

Gamification for Digital Humanities in Libraries: A Survey of the Web-based Games on Digital Literacy

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ABSTRACT

Games or gamification is an application of the digital humanities that impacts learning and education in the digital era. It has been playing significant roles in user education and promoting the user services of libraries. Libraries conduct several activities to promote library services and educate users on their digital resources and services. They have been following the best practices of promoting the library services and developing the digital literacy skills of users through conducting library orientation programs, resource sharing, vendor talks, demonstrations, training & tutorial sessions, content alerts, workshops, focus group discussions, etc. to make users aware and motivate them to the effective use of library services and resources. In the current digital era, acquiring knowledge through modern & intellectual skills using an online platform, has been introduced. Thus, modern libraries have started facilitating gamification platforms in the library premises to create more enthusiasm for learning quickly with deeper understanding, increasing engagement and motivation in using library services and digital resources. This research paper surveyed and evaluated the free web-based games available for developing digital literacy, including digital literacy instructions and promoting library services that benefit the libraries to identify the role of digital humanities in libraries by implementing gamification. The research study also evaluated the games, based on their features, simulations, play, etc., and ranked them based on selected criteria. The study found that Gaming Against Plagiarism (GAP), reference sources, and citation awareness is more popular.

Keywords: Gamification; Web-based games; User education; Digital humanities; Digital literacy; Library promotion; Ranking of games

1. INTRODUCTION

Gamification is an important modern library trend recognised by the American Library Association (ALA), Center for the Future of Libraries trends.¹ Web-based games are an innovative pedagogical strategy for user education and research. It supports user effectiveness in engaging in research activities. There are many instances of libraries using video games, action games, puzzles, strategy, trivia question and answers, casino games, adventure, simulations games, massively multiplayer online games platforms, etc. These are used for developing digital literacy skills, plagiarism awareness, finding research and online searching sources, citation games, knowing library resources, use of e-resources, library services promotion, and library catalogue search guide.

Before describing the concept of gamification, we must know the word's root. According to Katie

Salen and Eric Zimmerman, "A game is a system in which players engage enthusiastically in an artificial conflict defined by the rules that result in a quantifiable outcome".² Games are available on physical and online platforms and allow interaction with players. They provide a challenge to achieve common goals within time limits and competition. Each game has its rules, levels, and reward structure. Games also provide a feedback facility wherein players can send feedback on game facilities for future improvements.

Gamification has some similarities to games, but they are not the same.² The term gamification was coined by Nick Pelling in 2002. It was created as a "deliberately ugly world" to describe "applying game-like accelerated user interface design to make electronic transactions enjoyable".³ Gamification provides the structure to engage, motivate and focus the innovation activities of the learners; it is about rethinking motivation in a world where we are regularly connected digitally. Gabe Zichermann³ defines gamification as a "process of using

game thinking and mechanics to engage audiences and solve the problem". Amy Jo Kim, a renowned game designer, described it as "using game techniques to make activities more engaging and fun." Kapp defines it as, "Gamification is using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning and solve the problem."⁴ Gamification is rapidly growing in the educational, business, and corporate sectors. Many business and corporate companies have been using game-based learning to train their employees. Elements of games have made their way into problem-based learning and interactive learning experience for players. Now colleges and universities frequently use game-based knowledge to improve their student's learning skills, including information literacy, academic integrity, and research skills.

2. GAMIFICATION IS AN APPLICATION OF DIGITAL HUMANITIES

Digital humanities is an umbrella term to describe an emerging field of digital scholarship, human scholarships, teaching, and services grounded in digital resources, methodologies, tools and platforms. It is an interdisciplinary field that employs computer-based technologies to explore new areas of entry in humanities.⁵ Libraries have supported the digital humanities by establishing digital projects, archives, museums in digital art and culture, digital collection building, text mining, and digital pedagogy. So, libraries have incorporated the DH programs into existing library services and collections.

