Migration Letters

Volume: 21, No: S2 (2024), pp. 1133-1150

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)

www.migrationletters.com

Research on the designation of Gamified Teaching Method in Visual Teaching of Literature Review

Bin Yu[1,2]，Wee Hoe Tan[*1]，Jiyuan Feng[1]，Xiaohua Wang[1]

Abstract:

Through theoretical analysis of the game teaching method and visual teaching of literature review, this paper summarises the application principles of the game teaching method in visual teaching of literature review and applies it to practical teaching. Two teaching cases are designed. To further improve students' learning motivation, it is recommended that teachers can adopt various game-based methods for visual teaching of literature review, such as providing pictures and videos related to the course in games, Interpreting the course content using an approach, Setting multiple phased small goals and assessment methods. It provides a theoretical basis for the application of game-based instructional design in the visual teaching of literature review.

Keywords: *literature review, game, Visualization, gamified teaching method.*

1. Introduction

The primary objective of the literature review, an integral component of university curricula, is to succinctly synthesise and assess the significant body of research produced on a certain subject matter. This course enhances students' understanding of professional literature and fosters their appreciation of the field's evolution, leading to an enhancement of their professional kno[1]wledge and overall competence. Conventional instructional approaches, often including passive student participation and lectures, have been shown to have limitations in terms of both effectiveness and student involvement. A new study suggests that using interactive and student-centred teaching practices in literature review classes can lead to a significant enhancement in learning results. According to a study done by Landis et al. (2011), effective teaching methods for literature review classes at universities involve active learning activities that focus on teamwork and peer teaching. Moreover, students can enhance their understanding of the subject matter and engage in introspection on their own

[1]Department of Education, Faculty of Social Sciences and Liberal Arts, UCSI University, Kuala Lumpur, Malaysia

[2]Pingdingshan university, Pingdingshan467000, Henan Province, China

Corresponding author[*]

convictions by employing dialogical methods in these courses (Regmi, 2012). Additional instances of such methodologies encompass facilitation. These strategies can help overcome the challenges of traditional lecture-based teaching, which often leads to inefficient learning outcomes and limited knowledge of the course material due to time constraints. Implementing these advanced teaching strategies has the potential to significantly enhance classroom efficiency and better support the attainment of educational goals in literature review programmes.

The literature review is a crucial topic within the realm of higher education. It is responsible for compiling and evaluating the most significant literature related to a specific subject. Students must take this course to develop a deep understanding of important literature, remain up-to-date with the latest developments in their field, and enhance their overall professional knowledge and competence. Conversely, conventional teaching methods, mostly focused on delivering lectures, often result in students adopting a passive learning role, which may not always provide optimal educational achievements. The course material may pose challenges for students in fully comprehending and retaining it, especially when there are time constraints during class.

Given the presence of these barriers, it is imperative to explore novel instructional approaches that are more interactive and engaging for students. Games, being interactive activities that simulate real-world situations, have a substantial capacity for education within established parameters. By incorporating game components into the learning process, known as gamification in education, it is feasible to introduce the thrill and challenge of games into education. Consequently, this can enhance students' enthusiasm for learning and assist the acquisition of information and skills that are more engaging and meaningful. This study aims to assess the efficacy of gamification in the instruction of literature reviews, with the goal of igniting students' enthusiasm for learning and enhancing their interest and proficiency in professional topics.

Kaufmann (2018) Studies have shown that using gamification in educational settings may significantly raise student engagement, motivation, teamwork, and knowledge retention. Additionally, it can also improve the creation of personalised learning environments. As stated by Aynsley and Crawford (2017), maintaining ongoing engagement with the subject matter facilitates learning. Research conducted by Rababaah (2021) has demonstrated that incorporating gamification into software engineering education has a substantial impact on student engagement, the assimilation of fundamental concepts, and the development of critical thinking skills. Moreover, it fosters student engagement, acquisition of knowledge, and a sense of rivalry within the framework of the whole educational process (Raju et al., 2021). Moreover, the use of gamification enhances educational experiences by making them more enjoyable and favourable, thus resulting in enhanced exam outcomes and heightened self-assurance (Szeto et al., 2021).

2. literature review

2.1 gamified teaching method

Game-based activities, facilitated by the revolutionary game teaching style, enable students to learn knowledge, develop skills, and enhance their abilities. The game-teaching technique integrates gamification aspects into the process of acquiring knowledge. Applying this method to the teaching of literature review enhances the learning experience by making it more interesting and dynamic. By employing this approach, educators develop educational exercises that revolve around certain tasks and incorporate micro-games that are pertinent to the curriculum. This provides students with the chance to enhance their skills and capabilities in an educational and entertaining environment. The core premise that forms the basis of gamified education originates from cognitive psychology and aims to improve student's learning experiences. This technique diverges from traditional, one-way methods of teaching by including game elements, promoting active participation and immersive encounters. In cognitive psychology, there exists a hypothesis that posits the combination of learning environments with game mechanics significantly enhances students' motivation and interest in learning. Consequently, this leads to a more efficacious achievement of educational objectives.

