Would I Use It? A Study with Experts Exploring Game Design Storytelling as a Facilitating Process for Creating Educational Gamification

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Abstract: Educational gamification can improve student engagement, motivation, or performance; however, educators face challenges in aligning game elements with learning objectives. This article presents the Game Design Storytelling (GDS) process, developed to assist professors in creating gamified lessons that integrate game elements with learning objectives. The process uses a narrative structure as a guide for developing the elements, aiming to increase student engagement and motivation. A two-stage study was conducted to evaluate the ease of use of the process. In the first stage, education experts participated in focus group sessions to provide feedback on the process. Based on this feedback, an improved version of the process was developed. In the second stage, this new version was evaluated by more experts, who provided positive feedback on the implemented improvements. The results indicate that experts felt more inclined to use the new version of the process, with some expressing a desire to use the gamification generated in this study.

1 INTRODUCTION

Gamification aims to motivate students by integrating game elements, such as leaderboards, badges, and more, into academic environments, promoting participation to improve knowledge retention (Majuri et al., 2018). However, gamification can adversely affect student behavior, such as a lack of interest in the applied content, low interaction, and more (Hanus and Fox, 2015; Toda et al., 2017). A possible reason is that professors and instructors face difficulties in developing and implementing gamification proposals that connect game elements and learning objectives to the designed world, mainly due to their limitations and the overload of daily activities (Pernelle et al., 2021; Araújo and Carvalho, 2022).

To support the incorporation of gamification in the educational context, some tools have been developed, such as (i) *Kahoot!*, which creates interactive quizzes for dynamic reviews (Tan Ai Lin et al., 2018), (ii) *Classcraft*, which combines game elements with traditional teaching to reward positive behaviors and improve academic performance (Paiva et al., 2022), and (iii) the Palomino (2022) framework, which is centered on narratives and evolves to elevate the educational experience through gamification focused on the user experience.

In order to support the implementation of gamification in education, Bernardo et al. (2021) propose a process that allows creators (professors or instructors) to design gamified environments through personalized themes, challenges, types of activities, and assessment methods according to the needs of students. The process guides educators in creating gamified experiences for their classes through nine steps, covering everything from conception, theme development, missions, and scoring rules until the finalization of the proposal. However, professors did not evaluate the process; with their classroom experience, they could offer insights for improvements and adjustments.

Based on this, this article presents the results of a two-stage study that evaluates the ease of use of

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the Game Design Storytelling (GDS) process when applied to educational contexts. Education experts participated in evaluation sessions, where they provided feedback on the proposed process through a focus group (Kontio et al., 2008). As a result, the experts' opinions and suggestions served as a basis for improving and adapting a new version of the process, containing response selection forms and the automation of the generation of the gamified lesson project through ChatGPT[1].

2 GAMIFICATION IN EDUCATION

Gamification uses game-based mechanics, aesthetics, and thinking to engage people, motivate action, promote learning, and solve problems (Kapp, 2012). When applied to the classroom context, gamification can be an approach that uses game elements, such as boards, levels, *rankings*, and challenges, to help to engage and motivate students (Deterding et al., 2011), making it possible to transform monotonous tasks into more stimulating activities, to encourage student participation (Majuri et al., 2018).

Studies show that gamification can aid in academic performance and student participation in the classroom (Pimentel et al., 2022; Sousa-Vieira et al., 2021). Prieto-Andreu et al. (2022) conducted a systematic review of the literature on the relationship between gamification, motivation, and learning, and evidence that the correction of game elements, such as badges, leaderboards, and points, have a positive effect on student motivation and performance in educational environments, in addition to promoting a more positive attitude toward learning. However, the use of gamification as a learning strategy is still a challenge for education, as it lacks methodological rigor (Sailer and Homner, 2020) and/or tools that provide support for applicators to design their strategies (Araújo and Carvalho, 2022). To develop educational gamification that meets learning objectives and structures the instructional content well, gamification enhances instruction rather than replacing it (Landers, 2014).

A gamification design should begin with identifying desired learning outcomes and selecting game mechanics that align with these goals (Kapp, 2012). Include mechanics like group missions and friendly competitions to promote collaboration. In addition, assessment is a crucial part of the gamification process. It is important to measure academic performance and factors such as satisfaction, motivation, and student behavior during gamified activities (Sailer et al., 2017).

Considering the combination of instructional design with the gamification proposal, one alternative is to use processes or proposals for implementing educational gamification that simplify and optimize the planning of teaching activities, making them interactive and engaging for students. Some proposals to support gamified learning can provide structures that help professors practically integrate game elements into their classes without requiring much time and resources, promoting a more dynamic and stimulating learning environment.

