Journal of
Design Studio
v:5 n: 2 December 2023

Assessing Game Design Experience: Insights from Educators in Design Studio Environments

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Research Article / Received: October 25th 2023, Accepted: December 4th 2023
Refer: Coskun, E., (2023), Assessing Game Design Experience: Insights from Educators in Design Studio Environments, Journal of Design Studio, V.5, N.2, pp 279-294.
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DOI: 10.46474/jds.1381361 https://doi.org/10.46474/jds.1381361

Abstract: Although video games, one of the most popular tools of new media, have become an important focus of playing and informal learning, their lack of active use in education is an important phenomenon to be considered. Though researchers have focused on the potential benefits of using games in education and integrating them into curricula, this transition has yet to be effectively implemented. Especially why educators do not use games effectively and make them a part of education is an important situation that needs to be emphasized. Certain problems are mentioned in the literature about the reasons for this situation. The reasons that come to the forefront are that educators have doubts about the benefits of including games in the curriculum, educators do not have enough experience in games and game-based education, and the idea that efforts to include games in the curriculum will not yield the desired results. Well-designed digital games or digital game-based learning environments gain a more powerful and potential structure in terms of education as they offer positioned learning experiences with transferable information and instant feedback, unlike the structure of traditional education that focuses on knowledge rather than doing. In order to see the perspectives of educators and to understand how to create a common framework, this study has identified focusing on the game design experience and educators' approaches and perceptions towards digital game-based learning environments as a research problem. The fact that most of the research in the literature is on student experience supports the approach of the study.

Keywords: Game design, Video games, Design studio, Design studio experience, Educator perspective.

1. Introduction

Raising students as successful and competitive individuals, which is one of the most important basic objectives of education, is affected by social, economic, and global changes, and accordingly, educational approaches take their place in today's world under this unpredictable influence. Creativity is an important concept in the struggle against the unpredictable. The skills possessed by creative individuals enable them to exist in the complex system of life and enable them to emerge as problem solvers. The association of creativity with innovation and success encourages researchers to search for methods of how to use it in solving problems. In this context, design thinking, which is at the center of creative thinking, is one of the ways to solve problems creatively. The inclusion of design thinking approaches that will reveal, nurture and encourage the creativity of students, who are the focus of education, in educational curricula is gaining importance globally. When the studies in the literature are examined, it is seen that although there are various techniques followed by educators, the design thinking approach and creativity are not effectively adopted. Although approaches such as questioning students' assumptions, encouraging idea generation, encouraging risk-taking, allowing mistakes, etc. are used by educators, it

is understood that educational frameworks to support creative thinking are not effectively included. In parallel with this, in a phase where technological developments are transforming very rapidly, the necessity for environments that will nurture design thinking and creativity to be intertwined with technology emerges. As digital technologies show their influence in every field, they have an effective place in the difference in the approaches and understanding of students raised with new media compared to the adult generation. In order to establish a more effective educational infrastructure, it is important to be aware of how students perceive new media, to take into account their habits and to provide students with appropriate learning environments. When we look at the educational processes of students today, it is noticeable that in most educational environments, it is dominant to master the content effectively. In order to master the content, students acquire isolated skills and are obliged to memorize certain facts. This process causes students to spend more time following the instructions given to them and leads to a lack of development of problem-solving skills. Students need open-ended environments where they can develop problem solving skills and experience design thinking and creativity approaches. One of the approaches that can be considered as open-ended environments is digital games (Gee, 2010). The important factors for digital games to be creative educational approaches are that they increase students' intrinsic motivation, have an interactive structure that triggers learning by doing, provide an intrinsic learning experience thanks to their highly interactive structure, and contain environments that allow exploration (Frossard et al., 2015; Gee, 2004; Perrotta et al., 2013; Ke, 2009). The most important point to consider is that digital games offer an effective environment to influence students and make them active participants in the educational process. The environment in which learning takes place in this way can be defined as an active learning environment. An active learning environment is a learning environment in which students learn by doing and use their own knowledge and experiences instead of passive learning (only obtaining information) (Petty, 2009). Digital games offer an interactive and open-ended environment that facilitates active learning. They provide a social platform for players to interact and experience emotional responses. Customized feedback increases engagement, making games an engaging tool for behavioral learning. Player involvement requires careful planning and decision-making, which reinforces cognitive skills. The game provides rewards to the player for their behavior (e.g. points, power, ranking). Such positive feedback in the game can incentivize desired actions and indicate real-world consequences. These consequences are not hypothetical or abstract but are rather directly mirrored in the game. Triumphs and losses are directly linked with the player's actions, offering an exemplary model for the player. The player can learn from the characters in the game and gain an understanding of their behavioral experiences. (Lieberman, 2006). Nevertheless, it's important to acknowledge that there are obstacles to integrating digital games into formal educational environments, including the necessity of finding a harmonious blend between entertainment and education, as well as ensuring their alignment with the curriculum. It is important for educators to explore ways to overcome these obstacles so that open-ended environments can be designed (Frossard et al., 2015).