Research has shown evidence that educational games may significantly enhance students' learning motivation and outcomes, therefore supporting this technique. An illustration of this may be seen in the study carried out by Rakasiwi and Muhtadi (2021), wherein they observed that educational games resulted in a substantial 84.4% rise in students' learning motivation and significantly improved their learning outcomes from 48.9 to 85.1. In addition, Liu et al. (2020) found that game-based learning and gamification enhance student motivation and engagement in learning, leading to significantly better learning outcomes compared to the control group.

Research has provided evidence for the positive effects of gamified education techniques on students' cognitive and psychological development. The research done by Najjar & Salhab (2022) shows that the use of gamification improves critical thinking skills, stimulates curiosity, and fosters greater active participation in the learning process. In addition to enhancing cognitive abilities, this educational tool provides students with an enjoyable and immersive gaming experience that motivates their active involvement in the educational process. Moreover, gamified courses exert a positive impact on the motivation, recognition, and autonomy of participants, leading to enhanced learning experiences (Kopcha et al., 2016). Moreover, empirical evidence has shown that the implementation of gamified incentive systems, specifically in the context of mathematics education, may effectively improve students' attitudes towards the subject, alleviate anxiety, and significantly strengthen their willingness to engage in studying (Rincon-Flores et al., 2023).

The notion of gamified education extends beyond mere amusement, as it subtly motivates students to explore, analyse, and apply their acquired knowledge in an immersive environment. This educational style is particularly ideal for programmes that necessitate students to undergo simulated, contextualised, and practical experiences. The implementation of gamification in the teaching of literature review creates a learning

environment that closely resembles real-world situations, thereby enhancing practical and realistic learning experiences. Teachers might employ simulation exercises or strategy games, such as a "press conference," to engage students in role-playing as journalists, researchers, or critics of the press. Engaging in literature analysis not only enhances understanding of its significance and facilitates effective literature reviews, but it also enhances collaborative skills and fosters critical thinking (Haruna et al., 2018; Tzelepi et al., 2020). In their study conducted in Najjar & Salhab (2022) found that engaging in activities such as "merchandising" and "role-playing" can enhance students' strategic and practical planning skills by allowing them to approach literature from different perspectives within simulated real-life scenarios.

These qualities can be fostered by implementing gamification in the instruction of critical thinking and literature review skills. Gamification may also enhance self-confidence, amplify motivation, and stimulate self-regulated learning. In a study conducted in Tzelepi, Petroulis, et al. (2020), it was found that incorporating gamification elements such as badges and progress bars can enhance participation and interest in online discussions, ultimately fostering higher levels of critical thinking. In a study conducted by Tzelepi, Makri, et al. (2020), it was shown that gamification tactics may effectively involve students and foster a sense of Community of Inquiry by means of asynchronous interactions. Consequently, this fosters cognitive engagement and enhances the capacity for critical thinking.

2.2 Literature Review Visualisation

A literature review is a rigorous examination of published sources that are relevant to a certain topic or research issue. It serves to provide an overview of existing knowledge in the field and to highlight areas that require more investigation. The objective of the technique referred to as "literature review visualisation," as stated by Felizardo et al. (2011), is to present the results in a visually appealing and easily understandable manner. This method employs visual representations such as diagrams, graphs, and charts. By employing this method, the data becomes more comprehensive and facilitates smoother communication, leading to academic study conclusions that prioritise relationships (Pain, 2012).

The introduction to a visualisation of a literature review should encompass defining the objective and significance of the study, elucidating the methodology employed for conducting the review and delineating the visual instruments employed for displaying the findings. This section should emphasise significant findings, conclusions, and potential areas for further research (Narechania et al., 2022). Additionally, it should have a concise overview of the evaluation procedure, encompassing the choice of sources, research, and amalgamation.

The application of data visualisation in a literature review enables the identification of patterns and trends, facilitates the comparison of studies, and emphasises significant discoveries. Visual representations aid in identifying deficiencies in the current literature, areas that require more exploration, and the effective communication of research findings

(Amigud et al., 2017). Visualisation is a powerful technique in literature reviews, as it may effectively synthesise and present complex information in a clear and straightforward way, thereby enhancing accessibility for a broader audience.

Within the realm of scholarly investigation, literature reviews are a vital element that encompasses the systematic arrangement and examination of relevant data pertaining to a certain topic or research query. They offer a concise overview of the current understanding of a particular subject, emphasise areas that require more investigation, and guide future research endeavours. However, the challenge is in presenting this information in a way that is both impactful and streamlined. Literature review visualisation offers a solution to this challenge by creating visual maps that depict key themes, track their frequency across the text, and illustrate variations and connections.

A literature review visualisation is a technique that utilises diverse visual representations, such as charts, graphs, and diagrams, to visually depict the vast quantity of information included in a literature review. The objective of this approach is to simplify complex content and provide a user-friendly graphical interface, enabling users to quickly discover, understand, and absorb crucial information. A study conducted by Almutairi and Al-yahya (2019) found that a significant majority of evaluators, namely seventy per cent, consider visualisation in literature reviews to be quite beneficial. Visualisation aids in the analysis, synthesis, and development of a conceptual understanding of the subject area.

