usage patterns of digital library resources reveal important trends in how students engage with these tools. A significant portion of respondents (31.10%) reported using digital library resources daily, while 33.20% indicated occasional use. This suggests that a majority of students are integrating digital resources into their academic routines, which is crucial for developing information literacy skills essential for navigating the complexities of today's information landscape (Head and Eisenberg, 2010).

Conversely, the relatively low percentage of respondents using digital library resources monthly (2.60%) or rarely (16.10%) raises questions about the barriers some students may face in accessing or utilizing these resources. Previous research has identified factors such as a lack of awareness, inadequate training, and usability issues as common obstacles to effective engagement with digital library resources (Bishop, 2020). Understanding these barriers is critical for librarians and educators seeking to enhance the digital literacy of their students.

These findings have significant implications for information literacy education within LIS programs. With a large proportion of undergraduates relying on digital resources, it is essential to incorporate comprehensive information literacy training into the curriculum. This training should address not only how to locate and access digital resources but also how to critically evaluate information, ensuring students are equipped to navigate the information-rich environment they inhabit (Association of College and Research Libraries, 2016).

The data suggests that the majority of respondents are either unfamiliar with or have only a cursory understanding of gamification. This finding aligns with previous studies indicating that while gamification is a growing trend in library services, it has yet to achieve widespread, deep integration among patrons and professionals. For example, Kroski (2013) and Nicholson (2015a, b) both discuss how gamification has primarily been in its introductory phase within the library sector. This trend has been noted globally, as libraries experiment with gamification concepts but are yet to achieve a level of familiarity that allows full utilization of its potential.

Research by Kim (2015) underscores that library staff and users tend to be cautious with new technologies, often resulting in slow adoption rates for innovations like gamification. The study found that users frequently report slight familiarity with gamification concepts in a variety of educational and service-oriented contexts. Similarly, Hamari *et al.* (2014a) indicate

that while there is interest in gamification, there is also a knowledge gap which prevents full-scale adoption and understanding. This lack of familiarity reflects a broader trend across many sectors, where gamification is seen as a novel but not fully understood approach to engagement.

The limited number of individuals who are highly familiar with gamification (only 2.6%) suggests that there is significant room for educational outreach. Libraries aiming to integrate gamification into their services might consider implementing training programs for both staff and patrons to increase familiarity. Considering the potential of gamification to boost engagement, as noted by [Deterding et al. \(2011\)](#), educating users could enhance library experience and potentially improve service uptake. Furthermore, familiarity levels indicate that any gamification initiatives should start with foundational concepts to bridge this knowledge gap. A gradual approach, as recommended by [Smale and Regalado \(2017\)](#), might involve introducing simple, game-like elements in library services before advancing to more complex systems. Libraries could also explore partnerships with educational institutions to create workshops or information sessions on gamification.

The data presented in [Table 3](#) provides a foundation for discussing the role of user perceptions on the effectiveness of gamification in encouraging library resource exploration. Notably, nearly half of the respondents (44.0%) agreed that gamification enhances library resource exploration, and an additional 16.6% strongly agreed. This aligns with the findings from previous research, such as the study by [Hamari et al. \(2014a, b\)](#), which concluded that positive perceptions of gamification significantly contribute to its effectiveness. Their research demonstrated that users are more likely to engage with gamified systems when they view the elements of gamification as enhancing the overall experience. The substantial portion of respondents who agree or strongly agree with the positive impact of gamification (60.6%) underscores its potential as an engaging strategy in the library context. The results echo findings by [Huang and Soman \(2013\)](#), who noted that gamification elements, such as points, badges, and leaderboards, can create a sense of achievement and motivation. In a library setting, these elements may foster a more interactive and rewarding experience, encouraging users to explore resources they might otherwise overlook. The support for gamification among a significant portion of the sample suggests that incorporating game-like features could be an effective way to engage library users, potentially leading to increased resource utilization.

However, the data also reveals a large group of respondents (31.1%) who remain neutral on the topic. This neutrality could indicate ambivalence or a lack of familiarity with the concept of gamification and its benefits within the library setting. According to [Mora et al. \(2015\)](#), user engagement with gamified systems is often contingent on the user's understanding and appreciation of the system's goals. In a library context, this may suggest that users who are neutral could benefit from increased awareness of how gamification features can enrich their exploration experience. Perhaps integrating tutorials or demonstrations could shift these neutral perceptions toward a more positive viewpoint.

The minority of respondents who disagree or strongly disagree (a combined 8.3%) might reflect a skepticism toward gamification's relevance or suitability within a library environment. This group could perceive gamification as distracting or non-essential for scholarly activities, as suggested by [Huotari and Hamari \(2012\)](#), who noted that some users view gamification as incongruent with environments typically associated with serious or educational purposes. This highlights a potential challenge in designing gamification strategies that resonate with all users, including those who may perceive the approach as incompatible with the library's core mission.

