"BayaniCard "

Chap 1

Nowadays, technology has definitely evolved into an essential asset in nearly every aspect of life; one might say it has made its mark in almost all areas that influential individuals consider, and education is no different. Education has transcended textbooks and traditional lectures due to progress in digital platforms, online courses, and engaging resources. Technology has the ability to change how we learn, making it more engaging, interactive, and reachable. Educational games, applications, and interactive simulations are increasingly becoming popular as resources for mastering subjects as intricate as history. It has truly changed how learners engage with history, as their interactions with these technologies cannot be executed in traditional ways. Games such as BayaniCard utilize this technology to present students with the rich and varied history of the Philippines in an engaging, interactive, and lasting manner

According to Peter Seixas and Tom Morton in their book The Big Six Historical Thinking Concepts, many students across the globe struggle to connect with history because it is often presented as a list of names, dates, and events, without context or emotional relevance. This approach results in a lack of engagement and difficulty in understanding the significance of historical developments. Studies have shown that students tend to perform poorly in history when the learning materials lack interactivity and fail to stimulate critical thinking. As a result, young learners often view history as boring or irrelevant, rather than a meaningful story that shapes their identity and society.

According to the Philippine Institute for Development Studies (PIDS), Filipino students consistently show low proficiency in history and social studies, which is reflected in national assessments and classroom performance. Traditional history instruction in the Philippines relies heavily on memorization of facts, dates, and heroic names, often overlooking the broader cultural and social contexts. Research also reveals that students have minimal exposure to interactive or alternative methods of learning, which leads to a weak understanding and appreciation of the country's historical background. This lack of engagement with history education results in a diminished sense of national identity and historical awareness among young Filipinos.

The creative learning resource aimed at addressing these gaps in historical education. Shifting focus from technology, interactivity, and historical precision, BayaniCard transforms the teaching of Filipino history. It brings to life Philippine heroes and significant historical events, allowing players to engage with history via strategic gameplay. Every card signifies a unique hero, event, or cultural achievement, and players need to utilize their historical knowledge to overcome various challenges and tasks. BayaniCard engages players in the rich narrative of the Philippines by using a dynamic and hands-on method, transforming history into an exhilarating, significant, and accessible subject for everyone. Underneath, BayaniCard acts as a supporter for both educators and students, not only connecting them more closely to history but also fostering knowledge and a sense of national pride among young people

The longstanding approach to teaching history in the Philippines greatly mirrors the conventional methodology, which heavily depends on textbooks, lectures, and assessments. Throughout the country, history instruction in the classroom often takes a sequential approach where students learn dates, names, or events by heart, with little connection to the significance or relevance of these facts. Though this approach has its advantages, it has not led to an immersive and inspiring learning experience. At times, teachers may face limited resources while trying to creatively develop methods to instruct students. The atmosphere of a conventional classroom is also not suitable for contemporary students, who prefer more interactive, multimedia, and gamified methods of learning. Consequently, students might perceive history as a subject learned passively, rather than one that can be authentically explored or felt

Even though there is growing recognition of the necessity for a far more engaging teaching method, various obstacles hinder the successful implementation of technology-driven educational resources like BayaniCard. Opposition to change is one of the main issues facing the educational sector. Numerous educators, particularly those from rural regions, might not be acquainted with or may oppose the concept of incorporating games and digital platforms in history instruction. Scarce resources also hinder these implementations; numerous schools, particularly in underprivileged regions, lack the technology or infrastructure to utilize such educational tools effectively. Online platforms, for example, might not be practical in areas with restricted internet connectivity. A significant challenge is equipping teachers to utilize new educational tools in their lesson plans. These obstacles hinder the broader acceptance of any more engaging and creative methods of teaching history

To tackle these challenges, the incorporation of BayaniCard offers a highly sought-after remedy for the educational system in the Philippines. BayaniCard comes in both physical and digital formats, making it suitable for any school setting, regardless of whether it has the technological infrastructure to support the digital version of the game. In situations where classroom resources are scarce, the physical card game can be utilized; in a school equipped with technology, the digital version may be favored. Educators can incorporate the game into the current curriculum as a teaching tool that enhances traditional methods of history instruction. The game’s tactical and strategic features inspire critical thinking, teamwork, and the contextualization of historical occurrences. It can also encourage student involvement via game-based learning, thereby making history more interesting and relevant. In the end, BayaniCard will revolutionize history education in the Philippines by increasing interactivity, providing a modern approach, and focusing significantly on inclusivity for students nationwide

## Statement of the Problem

A historical card game designed to teach Philippine history and promote deeper understanding of Filipino heroes among students. The study will explore the effectiveness of integrating game-based learning to address common issues in history education such as lack of engagement and limited retention of facts.