A preliminary overview of the pertinent scholarly works The study's structure is determined by the visualisation, encompassing the setting of research objectives and their significance, the technique employed, and the selective choice, interpretation, and integration of numerous sources. This document offers a comprehensive outline of the whole process involved in doing a literature review. Additionally, it gives a glimpse into the most significant findings, conclusions, and potential avenues for future research. Lee and Laverty (2014) argue that incorporating visualisation and discussion techniques in literature reviews enhances students' understanding of information literacy and highlights the literature review as a distinct area of academic inquiry.

Researchers can enhance their capacity to identify patterns, trends, and connections in the data by employing literature review visualisation techniques. Moreover, they have the ability to highlight the most noteworthy findings from the multitude of investigations. This approach equips researchers with the required resources to delve further into the current literature, making the findings more comprehensible and applicable to a broader readership, including non-specialists on the subject. VITALITY, a transformer language model developed by Narechania et al. (2022), utilises an interactive two-dimensional scatterplot to show the document-level embedding space and facilitate the serendipitous discovery of related literature. Essentially, the presentation of literature reviews has progressed into a contemporary and efficient approach for scholars to analyse complex academic content in the present day.

3 Strengths of this study

3.1 Integrating games into classroom teaching

The integration of games into classroom education has the ability to provide a wider range of opportunities for student involvement, effectively stimulate interest in learning, and enhance motivation, as compared to traditional instructional techniques. Teachers may design captivating games for their students to engage in game-based learning, so enhancing their focus and fostering a greater enthusiasm for the subject matter. For teaching the chapter labelled "Literature Review," a game called "Guessing Words by Looking at Pictures" might be employed. This game presents terms and concepts related to the topic through visual representations such as drawings, cartoons, or written words. This technique not only engages students but also enhances their understanding and retention of the content more efficiently (Datta & Mirza, 2019).

A simple yet effective game, such as "observe the image and deduce the word," can visually illustrate important concepts or knowledge points, capturing students' attention and aiding in the understanding and retention of information. When students demonstrate a substantial enthusiasm for a certain concept, educators might seize the chance to provide increasingly demanding activities that require deeper levels of thinking. This aids pupils in consolidating their knowledge and improving their capacity for critical thinking. Pera (2013) found that incorporating games into classroom education yields positive learning outcomes, as well as increased student engagement and motivation.

Typically, the instructional approach that utilises game dynamics prioritises the transmission of knowledge to students, together with their active participation and emotional investment in the learning process. The aim of this educational approach is to cultivate the holistic growth of students' abilities and motivate them to strive for excellence in their learning consistently.

3.2 Closely aligned with course content

Integrating the game teaching technique into the teaching of literature review visualisation offers the advantage of offering students many learning paths and immediately aiding them in fully comprehending and applying knowledge, skills, and abilities. The effectiveness of this teaching strategy relies on the teachers' ability to integrate the game mechanism with the course content adeptly. This guarantees that the game serves not just as a means of entertainment but also as a conduit for a profound educational encounter.

The teacher is responsible for both developing and promoting the game, as well as establishing a relationship between the game and the course material. This is done to ensure that the pupils are able to achieve the objective of learning while they are participating in the activity. By engaging in this activity, students experience a significant boost in their level of involvement and curiosity in the learning process. They are able to effectively absorb knowledge and apply their skills while participating in a game that is both enjoyable

and calming.

3.3 Gamification approach to build an emotional connection with students

Students often exhibit strong enthusiasm for learning when they are enrolled in literature review programmes, yet they may also encounter a certain level of learning fatigue during their education. Most often, students struggle to derive valuable concepts from the large volume of material they read. Without establishing an emotional bond with their students, if teachers just rely on mechanical reading and memorisation, it will be challenging for students to maintain a sustained motivation for studying in the long run. Therefore, teachers ought to include game-based instructional design in the teaching of literature review courses to foster an emotional bond with their students. For example, educators can create exercises that are relevant to the objective of helping students extract valuable information from reading materials. For example, teachers might utilise video excerpts that captivate students' interest, enabling them to participate and immerse themselves in the training actively. Chang et al. (2010) suggest that this strategy can attract students' attention and increase their motivation to study, hence improving their understanding of the course material and its impact on their learning.

An effective "picture-based word guessing" game can visually illustrate relevant concepts or knowledge points using images, illustrations, or text. Consider the "literature review" as an illustration. This strategy not only captures the students' attention but also enhances their comprehension and retention of knowledge. Teachers can enhance students' knowledge and cognitive skills by incorporating more challenging activities that require deep thinking after they have developed a strong interest in a certain subject. These activities might enhance students' critical thinking skills on the subject. Game-based student response systems, like Kahoot!, enhance the calibre of student learning. The authors of the publication are Licorish et al. (2018). These technologies enhance classroom dynamics, foster engagement and motivation, and improve the overall learning experience.

This research showcases how gamification may be employed in instructional design and practice to establish emotional bonds with students in a literature review course. A pragmatic investigation of course instruction was conducted utilising the results of the research, which involved a blend of classroom scrutiny and student questionnaires. The findings of this investigation can be utilised as a benchmark for forthcoming research and trials that are analogous.