Gamification can offer much for the exploration and teaching of digital humanities topics. Games play a critical role in the history of humanities computing and digital humanities. The development of video games is associated with digital technologies and humanities modes like narrative, design, social communication, and cultural expression. The UC Davis Office of Research Centre of digital humanities aims to create the cultural aspects of games and the use of game technologies for digital humanities research, the use of game technologies for transmedia artistic practices, and how game impact scientific research. Digital humanities and social sciences are used for game technologies and gamified media for production and development.⁶ Therefore, it determined that gamification has historically been a source of inspiration for digital humanities.

Implementing gamification in libraries provides the solution to the challenges faced by libraries while successfully incorporating the digital humanities in library services. It helps develop digital literacy skills such as search and retrieve, awareness of information sources, ready reference, research ethics, copyright, citation, plagiarism, identification of library collection with classification schemes, etc. Therefore, it is an opportunity for libraries to support users in developing their digital literacy skills using gamification platforms.

3. LITERATURE REVIEW

The literature review covers the significant research published in the area of gamification used for digital literacy skills, such as formation literacy and awareness of library services.

Beck,⁷ *et al.* explained the creation of web-based video games for information literacy instructions at University Libraries at Carnegie Mellon. These libraries have developed information literacy video games called "Library Arcade." This game gives opportunities to understand how libraries use the library classification system for categorizing and organizing information. Apperley and Walsh,⁸ describe digital games' impact on school-based literacy practices, including reading and writing. This study presents the Heuristic for Understanding Gaming (HUG) to understand digital games in-depth. HUG evolved with action-type research project games for playing. Beavis,⁹ *et al.*, examined digital literacy practice through action research computer games in English school classrooms.

Adams,¹⁰ conducted a case study of video games implemented by public libraries in the USA for learning, community, social or recreational purposes and democratising user research goals. This study shows evidence that gaming has benefits beyond boosting the number of user walk-ins into the library. Guo, Goh, and Luyt,¹¹ led a study investigating the impact of information literacy (IL) games on learning, motivation, enjoyment and perceived usefulness in a major public university in Singapore. The authors used the game "*Library Escape*," developed by wowescape.com. Libraries have tapped digital game-based learning (DGBL) to promote user information literacy (IL) instruction. DGBL has the major conceptual framework for understanding, motivation, perceived enjoyment, and perceived usefulness. Kambouri, Thomas, and Mellar,¹² evaluated the game "*Runner*" and concluded that it is a quality educational game designed by the University of Industry to attract young adults. It is a unique product to motivate learners to improve their basic information literacy skills, especially attracting them to information literacy courses offered by the University of Industry. The evaluation focused on user education achievement. The study found that players found the Runner game interesting and allowed them to make significant achievements in literacy gains.

Markey & Leeder,¹³ examined college students' behaviour while playing web-based information literacy (IL) game called "*BiblioBouts*." This game teaches information literacy basic skills, including finding information sources, evaluating their usefulness, and assessing the accuracy & quality of the best sources. Gumulak and Webber,¹⁴ conducted a qualitative approach to identify what inspires more young people to play video games and which facilitates information literacy learning. This study used the structured interview method to select young people playing video games. Results suggest that librarians and decision-makers should promote information literacy games using a problem-solving

approach. Steinkuehler,¹⁵ examined the literacy practice through *Massively Multiplayer Online Games* (MMOGs). MMOG are highly graphical two or three-dimensional online video games that allow individuals to create their own digital character or *Avatar* to interact with the gaming software.

Walsh,¹⁶ studied the potentiality of gamification using libraries to increase student commitment and achievement of their goals. The study asserts that games can potentially increase resource usage with student academic achievements. Implementing the “Lemon tree,” web-based game as a gamification project at the University of Huddersfield was done to improve library resources, including books, journals, and electronic databases. The study suggests that users can accept a gamification system in libraries for continued engagement with library resources. Guo and Goh,¹⁷ evaluated the affective interface agents in information literacy games targeted at voluntary students at Carnegie Mellon University, University of Michigan, and Utah Valley University.

