

On the Application of Gamification Elements in Libraries

Seong-Kwan Lim* 

Educational School Librarianship, Graduate School of Education,
Kyonggi University, Suwon, Korea
E-mail: kglimpro@kyonggi.ac.kr


ABSTRACT

Libraries are still conservative in their approach or practice of providing various services for the unspecified majority of visitors attending these institutions. It is very apparent that libraries are not actively trying to increase the interest and participation of users by applying the various angles or elements associated with gamification. By its very nature, gamification is the application of game-playing elements such as point scoring, peer competition, team work, score tables, and such used to motivate participants and make them more engaged with the subject matter. In areas such as education, marketing, and exercise, the implementation of gamification techniques is actively taking place in order to maximum participation by taking advantage of uncertainties or the competitive nature that many people have with the setting of goals. In this study, four libraries that have applied gamification are analyzed to understand how and to what degree gamification has been applied. Broken down into four different elements, this includes: *Point, Reward, Leaderboards & Competition, Self-expression & Achievement*. By focusing on the results of this analysis, gamification measures that can be applied to other libraries are specifically proposed. The overall results of this study will provide useful guidance and potential plans for libraries seeking to increase the number of users by using gamification to increase user participation and/or satisfaction with additional library services.

Keywords: playing, gamification, library service, case study, Korea, United States of America

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***Corresponding Author:** Seong-Kwan Lim
 <https://orcid.org/0000-0002-9735-1717>
E-mail: kglimpro@kyonggi.ac.kr



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1. INTRODUCTION

Humans are beings who play. As Bolz (2014) says in *Wer Nicht Spielt, ist Krank (Who Doesn't Play, is Sick)*:

Games fascinate because they take us into the paradise of the essential. But what is essential is not what is useful. The playground is a cherished living environment in which everything is done properly. The rules of the game guarantee a good order in which one always knows exactly what to do. And that is why the game world is better than the real world. Games are fascinating because, as a player, you are totally focused and can completely lose yourself in them. (p. 9, German translation)

However, as Bolz (2014) continues, rational society demands human beings who escape from play and participate in productive labor. Therefore, play is regarded as *überflüssiges*, “superfluous” or useless, and those who are deeply immersed in play feel guilty. However, our desire to fall in love with play is neither substituted nor resolved by anything else.

In 1938, Huizinga stated in his book *Home Ludens*, “Playing is not an element of culture, but culture itself has the character of play.” (Huizinga, 1955). Therefore, play is older than culture, and it was also seen as the starting point of complex human activities such as language, law, war, philosophy, and art. Huizinga also claimed, “In happier days than now, we once called people ‘Homo Sapiens’, but over time, we cannot believe that we are as rational as in the 18th century when we worshiped reason and pursued optimism.”

Caillois (2014) then described the core principles of play in *Lemasque et le Vertige* (published in 1958) as Agon, Alea, Mimicry, and Ilinx, explaining them as strong instincts. Caillois’ four core principles add two more to Huizinga’s suggested principles of competition and motivation as the basic categories of play. Agon determines victory or defeat through competition in fair rules and orders, and Alea can be controlled as a poker game and main chance. Mimicry means creating a fictional self like role playing and then internally accepting and acting on it. Lastly, Ilinx means a pleasant thrill such as rollercoaster riding and air acrobatics.

Therefore, if we look up these principles in our lives, we can see that they are already found everywhere, and that we are already enjoying them every day. A general question arises, though, regarding how much play and

game elements can be applied to libraries, especially when the traditional purpose or role of these institutions are to collect and preserve important materials and provide access to them for those needing this service.

Of course, this situation may have occurred because there is an environment where information resources can be easily accessed online, and there are more places where citizens find it much more entertaining and beneficial than via libraries. Therefore, since libraries are organized and operated for the purpose of contributing to reading, research, reference, and hobbies to readers by collecting, organizing, and preserving books and other materials, they will place greater value on activities such as information utilization education. In the end, the operational purpose of the library will not be achieved if it does not receive the proper attention of users.

As previously stated, the purpose of this study is to analyze how and what degree library services gamification can be applied and suggest specific measures for the further application of gamification. Of course, there are implications for libraries implementing gamification techniques and methodology, and these will be discussed and explored in some detail.

2. GAMIFICATION

2.1. Definition of Gamification

Gamification was first used as a concept in 2002 by British engineer Nick Pelling and was officially announced at the Gamification Summit held in January 2011 in San Francisco, California. Since then, this concept has been gradually systematized through interests and applications in various fields.