3.4 Teaching Literature Review Visualisation Using Multiple Formats

The flipped classroom approach in literature review classes allows students to engage with course content by utilising micro-videos and micro-presentations. This allows individuals the autonomy to choose their preferred content and customise their viewing experience, considering their unique preferences, needs, and cognitive abilities. According to Uzunboylu and Karagozlu (2015), this technique ensures that students will become more

engaged participants compared to traditional classroom methods. Subsequently, the videos, PowerPoint presentations, discussion papers, and other instructional resources that were examined by students in groups are posted to an online platform where they may be freely downloaded and accessed. The group collectively analyses discusses, summarises, and revises the shared materials at the end of the course.

Furthermore, the content of the literature review course is intertwined with real-life scenarios, allowing students to examine these scenarios by integrating their existing knowledge and their capacity for analytical thinking. The instructor might choose to create a case discussion subject on "the alteration of college students' information retrieval patterns in the era of social media" once the students have acquired knowledge about "information access." The utilisation of group discussions in the literature review class, as indicated by the research conducted by Fernández-Martín et al. (2020), has the potential to enhance students' knowledge, attitudes, collaborative work, autonomy, self-regulation, and academic performance.

Ultimately, the education is implemented using a combination of media-based and traditional instructional methods. For instance, while instructing on the subject of "comprehending scientific and technological literature," multimedia courseware might be employed alongside conventional teaching approaches. Likewise, while instructing on the subject of "composing scientific and technological papers," it is feasible to employ conventional instructional approaches with multimedia instructional approaches. When instructing on the subject of "literature review," a combination of conventional teaching approaches and multimedia teaching methods might be employed.

3.5 Blended learning model combining online and offline

In light of the current "Internet Plus" age, universities and institutions should adapt their instructional methods accordingly. Furthermore, the online course platform not only grants students access to a plethora of online learning resources but also enables them to engage in self-directed online learning. Teachers may utilise the online course platform and many teaching tools, including PowerPoint presentations, images, videos, and more while doing traditional classroom instruction. In addition, they may conduct thorough analysis and exploration of the curriculum to meet the personalised educational needs of the students, leading to enhanced efficacy of in-person classroom teaching. Utilising a combination of online and offline blended learning methods at various levels of student education in the literature review course can facilitate teachers in gaining a deeper understanding of student learning within the classroom. This allows for timely adjustments to teaching content and methods, ultimately leading to the successful construction of students' knowledge systems and the enhancement of their overall abilities. This may be achieved by employing mixed learning.

Research has shown that using gamification in educational settings may effectively boost students' learning motivation and enhance the learning outcomes of learners. In the future, we will further explore the implementation of the gamification teaching approach in the

literature review visualisation course. In addition, we will examine how the gamification teaching approach may be effectively applied in the literature review visualisation course to improve the educational impact of practical courses.

4. Principles and Ideas of Gamification Instructional Design

A literature review is an extensive investigation that collects, assesses, and evaluates relevant literature pertaining to a specific topic or field. The major focus and most difficult component of teaching a foreign language is to make comments and predictions based on the provided information. The integration of literature review and visualisation instruction is an innovative pedagogical approach that enhances students' motivation to study and fully activates their initiative and enthusiasm during the learning process. The learning materials and A4L test topics will be aligned in a constructive manner, and they will be integrated with the six structural components of the game. Upon the completion of the alignment process, a game design document, commonly referred to as a GDD, will be generated. Subsequently, a different version of a game will be created by applying Tan (2022) seven principles of learner-centred emotional gamification.

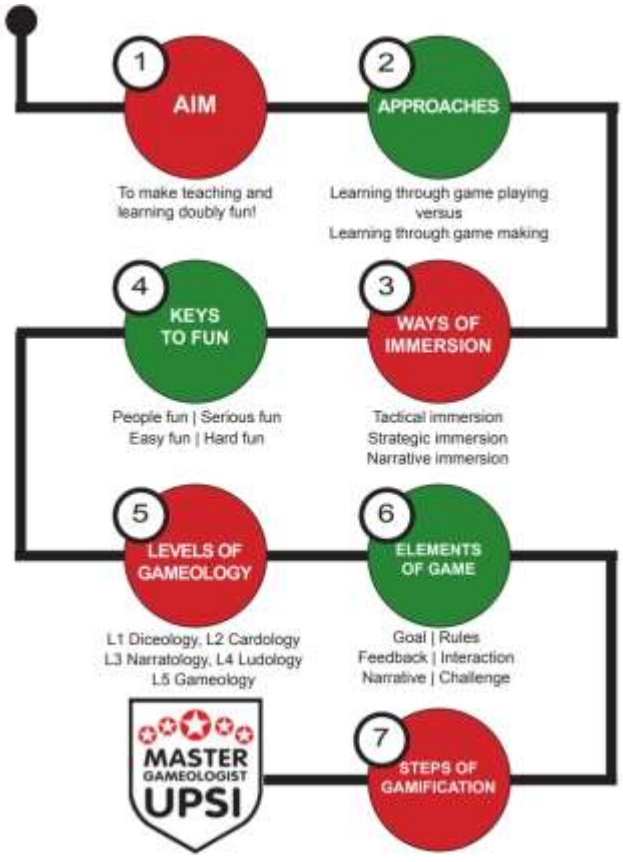

Fig 1: Seven principles of learner-centric emotional gamification (Source: Tan, 2022).