Specifically, it seeks to answer the following questions:

1. What are the features and functionalities of *BayaniCard* as a historical educational game?
2. How can *BayaniCard* enhance student engagement and understanding of Philippine history?
3. What are the perceptions of teachers and students on the use of game-based learning in history education?
4. How does *BayaniCard* perform in terms of software quality based on the ISO 25010 standards (functionality, usability, reliability, maintainability, and portability)?

The main objective of this study is to design and develop BayaniCard, a historical card game that aims to enhance students' interest and understanding of Philippine history through interactive gameplay.

1. Develop a physical and digital card game that features Filipino heroes, events, and historical facts.
2. Promote engagement and active participation among students in learning history through a game-based approach.
3. Evaluate the usability, functionality, and effectiveness of the game based on the ISO 25010 software quality standards.
4. Gather feedback from educators and students on the educational value and usability of BayaniCard.
5. Identify how the use of BayaniCard can influence students’ knowledge retention and appreciation of Philippine history.

**Significance of the Study**

This research is significant in addressing the gap in how history is traditionally taught in schools—mainly through memorization of facts and dates. By introducing BayaniCard, a game-based educational tool, this study provides a modern, interactive, and engaging way to learn about Philippine history and heroes. It emphasizes not just remembering information but understanding the importance of events and figures in national development.

Beneficiaries:

Students – will benefit from a more enjoyable and interactive way of learning history.

Teachers – will be provided with an additional teaching resource that can help supplement traditional methods.

Schools and Educational Institutions – can adopt innovative approaches in curriculum delivery.

Game Developers and Educational Content Creators – will be encouraged to design more educational tools.

**Scope and Limitation**

User capabilities:

Users (students) will be able to:

Play the game in either single player mode.

Learn facts about heroes and events through the cards.

complete missions related to the historical topics.

Teachers will be able to:

Use the game as a classroom activity or supplemental tool.

Track student progress (digital version only, if applicable).

Limitations:

The game will not cover the entire history of the Philippines.

The digital version requires devices and may not be fully accessible in low-resource settings.

The system will not provide advanced analytics or adaptive difficulty in its initial version.

**Definition of Terms**

BayaniCard – The title of the educational card game developed in this study to teach Philippine history through interactive gameplay.

Game-Based Learning – A teaching approach that incorporates game elements to engage learners and improve understanding.

Philippine Heroes – Historical individuals who contributed significantly to the nation’s identity and independence.

Interactive Learning – A method where learners engage actively with content through participation and feedback.

ISO 25010 – An international standard used to evaluate software quality based on factors like functionality, usability, and reliability.

Educational Tool – Any material or resource used to support teaching and improve student learning.

Engagement – The level of attention, curiosity, and interest that students show while learning.

**Chapter 2**

Review of Related Literature

This chapter introduces the review of literature that the researchers have found. This includes problems that were related to study and a more thorough evaluation of those problems. The researchers use the following keywords for the study, Games in Education, Educational Card games, Cultural Relevance of Educational Games, Interactive Learning.

**Games in Education**

According to Serafeim A. Triantafyllou (2022), the integration of gamification into educational and training environments can significantly enhance learner engagement and motivation, potentially leading to behavioural changes that support the learning process. However, while there is evidence of its positive influence, the overall effectiveness of gamification in strengthening education and training remains inconclusive. In a descriptive literature review, the author analyzed 46 publications from six bibliographic databases using the PRISMA framework. The study explored various gamification-related theories, models, elements, and mechanics that contribute to learning. Furthermore, it identified key challenges, constraints, and organisational factors that can affect the implementation of gamified programs. The findings highlight the need for further investigation into this emerging approach and emphasize that gamification tends to be most effective when it is grounded in instructional design principles that cater to learners’ specific needs and expectations.

