Gamification of Cataloguing and Classification Education in Nigeria Library and Information Science Schools: A Technology-Enhanced Approach

Adebowale Adetayo
Library and Information Science, Adeleke University, Ede, Osun, Nigeria

Yetunde Oladipo
Salford Business School, University of Salford, Salford, United Kingdom

Olateju Adeleke
University Library, Lagos State University, Ojo, Lagos, Nigeria

Abiodun Odunewu
University Library, Olabisi Onabanjo University, Ago-Iwoye, Ogun, Nigeria

This research explored how gamification addresses cataloguing and classification education difficulties in Nigeria. It illustrates how library schools may utilize gamification to improve students' teaching and learning experiences using technology. A comprehensive review of the literature was carried out. Literature discoveries were then utilized to build a gamification model suitable for the library school. The findings suggest that library schools should continue to plan through gamification in order to better position themselves for cataloguing and classification delivery.

Keywords: cataloguing, classification, cloud computing, gamification

Nigeria has one of the strongest education systems in Africa. Some of the best universities in Africa are found in the country. Among the thriving programs offered in these universities is library and information science (LIS). Central to this LIS curriculum is cataloguing and classification, which aims to ensure that library collections are well organized and retrieval is not cumbersome.

Cataloguing is the thorough description of the physical features of a document, book, or other reading material to facilitate quick retrieval afterwards. Yusuf (2015) described cataloguing as the description of information items, whether monographs, series publications, or other non-book materials, including essential bibliographic components such as the author, title, publisher, location of publishing, and other distinct components. Cataloguing might be done descriptively or by subject. The former describes an item as it is perceived, while the latter refers to giving subject headings and classifying items. Cataloguing is accomplished using a variety of tools: Anglo-American Cataloguing Rules (AACR), Machine Readable Cataloguing (MARC) standards, and Resource Description and Access (RDA) standards are a few examples.

Journal of Education for Library and Information Science 2023
Vol. 64, No. 4 DOI: 10.3138/jelis-2022-0028

KEY POINTS:

- Gamification holds the potential to significantly enhance cataloguing and classification education in Nigeria's library and information science schools, making it more engaging and motivating for students.
- The gamified approach to cataloguing and classification breaks down complex tasks into manageable stages, helping students build practical skills while maintaining their motivation and interest in the subject.
- While there are challenges related to costs and technological proficiency in implementing gamification, it represents a promising solution to address the current issues and negative perceptions surrounding cataloguing and classification education in Nigeria. It requires support and collaboration from key stakeholders in the field to become a reality.

Classification is the process of putting comparable items together and imposing some structure on the material to improve comprehension. It is done with the intention of assigning class marks to books using systems such as the Library of Congress Classification (LC), the Dewey Decimal Classification (DDC), the Moys Classification scheme, and others. The routine in the cataloguing and classification department of libraries, although done behind the scenes, is very technical, necessitating specialized expertise. As a result, students find it challenging to learn cataloguing and classification in the typical classroom setting, where the focus in Nigeria is mostly on theory rather than practice. Furthermore, students frequently find the course to be highly challenging. Therefore, a more exciting and engaging strategy is required. Gamification is one such strategy.

Gamification is defined as a way of creating systems, services, organizations, and activities to provide comparable experiences and motivations to those found in games, with the additional educational objective of influencing user behaviour (Huotari & Hamari, 2016). Games are known to inspire and engage players due to the fun and excitement that this activity provides (Koivisto & Hamari, 2019). Gamification thus strives to provide this experience in different settings, and this is typically attempted in the target environment by employing game mechanics or other game-like concepts.

Gamification encourages students to participate more in education by playing a game and competing, making gamification a new approach to pushing students to become more active in the classroom and e-learning. This game-related phenomenon of maintaining attention for hours and losing track of time for advancement might be an area that cataloguing and classification education in Nigeria has been searching for for a long time, capturing students in a fresh, exciting, and competitive environment for the sake of learning and knowledge usage. Gamification in education is an attempt to capture precisely those characteristics that characterize games as a source of entertainment while inspiring players to continue playing with the goal of advancement.

Gamification techniques are being used more frequently to favourably influence behaviour and cognitive processes by improving the system or service with motivating affordances and, eventually, by providing comparable experiences to those of games (Huotari & Hamari, 2016). There are a few examples of gamification in the education business, such as Ribbon Hero, a Microsoft Office add-in game that teaches users how to use Office products

properly; and Class Dojo, which transforms courses into a game of rewards and instant feedback, is another example (Kasinathan et al., 2018). The article will be based on Ryan and Deci's (2000) self-determination theory, which identified two types of motivation: intrinsic and extrinsic. Intrinsic motivation relates to doing something because it is intrinsically fascinating or pleasurable, whereas extrinsic motivation refers to doing something because it leads to a distinct outcome.

While there is some evidence of gamification in libraries for reading, instructions, and orientations (Kim, 2015), there is little to no research on gamification of cataloguing and classification, despite its potential to improve those areas. In Nigeria, many librarians are not even aware of gamification (Adeyemi et al., 2021), so no research has yet established a framework for its application in Nigerian library schools. If present trends in Nigeria persist, student enrolment may continue to decline, and then Nigeria library schools may eventually lose their academic credibility in most institutions. Because of this context, the current study presents a paradigm for gamification in cataloguing and classification education in Nigeria.