The author constructed two game instances that were based on the content given in the literature review course, following the principles and ideas described before.

The first illustration pertains to the structural arrangement of the instructional endeavour for the literary examination known as "Reading Literature," which predominantly comprises four hyperlinks: (1) Teachers provide visual aids such as images and videos related to the course; (2) The course topic is explained using visual materials like pictures or videos; (3) The case is analysed and interpreted; (4) Milestones and assessment methodologies are established. Methods.

The second example pertains to the case design for "Visualisation," a visual instructional activity that entails the examination of literature. It consists of the following components: Initially, educators will provide students with pertinent photographs and video resources pertaining to the subject matter. Subsequently, students will analyse the visual materials that are connected to the course content. Following this, students will collaborate in groups to interpret the materials. Lastly, students will work collectively to assess and evaluate the findings. Each instance was designed using a gamified method. To examine the effectiveness of gamification in teaching literature review visualisation, the author decides to merge the two situations and analyse them.

5. Steps in Gamified Instructional Design

5.1 Gamified Instructional Design

This study employed a gamified instructional design to teach the concept of literature review visualisation in the Literature Review course. The design encompassed the initiation session, the formulation of tasks and activities, the evaluation session, and the feedback session. The gamified instructional design was categorised into three unique groups, each aligned with a certain learning objective and teaching material.

One approach is to provide games to students as a means of capturing their interest and inspiring them to engage with the subject matter. As part of the "Frontiers of Science" course, we conducted a teaching activity that focused on visualising a literature review. The participants were presented with three questions during the introduction game: (1) "What is the role of scientists?" "What obstacles or difficulties are encountered in the field of scientific research?" "What is the process of conducting scientific research?" By employing these three questions, students may uncover the difficulties encountered in scientific inquiry and the skills needed to overcome them, therefore enhancing students' drive to study.

(2) "What challenges are encountered in scientific research?" "Which skills are necessary for scientists to overcome challenges encountered in scientific research?" The question set should be utilised to push students to analyse and articulate the essential abilities that scientists must possess in order to effectively address scientific research challenges.

(3) "What difficulties do scientists encounter?" By engaging with the allotted material, students had the chance to autonomously uncover facts and raise inquiries, which were then addressed by the instructor. The students in this session tackle and overcome the obstacles encountered in scientific research by employing critical thinking, collaborative inquiry, communication, and discussion.

The second aim is to enhance students' learning motivation by devising activities and assignments for them to do. Regarding the task configuration, we formulated two gaming tasks: (1) Engaging in the examination of pertinent material and consolidating the ideas encompassed within it, and (2) evaluating and condensing the latest trends in the applicable scientific research fields based on predetermined inquiries. In terms of activity design, we have organised the following three activities: 1) The professors will interrogate the students; 2) The students will complete the task and respond to the inquiries; and 3) The students will independently examine and condense the knowledge.

The third aspect is augmenting the educational influence on the student by employing evaluation and feedback sessions. The evaluation link comprises two main components: the first component is to evaluate the design scheme of gamified teaching, while the second component aims to construct different gamified teaching schemes based on specific evaluation objectives.

When it comes to teaching literature review using the traditional approach, teachers often choose to discuss the course material in the classroom and then use that information as the subject of the test. Students can only passively absorb knowledge, resulting in a limited learning impact.

A gamification is an instructional approach that motivates students to actively engage in the learning process actively, enhancing their information acquisition and skill development. This is achieved by eliciting students' curiosity through a diverse range of engaging methods. Consequently, we include the gamification instructional style in the course that focuses on the literature review.

1. Attain comprehension of the subject matter presented in the course and enhance the clarity of the instructional objectives. The gamified instructional method we created was designed to align with the teaching goals of the Literature Review course (see Table 1 for further details).

Which instructional steps can be gamified? During the initial phase, referred to as the pre-course preparation stage, the teacher should start by delivering a succinct overview of the content that will be addressed in the Literature Review course. This will enable the students to grasp the importance of the content that will be addressed in the course. Simultaneously, the teacher ought to create a gamification instructional exercise, such as crafting a little game, image, or movie that pertains to the subject matter. Additionally, the instructor should provide guidance to the students in order to facilitate the implementation of gamification learning in small groups. This will enable students to establish a correlation between the course content and their existing knowledge framework. Upon the conclusion of this section of the exercise, the instructor should arrange for the students to engage in a discussion and review of the learning experience.

During the course, the teacher utilises the case as the basis for instructional design and for presenting operational procedures in the classroom. The instructor might provide students with course-related photos or films during the case study session. Simultaneously, the instructor will assist students in condensing and contemplating the content taught in the course.

In the third step, following the class's conclusion, teachers utilise online platforms to

immediately deliver relevant links and screenshots of the gamified instructional content. They also give discussion topics and other reference resources.