According to Liudmila Daineko (2023), the ongoing global transformations in society are reshaping how education is organized, compelling educators to adopt innovative tools that promote active student participation. Among these, gamification has emerged as a powerful method for enhancing pedagogical practices through the application of game mechanics. Daineko’s study presents a systematic literature review focused on various aspects of gamifying education. The review analyzed sources published between 2018 and 2022, selected from a scientific publication aggregator using the keywords "education" and "gamification" in titles, abstracts, and full texts. Through article clustering, the study introduced a six-category typology of the selected research. The review revealed a broad international authorship and a generally positive perception of gamification among educators and learners across all continents. Most studies highlighted an increase in student motivation within gamified learning environments, while also emphasizing the importance of considering individual learning behaviours. The findings support the broader applicability of game-based methods across different educational levels.

According to Nadire Cavus (2023), gamification has gained attention as a promising approach for enhancing user engagement, particularly in the context of online education. Despite the growing body of research over recent decades, there remains a lack of clear classification regarding its specific impacts. Cavus’s study aimed to address this gap by examining how gamification influences the engagement of both students and teachers in digital learning environments. Utilizing a systematic literature review approach guided by PRISMA protocols, the study analyzed 40 high-quality articles published between 2012 and 2022, sourced from databases such as Scopus, ScienceDirect, and Web of Science. The findings highlighted the benefits of gamification in fostering student motivation, creativity, engagement, and academic performance, while also supporting teachers in areas such as motivation, engagement, and feedback mechanisms. The review pointed out that gamification is most commonly applied in higher education settings, but it also identified several challenges in its implementation. Ultimately, the study offers valuable insights intended to help educators and learners effectively use gamification as a tool to improve educational outcomes and create conducive learning environments.

According to Wilk Oliveira (2022), gamification has been extensively utilized to enhance educational systems by promoting positive student experiences such as increased concentration, motivation, engagement, and flow. As research in this area has progressed, there has been growing recognition of the importance of personalizing gamification elements to align with individual learners’ needs, characteristics, and preferences. Consequently, numerous studies have explored personalized approaches to gamification in education. However, findings in this area remain inconsistent and require deeper investigation to clarify their effectiveness. To address this, Oliveira conducted a systematic literature review aimed at consolidating current knowledge on tailored gamified learning. Out of 2,108 reviewed studies, 19 were selected for detailed analysis based on specific research questions. The review revealed that most existing research focuses primarily on adapting systems according to students’ gamer profiles, but often lacks robust statistical evidence, particularly regarding the impact on actual learning outcomes. The study concludes by outlining key challenges and future research opportunities, offering a roadmap to strengthen the development of personalized gamification strategies in educational contexts.

According to Amina Khaldi (2023), the evolution of university teaching methods has led most higher education institutions to adopt e-learning platforms. Despite their widespread use, these digital learning environments often suffer from high dropout rates and low course completion, largely due to insufficient student motivation and engagement. To address this, gamification, which refers to the application of game design elements in non-game contexts, has been increasingly applied to promote student involvement. However, selecting the appropriate combination of game elements remains a significant challenge, as there is no universal design model suited to all contexts. Khaldi’s study offers a comprehensive review of the current landscape of gamification in online higher education, aiming to guide designers and practitioners in building effective gamified systems. Using a systematic literature review method, the study examined relevant articles from Scopus and Google Scholar, focusing specifically on gamification in digital higher education, excluding game-based learning, video games, or face-to-face environments. The findings show that commonly used gamification elements include points, badges, leaderboards (PBL), levels, and feedback, with a growing interest in deeper components such as challenges and storytelling. However, the study also identified a gap: of the 39 reviewed studies, only a small fraction was grounded in motivational theories or used established gamification frameworks. The review underscores a trend toward personalized gamification approaches and notes a research imbalance, with more focus on structural gamification than on content-related strategies.

According to Judy Julieth Ramírez Ruiz (2024), school engagement refers to students’ active involvement in academic, emotional, and behavioral dimensions that are empirically associated with positive educational outcomes. Gamification has emerged as an innovative educational approach, utilizing game design elements to increase student engagement in the learning process. In this systematic review, Ramírez Ruiz examined how gamification has been applied to enhance school engagement in primary and secondary education between 2013 and 2023. Following PRISMA methodology, 90 interventions that met specific inclusion criteria were analyzed. The study’s findings highlight the importance of evaluating school engagement more comprehensively when applying gamification strategies, emphasizing that engagement should not be viewed solely through the lens of motivation and participation. Instead, a more holistic understanding that includes various dimensions of the learning experience is necessary to effectively support teaching and learning goals

**Educational Card Games**

According to Kristina Preidyte (2025), the increasing presence of digital screens in children's daily lives highlights the growing need for engaging and educational alternatives that support healthy development. In response to this, the author suggests that card games remain a timeless and effective option, offering a range of cognitive and developmental benefits. The article explores how these games can help improve children's cognitive flexibility, responsiveness, hand-eye coordination, and numeracy skills. Unlike passive screen time, card games promote active participation, social interaction, and strategic thinking. Preidyte emphasizes that integrating such simple yet stimulating tools into children's routines can contribute meaningfully to both learning and play.