With digital technologies, new media is no longer a tool, it changes perception patterns and habits and takes its place as a new approach to design thinking. In this context, design education should be able to adapt to developments and gain a dynamic and interactive structure. In order to ensure adaptation, appropriate environments need to be identified and integrated with design education. An in-depth exploration of the possibility of utilizing digital games to promote innovative teaching techniques aids in comprehending the phenomenon of creativity. In this context, it is important to understand how educators experience this process in terms of creating and constructing educational materials. The definition of "Design is to design a design to produce design", which emphasizes that the design process is a search, and that the designer

should experience this search process and be aware of the dynamics, has an important place in terms of understanding the subject to be addressed within the scope of the study (Heskett, 2005). The important thing is to gain continuity in the search process, which is a situation that the designer faces when faced with a decision-making situation among infinite design outputs. Being a continuous search, gaining continuity and having decision-making moments can be considered as the most important elements that shape the design. In this context, it is necessary not to put students into a process where there are definite patterns and generally valid acceptances within the scope of design education. Students' ability to understand the design process, interpret their experiences and gain the ability to represent their thoughts with different tools is a situation that needs to be emphasized. In this context, the design process may have an intertwined and simultaneous structure with feedback at every stage rather than a linear structure. Accordingly, design education becomes a working environment where different methods and approaches are designed and applied together. Developing students' awareness in the process has become a common denominator in today's design education and it is argued that this is achieved through experiential learning. The fact that traditional learning methods still take place in design education is becoming increasingly difficult, especially in terms of keeping students' interest alive and directing their energy to the design process. Environments where the flow of information and the process is slow lead to demotivation on the part of the students and, accordingly, lead to the failure to achieve what is intended in design education. It is an important stage for educators to construct the open-ended experience environment of digital games in line with a content that can be experienced by students and that can be meaningful (Tekinbaş & Zimmerman, 2006). This study aims to provide a framework to understand design educators' approaches to games and game-based learning environments and to reveal how their perceptions are affected. Understanding how games and game design experience affect design educators and their attitudes towards games is important for providing students with an active and dynamic learning environment. For this reason, the study has a flow that aims to measure the approaches and attitudes of design educators instead of students' experiences in game-based learning environments. The study conducted qualitative and quantitative evaluations with design educators. The findings demonstrated that the experience of game design had a positive impact on educators' attitudes, approaches, self-efficacy, and perceptions towards implementing digital games in design studios.

2.Background of the Study

Although video games, one of the most popular tools of new media, have become an important focus of playing and informal learning, their lack of active use in education is an important phenomenon to be considered. Though researchers have focused on the potential benefits of using games in education and integrating them into curricula, this transition has yet to be effectively implemented. Especially why educators do not use games effectively and make them a part of education is an important situation that needs to be emphasized. Although certain problems are mentioned in the literature about the reasons for this situation, the reasons that come to the forefront are that educators have doubts about the benefits of including games in the curriculum, that educators do not have enough experience in games and game-based education, and that their efforts to include games in the curriculum will not yield the desired results. The fact that games are an increasingly popular medium for playing and learning has gained great momentum, especially in recent years. It can be said that one of the main features that provide this momentum is that games quickly draw players into the magical circle of the game and players immerse themselves (Kenny & McDaniel, 2011). Researchers have acknowledged that video games enhance 21st century abilities like critical thinking, social interaction, teamwork, media literacy, leadership, and productivity, and therefore agree on the suggestion that video games create an exceptional informal learning environment (Gee, 2004; Kenny & McDaniel, 2011; Kirkley & Kirkley, 2005; Prensky & Thiagarajan, 2007;

Sawyer, 2007). In the current information age, there is a need for problem solvers who possess new types of skills and competencies, can take initiative, have critical and creative thinking skills, and can effectively manage available resources and tools (Squire, 2005). Despite the need for skills in working with digital media as a reflection of digital media being at the center of major societal changes, most educators focus on content and what to teach rather than understanding the process. This results in the failure of the traditional content-centered approach to learning to capture the excitement and focus of today's learners. The active, interactive, entertaining, fun, instant feedback, and fun activities offered by video games etc. should be considered as alternative approaches (Prensky & Thiagarajan, 2007). Digital game-based learning offers a learning environment for students to cultivate their critical thinking and problem-solving skills, as well as master the skills offered by the information age. It has the potential for effective and powerful learning outcomes (Gee, 2010; Prensky & Thiagarajan, 2007; Shaffer et al., 2005; Squire, 2005).