Although gamification as expressed is a relatively recent concept, the idea behind it has already existed for several decades. Kapp (2012) defines gamification as “using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems.” Deterding et al. (2011) said that gamification is the use of game design elements in fields other than games, and Zichermann and Linder (2010) defined it as a process of solving problems by immersing users in using game thinking and techniques. Subsequently, Seaborn and Fels (2015) stated that it is an approach taken to achieve the purpose of motivation, enjoyment, and immersion in a non-game situation.

For the elements of gamification, Bunchball Inc. (2010) has six different types: Reward, Status, Achievement, Self-expression, Competition, and Altruism. Zichermann and

Cunningham (2011) have the following: Levels, Leaders (1), Leaders (2), Leaders (3), and Border. In addition, Kim (2013) said that it is based on the structure of Rule, Story, Design, and Interaction, and that game mechanics and game components interact to induce user participation and behavior.

Ana Ordás, an expert in games and gamification in Spanish libraries, stated in a chat interview with Lapointe (2017) titled “*Engaging library visitors through gamification*” that

“Gamification in libraries is the use of elements with games with people – it is to use games and gamification to get closer to the physical and digital spaces. In the end, the significance of gamification in libraries is to put the user in the center of the design of the gamified system, taking into account the user’s needs. To do this, you must first focus on preparing an environment where users are encouraged to interact with the library.”

2.2. Effects of Gamification

Gamification focuses on “fun theory,” where people are willing to do any activity when they have fun, and this provides joy and fun to users so that they can naturally recognize and pay attention to objects (Lee, 2019). Successful gamification must have an attracting theme or element that can immerse users in the beginning, and after that, it must be addictive so as to make them play games periodically. In addition, various devices that can imprint messages or images that the game’s design entity wants to convey to the user must be incorporated. Finally, there should be an oral effect that allows users who enjoy games to naturally attract others to the game (Navercast, 2015).

In the end, gamification is not a “real” game. It is a very large feature with the advantage it gives to motivate people to voluntarily participate (through various techniques that induce specific behaviors which satisfy the desire for achievement as well as fun). Currently, gamification techniques are being used in various fields such as marketing by companies around the world, as well as in education, health, and multiple components of public policy.

2.3. Gamification Application Examples in Various Fields or Disciplines

Service cases to which the gamification technique is applied are already known in various fields. Among them, there is *My Starbucks Reward* with Starbucks, *Starbucks Planner*, Apple, and Nike (a healthcare running app service created jointly by the latter two). There are also Mc-

Donald’s Monopoly partnership, *Duolingo*, which accumulates experience every time users practice and improve their language skills by comparing scores with friends, and *Friendsurance* (the world’s first social network service-based insurance recruitment platform).

According to Gartner (2014), a global information technology business research consulting group, at least 70% of the world’s 2,000 global companies will introduce one or more gamification marketing programs by 2029 and at least 50% of companies will pursue innovation processes using gamification concepts. Therefore, the list of field applications for gamification will continue to increase, and the types will continue to vary accordingly. The following is a summary of case examples in which gamification concepts and techniques were applied to different disciplines.

2.3.1. Gamification in Marketing: Brandification

Gamify (2022) describes *Brandification* as follows:

Brandification in its simplest form consists of in-game advertising for real-world products and services. This could look like messages, images, or videos promoting a brand, product, or service within a video game’s world.

2.3.2. Gamification in Healthcare: Patient Monitoring and Recovery

Phillips et al. (2019) said that gamification is a pressure to be actively introduced to motivate patients because of studies that have already been conducted on various states. However, this raises the fundamental question of whether it can be used under a doctor’s prescription and supervision, as it can lead to other problems, such as creating a game-dependency state for patients. Nevertheless, those with chronic diseases such as cardiac disease, chronological orders of disease, and patients with type 2 diabetes were provided with a gamification app based on clinical scenarios (due to high management costs). The free app *SuperBetter* is highly recommended by psychotherapists because it helps psychological recovery by solving challenges one by one when and as problems occur, such as anxiety, depression, stress, and chronic pain.