According to Joseph, Antony R. (2024), educators in the health sciences often encounter significant challenges when implementing interprofessional education (IPE), such as scheduling conflicts between departments, insufficient funding, limited leadership support, and faculty members' lack of confidence or preparedness in delivering IPE. Traditionally, higher education has relied heavily on lecture-based teaching methods, especially in nursing and other health science programs that require the delivery of dense academic content. However, some students find this one-way instructional approach to be dull and disengaging. To address this issue and promote more active learning, a growing number of instructors have begun incorporating gamification into their teaching. By using game-based strategies, they aim to create more dynamic, interactive, and engaging learning experiences for students in health-related disciplines.

According to Elvira Gómez (2024), educational games have gained considerable attention as effective learning tools, combining improved academic outcomes with engaging formats that encourage collaboration among peers. Although colloids play a vital role in numerous chemical and industrial applications, colloidal chemistry is often only briefly covered or treated qualitatively in university curricula, typically as a noncompulsory subject. This is despite its wide-reaching relevance in industries such as food production, biomedicine, and paint manufacturing, making it one of the most socially and economically significant branches of chemistry worldwide. As a result, there is a growing need for effective teaching tools that support a deeper understanding of colloidal systems and their properties. In response, this paper introduces an innovative educational game called Colloidal Cards, developed to support the teaching and learning of colloidal chemistry. The game is designed to help students recognize colloidal systems in both everyday life and industrial contexts, and to provide knowledge about the key physicochemical properties that define colloidal systems.

According to Pratchayapong Yasri (2019), chemistry often involves abstract concepts that many students find difficult, which can contribute to negative attitudes toward the subject. Recently, educational innovations such as card games have gained popularity for their ability to engage students both cognitively and emotionally in learning chemistry. This study evaluated the effectiveness of a specially designed card game focused on the periodic table, used with a group of grade 10 students. Results revealed a statistically significant improvement in students’ conceptual understanding after playing the game, as indicated by pre- and post-test scores. Furthermore, the card game fostered a more positive attitude toward chemistry, with students reporting that the game made learning more collaborative, intellectually stimulating, and enjoyable.

According to Jori Skalitzky (2023), researchers at the University of Wisconsin–Madison developed an educational card game called Speciation to make complex evolutionary concepts more engaging and easier to grasp. Designed by postdoctoral researcher Katie Peichel and her team from the Genetics Department, the game teaches players about the process of speciation, which is the emergence of new and distinct species through evolution. Through gameplay, participants experience evolutionary forces such as mutation, natural selection, genetic drift, and gene flow by drawing and playing cards that represent different traits and events, leading their populations toward speciation. The idea for the game originated from the researchers' desire to create a fun, interactive tool that could be used in classrooms, outreach programs, or informal learning environments. It has been tested in educational settings, where feedback helped refine both its mechanics and educational effectiveness. Speciation blends scientific accuracy with playability, offering students a hands-on way to understand how genetic and environmental factors drive evolutionary change over time.

According to Bazrina Ramly (2025), this study explored the effectiveness of an innovative card game titled POS by the Nas as a teaching tool for English language learners studying parts of speech. Recognizing the limitations of traditional teaching methods, the game was developed to offer a more interactive and engaging learning experience. Participants from various proficiency levels engaged with the game, which required them to identify and match different parts of speech through structured gameplay. To evaluate its educational impact, a survey was conducted to measure changes in participants’ understanding and interest. The findings revealed strong positive responses, indicating that POS by the Nas may serve as a valuable alternative to conventional approaches. The study recommends further research into the game’s potential to improve students’ writing skills and its broader applicability across different learning environments.

**Cultural Relevance in Games**

According to Per-Arne Karlsson (2020), this research project centers on the use of narratives and role-play as instructional strategies, drawing from teachers’ practical classroom experiences and their assessments of student learning. The study is grounded in theories from both history education and educational psychology. Its primary aim is to produce materials that support classroom teaching and assessment while also contributing to academic research. Through close collaboration with practicing teachers, the project seeks to generate insights and strategies that enhance the effectiveness of teaching history and other social science subjects.