Objectives

The major objective of this work is to contextualize the application of gamification for cataloguing and classification education in Nigeria LIS schools. Other specific objectives are as follows:

- to examine the concept of gamification;
- to highlight the understanding of cataloguing and classification;
- to examine the status of cataloguing and classification education in Nigeria library schools; and
- to apply gamification to cataloguing and classification education in Nigeria.

Concept of gamification

The term *gamification* was invented quite recently. It was introduced in 2002 by Nick Pelling, but it was first used in 2008; before that, there was no evidence of its use, and it was extensively accepted in the second half of 2010. Pelling defined the phrase in 2002 as using game-like accelerated user interface design to make electronic transactions both fun and speedy. Yu-Kai Chou, a top gamification expert and author of *Actionable Gamification*, describes gamification as the skill of taking all of the enjoyable and addictive features found in games and applying them to real-world or productive tasks (Captain Up, 2015).

Gamification is the process of incorporating game aspects into non-gaming contexts. The purpose is not to create a full-fledged game; instead, it uses these principles to encourage and reward behaviours that promote learning and healthy social interactions. One method is to give the course a narrative or construct quests that students must fulfil to demonstrate their expertise. Gamification and game design types are usually horizontally classified into three major categories: immersion, social-based, and achievement/challenge (Koivisto & Hamari, 2019; Xi & Hamari, 2019). The immersion-based game design seeks to immerse the player or user in a story, with role play and audiovisual richness. The design of social-based games is frequently centred on various types of competition and collaboration. Finally, the

achievement/challenge-based game design emphasizes overcoming obstacles, progressing and receiving prizes, and feeling competent.

In a gamified application, all learning objectives are constantly visible and accessible to users from the start. The environment depicts real-world issues and circumstances, and its goal is to improve the player's enjoyment, satisfaction, and motivation by employing a set number of game elements (Klock et al., 2018). All gamification apps have two sets of goals: learning goals that correlate to the material and fun goals that correspond to the user experiences they elicit, such as enjoyment and satisfaction (Sailer et al., 2017). The gamification content defines the learning objectives, whereas the fun goals are associated with the game design features included in the gamification application, their motivating strength, kind, and the psychological requirements to which they correspond. A gamified learning environment must be appropriately developed, particularly around the game elements that it employs, and must include explicit and unambiguous instructions. Otherwise, students may become sidetracked from their learning objectives.

Gamification provides certain benefits with varying consequences in a learning setting, depending on the game components employed. It improves student motivation by allowing for a greater degree of engagement in the gamified activity; game features help individuals to maintain high motivation in order to attain new goals. It creates a secure learning environment by encouraging participants to take on new tasks without fear of experiencing real-world repercussions. It also promotes student collaboration by developing social skills for team play, decision making, and problem solving. And it keeps students updated on their progress in gamified exercises. The greater the frequency and timeliness of feedback, the more successful the learning will be (Bruder, 2015).

Gamification may be used in education to give rewards for anticipated behaviours and ensure that expected actions assist students in achieving good learning outcomes. Furthermore, gamification offers several cognitive, emotional, and social advantages. Students can enhance their critical thinking abilities by spending several hours applying them in game-based contexts (Gee, 2003). Furthermore, because game-based environments may elicit sentiments of interest and disappointment, students grow more prepared to handle learning setbacks (Lazzaro, 2004).

Cataloguing and classification

Cataloguing and classification are regarded as the foundations of librarianship (Yusuf, 2015). This is because a well-catalogued library allows patrons to identify, find, obtain, and use library materials. Cataloguing is the description of a book or other information material that includes bibliographic information such as author, editor, publisher, series, tracing, and other access points. It is the process of creating a library catalogue in order to facilitate information retrieval (Olawale & Olusegun, 2017).

Cataloguing is divided into two parts: descriptive cataloguing and subject cataloguing. The descriptive cataloguing process is concerned with identifying and characterizing the physical and bibliographic features of the object, as well as determining the name(s) and title(s) to be used as entry points in the catalogue, but not with assigning subject and form headings. In other words, descriptive cataloguing is the process of transcribing components

of bibliographic description such as title-page details, collation, and entry selection and form. The procedure entails creating a physical description of a book that contains the author's or authors' names, the precise title of the materials, the date and location of publication, the names of publishers or printers as appropriate, the pagination, illustration, price, format, and, for rare books, features such as paper type and binding. Anglo America cataloguing Rules Resource Description and Access (the new RDA) or International Standard Bibliographic Description (ISBD) are the tools for descriptive cataloguing.

Subject cataloguing, on the other hand, is used to determine the subject content of information materials and other information items for the goal of consistency within one catalogue and other catalogues or between other catalogues that use the same subject headings list and in order to identify the typical usage for simple access to terms and uniformity. The subject cataloguing tool is either the Library of Congress subject headings (LCSH) or the Sears list of subject headings (SLSH). They are a collection of elements in the English language that are suitable as subject headings and are organized alphabetically. They are standard words that are accepted and used throughout the world. Cataloguing can be done manually or electronically. A prototype cataloguing interface, which provides easier data entry, has been proposed in a recent study (Budanović & Žumer, 2021).

Classification is a categorization method used to organize library items such as books, serials, audiovisuals, computer files, maps, manuscripts, and realia by subject and then to assign them a call number. Classification groups together similar information pieces or collections and distinguishes them from unrelated ones. Classification entails grouping related subjects with similar features and distinguishing them based on their similarity. Cataloguing and classification are grouped together due to the interdependence of the two procedures and the fact that the actions of one lead to the activities of the other.