Swiatek,¹⁸ focused on the non-virtual and public-oriented games used by libraries and underlined how gaming activities for promoting library services. French Academic Libraries have initiated innovative gaming by establishing a public gaming policy at the library. ARG (Alternate Reality Game) was the first game developed by French Academic Libraries. It is a symbolic game that aims to convey a sense of belonging to an information community. Flowing LARP games (Live-Action Role Playing) draw the participants into a virtual world. The European academic research community has strongly supported gaming activities for research purposes. Fitz-Walter,¹⁹ focused on “Secret SLQ”, a mobile game encouraging users to engage with State Library of Queensland services and resources. This game encourages people to visit and explore the library. It suggests that mobile game technology is suitable for delivering an engaging and educational experience.

Nicholson,²⁰ highlighted how public libraries in the USA supported gaming in their library service promotion and stated the types of gaming programs offered, from board games to video games. The study also focused on the goals and outcomes of those gaming programs and found that the primary goal of more extensive libraries to attract patrons and create a space for social interactions between patrons within library premises is attained with these games. A study has critically analysed literature to find the online games and free online games available for the library and found seventeen (17) online games available for library promotion, but some of the only successful among them. The author suggests simple games, having a plan to use them before developing games for the future.²¹ Markey,²² *et al.* studied the efforts in designing, developing, and testing online games of information literacy skills and concepts for teaching undergraduate students. The designing of games involves interactive arcades, computer support, creative writing, programming, library research, graphic design, etc. The

web-based games can also be developed with questions and answers where students use the library resources for answering questions.

4. OBJECTIVES OF THE STUDY

- To study games or gamification as an application of digital humanities.
- To study and identify web-based games related to digital literacy, including information literacy and library service promotion.
- To evaluate and rank the free selected web-based games, based on their features, simulations, play, etc.
- To describe the challenges in implementing web-based games on digital literacy, that attract the digital humanities in libraries in India.

5. SCOPE AND LIMITATIONS OF THE STUDY

It has been seen that many web-based games are available to develop user’s digital literacy skills. Perhaps the maximum games have been used in the business and corporate sectors in their training activities, military training, psychology, and cognitive science. However, the scope of the present study includes only web-based games on digital literacy skills development related to library services, including citation, plagiarism, reference source management, library resource access guides etc. Further, the list of criteria applied for the selection of games has been described in the subsequent methodology section. Researchers have not considered all the games for evaluation and ranking for various reasons, such as usability issues, needing to be updated regularly, ineffectiveness, and inefficiency in simulations and play, etc. The researchers have no control over the long-term sustainability of selected games because these are online, web-based & independent platforms. The library professionals of Indian academic and research institutions have been chosen to collect their perspectives, including challenges in implementing web-based games on digital literacy in libraries.

6. METHODOLOGY

Mixed research methods have been used for this research study. A web survey has been undertaken to identify the web-based and video online games designed and maintained by libraries. We identified thirty (30) games related to digital literacy, including information literacy instruction and promotions of library services. Of these, ten (10) web-based games (Annexure -1) were selected for the research study, which are fulfilling the following criteria:

The game ranking has been undertaken for selected games based on criteria given by Melissa A. Federoff²³ The criteria, such as colours, design, sounds, game guides, game interfaces, consistency in control, etc., are used for evaluating the games. A questionnaire-based survey was used to identify the challenges in implementing web-based games on digital literacy in Indian libraries.

1. Sustainable games (present on the web for a long time) and independent platforms.
2. Web-based and video games which could be used in the off-line mode, and which consume less technology support (plugins, joysticks, and other software and hardware accessories).
3. Games that guide learning basic information skills and do not require special usage skills.
4. Games that provide continuous motivation to players.
5. Games integrated with the library catalogue, discovery services, and research database searching.
6. Games that develop user skills in avoiding plagiarism, making the right citations for the right sources, searching and retrieving quality research information that helps researchers produce the quality research content.
7. Definition games on different reference sources and types of collection that create more awareness of sources available in the library.
8. Games that help users understand library classification systems using different classification schemes for arranging and categorising library collections.