2.1 Proposals to Support Gamification

An example of a tool that supports learning through gamification is *Kahoot!*[2], which allows the creation of interactive quizzes and question-and-answer games. Educators can create curriculum-based challenges and engage students in friendly competitions, making the review and learning process more dynamic and fun. However, *Kahoot!* focuses mainly on applying gamified elements without including specific mechanisms for the continuous evaluation of the impact of these elements on student performance (Tan Ai Lin et al., 2018).

The *Classcraft*[3] platform is an educational platform that combines game elements with traditional teaching to create a more motivating learning experience for students with a theme. Professors can reward students for good behavior and academic performance, while negative actions can result in losing health points (*HP*) from student characters. Paiva et al. (2022) conducted a study using the gamified platform Classcraft to evaluate how user experience (UX) and usability influence the acceptance of this tool in the educational environment. The study aimed to investigate the factors that affect student motivation and engagement in gamified learning activities. An empirical experiment was conducted with high school students, in which aspects related to the UX and usability of the platform were evaluated. The methodology included applying the AttrakDiff model, which measures an interface's pragmatic quality, hedonic quality, and attractiveness. The results indicated that, despite positive expectations regarding gamification, students found the interface unattractive, with insufficient visual elements to keep them engaged. Furthermore, the data collected indicated low usability and limited stimulation, demonstrating that gamification does not guarantee the acceptance of an educational

[1] https://chatgpt.com/

[2] https://kahoot.com/

[3] https://www.classcraft.com/pt/

platform if a good user experience does not accompany it.

The Palomino (2022) framework, centered on narratives, aims to assist in the learning and experience of students, proposing to encompass four components: narrative establishment, narrative-based structure, customized approach to the gamification journey, and an application ontology. Analyzing these components through empirical studies, user testing, and conversations with experts, indicates that the logical combination of game elements can elevate gamification from a simple application to a relevant experience.

Unlike previous proposals, this paper presents the evaluation and improvements in a gamification process. The process helps to develop game elements and learning objectives through a game design proposal integrated with the narrative structure. It allows the creation of the gamified environment through the selection of the most appropriate theme, the definition of the challenges to be faced, the types of activities to be applied, criteria for evaluating the performance of the participants, and combining this and other information in a narrative specific to the project.

3 THE GAME DESIGN STORYTELLING PROCESS

With the plot (narrative) as the backbone of the Process, GDS proposes a pattern of events in a timeline format[4]. In each stage, the user/student is the main hero of the gamification. To do this, the creator must look at the narrative from the same perspective as the user, being aware of the order of the events, experiences, and elements will be structured in a logical sequence of events, creating a plot that the user can follow (Bernardo et al., 2021).

In the **Introduction** phase, the player is introduced to the game through the story, scenario, and rules, essential elements to engage players, obtained through research on the target audience. Moving on to the **Routine** phase, aspects of the player and their daily activities are outlined, immersing them in the character's story, social role, interpersonal ties, hierarchies, and motivations to get involved in the game.

In the **Event** phase, villains, drastic changes, challenges, and barriers are explored to take the player out of their comfort zone, indicating danger. In the **Call for adventure** phase, elements that support the hero's journey are introduced, such as missions, learning objectives, desires, needs, obstacles, hero identity, rules, and collectibles. It is suggested that a map of phases/missions, a personal or team identifier, a visual scoring system, and a repository of gains be included to arouse the player's curiosity.

In the **Daily journey**, the player faces missions proportional to the number of content classes, involving progress in tasks and application of motivating elements. It is recommended that elements such as learning objectives, mission names, player objectives, challenges, and game elements be included to maintain progress.

In the **Final Challenge**, players face the most significant obstacle (*boss*), exploring the villain/cause to the fullest and connecting it with elements of the journey, generating *flashbacks*. Players apply the content learned and receive tips to overcome the challenge. After "defeating the Boss", participants complete their journey in the **Finalization** and are rewarded according to the scoring system and the leaderboard. After overcoming the obstacles and being decorated, players can return to their world or continue as expected.

Two complementary documents facilitate the practical application of the Game Design Storytelling Process (GDS) in educational settings. The first is a tutorial[5] for educators, which provides a step-by-step guide on how professors can gamify their lessons using the GDS framework. The second is a comprehensive guide[6], offering detailed instructions on designing a gamified experience based on the process. These resources provide practical insights and examples to support educators in implementing gamification in their classrooms. Both documents can be accessed through the links provided in the footer of this page, ensuring readers have direct access to the complete materials for further exploration.