2.3.3. Gamification in Education: Classrooms

Encouraging and maintaining students’ motivation has been an old challenge in the field of education. Many studies concerning gamification have been conducted to date because gamification has the potential to motivate

students. Dichev and Dicheva (2017) suggested, though, that there is no consistent guideline for game design based on various educational experiences, and that it is necessary to explore the influence of game design elements including game dynamics throughout learning. *Kahoot*, which is currently widely used in schools, is an intuitive and interactive educational program that allows students to submit answers to questions asked by teachers during class in real time.

2.3.4. Gamification in Websites: Gamification Nation

Gamification Nation is a leading company in gamification design consulting in the United Kingdom, Europe, the United States, and Asia, and with corporations such as the sports clothing brand Adidas. In particular, it was selected as the European winner at the Outstanding Gamification Agency Awards in 2017.

2.3.5. Gamification in Influencers: Yu-kai Chou

Yu-kai Chou is an entrepreneur, business consultant, writer, and instructor. As a pioneer in the field of gamification, he gained notoriety and popularity in 2014 for lectures at Technology, Entertainment, and Design, published a book entitled *Actionable Gamification: Beyond Points, Badges, and Leaderboards* in 2017, and won the Gamification Guru of the Year award at the Gamification Europe conference.

According to Yu-kai Chou, gamification focuses on playful engagement, and is increasingly used in marketing and health products to increase incentives to engage with products and systems (Walsh, 2014).

3. LITERATURE REVIEW

Libraries are one of the most important organizations where new ways and innovative approaches. One of the problems with libraries is how librarians can increase users' engagement in library websites and library operations. This question could be answered by use of games and gamification elements in library websites could improve their operation (Bigdeli et al., 2016).

As Sukovic et al. (2011) remarked, "engagement through serious games and plays is proposed as a way of dealing with discrepancies between library traditional roles and contemporary demands, enabling experimentation and exploration of future roles." Actually, library managers now recognize that their instructions should "gamify" services to attract more and more users as well as boost customers' engagement with library websites (Rad-

hakrishnan, 2013, as cited in Bigdeli et al., 2016).

Felker (2014) emphasized that gamification can be a strategy and framework for immersive learning and play, as well-designed games can provide powerful educational experiences that can promote positive interactions between libraries and users. Some libraries are already aware of the possibility of gamification participation, and "Project Velius," an alternative reality game developed by the University of Alabama to participate in library orientation by engaging students in a kind of online mystery scenario, may be an example. Also cited are the following operational areas as obvious candidates for library gamification:

- 1) Library orientation: A game that can inform users of basic information about how the library operates and what services are available.
- 2) Information literacy instruction: Games can be used for active experiences of users.
- 3) Resource usage: Games can give patrons more frequent or longer access to library resources.
- 4) Reading programs: Games can encourage children to read more to improve their reading interest and reading skills.

Walsh (2014) implemented *Lemontree* at the University of Huddersfield, England, a platform that creates an attractive environment in the library by taking ideas from games and providing a game layer on top of normal library activities. In doing so, he wanted to clarify what kind of relationship there is between them. An online survey was conducted for users registered with *Lemontree*, and as a result, 85% of students answered that gamification was appropriate in education. In addition, 60% of students responded that interaction within *Lemontree* changed their library usage behavior, suggesting that they can accept and easily participate in gamification in a university environment.

Based on the above responses, the gamification application method proposed in this study could be implemented to all primary/secondary, university, and general public libraries. In reality, though, not all libraries will be able to apply gamification immediately. This study is different from previous studies in that it derives gamification elements centering on cases applied in the United States and Korea and suggests ways to apply them. Nonetheless, if the proposed method can be applied to libraries, it will have positive effects in various aspects associated with increased user participation.

4. RESEARCH METHOD

This study began with the following questions:

Q1: In what field(s) is/are gamification applied and what are the specific application methods?

Q2: What are some examples of gamifications applied to library services?

Q3: What gamification measures can be applied to library services and how can they be applied?

Then, in order to achieve the purpose of the study, the following steps were taken.

Step 1: In terms of theory, the concept, effects, and application of gamification were examined, and the results of related previous studies were summarized.

Step 2: Four libraries in the United States (US) and Korea which systematically summarize the process and results of gamification application through literature reviews and Internet information search were selected as targets for analysis. The specific libraries (and games) to be analyzed include the *Mobile Scavenger Hunt* at North Carolina State University Library, and *Summer Game* at Ann Arbor District Library in the US. The *Reading Marathon* at Jeungpyoung County Library, and *Board Game* at Song-gok Girls' High School library in South Korea were also included.