Status of cataloguing and classification education in Nigeria

The admission and retention of students in LIS undergraduate programs in Nigeria have been major concerns. Only a small number of undergraduates apply to study LIS as their first-choice course. Many of those who are finally admitted to library schools applied because they were persuaded to do so or because it was the only option available to them after being denied entrance to other chosen departments. This circumstance has the potential to turn Nigerian library schools into dumping sites for applicants who were not admitted to pursue their desired disciplines. Students who accept this fate flow with time, with no clear plan for what to do after school. Others begin to plan for a second degree in their desired field of study. This is due to their perception of a librarianship career as "books and boring," indicating that little or no preparation is done to adapt to a librarianship profession's work environment (Ukamaka et al., 2021).

Many students who enter the field with this mindset are typically uninspired by traditional classroom teaching techniques, particularly when confronted with the technical elements of the LIS curriculum known as cataloguing and classification. The cataloguing and classification curriculum in Nigeria is not comprehensive as it is in most developed nations. Due to the declining status of public libraries in Nigeria, the curriculum is geared toward academic libraries. As a result, students are almost exclusively taught using the Library

of Congress classification scheme, Anglo-American Cataloguing Rules (AACR), AACR2, and Library of Congress Subject Headings (LCSH). The Dewey Decimal Classification is taught mostly theoretically, while newer standards like Resource Description and Access (RDA) are being incorporated, but not in all library schools.

In certain schools, lectures are delivered conceptually rather than practically. According to Engelson (2019), an emphasis on theory over practice leads to graduates lacking the practical skills required to execute their professions and reliance on the cataloguing community to train them. However, employers in all sorts of libraries prefer people with common cataloguing abilities and technical qualities and experiences (Bello & Mansor, 2013), who can tailor bibliographic descriptions to meet users' expectations and information needs (Strader, 2021). Sibiya and Shongwe (2018) identified several possible cataloguing skills, including cataloguing and classifying standards and regulations and technologies like the AACR, DDC, RDA, LCSH, and MARC21. Others include cataloguing and classification tools such as USMARC, knowledge of the OCLC, SLIMS; knowledge of online cataloguing tools such as web Dewey, cataloguer's desktop, and WebClass; a good sense of general knowledge, expertise with taxonomy, metadata, and tagging for digital content management; robust digital content experience; familiarity with popular social platforms; and knowledge of the OCLC, SLIMS.

Applying gamification to cataloguing and classification education in Nigeria

Education is one of the contexts in which gamification might be used (Caponetto et al., 2014). Gamification is used in education to improve engagement and inspire students to study. For example, a study at the Zagreb School of Economics and Management discovered that 80% of students polled claimed they used gamification in at least one course. On a Likert scale of 1 to 5, students indicated their pleasure with utilizing gamification in their courses: 67% of students evaluated their satisfaction with a 5, 26.8% scored 4, while just 5.2% scored 3, and only one student declared their discontent with gamification. When students were asked how much gamification benefited them in terms of motivation for lectures, 90% gave it a 4 or 5, and 86% said it helped them obtain higher marks (Aleksic-Maslac et al., 2017).

Sheldon (2020) provided another example of gamification application when he redesigned his university course by converting marks into experience points (XP) and student groupings into guilds. Levels related to XP, which equated to grades. On the first day of class, students were given an F but were assured they may level up by completing compulsory and optional tasks. Students could also redo tasks for re-scoring, much like they might with a digital game. During the semester, this resulted in a B class average rather than the prior C. In a charter school in New York, game designers collaborated with instructors to create a new curriculum that provides students with fun activities throughout the day (Corbett, 2010).

Using eLearning environments hybridized with immersive interactive scenarios, such as Lifesaver—a learn-by-doing model to teach the basic steps in responding to a situation where a person suffers a heart attack or chokes—it is simple to present gamification mechanics during classes by incorporating them into the grading system (Pandey, 2015). Appropriately using narrative layers may enhance user interest, and points can be earned

by completing brief activities (missions). Students can pick and choose whatever tasks they want to complete in order to pass the classes. Students receive more points for more strenuous activities.

Applying gamification in cataloguing and classification in Nigeria would require a technological platform and workable model that various schools can build on.

Technological platform

There are several technology platforms available for incorporating gamification into cataloguing and classification teaching. Cloud computing, affective computing, and distributed computing are only a few of the potential platforms mentioned by Hakak et al. (2019). This paper will focus on cloud computing, with a dash of affective computing thrown in for good measure.

Cloud computing is a platform that provides infrastructure as a service, platform as a service, and software as a service (Adetayo et al., 2021; Hakak et al., 2013), while affective computing is the research and development of systems and devices which can identify, interpret, process, and even respond to a human's emotional state (Brigham, 2017). Cloud computing can be used for gamification by exploring all customizable resources and employing those resources for designing and building games with learning outcomes. This eliminates the issue of educational institutions incurring costs while updating current computing equipment. It is critical to determine the audience before implementing gamification over the cloud. Using the cloud service alleviates the need to upgrade current computer resources (Adetayo et al., 2021). A good categorization can help increase the quality of learning while also reducing the overhead of financial considerations. The next step is to pick cloud services. All relevant components from all of the topics required for learning may be incorporated into a single learning application and handed over to the cloud vendor for gamification.