Well designed digital games and game-based learning environments have the potential to offer a robust structure for education by providing targeted learning experiences with knowledge transfer and immediate feedback. This stands in contrast to traditional education, which often prioritizes theoretical knowledge over practical application. Students learn to effectively use the knowledge and resources provided by the game environment to solve the problems given to them by getting rid of the memorization ritual required by traditional education. This active and involved state in the game environment helps students to acquire the skills required by the information age (Gee, 2010; Shaffer et al., 2005; Yunjo & Bonk, 2009). Despite all these affirmations and the fact that games are an effective media, it is seen that many educators do not include digital game-based learning environments in their teaching (Egenfeldt-Nielsen, 2004; Kenny & McDaniel, 2011). One of the reasons for this may be that educators do not have enough interaction with new media or have never experienced these environments (Prensky, 2001). Even if game environments are designed or developed to bridge the gap and provide the opportunity to develop 21st century skills, educators have difficulties in deciding how to start the process or how to select and use digital games. The involvement of educators in the video game design process and their participation in the game experience is one solution to overcome this obstacle and create a productive learning atmosphere. Effective digital game-based learning environments can be created through collaboration among game researchers, developers, instructional designers, and educators. Their joint efforts are crucial to ensure the success of the process. In order to see the perspectives of educators and to understand how to create a common framework, the study identified as a research problem to focus on the game design experience and educators' approaches and perceptions towards digital game-based learning environments. In this context, the fact that most of the research in the literature is on student experience supports the approach of the study.

2.1.Digital Game Based Learning

Digital games are a system that can be played utilizing a range of digital technologies like computers, mobile devices, and consoles and these games may incorporate different genres. What makes digital games more than just a tool is that they have variable and measurable outcomes, a rule-based structure, a system in which the player struggles, an environment in which the player's choices affect the outcomes, and an environment in which the player immerses himself/herself (Juul, 2003). Digital game-based learning entails harnessing the engaging nature of digital games for educational purposes (Prensky & Thiagarajan, 2007). In this context, digital game-based learning provides a connection between game elements and learning environments. While providing this connection, the balanced use of entertainment and education components is an important phenomenon (Dondlinger, 2007; Nussbaum & De Sousa Beserra, 2014). When evaluating digital game-based learning environments due to their entertainment and educational components, it is necessary to look

at them both as a learning environment and from the perspective of the player.

The reflections of game design experience in design education overlap with the basic principles of design thinking - critical thinking, problem solving skills, creative thinking (Bressler & Annetta, 2022; Akcaoglu & Koehler, 2014; Ke, 2014; Carolyn Yang & Chang, 2013). This is not only true for higher education. Game design experience can be used at all levels of education to provide an environment for design thinking (Gaskin & Berente, 2011; Kalmpourtzis, 2019). When attempting to design a game, students acquire the language of game design. By using this learned language, they engage in a unique thinking process and express themselves creatively. Throughout the game design process, students apply reasoning and problem-solving skills and then put their newfound knowledge to work in developing their own game. One advantage of students acquiring proficiency in game design language is the development of communication skills akin to those of designers (Tekinbaş & Zimmerman, 2006). These skills are a motivating and driving force for students. The combination of motivation, which will enable students to immerse themselves, with the experience of game design as a fun and engaging activity, contributes to the creation of an environment that will ensure effective and efficient learning. Motivation is an important concept to focus on. In an environment where today's students consume every phenomenon presented to them very quickly, it is not always possible to ensure and maintain motivation. The continuity of students' motivation is parallel to the fact that the learning environment is interesting, rewarding, rewarding, and responsive, and that the student feels a sense of ownership (Bressler & Annetta, 2022; Slussareff & Boháčková, 2016). In this context, one of the starting points of the study is to understand what a learning environment whose effects on students are important can mean for design educators. One of the goals of the study is to raise awareness within the scope of designing education plans and creating effective learning environments in the scenario where design educators have the same experience.