7. WEB-BASED GAMES ON DIGITAL LITERACY

In the modern information age, the library's primary function is to develop their users' digital literacy skills. It develops users' abilities in searching and accessing the digital resources available on the library premises. Libraries have been conducting library orientation, training sessions, vendor talks, and tutorials on library resources to develop user awareness of digital resources.

In the gamification platform, libraries provide games that help users with primary and secondary information sources, manage various citation styles and citation games, integrate with another system, evaluate the quality of information, know library resources, ready references, search encyclopaedia, and dictionaries. These plagiarism games help users do quality research. Below is an overview of major games and their features related to information literacy instructions.

7.1 Citation Game

It is an interactive online citation game designed and maintained by the University of Washington TRIO training. It helps to learn how to correctly format the APA and MLA citations for books, online Encyclopaedias and Dictionaries, music, online periodicals, journals, television broadcasts, photographs, lectures, speeches, and photo sharing sites, etc. Citation games provide review sheets for APA and MLA citation styles to understand how to format citations for different types of references before starting the games. It is a drag-and-drop citation game that needs to place citation pieces in the correct order.

7.2 Defence of Hidgeon

It is an online game for digital literacy development, developed by the University of Michigan to teach digital

literacy skills to incoming undergraduates. It is designed by question and answer-based games on web pages, online encyclopedias, dictionaries, books, journals, and databases to give correct answers to the questions in "Defense of Hidgeon."

7.3 Encyclopaedia Challenge Board

It is a game that multiple players can play. It tests the player's knowledge of the encyclopedia because it is a game where players answer questions related to the encyclopedia, like "In what volume of the encyclopedia would you find the answer to this question (give the letter)? In what parts of the world do rabbit live?" both players earn the points on each right answer.

7.4 Goblin Threat Plagiarism Game

It is a plagiarism instruction game designed and maintained by Lycoming College, USA. Mary Broussard created it with the assistance of Jessica Urick Oberlin. It is a Goblin-based plagiarism game to learn academic integrity and the benefits of citing sources. Goblin games involve finding goblins and defeating them by answering plagiarism-related questions correctly.

7.5 Library Hangman

Library Hangman is a library related to word puzzle games. It answers the questions related to identifying the library resources, services and tools etc., based on multiple-answer questions.

7.6 Lyco Map Game

It is a location-based & e-learning object-oriented game by Lycoming College. It includes gaming activities matched to e-learning goals and meaningful assessments.

7.7 Primary and Secondary Sources

It is a free online game for knowing primary and secondary information sources designed by the Quintessential Instructional Archive. It is a multiple-choice question-based game. A player earns points for every right answer, and it also provides hints to help the players.

7.8 Ready Reference

The game asks for definitions of reference sources, like what an encyclopedia is, dictionaries, atlas, gazetteers, and types of books. It is a multiple-choice question-based game, and questions may define any reference sources. Players have to identify the reference sources based on the definition given in the game.

7.9 Stop Plagiarism

It is a plagiarism prevention game that creates awareness on avoiding plagiarism while writing assignments, projects, and other students' homework.

7.10 The Meaning of Beep: Plagiarism

The game assists users in learning more about the most basic form of plagiarism, like copying and pasting someone else’s work directly into their own work. The users will also learn why plagiarism is taken so seriously in academic writing and tips to avoid it. Further, this game also helps to know the citing sources and paraphrasing other articles.

8. RANKING OF DIGITAL LITERACY-RELATED WEB-BASED GAMES

Identifying the best web-based games and ranking them based on their usability, efficiency, effectiveness, game interface, game mechanics and gameplay, etc., assist library professionals in quickly implementing web-based games or gamification in libraries. Most web-based games have a better user interface, are user-friendly, and are regularly updated with the latest technology. They all have specific purposes and game structures that come under the Game Interface, Game Mechanics, and Game Play.

8.1 Criteria for Ranking Digital Literacy-related Games

Federoff²³ used the following criteria for ranking selected games: Game Interface, Game Mechanics, and Game Play (Fig. 1).