Overall, the positive responses (60.6%) support the notion that gamification can enhance user engagement and resource exploration in libraries. However, the neutral responses suggest room for further development, possibly through personalized gamification features tailored to varying user preferences or more effective communication strategies about the benefits of gamification. Given that user perceptions strongly influence gamification's effectiveness, libraries aiming to integrate gamification should consider user-centered design principles, as

recommended by [Deterding et al. \(2011\)](#). By doing so, libraries can potentially increase positive perceptions and, consequently, the effectiveness of gamification in promoting resource exploration.

The data reveals that a significant majority of respondents (69.4%) do not perceive gamification positively or are not interested in participating. This could stem from a lack of familiarity or understanding of gamification and its potential benefits within a library context. [Nicholson \(2015a, b\)](#) suggests that for gamification to be successful, users must recognize and appreciate the purpose and value of the gamified elements. If library users are not adequately informed or educated about the goals behind gamification, they may view it as unnecessary or irrelevant to their library experience.

The library is generally perceived as a place for quiet study, reading, and research, which contrasts with the interactive and competitive nature of gamification. Studies by [Deterding et al. \(2011\)](#) have found that gamification is most effective in environments where users are open to challenges and rewards. However, in traditional library settings, users may not feel that these elements align with their expectations of what a library should offer. For example, academic library users might view gamified activities as a distraction rather than an enhancement to their library experience. The 69.4% negative or indifferent response rate may reflect this misalignment between user expectations and the concept of gamification in libraries.

Individual preferences and demographics could significantly impact the reception of gamification in libraries. Factors such as age, technology familiarity, and motivation may play a role in influencing how users perceive gamified activities. For instance, younger users who are more familiar with gaming and digital tools may be more receptive to gamification compared to older users who may prefer traditional library services. This aligns with studies like those by [Hamari et al. \(2014a\)](#), who highlight that gamification appeals more to users with a pre-existing interest in gaming and digital interaction. Libraries may need to consider these demographic factors when designing and implementing gamified features to ensure they are tailored to their target audience.

The library environment and the extent of digital infrastructure can also influence the effectiveness of gamification. In physical library spaces, there may be limitations in incorporating gamified elements without disrupting the quiet and studious atmosphere that users expect. In contrast, digital library settings offer more flexibility for integrating gamification seamlessly. However, if users lack access to the necessary technology or do not frequently use digital library resources, they may not engage with these features. [Seaborn and Fels \(2015\)](#) point out that successful gamification relies heavily on the environment in which it is implemented, with digital spaces often being more conducive to gamified interactions.

The data also suggests that a portion of users (19.7%) do have a positive perception of gamification, which may indicate that the appeal of gamification hinges on the types of rewards or incentives provided. Extrinsic rewards such as badges, points, or prizes can be motivating, yet they may not resonate with all users, especially if they do not see a direct benefit to their library experience. Intrinsic motivation, such as the enjoyment of participating or the opportunity to learn, is often a stronger motivator for sustained engagement ([Deci and Ryan, 2000](#)). Libraries could explore incorporating rewards that are directly relevant to their users, such as extended borrowing privileges or exclusive access to resources, to potentially increase participation.

The 10.9% of respondents who indicated that they were unsure about gamification may represent an opportunity for libraries. This group could potentially be swayed to participate with proper guidance and education. Providing clear information about how gamified activities work, their benefits, and how they can enhance the library experience may help reduce uncertainty. [Basten \(2017\)](#) notes that users are more likely to engage when they understand the purpose behind gamification and how it aligns with their goals. Libraries might benefit from pilot programs or introductory sessions to familiarize users with gamification concepts and demonstrate their value.

The corrected model reveals that academic level significantly influences familiarity with gamification concepts in library services. This finding is consistent with the literature suggesting that individuals at different academic stages may have varying levels of exposure and receptiveness to gamification. For instance, undergraduate students are often more exposed to gamified learning environments, which are increasingly integrated into undergraduate courses and academic support services (Dichev and Dicheva, 2017). Graduate students, on the other hand, may have more specialized academic interests and a higher likelihood of engaging with advanced tools and platforms, making them more familiar with gamification as an educational enhancement tool. The multiple comparisons reveal a statistically significant difference between undergraduate and graduate students (mean difference = -0.6548 , $p = 0.014$), indicating that graduate students demonstrate higher familiarity with gamification than undergraduates. This difference could be attributed to the specific academic experiences and digital engagement typically associated with graduate studies, where students are often required to use advanced digital resources and educational tools more frequently than their undergraduate counterparts (Capdevila and Stanoevska-Slabeva, 2021).

Interestingly, the comparison between undergraduates and PhD students, as well as between graduate students and PhD students, does not show a significant difference. This suggests that while familiarity with gamification increases from the undergraduate to graduate level, it stabilizes beyond that point, likely due to PhD students' focus on research and specialized areas where gamification may be less emphasized or relevant. This pattern aligns with studies indicating that technology adoption curves can vary significantly based on academic requirements and professional focus (Robson *et al.*, 2015).