Step 3: Based on the gamification elements organized by previous researchers, the analysis focused on whether these elements were applied to the four library programs selected for the target. Table 1 illustrates the gamification elements organized by previous researchers.

Step 4: From the results and findings gained through case analysis, the gamification plan applicable to all libraries (such as university and public libraries), was proposed focusing on the elements: *Point*, *Reward*, *Leaderboards* and *Competition*, *Self-expression* and *Achievement*.

Table 1. Gamification elements

Researcher	Gamification Elements
Bunchball Inc. (2010)	Reward, Status, Achievement, Self-expression, Competition, Altruism
Zichermann & Cunningham (2011)	Point, Levels, Leaderboards, Badges, Challenges/Quests, Onboarding, Engagement loops
Kim (2013)	Rule, Story, Design, Interaction

5. CASE ANALYSIS

5.1. Case Analysis 1: Mobile Scavenger Hunt at North Carolina State University Library (Raleigh, NC)

The North Carolina State University Library (NCSU) Library Mobile Scavenger Hunt, developed with feedback from students and instructors during 2020-2021, was aimed at guiding students to libraries, promoting the use of new technologies, and inspiring confidence in using multiple types of materials and media.

Students who participated in the NCSU Library Mobile Scavenger Hunt received instruction on the rules for this activity and on how to use iPads and Snapchat. Afterwards, each team received a clue sheet containing 12 questions about libraries and library services, a library map, and an iPad Air to use for submitting answers. Each team then went to the library for 25 minutes to find answers to the questions and write them on Google Spreadsheets. At the end of the allotted time given, they returned to the starting place, where their responses were reviewed, and the winning team with the most correct answers received a prize.

Based on *Rule*, several students teamed up to *Interact* as *Engagement loops*, and *Leaderboards* were selected to solve *Challenges/Quests* to obtain more *Points* and eventually the winning team was *Rewarded*. Since students have the advantage of being able to explore the library and gain knowledge as if they were game playing, it was helpful in revitalizing library operation of the library. Fig. 1 shows a sample of the scavenger hunt questions posed to participants and Fig. 2 shows the scoresheet template used (North Carolina State University Libraries, 2020).

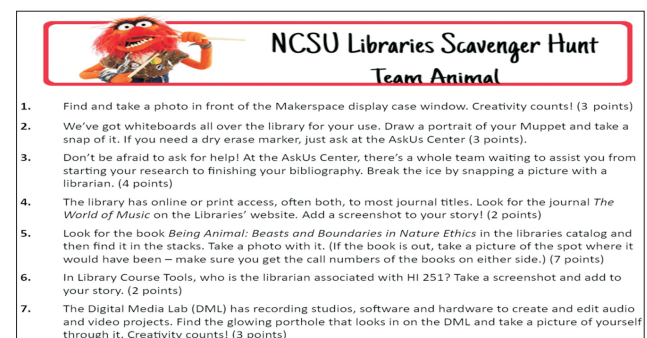


Fig. 1. Scavenger hunt team animal questions. Reproduced from North Carolina State University Libraries, 2020 with copyright holder's permission.

Team	Clue 1	Clue 2	Clue 3	Clue 4	Clue 5
Question summary ->	Brief reminder of question 1				
Question value ->	2	2	3	3	4
Team 1	Reminder of correct answer to question 1 for team 1				
Team 2	Reminder of correct answer to question 1 for team 2				
Team 3	... etc.				
Team 4					
Team 5					
Team 6					
Team 7					

Fig. 2. Scavenger hunt scoresheet template. Reproduced from North Carolina State University Libraries, 2020 with copyright holder's permission.

5.2. Case Analysis 2: Summer Game at Ann Arbor, Michigan District Library

Ann Arbor district library began running summer reading programs for children in the 1940s. These programs, evolving over the years as an event for everyone, are divided into three parts or types: *The Summer Reading Game*, *The Summer Game: Explorer Series*, and *The Summer Game: Online Codes*. Children participating in *The Summer Reading Game* have to read ten age-appropriate books, and teenagers and adults also have to read ten books. Children and teenagers who complete the mission will be given 2,000 points and tokens to receive free books, while adults will also be given 2,000 points. *The Summer Game: Explorer Series* is played in "extreme" parks, across all five ADL locations in the city, in attempts to find summer game codes (either participating outside and/or in-person). These codes are considered points. Lastly, *The Summer Game: Online Codes* is played by completing a puzzle by searching secret codes hidden on the Ann Arbor district library Internet site. The winning prize is a special badge given by the library.