The initial phase of the course includes a dedicated session for case analysis, which focuses on situations that are highly pertinent to the subject matter. Therefore, instructors have the ability to include gamified educational content into it. The video game we created is titled "I am an academic thief" (Innocence Positive Crime), and it was constructed in alignment with the project's aims.

To play in the game, students must take on the persona of an "academic thief" online and partake in various acts of intellectual theft. These acts encompass activities such as disseminating deceptive documents, engaging in plagiarism, appropriating the intellectual property of others, and engaging in similar misconduct. Players can amass points by successfully achieving the game's goals.

Below is a compilation of the objectives we have set for the "I am an Academic Thief" course to improve students' learning motivation and efficiency. To achieve the following objectives: (1) To foster students' capacity for information gathering, information analysis, and independent thinking; (2) To enhance students' teamwork skills and professional engagement; (3) To ignite students' enthusiasm for acquiring course-related knowledge; (4) To enhance students' understanding of literature review and the advancement of academic research, both domestically and internationally; and (5) To deepen students' comprehension of literary works. (iv) Improve students' comprehension of the literature review process, as well as the development of academic research (both domestic and international) and other aspects of knowledge content. The course consisted of two distinct phases: the pre-course preparation phase and the classroom execution phase. Once the teaching objectives have been identified, we divide the course into two parts based on its content.

In the initial stage, we created a game-oriented educational activity called "I am an Academic Thief." This activity involves two tasks: (1) searching for and examining material and (2) downloading suitable literature and comprehending its content. Additional instances of such endeavours encompass phrases such as "I engage in academic plagiarism." The initial task necessitates students to actively search for and assess significant content by utilising the existing literature at their disposal. For the second duty, students must download pertinent material and engage in studying it to enhance their comprehension. During the second stage, the instructor may encourage students to utilise existing resources to analyse and elaborate on the course material. Students have the autonomy to choose a task based on their own knowledge and skills and then produce a report related to that activity. Furthermore, under the guidance of the teacher, students can choose supplementary assignments based on their degree of mastery.

5. Developing strategies for assessing performance using game-based approaches. In the Literature Review course, we implemented a game-based assessment approach. After completing each game task, students were evaluated based on their performance and the quality of their reports. Additionally, upon completing each module, students were assessed based on the content of their submitted reports. Furthermore, the teacher had the option to administer a questionnaire survey to collect data from students, which could then be analysed using SPSS for statistical analysis.

6. Conducting a statistical analysis of the data and engaging in a comprehensive discussion of the results. We employed SPSS 18.0 to conduct a data analysis and then provide a statistical interpretation of the results, which were derived from the instructional situations outlined earlier.

5.2 The Application of Gamification Instructional Design in Literature Review

The adoption of gamified teaching, an innovative pedagogical method, has revitalised the Literature Review class. In order to enhance the visual teaching material of the Literature Review course, we have systematically developed and applied three unique forms of gamified instruction.

1. An educational game specifically created to captivate students and stimulate their curiosity towards learning:

Against the backdrop of "scientific frontiers," questions are raised about the nature of scientific labour. Motivate students to really reflect on the fundamental principles of scientific inquiry.

The query pertains to the difficulties encountered in scientific study. Students get insight into the inherent challenges involved in doing scientific research and contemplate the necessary skills and competencies of scientists.

When students are given the task of exploring the issues faced by scientists, they must undertake their own research in the literature to develop their capacity to think independently.

2. The activities and assignments are designed to optimise the pupils' learning process.

Students must engage with relevant reading and provide concise summaries of the themes presented.

Offer an extensive examination and synopsis of pioneering topics in crucial scientific research fields.

The exercises are meticulously crafted to foster more kid engagement in the learning process.

Evaluation and feedback are crucial for consolidating and enhancing children's learning.

An assessment of instructional design techniques that use gamification.

The evaluation objectives should guide the establishment of the assessment criteria for the gamified educational course.

Compared to traditional instructional techniques, gamified education promotes greater student engagement and participation in the learning process, resulting in enhanced learning results.

Another aspect of this study was creating a game titled "I am an Academic Thief" with the goal of improving students' cognitive abilities, professional curiosity, and analytical skills. The game was designed with the aim of offering students a more comprehensive understanding and immersion in the literature review. It was created with two fundamental objectives.

Regarding assessment, we employed many methods, like analysing the completion of game tasks, evaluating the substance of the stage report, and summarising the assessment at the end of the semester.

5.3 Application of game pedagogy in teaching literature review visualisation and research limitations

The research on the practical use of game pedagogy in teaching the visualisation of literature reviews has yielded the following results and observations:

5.3.1 Inferring and Noting Observations

There is a level of theoretical alignment between game-based teaching and the education of visualising literature reviews. Furthermore, there is a significant synergistic effect that arises in the practical implementation of education.

By employing game-based teaching, students demonstrate heightened levels of engagement and enthusiasm towards their studies.

The gamification teaching mode offers some clear advantages in terms of visualising literature study as compared to the traditional teaching technique.