The framework for gamification to improve cataloguing and classification teaching is depicted in Figure 1. The game's creators must offer a backend that is structured to include all of the program's features. However, choosing a cloud service for deployment is critical. Several well-known cloud computing platforms may be used to improve gamification. The following cloud computing systems are available: Google Cloud Platform, Microsoft Azure, Alibaba, IBM Bluemix, and Amazon Web Services.

Implementing gamification in cataloguing and classification teaching requires five crucial aspects: motivation, short-term tasks, a reward system, task design, and teamwork.

Motivation

When creating games for cataloguing and classification purposes, motivation is a critical factor to consider. Gamification incorporates numerous opportunities for self-motivation through both extrinsic and intrinsic reward-based game elements (Sailer et al., 2017; Stansbury & Earnest, 2016). Intrinsic motivation in games occurs when a player is motivated to perform something for the sake of self-satisfaction. Extrinsic motivation refers to being inspired to perform something because of the predicted consequence. Although extrinsic and intrinsic elements are associated with increased motivation, the patterns of

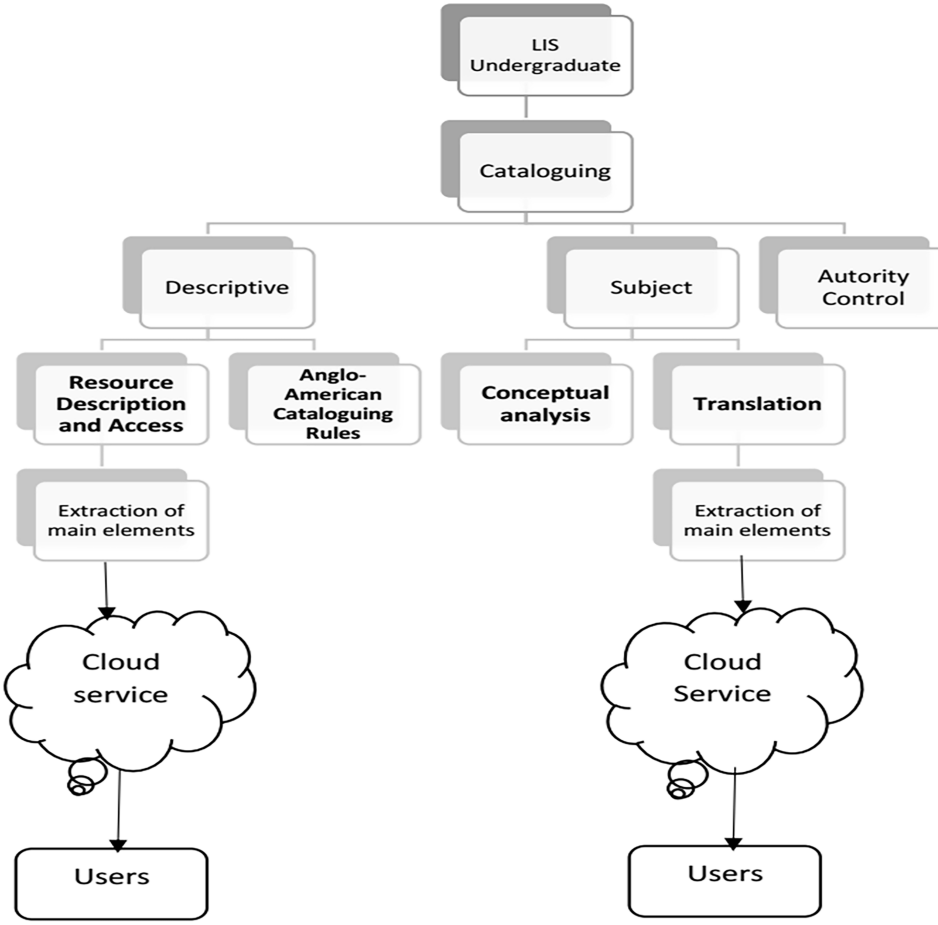

Figure 1: Technological enhanced gamification of cataloguing and classification education
Source: Authors' illustration

intrinsic motivation as highlighted by the gamification process are stronger when a task is found to be inherently satisfying. It is anticipated that the concept of flow initiated by Csikszentmihalyi (1990) may explain the impacts of intrinsic rewards in gamification. Flow induces a condition of absorption and strong focus, as well as a lack of self-monitoring. People in flow have the impression that they are being perfectly challenged and that time is rushing by, making an activity intrinsically joyful (Deci & Ryan, 1985). This condition may be attained by achieving a balance between boredom and frustration while performing a task. Individuals are meant to experience flow as a result of game components (Muntean, 2011). Understandably, extrinsic motivation such as working toward completing a task to obtain external reward, may be easier to stimulate (Ryan & Deci, 2000). However, because

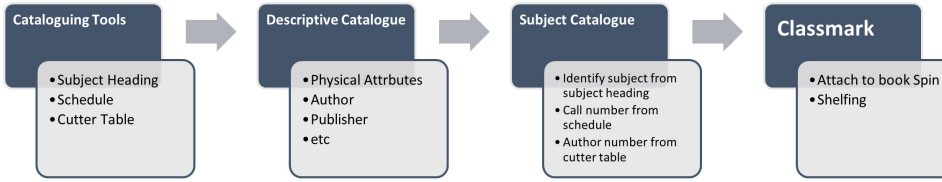

Figure 2: Cataloguing and classification task design
Source: Authors' illustration

gamification is based in part on the concept of rewards, it has been observed that tangible rewards consistently impair intrinsic motivation for interesting activities, although this is not the case when the rewards are unexpected and/or not contingent on task performance. In such circumstances, intrinsic motivation remained unaffected. Verbal positive feedback was the only sort of "reward" observed to increase intrinsic motivation (Ryan & Deci, 2000).