Although it is a popular topic to talk about the relevance of digital games to design education and making them a part of design education, design educators' lack of experience with games, their lack of awareness of the pedagogical benefits that games can offer, or their skepticism about games create only a perception of apparent interest. Digital game-based learning environments are not embraced by most design educators. This may be due to a lack of understanding of the resources available in educational environments and a lack of knowledge, insecurity and understanding of how games can be used as design tools. Although digital games seem to be very attractive, the feeling of uncertainty as a medium makes it difficult to use them as a learning environment. At the same time, it is not an easy process for enthusiastic and open to experience design educators to discover which digital games they can incorporate into the design studio. There are not many references on which existing games can be efficiently incorporated into education. Even if there are references according to research and studies, there are even fewer studies on how to include them. Even if design educators want to make their own design games, this poses a new problem in terms of resources, technical knowledge, and time. As a general approach, although the pool of common research on digital game-based learning environments is growing day by day, most of the studies remain on the research report or scientific publication side, causing a question mark for educators who want to actively include them in education. In this context, educators need to be able to recognize where, how and when the games they choose can benefit them. When it comes to games, the complexity, and the experience of the environment to foster learning may differ for each educator. These skills need to be easily accessible if we are to effectively incorporate digital game-based approaches into education. It is important to examine digital games from an educator's perspective (Kirriemuir, 2002; Prensky & Thiagarajan, 2007). Evaluating every game-based learning environment in

terms of suitability is also a time-consuming approach, and for this reason, from the perspective of design education, methods for design educators to use games more efficiently should be examined. What is important here is to ensure that design educators adopt games as a learning environment. If educators do not adopt games as a learning environment, it is not possible to talk about an effective approach. Design educators need to have confidence in their personal ability to use games and at the same time understand their limitations. These two conditions are critical for the adoption of games. At this stage, two different approaches can be used for educators to adopt games: (1) designing a new learning game, complemented with a prototype of a serious game designed by researchers and game developers, or (2) designing a learning environment by utilizing existing games and using the activities, objectives, game-playing experience and information methods provided by the game. Within the scope of the study, it was decided to address the second approach with the knowledge that educators may not have previous game experience and may lack technical knowledge in general. The aim of the study is to make design educators think seriously about how to design a game in line with design approaches and design ideas. The study aims to investigate (1) whether the game design experiences of design educators have an impact on their perceptions towards the use of digital game-based learning environments. (2) Additionally, to what extent did the game design experiences influence the design educators' approaches to incorporating games into their design studios?

3.Methodology

3.1. Course Design and Game Selection

The acquisition of the skills of design educators to use digital games effectively, which is the focus of the research questions, is directly related to the parameters of educators' confidence in using games and their understanding that games have limits as well as potentials. Within the scope of the study, although it is considered an advantage for design educators to have active interactions with games, it is not a necessary condition. It should not be forgotten that most educators do not approach games from the perspective of using them in education. In the study, the focus is on designing a learning environment by utilizing existing games, using the activities, goals, game-playing experience and information methods offered by the game. For this reason, which game will be used within the scope of the research is an important point. Another situation is that design educators experience the game environment as part of the design studio, which is the most important course of the design education curriculum. Since the general structure of the design studio includes in-studio and out-of-studio activities, the games to be used for design studios will contribute positively by enabling in-class and out-of-class use. A game that can be part of a design studio should have features such as creating a sense of reality, creating activities, providing a collaborative environment, enabling experience, having a design construct structure and revealing acquired knowledge (Kuhn, 2001). Playing games is important to develop the game idea. This makes the game-based learning environment unique to the course. Since it is considered a priority for educators to know what games can do, their limits, and to understand what kind of environment they can offer to students, introducing design educators to different types of games has been an important step. The approach we emphasize here is that educators see the concept of game literacy as a part of the process (Becker, 2007, 2017; Egenfeldt-Nielsen, 2004; Prensky & Thiagarajan, 2007; Shaffer et al., 2005). In this context, different games were analyzed and tested by design educators throughout the process (Table 1).

***Table 1**: Games Experienced by Design Educators*

Games Experienced by Design Educators
Minecraft
Civilization
Gone Home
Monument-Valley
Block'hood
Sim city
Euclidean Lands
Cities in Motion
Blockland

Interviews with design educators during the process of experiencing the existing games revealed that the game environment to be selected should support certain parameters to meet the needs of the design studio. In this context, the game environment should have a multiplayer structure, provide real-time feedback, have clear objectives, provide a suitable framework for course instructors, allow interaction, include scenario elements, allow collaboration, include an inventory system, and have a structure that can increase abstraction skills. In addition, the fact that the game includes a self-entertainment activity was also an important factor. In this context, existing digital games were scanned and Minecraft: Education Edition was selected for the study.