Ann Arbor district library's overall *Summer Game* reported that 7,858 players scored 141,708,438 points in 2021, and 266,374 badges were obtained. This result alone shows that the *Summer Game* is an event that many citizens are participating in, and utilizes elements in three ways: *Design*, *Competition* to obtain *Points*; *Badge* in accordance with each *Rule*; and, *Leaderboards* to make for a larger *Reward* factor. Fig. 3 is an introduction page for the Summer Game sponsored by the Ann Arbor District Library and Fig. 4 is part of the badge series that can be obtained by those who participated in those games (Ann Arbor District Library, 2021).

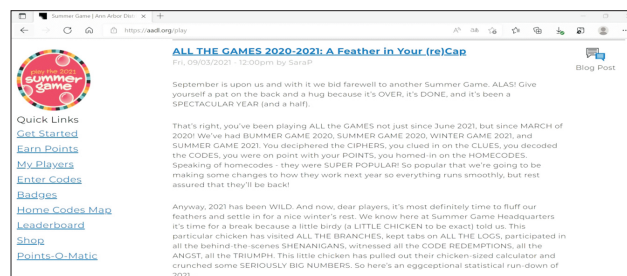


Fig. 3. Introduction to Summer Game. Reproduced from Ann Arbor District Library, 2022 with copyright holder's permission.



Fig. 4. Summer Game badge series. Reproduced from Ann Arbor District Library, 2022 with copyright holder's permission.

5.3. Case Analysis 3: Reading Marathon at Jeungpyeong County Library

The Jeungpyeong County Library selected Kim Deuk Shin, a poet and reading enthusiast of the Joseon Dynasty, as its representative figure and used his name for various events. The Kim Deuk Shin reading marathon of the Jeungpyeong county library, which started in 2020, is currently celebrating its third anniversary in 2022. In order to participate in the competition, players must join the library as a member, read the appropriate borrowed/lended books, write journal entries in a "reading" diary, or submit certified reading activities on a social network service or blog for final confirmation. Table 2 summarizes the courses of the Kim Deuk Shin Reading Marathon.

In Table 2 the reading marathon course is organized into seven steps. This stage is structured as to raise the level of the game, and pages read are converted into distance traveled and number of volumes/copies. If participants read more than 42,195 pages, which corresponds to a total of 141 books, the course is completed. Thus so, there is a great deal of reading involved with this course.

As may be surmised, it is difficult to complete a whole marathon and there will be many dropouts. If players

Table 2. Kim Deuk Shin's reading marathon course

Conversion	Course name (distance)						Kim Deuk Shin (42.195 km-)
	Turtle (3 km-)	Horse (5 km-)	Rabbit (10 km-)	Tiger (15 km-)	Ostrich (20 km-)	Cheetah (30 km-)	
Page conversion (1 p=1 m)	3,000 p- 4,999 p	5,000 p- 9,999 p	10,000 p- 14,999p	15,000 p- 19,999 p	20,000 p- 29,999 p	30,000 p- 42,194 p	42.195 p-
Converted number of copies (=300 p)	10 copies	17 copies	34 copies	50 copies	67 copies	100 copies	141 copies

p, point.

**Fig. 5.** Public relations poster for Kim Deuk Shin's reading marathon. Reproduced from Jeungpyeong County Library, 2022, Kim Deuk Shin's reading marathon, with copyright holder's permission.

succeed in the rabbit course, they receive either a puzzle, pop-up book, or toothbrush set. If players succeed in the cheetah section, they receive cold bags or Kim Deuk Shin slippers. Ultimately, if they complete the Kim Deuk Shin course, they participate further (between October and November) to certify their reading activities. In addition, the final finisher will be given the benefit of borrowing from two to four more books.

This activity includes the elements of gamification in that participants can receive *Achievement*, *Rewards* according to the final *Status* and *Point* through the *Self-expression* process. This includes such things as writing diary entries after reading according to *Levels*, which is *Design* in a total of seven stages. Accordingly, this helps increase reading opportunities along with citizens' use of libraries. Fig. 5 is a promotional poster for the 2022 Kim Deuk Shin's reading marathon published in the Jeungpyeong County Library (2022).

**Fig. 6.** Board game corner of Song-gok Girl's High School library. Reproduced from Lee et al. 2017. Board games in the library. Gyeonggi-do Cyber Library.