While most students actively engaged in the gamified education, a small number of pupils demonstrated little enthusiasm. To enhance student involvement and excitement in learning, we propose that teachers explore employing diverse strategies for teaching literature review visualisation. These strategies involve integrating gamification elements into the course content and implementing blended learning models that integrate both online and offline training.

5.3.2 The limitations of the study

The questionnaire's methodology is hindered by issues of reliability and validity, and the limited sample size might affect the generalizability of the results.

Although we have made attempts to combine qualitative and quantitative research methods, the unique nature of the literature review course presents a difficulty in terms of measuring and effectively managing the students' learning process.

The main objective of this study was to evaluate the impact of game-based teaching methods from the student's point of view. Nevertheless, the research failed to sufficiently include the viewpoints of educators and other stakeholders throughout its whole.

5.3.3 Potential Avenues for Future Research

The aim is to explore the specific strategies of using game-based teaching methods to teach visualising literature reviews. This entails analysing the use of game design elements to amplify students' motivation for learning, as well as implementing gamification strategies to foster emotional connections with pupils.

The aim is to evaluate the efficacy of blended learning models, encompassing both online and offline components, and thereafter identify strategies to enhance and optimise them.

To effectively investigate the teaching methods of the literature review course, it is advisable to employ the blended learning model, which caters to students with different levels and abilities. Consequently, this will lead to more precise and customised educational results.

6. conclusion

In this study, the application impact of the game teaching technique in the visualisation teaching of literature review is discussed. Additionally, the paper evaluates the benefits and disadvantages of the two teaching methods using case studies. Furthermore, with gamification education, students are able to select the learning content that corresponds to their individual interests and preferences, as opposed to the traditional teaching method, which only allows students to select the materials that are allocated for the course. Therefore, while adopting gamification in the classroom, teachers should take into consideration the concerns and interests of their pupils in terms of learning. In addition, although both methods can improve students' interest and commitment to the course to a certain extent, due to the lack of systematic and scientific game-based teaching and some problems occurring in the process of game-based teaching will affect the classroom effect, so in the implementation of the process, we also need to pay attention to the following points: firstly, the teacher should combine with the content of the course to scientifically design the game-based content and the game-based task; secondly, the teacher should do a good job of pre-course preparation, timely collection and analysis of students' interest in the course. In the second place, instructors should also do a good job of pre-course preparation, which includes immediately collecting and assessing feedback from students on the content of the course. In the third place, teachers should do a good job of summarising the work that students have done after class. It is only through this manner

that we will be able to fully use the benefits and qualities of the gamification teaching method, which will allow us to produce the most effective teaching impact possible for the course.

References

Almutairi, T., & Al-yahya, M. (2019). LRV: A Tool for Academic Text Visualization to Support the Literature Review Process. Computers, Materials & Continua, 58, 741–751. https://doi.org/10.32604/cmc.2019.06239

Amigud, A., Arnedo-Moreno, J., Daradoumis, T., & Guerrero-Roldan, A.-E. (2017). Using Learning Analytics for Preserving Academic Integrity. International Review of Research in Open and Distributed Learning: IRRODL, 18(5), 192–210. https://doi.org/10.19173/irrodl.v18i5.3103

Aynsley, S., & Crawford, R. (2017). Pilot evaluation of medical student perception of a novel pharmacology-based role-play game: Braincept. Education for Health, 30(1), 97–97.

Chang, Y. C., Peng, H. Y., & Chao, H. C. (2010). Examining the effects of learning motivation and of course design in an instructional simulation game. Interactive Learning Environments, 18(4), 319–339. https://doi.org/10.1080/10494820802574270

Datta, S., & Mirza, M. S. (2019). Software Engineers at Play. 2019 International Conference on Computational Science and Computational Intelligence (CSCI), 816–820. https://doi.org/10.1109/CSCI49370.2019.00155

Felizardo, K. R., Salleh, N., Martins, R. M., Mendes, E., MacDonell, S. G., & Maldonado, J. C. (2011). Using Visual Text Mining to Support the Study Selection Activity in Systematic Literature Reviews. 2011 International Symposium on Empirical Software Engineering and Measurement, 77–86. https://doi.org/10.1109/ESEM.2011.16

Fernández-Martín, F.-D., Romero-Rodríguez, J.-M., Gómez-García, G., & Ramos Navas-Parejo, M. (2020). Impact of the Flipped Classroom Method in the Mathematical Area: A Systematic Review. Mathematics, 8(12), Article 12. https://doi.org/10.3390/math8122162

Haruna, H., Hu, X., & Wah Chu, S. K. (2018). Adolescent School-Based Sexual Health Education and Training: A Literature Review on Teaching and Learning Strategies. Global Journal of Health Science, 10(3), 172. https://doi.org/10.5539/gjhs.v10n3p172

Kaufmann, D. A. (2018). Reflection: Benefits of Gamification in Online Higher Education. Journal of Instructional Research, 7, 125–132.