Within the scope of the study, design studio instructors were asked to develop a conceptual game design idea that could be a part of the design studio and to build a game environment. Design educators focused on the game design task during the study. In the game design task, design educators were asked to design a game environment where learning could take place for their students. In order to be a pilot study and to be a part of the weekly lesson plan, the study was limited to a 5-week period. 2 weeks of the 5-week period was defined as the preliminary preparation phase. Due to the structure of the design studio, design educators and students come together at least twice a week in the studio environment and interact. Design educators also came together twice a week during the game design experience and the process was followed. In the preliminary preparation phase, the design educators accessed materials related to game design, did the necessary reading and adapted to using the game environment. Considering that there was a total time of 5 weeks and that they would learn new directly applicable knowledge while trying to complete this task, it was inevitable that the game designs would be of a conceptual nature. It is worth noting that the majority of participants had limited previous experience of using games in this way and lacked technical expertise. After the preliminary preparation process was completed, the design educators actively experienced the game design task and the game environment. The design educators were reminded that they were expected to create a narrative that could be a small module of the 14-week lesson plan and develop their game design ideas according to this narrative. It was not foreseen to use any game design software for the game design experience. The educators' possible reasons for distancing themselves from game design experience may include their efforts to learn game software, limited programming skills, or the limitations of game design software (All et al., 2016; An & Cao, 2017). Therefore, the study allowed design educators to experience game design at the conceptual stage. In terms of receiving feedback in the context of the pilot study, the positive reflections of keeping the game design experience at the conceptual stage were observed.

3.2. Participants

Within the scope of the study, design educators were defined as expert designers. This is because their experience in the field of design is longer than that of students. In order to be defined as an expert, it is sufficient for an organization to have staff with a certain

professional function and a certain experience and knowledge for this purpose (All et al., 2016; Flick, 2014). In this context, within the scope of the study, it is prioritized to select design educators with at least a doctoral degree or professional designers who actively continue their design studies. The study was designed as a pilot study on the game design experience and the perceptions of design educators on the use of digital games in design studios. Since it was a pilot study, a small group of 5 experts was selected. The reason for choosing a small group is to provide feedback by making in-depth analyzes and evaluations and to create a framework for future studies.

3.3. Evaluation Criteria

Game design is an important area of user-centered design. The fact that it has become an important area of user-centered design has led to the involvement of more human-computer interaction experts in the process, which has led to the increasing prominence of methodologies that address game design (Desurvire & Wiberg, 2009). There are many methodologies that analyze the productivity of software. Usability testing and heuristic evaluation are examples of these approaches. The priority of these approaches is to make the user interfaces of applications or software understandable, easy to use and help to facilitate tasks. Although these definitions are sufficient for applications focused on a specific task, when games are the focus, additional concepts such as providing an immersive and immersive environment, sufficient challenge, fun, etc. should be considered (Desurvire & Wiberg, 2008, 2009). Heuristic evaluation is an approach that is useful when the boundaries are clear. In the case of games, too many parameters must be considered. Therefore, PLAY, an extended version of heuristics for games, was developed to provide a general framework. In the context of PLAY, heuristic evaluation is listed in four main categories: Game play, game usability, game mechanics and game story (Desurvire & Wiberg, 2009; Federoff, 2003). The principles identified in these four categories were created to help game developers throughout the entire process, especially during the concept design phase. These principles are based on current and past research conducted by game designers (Desurvire & Wiberg, 2009).

Since the study aimed to evaluate the game design experience and the effects of digital games on design educators, evaluation forms were created for experts by using heuristic evaluation criteria. The creation of evaluation forms was considered important to measure the perceptions of design educators towards games and game-based learning environments. In this context, the experts were asked to fill in the forms after the study. The evaluation forms were reconstructed in terms of design education and studio education by taking the heuristic evaluation criteria developed for games as a general framework and transferred to the experts. In this context, the evaluation forms were created in a way to evaluate the games and game-based learning environment experiences of the experts through game environment and play style, game environment and interaction, game environment and mechanics, game environment and narrative. A 5-point Likert scale was used in the evaluations. The evaluation forms are available in the appendix. The evaluation tables based on the intuitive evaluation criteria revealed the perspectives of the experts on the use and benefits of game design experience and digital games in design studios (Table 2).