According to Jorge Oceja (2022), this study presents a systematic literature review conducted using the Scopus database to identify educational projects that have incorporated games in teaching geography and history at the secondary education level. Adhering largely to the PRISMA methodology with some adaptations, the researchers initially identified 255 works. After applying inclusion and exclusion criteria, the sample was narrowed down to 125 relevant studies, which were further refined during subsequent stages. Descriptive statistical analysis of the final selection revealed that most of the identified projects were presented in conference proceedings and primarily relied on custom-made educational games rather than commercial ones. Additionally, many of these projects had not been fully implemented, and when they were, their educational outcomes were seldom evaluated with rigorous methods.

According to Taylor M. Kessner (2022), in response to ongoing interest in video games as educational tools and the demand for more engaging history instruction, some developers have created history-focused video games tailored for classroom use within typical institutional limitations. However, there remains limited empirical evidence on the effectiveness of these purpose-built educational games. Viewing game mechanics as a form of language and drawing from discourse analysis principles, the study conducted a content analysis of the educational game Mission US to assess its support for historical thinking and reasoning. The analysis revealed several game moments that encouraged disciplinary thinking, though few actually required it. Consistent with previous research, the study concluded that such games are most effective when integrated into a broader instructional framework rather than used in isolation. Notably, mechanics like map-based navigation and historically themed trading were identified as particularly promising for enhancing future educational game design. These insights may benefit educators, curriculum developers, and researchers interested in game-based learning in history education.

According to Edward Metz (2022), the project team aims to create an innovative prototype of an educational delivery platform that features several key components: a student interface for role selection in a collaborative game, access to primary historical sources for deeper exploration of various perspectives surrounding a U.S. historical event, and an educator dashboard for monitoring student progress. By the end of Phase I, a pilot study will be conducted involving 60 students across two middle school social studies classes. The study will evaluate whether the prototype effectively supports role-playing and storytelling, assess the practicality of implementing the game in a classroom environment, and measure students’ knowledge gains from pre- to post-test.

According to Acta Educationis Generalis (2024), the study aimed to identify effective teaching strategies that could bridge the gap between theoretical and practical approaches to teaching history. Using a qualitative exploratory case study, researchers engaged 20 K–12 history educators through semi-structured interviews and document analysis. The results revealed that history is most effectively taught when students are actively engaged through innovative activities combined with traditional methods, fostering the development of historical skills. The discussion emphasized the importance of using a variety of teaching strategies, particularly those that promote engagement, creativity, and authenticity, to make historical content more meaningful. Despite challenges with scheduling interviews, the study’s findings offer valuable insights for educators seeking to improve their instructional practices in history or other subjects.

According to Dr. Jim Gigantino (2022), the “Reacting to the Past” series consists of affordable role-playing games based on historical events that aim to teach students content through immersive experiences. Each game varies in length and is built around specific documents and historical contexts, requiring students to take on roles, engage in debates, and collaborate with peers. Before playing, students must complete assigned readings and write a simulation paper that outlines their character’s arguments and position. During the game, Gigantino facilitates discussion, ensuring active participation and encouraging dynamic interactions. Afterward, a debrief session helps students reflect on their learning, link the activity to course objectives, and understand the historical content more clearly. He emphasizes that while students may forget lectures years later, they often remember the lessons they learned through this interactive approach.

According to Marcus Toftedahl (2025), this study explores the practices of indie game developers regarding game localization through fieldwork conducted at two indie studios, one in Sweden and one in China. Focusing on developers who follow a self-publishing model, the research investigates how localization is prioritized and integrated into the development process. The study examines three dimensions: strategic decisions driving localization, the actual development workflow, and product outcomes, using participatory observation. Findings reveal that localization is often just one of many competing tasks and that neglecting to plan for it can negatively impact the final product. The research also introduces an organizational model illustrating how indie studios manage various development responsibilities, whether internally or through external support.

According to Ye Wang (2025), as China’s cultural presence expands in the global market, video game localization has become crucial for enhancing both accessibility and cultural authenticity. Focusing on Black Myth: Wukong, China’s first AAA single-player game, this study explores the complexities of localizing culturally rich and narrative-heavy content. By applying Communicative Translation Theory (CTT), the research examines the English localization of character names, in-game achievements, and dialogues through qualitative textual analysis. It evaluates techniques such as adaptation, simplification, and idiomatic expression. The results highlight both successful strategies and areas needing improvement, providing valuable insights for improving the localization of Chinese video games.