Understanding these differences in familiarity with gamification is crucial for library services aiming to implement gamified elements to enhance user engagement. For instance, as familiarity is higher among graduate students, libraries may consider targeting this group with advanced gamified resources, such as digital scavenger hunts or interactive research tutorials. Undergraduate students, on the other hand, may benefit from more introductory gamification elements, such as achievement badges for completing basic library orientation modules.

The findings imply a need for tailored gamification strategies that align with the academic stage of library patrons. Libraries could develop programs that introduce undergraduates to basic gamified concepts, while offering more sophisticated, research-oriented gamification elements for graduate and PhD students. According to Hamari *et al.* (2014a, b), gamification strategies are more effective when they are customized to the preferences and engagement levels of different user demographics, suggesting that libraries could benefit from diversifying their gamified services based on these academic differences. The results also highlight an opportunity for further research into how educational background influences technology adoption in library environments. Expanding on this study, future research could explore the relationship between academic discipline and familiarity with gamification, as different fields of study may yield varying levels of engagement with digital tools and resources (Kim *et al.*, 2018).

In Table 5, the corrected model for the ANCOVA analysis presents a non-significant F-value of 0.422 with a p -value of 0.792, demonstrating that the primary area of study does not have a statistically significant influence on participants' familiarity with the concept of gamification in library services. This outcome is further supported by the R-squared value of 0.009, which, along with an adjusted R-squared of -0.012 , highlights that the model explains little to no variance in familiarity based on specialization.

A noteworthy observation from the table is the significance of the intercept ($F = 254.656$, $p = 0.000$), suggesting that while the overall mean familiarity with gamification across all respondents is substantial, individual area-specific variations are minimal. This finding may reflect a general awareness or exposure to gamification concepts within the LIS field, regardless of specialization, suggesting a shared foundation or baseline familiarity. The pairwise comparisons in the analysis further reveal no significant differences between any two

specific areas of study. For instance, comparisons such as Academic Libraries vs. Public Libraries or Information Technology vs. Archives yield non-significant p -values, underscoring that familiarity with gamification does not significantly differ across these areas.

Previous research suggests that the integration of gamification in library services is gaining traction as libraries seek to improve user engagement and learning outcomes (Muntean, 2011; Bicen and Kocakoyun, 2018). However, the lack of significant differences in the current study could imply that LIS professionals across specializations may have had limited direct exposure to practical gamification initiatives. This finding aligns with studies indicating that while gamification concepts are recognized across various professional fields, their actual implementation may still be limited or uniformly distributed across LIS specializations (Hamari *et al.*, 2014a, b; Deterding *et al.*, 2011).

The relative uniformity in familiarity with gamification across specializations highlights a potential opportunity for LIS programs to strengthen their curriculum around innovative technologies, like gamification, and tailor these topics to specific areas of practice. As the library profession continues to evolve with technological advancements, gamification can play a role in addressing challenges such as user engagement, information literacy, and digital skills development (Severino and Messina, 2013). Enhanced training that incorporates gamification concepts into both general LIS and specialized coursework could create more informed and skilled library professionals capable of integrating these techniques into their specific library settings.

Conclusion

The data underscores the importance of academic libraries in supporting student learning and research, with a significant number of respondents indicating their specialization in this area. The emphasis on academic libraries reflects their pivotal role in shaping information-seeking behaviors among LIS students. Furthermore, the noticeable focus on information technology indicates a growing recognition of digital transformation within the LIS field. However, the limited interest in areas such as archives, preservation, and public libraries suggests a need for broader exposure to these specialties within LIS programs. This lack of representation could imply that more efforts are needed to convey the value of these areas to LIS students.

Regarding digital resources, a majority of students are integrating them into their academic routines, highlighting the critical role of digital literacy in contemporary education. However, a minority of respondents reported infrequent use of these resources, indicating barriers that need addressing, such as awareness and usability issues. Furthermore, findings related to gamification reveal a knowledge gap that may hinder its effective integration within library services. Although a considerable number of respondents see gamification as beneficial, many remain ambivalent or uninformed about its advantages.

Recommendations

The following recommendations will enhance not only awareness of gamification within the LIS system but also its utilization among information science students and professionals:

- (1) LIS programs should broaden their curriculum to emphasize the diverse roles of different library types and specializations, including public libraries and archival work, to create well-rounded library professionals.
- (2) Libraries should develop comprehensive digital literacy training programs for students, addressing not only how to locate digital resources but also how to critically assess and utilize them.
- (3) Libraries can conduct needs assessments to identify and mitigate barriers that prevent students from fully engaging with digital resources, such as lack of awareness, training, and ease of access.

- (4) To improve familiarity with gamification, libraries might consider introductory workshops for both students and staff. These sessions could cover foundational concepts, allowing for a gradual and informed integration of gamification elements tailored to different user needs.
- (5) Recognizing that academic level influences familiarity, libraries could implement gamification elements suited to each academic stage. Undergraduates might benefit from basic gamified experiences, while advanced gamification strategies could engage graduate and PhD students.

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Corresponding author

Oluwole O. Durodolu can be contacted at: woledurodolu@gmail.com