***Table 2**: Design Educators' Perspectives on the Integration of Digital Games in the Studio Setting*

Perspectives
Digital games have a positive impact on students' motivation in the design studio.
Digital games contribute to students' development of problem-solving skills.
Digital games can help students learn.
Digital games can enhance student interaction and collaboration.
Digital games can aid students in acquiring 21st century skills.
Digital games can provide a meaningful learning environment in the design studio.

Digital games can offer personalized learning environments in design studios.
Digital games can be flexible in design studios according to the needs of students.
Digital games can be utilized to assess the design processes of students.

The study gathered both quantitative and qualitative data as part of its research. Qualitative data was gathered through in-person interviews with educators in the design field, focusing on their experience with game design over a 5-week period and incorporating games. In face-to-face interviews, design educators' perceptions about game design and the use of games and their opinions on whether they can contribute to design education were obtained. Pre- and post-surveys were conducted to measure the impact of game design experience on design educators' attitudes towards the integration of digital games in education. (Table 3).

Table 3: *Design Educators' Attitudes*

Design Educators' Attitudes
Using digital games in design studio interests me.
I am at ease using digital games in design education.
I oppose using digital games in design education.
I am confident in using digital games in the field of design education.
I possess the requisite knowledge and skills necessary for utilizing digital games.
Digital Games are easy to integrate into studio environment.
Using digital games will increase my motivation.

Design educators' attitudes towards the use of digital games were measured using a 5-point Likert scale. Apart from attitudes towards the use of digital games, evaluation forms based on intuitive evaluation criteria were filled out to compare the benefits of digital games in design education. The evaluation forms provided data in terms of revealing the benefits of design educators for the use of games. The absolute minimum recommended by experts for data collection in this type of study is 20 participants per condition. For more comprehensive statistical analyses, the minimum required condition is 30 participants (All et al., 2016). Since the study was envisaged to be a pilot application and to be developed by receiving feedback, collecting detailed statistical data was not determined as one of the objectives of the study. In this context, the interviews, discussions and experiences with design educators were taken into consideration in the preliminary and final surveys, which were evaluated on a Likert scale.

4.Conclusion

4.1.Review and Thoughts

In order to analyze and interpret the results of the 5-week pilot study, the overall average scores were taken into account. Each level of the Likert scale was created by considering numerical values; "strongly disagree" is equal to 1 and "strongly agree" is equal to 5. In the preliminary preparation phase before the game design experience, a questionnaire study was conducted to understand the attitudes of design educators towards the use of digital games in design education. Design educators' attitudes towards the use of digital games were compared by conducting a survey again at the end of the 5-week experience. In addition, the design educators' perspectives on the use of digital games, which were formed by utilizing heuristic evaluation criteria in the preliminary preparation phase, were compared by conducting pre- and post-surveys. Throughout the whole process, design educators were interviewed and asked to share and discuss their experiences, observations, concerns, and approaches.

The questionnaires conducted during the preparation phase and after the game design experience provided an important input to understand the attitudes of design educators towards the use of digital games and to use them as a framework for future studies (Table 4).

Table 4: *Design Educators' Attitudes - Pre and Post Tests*

Attitudes	**Game Tas. Experience Pre**	**Game Tas. Experience Post**
* Using digital games in design studio interests me.	3.60	4.20
* I am at ease using digital games in design education.	3.20	3.60
* I oppose using digital games in design education.	1.60	1.20
* I am confident in using digital games in the field of design education.	3.20	3.80
* I possess the requisite knowledge and skills necessary for utilizing digital games.	3.20	3.40
* Digital Games are easy to integrate into studio environment.	2.40	3.20
* Using digital games will increase my motivation.	3.20	3.60

The overall scores show that design educators' attitudes improved after the game design experience. However, since the small number of experts reveals the necessity of evaluating qualitative data, it is important that the comments made by the experts during the process are consistent with the results. In this context, the comments and contributions made by the experts provided important feedback in terms of creating a framework in the context of design education.

"Although I found the use of digital games as an emerging medium in the design studio interesting, I had concerns about its integration into the studio. This process increased my interest in the use of games in the design studio."

"I am very interested in digital games, but I had previously thought about incorporating them into the design studio, but I could not provide the appropriate environment. The experience of designing games has positively influenced the idea that I can use digital games as a resource."

"The most important phenomenon in the design studio is that students discover how they approach and solve the design problem. This exercise made me realize that there can be new discovery environments in terms of problem-solving approach, collaboration, interactive interaction and designing a learning environment. The experience of designing my own game made me feel that a framework can be created that my students can actively experience."