To counteract the unintended consequences of tangible rewards, efforts must be taken to create lecturing settings that promote autonomy and competence. This situation, as discovered by Ryan and Deci, will consistently favour the development of intrinsic motivation, whereas conditions that govern behaviour will weaken its expression (Ryan & Deci, 2000). As a result, the gamification rewards should not be revealed to students ahead of time. They should be made to receive the reward unexpectedly, and instructors should provide positive feedback on each stage of their accomplishments.

While the primary goal of gamification is to aid in the facilitation of intrinsic motivation, it should be emphasized that the majority of activities individuals engage in are not, strictly speaking, intrinsically driven (Ryan & Deci, 2000). As a result, extrinsic motivation should be incorporated, but it should be used autonomously, because autonomous types of extrinsic motivation can lead to higher experiential well-being as well as performance (Ryan & Deci, 2000). The more internalized and integrated the extrinsic motivation, the more likely it is that students will perceive the motivation as internally produced, and thus they will become more autonomous and self-determined. For example, a student who attends class because they are afraid of being punished by the teacher is extrinsically driven to comply with an external behavioural constraint. Similarly, students who come to class for lectures because they believe it will help them in their chosen vocation are similarly extrinsically driven, but this student will have a better sense of self-determination. In the latter students, the extrinsic motivation for attending class has been absorbed and incorporated into their goals and identity, and they are thereby managing their own behaviour. This type of extrinsic motivation is far more likely to improve the student's perceived well-being (Ryan & Deci, 2000).

Short-term tasks

Short-term activities in a game improve a student's abilities by allowing them to complete the task repeatedly after some failed tries. As a result, the part inherited from the game for teaching must be divided into smaller tasks, as seen in Figure 2. The cataloguing and

categorization lesson must be divided into smaller assignments, with each task linking to the next. When a task is finished, the learner can go on to the next task. If the duties are not broken down into smaller tasks, gamification criteria will not be met, since time-consuming activities lead to boredom and lack of focus.

A classification game, for example, can be integrated by instructing students to categorize books using the Library of Congress classification scheme. To earn points, the learner must pick the suitable letter of the alphabet for each book. Each item must be dragged and dropped to the appropriate classification. If a student drops an item of the proper sort, they are awarded points; otherwise, they are not rewarded. The total number of correct answers is gathered at the end of the game for statistical purposes.

Reward system

When the game's tasks are performed, the student expects a mark of gratitude, which is generally in the form of a point-based reward system. These points can be included in students' ongoing evaluations. This game aspect can be utilized in gamification at the end of each teaching class to motivate students to earn prizes and move on to the next task. A practical illustration of this may be seen in the study of Ofosu-Ampong and Boateng (2018), which investigated students' perspectives on gaming elements in learning. The researchers discovered that students were open to the notion of incorporating gaming elements into academic learning. In addition, the survey selected points and leaderboards as the most desired game features for student learning.

Task design

Although students receive positive feedback in the form of rewards after finishing each assigned work, the difficulty of particular activities may cause anxiety and impede the learning process. As a result, as seen in Figure 2, there should be a flow in designing minor activities that do not need laborious effort. As a result, the fundamentals of cataloguing must be addressed early on. As students complete each simpler task, the tasks get more difficult until they reach the complicated portion of the course. Furthermore, the game must be structured to integrate modifications; hence, there must be game levels that require students to complete a prior task again, although in a scaled-down version. In terms of task completion, the task design should be balanced.

Teamwork

Teamwork should be incorporated into the game. This will allow members of each team to collaborate and assist one another in reaching the goal. It will also offer some students the motivation they require to advance. This technique is highly beneficial for LIS students, who may learn winning strategies from their peers.

Discussion

Gamification, as it has been investigated, is critical in making education more exciting and inspiring. This is due to the incorporation of gaming elements into teaching procedures. As a result, gamification serves as a motivator, particularly in the context of cataloguing and

classification education in Nigeria, where a boost in motivation is required to excite LIS students. Gamification may become seamless with the use of contemporary technologies such as cloud computing by providing an online environment where students can readily access work or projects regardless of physical location. Cloud computing also adds flexibility and continuity to the gamification of cataloguing and classification, allowing students to pick up where they left off the previous time.

This study discovered that cataloguing and classification task design, as illustrated in Figure 2, may be used to gamify the process of determining a class mark for a library book. Although studies have demonstrated that gamification is viable, none have been conducted for the cataloguing and classification of library materials. As a result, this study is critical to the advancement of library education in Nigeria. Figure 2 also showed the logical stages that each student would have to go through to finally get the catalogued book onto the shelf. The first stage as indicated is understanding the tools involved. Through a gamified environment students are thus able to explore the different cataloguing tools in an interesting but educational manner. This is confirmed by Haasio et al. (2021), who showed the uniqueness of a gamification as it brings a boring subject to life.