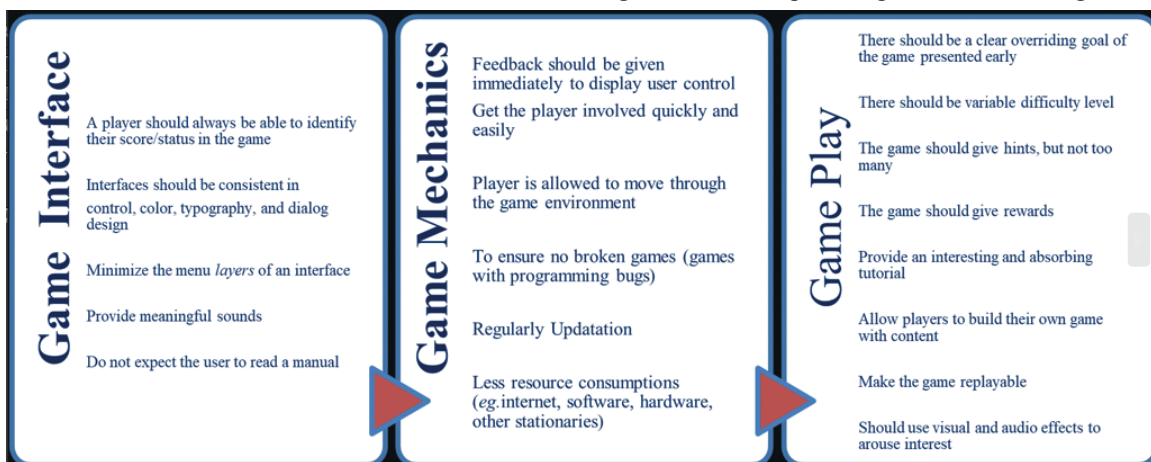


Figure 1. Criteria for ranking library-related games.

8.2 Ranking of Library-related Games

Ranking assessment of selected games (10 games) was done, based on major assessment criteria from Game Interface, Game Mechanics, and Game Play and presented in Table 1 and Figure 2 subsequently. The game Defense of Hidgeon has 14 game features, including a friendly interface, score/status of the game, various colours in games, regular updates, quick responses, provides sounds, etc. This game is also ranked number 1 among the other games. The game’s primary and secondary sources and ready references have 12 game features each. The remaining library hangman, encyclopedia challenge B, the meaning of beep: plagiarism and goblin threat plagiarism has 11 features. There are only 2 games found with interesting tutorials and guidelines for playing games. Though, these

criteria have been used for evaluating general games²¹, researchers have applied the same to ranking the library-related selected games as well.

9. CHALLENGES IN THE IMPLEMENTATION OF WEB-BASED GAMES IN INDIAN LIBRARIES WHILE ATTRACTING DIGITAL HUMANITIES

Since the last decade, Indian libraries have changed their role and responsibilities in delivering library services in modern ways. Indian libraries have been working with users and ICT developers to create modern user service platforms to full-fil user requirements. Gamification is a new concept in Indian library services. Figure 3 presents the Indian library professional perspective on gamification’s importance in libraries to develop their user’s digital literacy skills. It found that over 26.37 % of participants ranked these as very important, followed by reasonably necessary (28.57 %) and essential by 21.97 % of library professionals.

Implementing gamification in the library is the best way to incorporate digital humanities practices in library services, but it may face several challenges. While there is a growing interest in digital humanities in libraries, there still needs to be more awareness and understanding among librarians.¹⁵ Additionally, the implementation of gamification requires significant technological infrastructure

and resources, which may be difficult to obtain for many Indian libraries.²³ Libraries need to take more interest due to a lack of technology expertise, less awareness of Gamification Impact, and lack of availability of technical and physical infrastructure and user practices. The following are the significant challenges faced by Indian libraries:

- Technical issues related to downloading and customisation of games.
- Overly simple- no challenges in tournaments are not successful.
- More technology and artificial games are not user friendly
- One game cannot solve every problem because every game has different goals.