According to Ayaz Karimov (2025), online education encompasses any form of learning that occurs via the Internet. Since the early 2010s, numerous online educational platforms and tools have emerged, offering various learning experiences across different contexts. As these platforms gain popularity, their limitations are becoming more evident, particularly in areas like educational content localization. To localize content effectively, the process involves translating, proofreading textual material, and dubbing the translated text while editing videos as necessary. This process can sometimes take over a year to complete (De la Cova, 2016). In such cases, business process re-engineering can be a valuable approach to optimize the localization workflow (Reijers et al., 2010). This study aimed to achieve two main goals: improving the efficiency of content localization by implementing business process re-engineering, which would reduce personnel involvement and shorten the localization timeline, and enhancing the overall user learning experience on the platform.

According to George Caridakis (2024), video games have become a promising tool for increasing engagement with cultural heritage. However, there is limited understanding of how existing games effectively serve this purpose. This study examined and analyzed 100 video games focused on cultural heritage by adapting a framework that includes 10 key game attributes for comparative statistical analysis of their engagement features. These features included narrative-driven gameplay, information capsules, task-driven learning, ease of play, identity-driven content, open-world exploration, people-centered perspectives, meaningfulness, simulation, and verisimilitude. The analysis showed that while most games included most of the recommended attributes, features like task-driven learning, open-world exploration, and simulation were less common. The findings suggest a valuable opportunity for developing games that integrate these underrepresented features, enhancing immersive and engaging experiences for heritage education. The study also provides a comprehensive overview of current cultural heritage games, serving as a useful resource for developers, designers, and educators in this domain.

According to Ivan Dunđer (2024), the study of linguistics in computer science has become a widely discussed topic, particularly in the context of software localization, which involves the linguistic and cultural adaptation of software products to meet the specific needs of a market. Software localization has seen significant growth due to the rising market demand and the trend toward making computers interact with users in a more human-like manner. This paper focuses on the "linguistic" aspect of localization, specifically the language translation process from the viewpoint of translation studies. It examines how the language assets in video games are translated and adapted to make the game both linguistically and culturally suitable for the target audience. The study offers a systematic literature review of the key localization methods developed over the past four decades, highlighting major challenges related to linguistic and cultural aspects of video game localization. The findings are supplemented by qualitative analysis from a focus group consisting of both academic and professional experts in software and video game localization. The results provide valuable insights for academics and industry professionals, offering a detailed overview of the localization process and suggesting potential areas for future research.

According to Xiangyun Zhang (2025), games, as cultural products, often incorporate cultural elements that can be classified as either indexical or iconic, depending on their connection to real-world cultures. Indexical elements are directly linked to specific cultural references, while iconic elements are more symbolic in nature. This study examines how these elements affect game evaluations through secondary data analysis and three experiments. The results indicate that indexical elements enhance the perception of cultural authenticity more than iconic elements, but do not necessarily lead to higher game evaluations. On the other hand, iconic elements positively influence perceived effort, which in turn improves game evaluations. Additionally, for players motivated by authenticity, indexical elements enhance game evaluations by increasing perceived cultural authenticity. This research contributes to the theoretical understanding of integrating cultural elements in game design and offers practical insights for game developers and cultural product companies.

**Interactive Learning**

According to Juho Kahila (2019), previous research on learning-related digital games has primarily focused on adult participants and their learning outcomes. This study, however, explores children’s perspectives on what they have learned through playing digital games, how these experiences relate to 21st-century skills, and the contexts in which they benefit from such games. Data were gathered from children’s essays, which were analyzed using qualitative content analysis. The findings reveal that children’s learning experiences are often tied to core 21st-century subjects and skills, but they also reported improved physical abilities and sports competencies as a result of digital games. Children indicated that the skills they developed were valuable in the contexts of school, sports, and friendships. The study enhances our understanding of digital games in children's learning by offering insights into their perspectives on how digital games contribute to their development.