5.4. Case Analysis 4: Board Game at Song-gok Girl's High School Library

This is a board game in which at least two people participate according to set rules, using simple tools such as Board, Card, and Tile. Since the early 2000's, various board games have been introduced in Germany and the United States and many of these now-numerous games have been released and can be easily purchased. Board games are also used in various fields such as subject learning, psychological counseling, and personality and career development education, as it is effective in easily understanding specific concepts such as the development of creativity, reasoning, expression, problem-solving, and communication skills.

There are many cases where board games are used as learning tools in Korean school libraries. Song-gok Girl's High School library registers/lends more than 100 board games in the same way as general materials, so that students can borrow them and use them in schools. In addition, an example of using board games in library cooperative classes is the creation of *Dixit* card games in art subjects. The main activity is to divide the *Dixit* cards between students, select one of the cards based on the keyword of the card chosen by the storyteller, infer why

the card was selected, and award scores according to the correct answer or similar reasoning.

Fig. 6 is a board game corner located at the Song-gok Girl's High School library and Fig. 7 is a *Dixit* card drawn by students in their art subject cooperation class (Lee et al., 2017).

5.5. Analysis and Conclusion

According to the results summarized in Table 3, the gamification factor included in all cases was *Point*. Next, *Reward* was included in three cases, and *Rule*, *Leaderboards* and *Design* were found in two places. Lastly, *Interact*, *Engagement Loops*, *Challenges/Quests*, *Competition*, *Badge*, *Self-expression*, *Status*, and *Achievement* were used once each.

6. GAMIFICATION APPLICATION METHOD

Even before the term gamification appeared in general discourse, libraries used related terms or elements. Presently, though, the term gamification has won out and is actively used in various fields, increasing general interest. Therefore, the application plan is to focus on such components as *Point*, *Reward*, *Leaderboards & Competition*, and *Self-expression & Achievement* through case analysis, and this needs to be applied according to different conditions

and scenarios.

6.1. Point

A service that provides a customer with a score calculated under a specific condition, according to the purchase amount of various products or the number of visits to a store, is called or designated the term *Mileage*. Customers can use their mileage when they need it, and so they buy many products or visit stores more often to get higher scores. By applying this principle or service, *Point* provides a way or method of converting the number of in-person visits to the library, the number of times a website is accessed online, and the number of book loans, into scored points. In addition to this, accumulated points can be used to pay overdue fees, compensate for lost books or periodicals, and even make use of the library cafeteria.

6.2. Reward

The establishment and operation of libraries already provides sufficient compensation to many users. In addition, awards and products have been provided through various events such as multi-reader awards, reading appreciation contests, and reading quiz contests. Nevertheless, compensation can be a way to increase and maintain users' motivation for using the library. From time to time, it is recommended to proceed with informal things that



Fig. 7. Dixit card made by students. Reproduced from Lee et al. 2017. Board games in the library. Gyeonggi-do Cyber Library.

Table 3. Gamification factor derivation result

Case	Gamification factor
1	Rule, Interact, Engagement loops, Leaderboards, Challenges/Quests, Point, Reward
2	Design, Competition, Point, Badge, Rule, Leaderboards, Reward
3	Design, Levels, Self-expression, Status, Point, Reward, Achievement
4	Point

are in addition to events that have already been officially announced. As an example of this, markets sell vegetables and fish that are less fresh at lower prices before a deadline, or hold last minute sales on specific products. By applying these same measures, users who visit the library for, say, the 100th time could be allowed twice the set number of book loan outs, or could receive library bags as gifts on a first-come, first-served basis. Their satisfaction and loyalty to the library will likely increase due to these measures taken.

6.3. Leaderboards & Competition

Most users are satisfied with getting what they need when necessary among the various materials available in the library. *Leaderboards* installed in library lobbies can show real-time changes to individual activities, and if players see this every time they enter and exit, the inner competitive sentiment or nature can begin to percolate. Since it is easiest to calculate loan statistics for each user in the library, it would be appropriate to install *Leaderboards* to make or enhance competition between users.

6.4. Self-expression & Achievement

Libraries have materials from many different fields of endeavor such as literature, music, and the arts that users can appreciate and immerse themselves in. It would be nice to provide users with an opportunity to introduce and/or express their appreciation of books they read, such as with book talk sessions or discussion groups. This would create an environment of collective or shared intelligence with these types of interactions. The process will bring a community of participants together through the opportunities made available through outward expression.