Table 1. Ranking of library-related games

S. No.	Name of game	Criteria score	Rank
1	Defense of Hidgeon	14	1
2	Primary and Secondary Sources	12	2
3	Ready Reference	12	2
4	Library Hangman	11	3
5	Encyclopaedia Challenge B.	11	3
6	The Meaning of Beep: Plagiarism	11	3
7	Goblin Threat Plagiarism	11	3
8	Lyc0 Map Game	9	4
9	Stop Plagiarism	8	5
10	Citation Game	8	5

10. CONCLUSION

Web-based games or gamification is an application of the digital humanities, and it is an opportunity for library professionals to showcase their role in digital humanities by implementing the web-based games available on digital literacy. Libraries can engage users and promote library services through web-based games, creating immersive experiences for users to explore the resources and services available to them.²⁴⁻²⁵ However, using gamification or web-based games in libraries is a new concept, and game-based learning has grown exponentially over the decade due to high technology innovations and developments. Future libraries have facilitated the separate physical space (arcade), console, computer, handheld, etc. technology facilitates to promote gamification in library premises. Now games as library services and are part of library organisation, profiles, policies, and every activity. Gamification is a new function appearing in the librarianship landscape. After librarianship, called IT professionals, subject librarians, subject liaisons, data curators, research data managers, community managers, etc. New trends called them Game

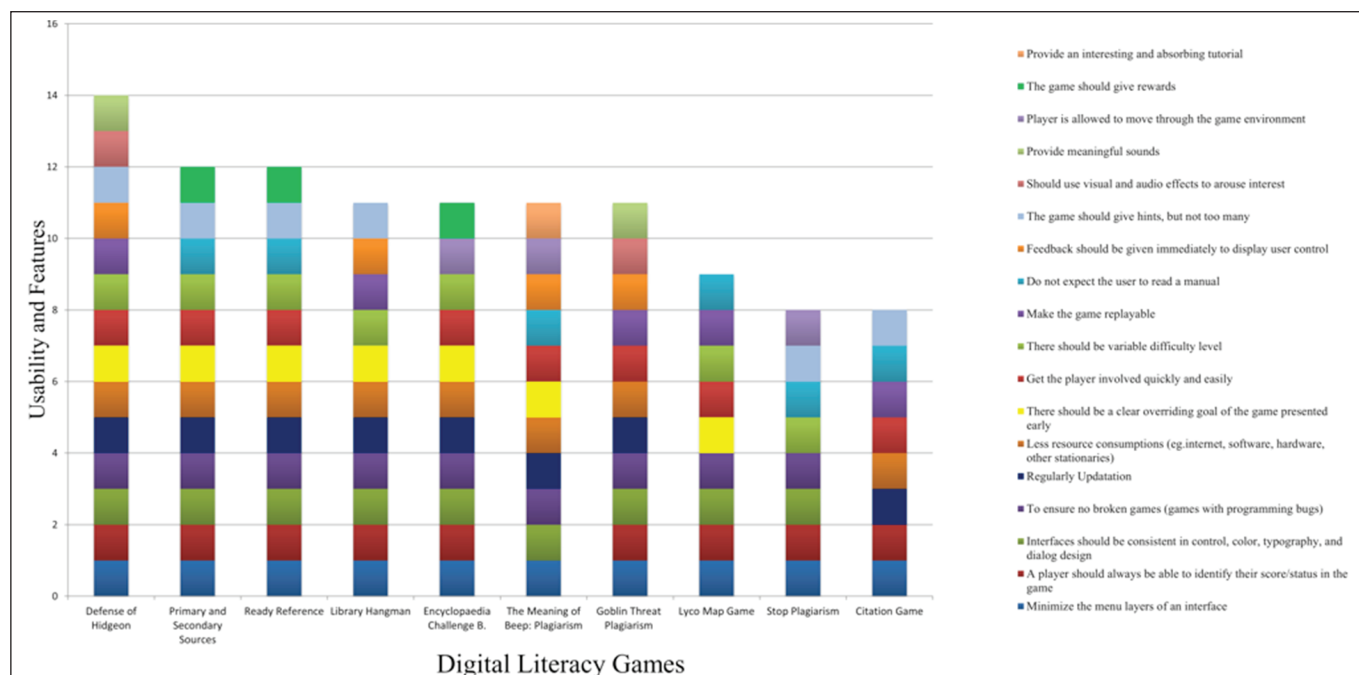


Figure 2. Ranking of digital literacy-related games.