Kopcha, T. J., Ding, L., Neumann, K. L., & Choi, I. (2016). Teaching Technology Integration to K-12 Educators: A 'Gamified' Approach. TechTrends, 60(1), 62–69. https://doi.org/10.1007/s11528-015-0018-z

Landis, A. E., Bilec, M. M., Klotz, L., & Pearce, A. R. (2011). Lessons Learned from a Distance Learning Research Methods Course Co-Taught by Clemson, University of Pittsburgh, and Virginia Tech. 22.1008.1-22.1008.12. https://peer.asee.org/lessons-learned-from-a-distance-learning-research-methods-course-co-taught-by-clemson-university-of-pittsburgh-and-virginia-tech

Lee, E. A., & Laverty, C. (2014). Unravelling the Literature Review: Helping Graduate Students in Education Re-conceptualize the Research Process. Information Literacy. Lifelong Learning

and Digital Citizenship in the 21st Century, 713–721. https://doi.org/10.1007/978-3-319-14136-7_74

Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. Research and Practice in Technology Enhanced Learning, 13(1), 9. https://doi.org/10.1186/s41039-018-0078-8

Liu, Z.-Y., Shaikh, Z., & Gazizova, F. (2020). Retracted Article: Using the Concept of Game-Based Learning in Education. International Journal of Emerging Technologies in Learning (iJET), 15(14), 53–64.

Najjar, E. A., & Salhab, R. A. (2022). Position Paper: Gamification in the Learning Process. International Journal of Online and Biomedical Engineering (iJOE), 18(01), 148–153. https://doi.org/10.3991/ijoe.v18i01.26609

Narechania, A., Karduni, A., Wesslen, R., & Wall, E. (2022). VITALITY: Promoting Serendipitous Discovery of Academic Literature with Transformers & Visual Analytics. IEEE Transactions on Visualization and Computer Graphics, 28(1), 486–496. https://doi.org/10.1109/TVCG.2021.3114820

Pain, H. (2012). A Literature Review to Evaluate the Choice and Use of Visual Methods. International Journal of Qualitative Methods, 11(4), 303–319. https://doi.org/10.1177/160940691201100401

Pera, A. (2013). THE SOCIAL ASPECTS OF TECHNOLOGY-ENHANCED LEARNING SITUATIONS. Geopolitics, History, and International Relations, 5(2), 118–123.

Rababaah, A. R. (2021). Enhancing Software Engineering Learning Environment with Computer Games: A Case Study. Journal of Engineering Education Transformations, 35(1), 126–143. https://doi.org/10.16920/jeet/2021/v35i1/22065

Raju, R., Bhat, S., Bhat, S., D'Souza, R., & Singh, A. B. (2021). Effective usage of gamification techniques to boost student engagement. Journal of Engineering Education Transformations, 34, 713–717.

Rakasiwi, C. W., & Muhtadi, A. (2021). Developing Educational Games for Mathematics Learning to Improve Learning Motivation and Outcomes. JTP - Jurnal Teknologi Pendidikan, 23(1), Article 1. https://doi.org/10.21009/jtp.v23i1.18356

Regmi, K. (2012). A Review of Teaching Methods--Lecturing and Facilitation in Higher Education (HE): A Summary of the Published Evidence. Journal of Effective Teaching, 12(3), 61–76.

Rincon-Flores, E. G., Santos-Guevara, B. N., Martinez-Cardiel, L., Rodriguez-Rodriguez, N. K., Quintana-Cruz, H. A., & Matsuura-Sonoda, A. (2023). Gamit! Icing on the Cake for Mathematics Gamification. Sustainability, 15(3), Article 3. https://doi.org/10.3390/su15032334

Szeto, M. D., Strock, D., Anderson, J., Sivesind, T. E., Vorwald, V. M., Rietcheck, H. R., Weintraub, G. S., & Dellavalle, R. P. (2021). Gamification and Game-Based Strategies for Dermatology Education: Narrative Review. JMIR Dermatology, 4(2), e30325. https://doi.org/10.2196/30325

Tan, W. H. (2022). Pencalonan Anugerah Pengajaran (Sastera Gunaan dan Sains Sosial Gunaan). Profesor Madya Ts Dr Tan Wee Hoe - AAN 2021. Tanjong Malim: Universiti Pendidikan Sultan Idris.

Tzelepi, M., Makri, K., Petroulis, I., Moundridou, M., & Papanikolaou, K. (2020). Gamification in

online discussions: How do game elements affect critical thinking? 2020 IEEE 20th International Conference on Advanced Learning Technologies (ICALT), 92–94. https://doi.org/10.1109/ICALT49669.2020.00035

Tzelepi, M., Petroulis, I., & Papanikolaou, K. (2020). Investigating Gamification and Learning Analytics Tools for Promoting and Measuring Communities of Inquiry in Moodle Courses. In R. Gennari, P. Vittorini, F. De la Prieta, T. Di Mascio, M. Temperini, R. Azambuja Silveira, & D. A. Ovalle Carranza (Eds.), Methodologies and Intelligent Systems for Technology Enhanced Learning, 9th International Conference (pp. 89–96). Springer International Publishing. https://doi.org/10.1007/978-3-030-23990-9_11

Uzunboylu, H., & Karagozlu, D. (2015). Flipped classroom: A review of recent literature. World Journal on Educational Technology: Current Issues, 142–147.
https://doi.org/10.18844/wjet.v7i2.46