The second stage as found in this study is the use of gamification to help the student to correctly describe the book to be catalogued. In reality, this stage is frequently completed by manually entering the book details into a prepared sheet or electronically into a library management system, which is learned through repetition. In the classroom, this process may be gamified by including exercises that require students to do repetitive descriptive cataloguing until they master it. The gamified system would only allow students to proceed if they completed the work successfully (Fleischman & Ariel, 2016). Repetitive study is supported by Saeedi and Kazerooni (2014), who discovered that task repetition promoted learning.

The third stage, subject cataloguing, is often the most challenging for Nigerian LIS students due to its technicalities. They frequently claim that it is time-consuming, repetitious, multi-tasking, and redundant (Okoroafor, 2012). According to Ogunniyi (2013), the majority of LIS undergraduates have a negative attitude about cataloguing and classification courses. They frequently regard such courses as difficult and approach the lectures and practical training with dread, hatred, and a negative attitude. Those that get a minimum of 40% in the course are always delighted and satisfied with their achievement. It is also the reason that many Nigerian LIS students fear or despise working in the cataloguing section when they get a job in a library or are sent to the library for Industrial Training (Ogunniyi, 2013). This is where the advantages of a gamified approach must be fully appreciated. It makes seemingly monotonous subjects, which are frequently presented in a boring manner, interesting, especially with the rewards provided at the end of each task (Oyadeji, 2012).

The final stage of the gamified cataloguing and classification course would be to create a class mark. This stage represents the completion of the entire procedure. The learner feels accomplished and is now equipped with the abilities required to catalogue and classify library resources. Furthermore, the students are taught how to properly affix the class mark to the spine of the book and where to place the book on the shelf. In contrast to

developed countries, the majority of Nigerian libraries classify only print resources, and many librarians lack experience cataloguing non-print materials. As a result, gamification can help bridge this divide.

This study has several limitations, particularly in terms of empirical research. During the search for literature, it was determined that there are few or no empirical studies on gamification as it pertains to cataloguing and classification in Nigerian library schools. As a result, the paper became more reliant on gamification applications in other contexts. Still, the article shows that gamification is expected to play a role in transforming the face of cataloguing and classification education in Nigeria, particularly given its success in the developing world. However, there are potential challenges that Nigerian library schools may confront in terms of financial and technological obstacles. First, the production of high-quality games for gamification incurs significant expenses, since gamified learning modules must be tested and assessed before completion. This evaluation includes hidden costs such as designer fees and consultation with course specialists. This challenge may occur due to budget cuts and inadequate financial investments in library projects in Nigeria (Adetayo et al., 2022). Second, young individuals are more technologically adept than most older people (Adetayo & Williams-Ilemobola, 2021). As a result, when compared to students, some academics may find it challenging to employ gamification technology tools. This might be a problem during the gamification adoption stage.

The present research has established a foundation on which future studies may be built. However, in order to truly cement the work, the practicability of this must be tested in reality. As a result, key stakeholders in Nigerian library schools, including the Nigerian Association of Library and Information Science Educators, the Nigerian Library Association, the Librarians' Registration Council of Nigeria, university administration, and the government, should convene to explore how to make gamification a reality in Nigerian library schools. Because of the financial and technological issues mentioned in the article, this gathering of stakeholders is critical. Policies should be developed and implemented to guarantee that the meeting's outcomes are fully implemented.

Conclusion

This research examines the concept of gamification by providing library professionals with a clear perspective on its potential. It was discovered that gamification blends game elements into non–gaming environments to stimulate and reward learning and positive social relationships. In addition, the study provided a brief overview of cataloguing and classification while investigating the quality of cataloguing and classification education in Nigerian library schools. It was observed that cataloguing and classification education in Nigeria is not up to par with those of other nations, especially since many students are unmotivated owing to the traditional nature of the teaching. The article shows that gamification can help students in Nigeria overcome the complexities and monotony of the cataloguing and classification program. Cloud computing may be utilized to improve the experience and the initiative's success. Specific requirements must be met in order to introduce cloud computing and gamification into a classroom setting, including motivation, task design, short-term tasks, teamwork, and a reward system. Based on these requirements, a simple

model for observing the flow of teaching and learning was established. However, financial challenges and technical adoption pose significant risks to the use of gamification in Nigeria. An outcome of these findings indicates it is worth pursuing additional funding through sponsorship or entrepreneurial activity. This additional funding will supplement the funds that institutions already have, giving them a better chance of successfully implementing gamification. In terms of technology adoption, academics should be taught how to use gamification technologies. This training can be obtained through workshops.

Adebowale Adetayo, an academic at Adeleke University, specializes in information science, information management, and library science. He boasts an impressive portfolio of published articles in esteemed journals and is currently dedicated to projects that explore the integration of library technologies into enhancing library services. With a PhD in library and information science, his expertise is a valuable asset in advancing these fields. Email: adebowale.adetayo@adelekeuniversity.edu.ng

Yetunde Oladipo is a graduate student at Salford University in Manchester, UK. As a dedicated scholar, her research passions encompass library and information sciences, catalogue systems, knowledge management, and archival management. She has a track record of publishing articles in esteemed peer-reviewed journals and is actively engaged in projects focused on innovative management systems, virtual learning, and emerging technologies. She completed her undergraduate studies at Bayero University in Kano, Nigeria, showcasing her commitment to academic excellence. Her academic journey reflects her enthusiasm for advancing knowledge in the field of library and information sciences and her dedication to making meaningful contributions to the academic community. Email: delem1997@yahoo.com