According to Ilana Ram (2025), while the benefits of active learning to student experiences are well-documented, there is limited knowledge about its impact in online education, particularly regarding the development of 21st-century skills. This study addresses this gap within the context of online Science, Technology, Engineering, and Mathematics (STEM) higher education. During the Spring 2020 term, 744 undergraduate students participated in a survey about learning design, perceived development of 21st-century skills, and overall course satisfaction. The analysis revealed a connection between various course design elements, such as group work frequency, and the self-reported development of key 21st-century skills. The findings supported previous research by categorizing these skills into communication and collaboration, domain-general, and STEM-specific skills. The study further indicated that active learning designs, including individual work, group work, long-term projects, and synchronous activities, contributed significantly to students’ skill development. Additionally, helping students develop these skills was linked to higher overall satisfaction with the course. The results suggest that active learning activities in higher levels of the Interactive, Constructive, Active, and Passive (ICAP) framework promote greater skill acquisition and enhance student satisfaction, providing valuable insights for course design and institutional support.

According to Evelyne Hoffman (2025), educational games have evolved from being considered optional tools to becoming central components of contemporary teaching methodologies. These games not only support learning but also transform it by integrating play with purpose. Game-based learning (GBL) offers hands-on, immersive experiences that engage learners, enhance critical thinking, and simplify complex concepts.​ In the modern educational landscape, GBL is increasingly recognized for its ability to foster active participation and deeper understanding. By presenting challenges and scenarios within a game context, students are encouraged to apply knowledge in practical situations, promoting problem-solving and decision-making skills. This approach aligns with the development of 21st-century skills, such as collaboration, communication, and adaptability.​ Furthermore, the adaptability of educational games allows for personalized learning experiences. Students can progress at their own pace, revisit concepts as needed, and receive immediate feedback, which reinforces learning and boosts motivation. The interactive nature of games also facilitates a safe environment for experimentation and learning from mistakes, which is crucial for building resilience and confidence.

According to Ryan Pecson (2024), instructional materials are essential tools for delivering quality education, as they transmit competencies and facilitate learning. As education evolves, there is a growing need for instructional materials that are diversified, interactive, flexible, inclusive, and learner-centered. In light of this, Pecson conducted a study to determine the perceptions of educators in various academic institutions regarding the essential 21st-century skills needed in developing instructional materials to support and enhance instructional quality. ​The study employed a descriptive survey design of quantitative research, surveying 39 purposively selected educators from various provinces in the Philippines. The findings underscored the necessity to integrate a broad range of 21st-century skills into instructional materials to prepare learners for modern complexities. Based on expert educators' insights, the study offers a comprehensive list of instructional materials for such integration and highlights the importance of educators' proficiency in selecting and utilizing these materials.

​According to Herlinawati Herlinawati (2024), a study conducted at the Faculty of Education in a university in Pekanbaru, Indonesia, utilized content analysis and descriptive qualitative designs to examine how 21st-century skills, specifically the 4Cs Communication, Creativity, Critical Thinking, and Collaboration are integrated into teachers' term evaluations and instructional plans. The research involved analyzing 54 documents, including 27 term evaluations and 27 instructional plans, and conducting interviews with four teachers to assess their familiarity with and perspectives on the 4Cs competencies. The study employed the Career Technical Education (CTE) Career Ready Practices checklist, a 21st-Century Skills/4Cs rubric encompassing these competencies, to evaluate the collected documents. Findings indicated that teachers' term evaluations and instructional plans incorporated 4C skills at levels categorized as "Not yet reached competency" and "Approaching competency." This suggests that while there is an acknowledgment of the importance of these skills, their integration into teaching materials is still in the developmental stages. The research emphasizes the necessity for teachers to be well-versed in 4Cs competencies to effectively incorporate them into their instructional materials and teaching practices. It advocates for a multifaceted strategy to enhance this integration, including focused professional development, collaboration among educators, support from institutional leaders, and alignment with broader educational priorities and goals.

According to Nurul Istiq'faroh (2024), a systematic literature review was conducted to examine the role of educational games in elementary schools. The study analyzed 20 articles published between 2013 and 2022, focusing on game-based learning and its integration into various educational settings. The research explored aspects such as the level of education, learning models, learning activities, types of research used, use of digital tools, and the impact of games on learning outcomes in elementary schools. The findings highlighted that incorporating technology, particularly educational games, into the teaching and learning process can effectively enhance students' engagement and achievement. The study concluded that educational games, when integrated with various digital tools, were successfully used in elementary schools to achieve learning objectives. This research provides valuable insights for educators and researchers seeking to increase educational effectiveness through the use of technology.