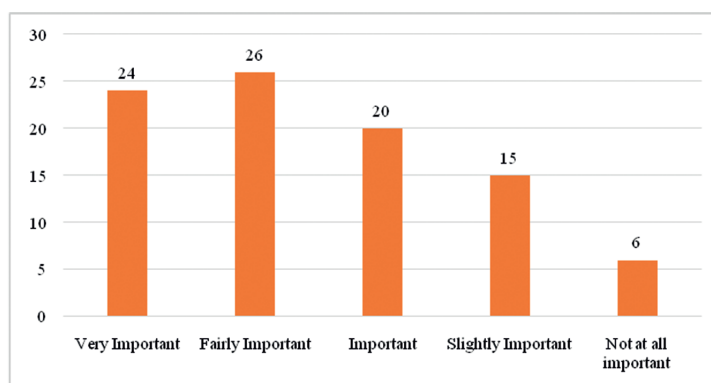


Figure 3. How important gamification in libraries is in-order to develop user’s digital literacy skills.

Managers and Game Designers. The library provides an attractive platform for the gamification process.

The overall findings of the research study are that the web-based games or gamification are one of the significant mediums for learning in the future. Therefore, it is the right time for libraries to adopt web-based games which are freely available or develop games that assist in developing the user's literacy skills through entertainment. This study found that sufficient games are available for developing information literacy skills, user training, and library service promotions and avoiding academic theft in research. Most of them are related to information services, citation games and avoiding plagiarism, encyclopedias, identifying library resources, etc. So, developing similar kinds of web-based games for users in India is essential. Ranking games helps to identify designing features of games that should be part of the influential game interface and mechanism and acquire the list of prominent games to use among the available games on the internet. Altogether, the authors made an attempt to enlighten library professionals to implement web-based games or gamification to present the value of libraries in digital humanities.

At the international level, higher education institutes and universities are developing their own Game Labs to bring together scholars, developers, technologists, and creators to conduct research and develop new applied games for user education. Major Game Labs are the MIT game lab, Cologne game lab, UCLA game lab, Video game lab, and CRI game lab. Therefore, it is apparent time for Indian libraries to take steps towards the development of web-based games. It should be considered as a hut for game-based learning activities and digital humanities. Instead of using the traditional orientation learning methods, game-based learning activities will attract more users, and it is the future of outreach activities and research support services programs of libraries.

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Her contributions to this paper are conceiving the idea, conceptualisation, review, editing, and supervision.

Annexure 1: List of web-based games on digital literacy

S. No.	Name of game	University libraries/host names	URL
1	Primary and secondary sources	Quintessential instructional archive	https://www.quia.com/rr/107632.html
2	Library hangman	Quintessential instructional archive	http://www.quia.com/hm/181840.html
3	Ready reference	Quintessential instructional archive	http://www.quia.com/rr/180044.html
4	Encyclopaedia challenge board	Quintessential instructional archive	http://www.quia.com/cb/300570.html
5	Citation game	University of Washington	http://depts.washington.edu/trio/quest/citation/apa_mla_citation_game/index.htm
6	Goblin threat plagiarism game	Lycoming college	https://www.lycoming.edu/library/plagiarism-game/
7	Lyco map game	Lycoming college	http://www.lycoming.edu/library/game/lycomap.html
8	The meaning of beep: plagiarism	BrainPOP	https://www.brainpop.com/games/mobplagiarism/
9	Stop plagiarism	Scirra LTD	https://www.construct.net/en/free-online-games/stop-plagiarism-12478/play
10	Defense of hidgeon	Studio hoppe GmbH	https://www.5.alphawars.com/