7. DISCUSSION

The American Psychological Association established the "Internet Game Disorder" item in the *Diagnostic and Statistical Manual of Mental Disorder-5* revised in 2013, and discussions of this disorder were held at the International Statistical Division in Geneva, Switzerland in May 2019 (72nd General Assembly B Committee). Such a development has sparked a backlash from game developers and gamers around the world. Technology marches on, though, and the continuing development of portable electronic devices such as smartphones and the like has only increased the number of people immersed in games. Without question, games are definitely interesting activities, but it is difficult to set standards for how appropriate

they are, especially for those at-risk gamer individuals who have difficulty in self-regulation or who lack discipline.

Those who emphasize the risk of gamification warn that in the case of activities focusing on external compensation, if the latter eventually disappears, behavior disappears while reducing internal motivation. In addition, it is said that if the participants' activities are tracked and scores and results are given, there is a concern regarding the matter of privacy. The library's gamification plans and focus will have to include discussions centering around the questions posed below.

1) To what extent will gamification be applied, and to which service?

Depending on the type of library, such as public or school libraries, the purpose of operation or use may vary, but library orientations, information literature instruction, resource usage, and reading programs, as selected by Felker (2014), can be applied to all libraries. Therefore, it is necessary to discuss in the library community to what extent gamification will be effective in applying to which services according to the type of library.

2) Will the service be effective even when the gamification, which includes external compensation, is stopped?

The library provides users with various services such as the provision of information, education, and recreation. However, with the development of media devices such as smartphones, the social environment has changed where necessary information can be easily found, and the proportion of users who visit the library is gradually decreasing. Therefore, this study proposed to find and apply a gamification method that satisfies all the factors of fun, participation, and external compensation to increase use over the long-term.

8. CONCLUSIONS AND RECOMMENDATIONS

Library managers now recognize that their institutions should gamify services to attract more and more users as well as boost customers' engagement with library websites (Radhakrishnan, 2013). It is necessary to think about how to apply or dovetail traditional services that are loved by many people to the library with the various new elements that appear as by-products of changing times.

Based on the cases of libraries applying gamification,

this study aimed to analyze different gaming aspects, how they were applied, and propose implementation and specific application plans for libraries to increase the number of future users and increase service satisfaction. The measures analyzed to achieve the above research objectives are summarized as follows:

First, the elements of gamification included in the *Mobile Scavenger Hunt* of the North Carolina State University Library are based on *Rule* and several students became part of *Engagement Loops* to solve *Interaction* and *Challenges/Quests* to achieve more *Composition* with other teams.

Second, the elements of gamification included in Ann Arbor district library's *Summer Game* are three *Designed* ways, making *Competition* to obtain *Points* and *Badge* in accordance with each of the *Rules*, and *Leaderboards* to make *Status* larger.

Third, the elements of gamification included in the Kim Deuk-shin's reading marathon Contest of the Jeungpyeong county library, which is *Designed* in a total of seven stages, are *Self-expression* to writing a diary after reading, the *Reward* according to the final *Status* and *Point*, and a sense of *Achievement* felt for all these processes and results.

Fourth, it can be said that a *Board Game*, which is used in curriculum cooperation classes at Song-gok Girls High School library, contains all elements of gamification, as there are various types and methods. Then, based on the analysis, the gamification plan applied to the library can be implemented as follows.

A) The *Point* element proposes a plan to convert the number of offline visits to the library, access to the homepage online, and the number of book loans, into scores so that they can be used to pay late fees, compensate for lost books, and use the cafeteria in the library.

B) The *Reward* element proposes a strategy to increase loyalty to the library with unexpected satisfaction to users, giving twice the number of books when making a loan on a special day, or giving a library bag as a gift on a first-come, first-served basis.

C) In the *Leaderboards & Competition* element, *Leaderboards* showing loan statistics for each user are installed in the library lobby to propose each other's *Compensation* plan.

D) The *Self-expression & Achievement* element proposes ways to provide users with an opportunity to introduce and express their appreciation of the data they read,

and furthermore, to create collective intelligence while interacting with each other.

There is nothing complete or an end-all in any tool or method. Therefore, gamification also needs to be considered in many different aspects that apply to the library. There will be many positive affects if an appropriate plan or roadmap is found. Further research regarding this topic is welcomed to advance the gamification knowledge base from various angles or points of view so that the library can always be fun and interesting, but above all, remain an important institution in our culture and civilization.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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