Olateju Adeleke earned her Bachelor's degree in library archival and information studies in 2005 from the University of Ibadan, Nigeria. She continued her education at the same institution, obtaining a Master's degree in the same field in 2008. In 2017, she achieved her PhD in library and information science from the University of KwaZulu-Natal, South Africa. Her career journey began in March 2008 when she joined Lagos State University as an assistant librarian, steadily progressing to her current role as a principal librarian. She now serves as the pioneering acting head of the Department of Library and Information Science in the School of Library, Archival, and Information Science at Lagos State University. Her diverse career interests demonstrate her deep knowledge of library science, and she is a proud member of the Nigerian Library Association and a Chartered Librarian. Email: tejfadipe@yahoo.com

Abiodun Odunewu is the head of the Multimedia Resource Centre at the Olabisi Onabanjo University Library in Ago-Iwoye. He holds a Bachelor's degree in education, a Master's degree in library studies, and a doctoral degree. His expertise and research interests lie in library and information sciences, and he has made notable contributions to the field through publications in peer-reviewed journals. Additionally, he has demonstrated his commitment to knowledge dissemination and academic excellence throughout his career. Email: bodunewu@oouagoiwoye.edu.ng

References

Adetayo, A. J., Adeniran, P. O., & Gbotosho, A. O. (2021). Augmenting traditional library services: Role of smart library technologies and big data. *Library Philosophy and Practice*, 6164. https://digitalcommons.unl.edu/libphilprac/6164

Adetayo, A. J., Suleiman, A. I., & Ayodele, M. O. (2022). Leveraging digital infopreneurship for financial well-being of academic librarians: The Nigerian perspective. *Library Philosophy and Practice*, 6652. https://digitalcommons.unl.edu/libphilprac/6652

Adetayo, A. J., & Williams-Ilemobola, O. (2021). Librarians' generation and social media adoption in selected academic libraries in Southwestern, Nigeria. *Library Philosophy and Practice*, 4984. https://digitalcommons.unl.edu/libphilprac/4984

Adeyemi, I. O., Esan, A. O., & Aleem, A. (2021). Application of gamification to library services: Awareness, perception, and readiness of academic librarians in Nigeria. *Electronic Library*, *39*(5), 767–781. https://doi.org/10.1108/el-05-2021-0096

Aleksic-Maslac, K., Sinkovic, B., & Vranesic, P. (2017). Influence of gamification on student engagement in education. *International Journal of Education and Learning Systems*, *2*. https://www.iaras.org/iaras/home/caijels/influence-of-gamification-on-student-engagement-in-education

Bello, M. A., & Mansor, Y. (2013). Mentoring in libraries and information organisation: The catalogue librarian perspectives. *Library Philosophy and Practice (e-Journal)*, 1007. https://digitalcommons.unl.edu/libphilprac/1007

Brigham, T. J. (2017). Merging technology and emotions: Introduction to affective computing. *Medical Reference Services Quarterly*, *36*(4), 399–407. https://doi.org/10.1080/02763869.2017.1369289

Bruder, P. (2015). Game on: Gamification in the classroom. *The Education Digest*, *80*(7), 56–60.

Budanović, M. P., & Žumer, M. (2021). Prototype cataloging interface based on the IFLA library reference model (LRM). Part 1: Conceptual design. *Cataloging & Classification Quarterly*, 1–25. https://doi.org/10.1080/01639374.2021.1974633

Caponetto, I., Earp, J., & Ott, M. (2014). Gamification and education: A literature review. *European Conference on Games Based Learning*. https://www.proquest.com/docview/1674172795

Captain Up. (2015). *What is gamification? Everything you need to know to get started*. Retrieved from https://blog.captainup.com/what-is-gamification-everything-you-need-to-know-to-get-started/

Corbett, S. (2010, September 9). Learning by playing: Video games in the classroom. *The New York Times*. https://www.nytimes.com/2010/09/19/magazine/19video-t.html

Csikszentmihalyi, M. (1990). *FLOW: The psychology of optimal experience*. Harper Collins. https://mktgsensei.com/AMAE/Consumer Behavior/flow_the_psychology_of_optimal_experience.pdf

Deci, E. L., & Ryan, R. M. (1985). Cognitive evaluation theory. In *Intrinsic motivation and self-determination in human behavior* (pp. 43–85). Springer. https://doi.org/10.1007/978-1-4899-2271-7_3

Engelson, L. A. (2019). Sufficiency of cataloging education: School librarians respond. *Journal of Education for Library and Information Science*, *60*(4), 285–311. https://doi.org/10.3138/JELIS.2018-0072

Fleischman, K., & Ariel, E. (2016). Gamification in science education: Gamifying learning of microscopic processes in the laboratory. *Contemporary Educational Technology*, *7*(2), 138–159. https://dergipark.org.tr/en/pub/cet/issue/25744/271554

Gee, J. P. (2003). What video games have to teach us about learning and literacy. *Computers in Entertainment*, *1*(1), 20–20. https://doi.org/10.1145/950566.950595

Haasio, A., Madge, O.-L., & Harviainen, J. T. (2021). Games, gamification and libraries. In O.-L. Madge (Ed.), *New trends and challenges in information science and information seeking behaviour*. Lecture notes in networks and systems (Vol. *193*, pp. 127–137). Springer. https://doi.org/10.1007/978-3-030-68466-2_10