Although the comments of the design educators, which are in line with the survey results, are positive feedback, the process also revealed certain concerns. Identifying the concerns of the experts created an important framework for studies on the use of digital games in the design studio.

"One of the most common problems students face in design studios is time management. One of my biggest concerns is that students cannot manage their time well in the game environment. The most important reason for their inability to manage time is distraction. The concern that games could distract students in this respect was a situation that haunted me throughout the process."

"The fact that the entertainment side of the work that I experienced during the process can be the main focus for students is a phenomenon that needs to be considered. If students focus too much on the fun side, I think the desired learning outcomes cannot be achieved."

"The fun and challenge factor offered by the games is a motivating force for me and will be motivating for my students. However, I believe that it is necessary to have the ability to use this motivation correctly. If we cannot build the learning environment flexibly, we may not be able to achieve the targeted outcomes. My concerns include whether it can be done without sufficient experience and knowledge, or whether there will be enough time."

Although the experts had concerns, the benefits that the game design experience could provide did not negatively affect the overall ratings by overriding the concerns. In the comments made by the experts, the concepts of entertainment factor, in-game struggle, being motivating, and keeping the interest alive came to the forefront. In this context, the pre- and post-surveys conducted to measure the perspectives of design educators on the use of digital games are consistent with the comments made (Table 5).

The perspectives that the game design experience has influenced the experts' evaluations and that have changed the most compared to the evaluations made before are listed below.

- Digital games can help students learn
- Digital games contribute to students' development of problem-solving skills
- Digital games can provide a meaningful learning environment in the design studio

Among these evaluations, especially the proposition that "digital games can provide a meaningful learning environment in the design studio" came to the forefront, providing important feedback for future studies and creating an effective digital game-based education framework for design educators. The most common concepts used by the experts in the interviews, "fun" and "making it interesting", enabled the use of digital games in design education to be seen as a positive and effective tool from the perspective of educators.

***Table 5**: Perspectives of Design Educators – Pre and Post Tests*

Perspectives of Design Educators	**Game Tas. Experience Pre**	**Game Tas. Experience Post**
* Digital games have a positive impact on students' motivation in the design studio.	3.80	4.20
* Digital games contribute to students' development of problem-solving skills.	3.60	4.20
* Digital games can help students learn.	3.40	4.00
* Digital games can enhance student interaction and collaboration.	3.80	4.00
* Digital games can aid students in acquiring 21st century skills.	3.00	3.40
* Digital games can provide a meaningful learning environment in the design studio.	3.40	4.00
* Digital games can offer personalized learning environments in design studios.	3.20	3.60
* Digital games can be flexible in design studios according to the needs of students.	3.40	3.80
* Digital games can be utilized to assess the design processes of students.	3.20	3.60

In this context, it was found that the experience of game design had a positive impact on the assessments of design educators. The experts shared a consensus that digital games can enhance students' development of 21st century skills and problem-solving approaches, as well as being entertaining and engaging.

> "*One of the most important effects that digital games can provide is that they have a structure that allows students to individualize their learning. This is important as it will enable my students to progress individually and at a pace that will make them feel good. Game design experience helped me develop this awareness. It was very valuable to be able to move at an individual pace and have the opportunity to improve at every stage when designing my own game idea."*

After the game design experience, the experts emphasized that the game design process should be experienced by the educators in order to use digital games effectively in design education. They stated that trying to make digital games directly a part of the design studio by knowing only the theoretical approaches would negatively affect the process.

4.2.Discussion

This study aims to evaluate the use of digital games in design education from the perspectives of design educators and to understand the approaches of design educators. The fact that most of the studies encountered in the literature are student-oriented constitutes the unique value of the study. This study was conducted with a limited number and a small group of participants. In addition to the limited number of participants, another limitation is that the study was conducted over a short period of time. Despite the limitations, the results obtained at the end of the study provided us with important findings within the framework of the use of digital games in design studios. Future studies will be conducted with a larger group of participants to quantitatively verify the findings. In addition, it has been determined as one of the goals of the 2024 academic year that the design experience, which was determined as 5 weeks in the pilot study, will be a part of the 14-week lesson plan and the idea of game design will be taken out of the conceptual stage and put into a feasible framework.

Even though the study was conducted with a limited number of experts, the fact that the experts did not have previous game design experience positively affected their approach to digital games and their attitudes towards their use in the studio environment. The increase in interest in games after the game design experience is an effective factor in the positive effect. It is seen that the average scores increased in the pre- and post-surveys. In the interviews conducted with the experts before the pilot study, it was observed that they perceived digital games only as an entertaining tool; however, this perception changed in the interviews conducted after the study. It was observed that the experts realized that the digital game-based approach has the potential to help students develop higher-order thinking skills and to provide a personalized and meaningful teaching environment for solving design problems. Again, the interviews with the experts provided important feedback when they stated that the game design experience increased the effect in the formation of this awareness. In this context, the most important finding of the study is that educators who want to make digital games a part of design education should make game design experience and conceptual game development stages a part of the education plan. The opinions of the experts are also in line with this finding. Although the experts' perspectives on the use of digital games in design education increased positively after the game design experience, the concerns that emerged in the interviews should be addressed in detail in future studies. Another limitation of the study was the necessity to use an existing game. At this point, it is necessary to create digital game-based learning environments by using game design software. It may be necessary to use this type of software for the implementation of original ideas, as existing games are limited in what they can do. Applications created with game design software will aid in comprehending the approach of digital game-based learning. However, factors such as game design software being complex

systems to learn, technical inadequacies, etc. may negatively affect the digital game-based learning approach. In order to overcome this negativity, it is necessary to first test the conceptual process of digital game design and determine how game designs can be used after the feedback received. Making game design experiences part of the design studio and lesson plan is one of the first steps to overcome this challenge. The common understanding that emerged from the interviews with experts is that the game design experience needs to be actively experimented with in order for design educators to understand digital game-based approaches and make them a part of education. Creating a game design experience framework that can be an active part of design education is very valuable in terms of ensuring the unity of digital games and design education.

Note: N/A
Acknowledgment: In this study, the data obtained during doctoral research in 2019 were utilized.
Conflict of Interest: The author stated that there are no conflicts of interest regarding the publication of this article..
Ethics Committee Approval: N/A
Author Contributions: The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.
Financial Disclosure: The author declared that this study has received no financial support.

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Appendix
ANNEX-A. Evaluation Criteria Based on Heuristics

Game Environment and Playing Style		
Proposition	**Explanation**	**(1-5)**
1	The process of the Game Module was challenging.	
2	If the game module is challenging, you lose interest in the game module.	
3	The Game Module allowed me to achieve the desired goals.	
4	I haven't lost interest in the Game Module.	
5	The fact that the Game Module was not in levels had a negative impact on me.	
6	The lack of a winning element in the Game Module had a negative impact on me.	
7	It was helpful to be given information about the game before trying the Game Module.	
8	The game module offered elements that would enable exploration.	
9	The fact that the Game Module had a framework that did not require expertise prevented it from being fun.	
10	I think I achieved what I wanted in the Game Module.	
11	I think I have control over the Game Module.	
12	The Game Module allowed me to get quick feedback.	
13	The Game Module offered elements that allowed me to dive deeper into the game.	
14	It is important to gain expertise in the Game Module.	
15	The combat in the Game Module provided a positive experience.	
Game Environment and Narrative		
Proposition	**Explanation**	**(1-5)**
1	It is important to have a story (scenario) in the Game Module.	
2	The Game Module must have a defined ending.	
3	Having my character in the Game Module helped me embrace the game world.	
4	I was satisfied with the experience at the end of the Game Module.	
5	There was a change in my feelings (excitement, ambition, winning, etc.) in the game module.	
Game Environment and Mechanics		
Proposition	**Explanation**	**(1-5)**

1	The Game Module responded to the actions you took in response to the design problem.	
2	Seeing the game's own elements in the Game Module had a positive impact on me.	
3	When determining goals in the Game Module, points, expertise, winning, losing, etc. are taken into account. elements should be included.	
4	I think the controls in the Game Module are restrictive.	
5	I think the controls in the Game Module are simple.	
Game Environment and Interaction		
Proposition	**Explanation**	**(1-5)**
1	Game Module provided quick feedback for your actions.	
2	The game module allowed feedback for the actions you took and their consequences.	
3	It is important for you that the interface of the Game Module is simple.	
4	The player must experience the menu as part of the game.	
5	Providing preliminary information before playing the game module made it easier for me to interact with the game module.	
6	I would like to experience the Game Module in multiplayer.	
7	The Game Module's sounds provided meaningful feedback.	
8	The Game Module should be able to appeal to a player with no knowledge.	
9	The structural features of the Game Module negatively affected my design process.	
10	It is important that the Game Module has a simple structure.	
11	Game Module was able to immerse you in the game.	