Hakak, S., A Latif, S., & Amin, G. (2013). A review on mobile cloud computing and issues in it. *International Journal of Computer Applications*, *75*(11), 1–4. https://doi.org/10.5120/13152-0760

Hakak, S., Noor, N. F. M., Ayub, M. N., Affal, H., Hussin, N., ahmed, E., & Imran, M. (2019). Cloud-assisted gamification for education and learning: Recent advances and challenges. *Computers & Electrical Engineering*, *74*, 22–34. https://doi.org/10.1016/J.COMPELECENG.2019.01.002

Huotari, K., & Hamari, J. (2016). A definition for gamification: Anchoring gamification in the service marketing literature. *Electronic Markets*, *27*(1), 21–31. https://doi.org/10.1007/S12525-015-0212-Z

Kasinathan, V., Mustapha, A., Fauzi, R., & Che Abdul Rani, M. F. (2018). Questionify: Gamification in education. *International Journal of Integrated Engineering*, *10*(6). https://penerbit.uthm.edu.my/ojs/index.php/ijie/article/view/2781

Kim, B. (2015). Gamification in education and libraries. *Library Technology Reports*, *51*(2), 20–28. https://journals.ala.org/index.php/ltr/article/view/5631/6951?utm_content=buffer19760&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

Klock, A. C. T., Ogawa, A. N., Gasparini, I., & Pimenta, M. S. (2018). Does gamification matter? A systematic mapping about the evaluation of gamification in educational environments. *Proceedings of the ACM Symposium on Applied Computing*, 2006–2012. https://doi.org/10.1145/3167132.3167347

Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, *45*, 191–210. https://doi.org/10.1016/J.IJINFOMGT.2018.10.013

Lazzaro, R. (2004). Why we play games: 4 keys to more emotion. *Proceedings of the Game Developers Conference 2004*. https://ci.nii.ac.jp/naid/10030941744

Muntean, C. I. (2011). Raising engagement in e-learning through gamification. *Proceedings of the 6th International Conference on Virtual Learning ICVL* (pp. 323–329).
Ofosu-Ampong, K., & Boateng, R. (2018, August 16). Gamifying Sakai: Understanding game elements for learning. *AMCIS 2018 Proceedings*. https://aisel.aisnet.org/amcis2018/Education/Presentations/4
Ogunniyi, S. O. (2013). *Perception of cataloguing and classification courses by undergraduate librarianship students in Nigeria: A case study of University of Ibadan and Delta State University, Abraka Library Schools*. University of Ibadan.
Okoroafor, C. N. (2012). Using library catalogue as access to academic library collection in Nigeria. *Journal of the Nigerian Library Association, Imo State Chapter*, *4*(2), 37–43.
Olawale, B., & Olusegun, S. O. (2017). Influence of computer literacy skill on on-line cataloguing by librarians in Ekiti State University, Nigeria. *Library Philosophy and Practice*, 1593. https://digitalcommons.unl.edu/libphilprac/1593
Oyadeji, A. E. (2012). Attitude of library science students towards the study of cataloguing and classification. *Library Review*, *2*(2), 14–28.
Pandey, A. (2015, October 6). *6 killer examples of gamification in eLearning (updated in 2020)*. Elearning Industry. https://elearningindustry.com/6-killer-examples-gamification-in-elearning
Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*(1), 54–67. https://doi.org/10.1006/CEPS.1999.1020
Saeedi, M., & Kazerooni, S. R. (2014). The influence of task repetition and task structure on EFL learners' oral narrative retellings. *Innovation in Language Learning and Teaching*, *8*(2), 116–131. https://doi.org/10.1080/17501229.2013.770860
Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, *69*, 371–380. https://doi.org/10.1016/J.CHB.2016.12.033
Sheldon, L. (2020). *The multiplayer classroom: Designing coursework as a game* (2nd ed.). CRC Press.
Sibiya, P. T., & Shongwe, M. M. (2018). A comparison of the cataloguing and classification curriculum and job requirements. *Library Management*, *39*(6–7), 474–487. https://doi.org/10.1108/LM-09-2017-0089
Stansbury, J. A., & Earnest, D. R. (2016). Meaningful gamification in an industrial/organizational psychology course. *Teaching of Psychology*, *44*(1), 38–45. https://doi.org/10.1177/0098628316677645
Strader, C. R. (2021). Cataloging to support information literacy: The IFLA library reference model's user tasks in the context of the *Framework for Information Literacy for Higher Education*. *Cataloging & Classification Quarterly*, *59*(5), 442–476. https://doi.org/10.1080/01639374.2021.1939828
Ukamaka, A., Iwuoha, J., Urhiewhu, L. O., & Nwachukwu, S. C. (2021). Awareness of career prospects in librarianship and students' preparedness in library schools in south-east Nigeria. *Information Impact: Journal of Information and Knowledge Management*, *11*(4), 117–128. https://doi.org/10.4314/iijikm.v11i4.11
Xi, N., & Hamari, J. (2019). Does gamification satisfy needs? A study on the relationship between gamification features and intrinsic need satisfaction. *International Journal of Information Management*, *46*, 210–221. https://doi.org/10.1016/J.IJINFOMGT.2018.12.002
Yusuf, T. I. (2015). Students' attitude to cataloguing and classification in an academic institution (the case of Federal Polytechnic Offa). *Library Philosophy and Practice*, 1340. https://digitalcommons.unl.edu/libphilprac/1340