4 METHODOLOGY

For this research[7], we adopted the methodology described below in Figure 1.

1. Focus Group. In the first Stage, we organized a focus group (Kontio et al., 2008) with five professors. These participants were selected based on their experience in Computer Science education and their interest in this research. During this session, we presented the process and examples of its application, including the tutorial described in Section 3. The group of four

[4]Process: https://encurtador.com.br/PLJnA

[5]Tutorial: https://encurtador.com.br/e3Fll

[6]Guide: https://encurtador.com.br/LIrrr

[7]This project is supported by the Ethics Committee, according to the approval of CAAE: 81543724.5.0000.5020.

Figure 1: The research methodology consisted of four stages: a focus group, identification of process improvements, implementation of improvements, and evaluation of the new version of the process.

women and one man discussed the process, identifying strengths and weaknesses regarding its applicability in the classroom. A moderator facilitated the discussions, presenting targeted questions and recording them through audio and transcriptions.

2. Identification of Process Improvements. The main improvements were identified based on feedback collected during the focus group. The analysis highlighted the need for adjustments, particularly in simplifying certain steps and developing support materials to assist professors in updating the use of the proposed tool. Data were organized into spreadsheets and analyzed qualitatively, with suggestions and criticisms categorized for future implementation.

3. Implementation of Improvements. After identifying potential improvements, there was a GDS update to optimize its usability, focusing on reducing the time and effort required to create gamified projects. Although the number of steps remained the same, new support materials were introduced, including two forms that allowed creators to select predefined options instead of manually writing details. The first form covered themes, assessments, types of feedback, challenges, and rewards, while the second focused on mission design, enabling the creation of personalized missions. These forms simplified the process, reduced complexity, and automatically forwarded responses to users for easy reference.

We identified that creating narratives for gamification was a significant challenge for educators, many reported a lack of time and difficulty in creating stories. To address this issue, ChatGPT[8], an artificial intelligence tool capable of generating texts based on specific prompts, was proposed as a means of assisting professors in creating narratives for gamification more efficiently.

4. Evaluation of the New Version of the Process. In the final Stage, the new version of the process was used and evaluated by eleven experts with experience in teaching computing. Five of the experts had previously participated in the focus group, while the remaining six were professors who volunteered for the study. Participants received the revised process proposal via a link (presented in Section 5.3). After submitting their responses through an online form, the gamified content was generated using ChatGPT and subsequently shared with the experts for evaluation. After analyzing the result of the generated gamification, a satisfaction survey was conducted to gather user feedback.

One of the professors liked the gamification generated and decided to apply it the following week in one of his Requirements Engineering classes. The results of this application are published in Bernardo et al., (2025) .

5 RESULTS

In this section, we present the results of the activities described in the previous section.

5.1 Focus Group Results: Experts' Perceptions of the Process

The experts here, referred to as ExpX, were initially presented with the steps of the GDS process (Section 3) and the important elements for understanding each of them. Afterward, the moderator asked the participants,: "Would you use this process to gamify your classes?" and asked each expert to express their opinions. Table 1 describes the experts' opinions.

In general, the participants expressed concern about the length of the process, considering it long and tiring. Points such as "the lack of time to dedicate to filling out the steps in detail, due to the workload" led to suggestions for shortening the process. Another point highlighted was the lack of ability to create narratives, which is a key element in gamification through the GDS process.

[8]https://chatgpt.com/

Table 1: Focus group: expert opinions.

Expert	Comments
Exp1	"This process is very long, just thinking about answering each step, I would have already given up".
Exp2	"I teach a lot of classes, it would take a long time to transfer my entire lesson plan to this proposal, I don't have all that time.".
Exp3	"If it was smaller and more objective, I think it could work, but I wouldn't use it because of its size.".
Exp4	"I don't have the creativity for creating stories.".
Exp5	"We have to find a way to optimize this, it's a very large and detailed process, I feel lost.".

The experts were then asked what could be done to improve the process. Table 2 presents the improvements suggested by the experts.

Table 2: Focus group: suggestions for improving the process.

Expert	Suggestions
Exp1	"Could summarize the questions, reducing the number of questions as well".
Exp2	"Look, it would be interesting if, instead of writing things down, I could just select them".
Exp3	"Have you ever thought about making a light version of the process, with just a few fixed game elements?".
Exp4	"Have you ever thought about doing something with short descriptions of what it is to do?".
Exp5	"There could be examples of ready-made gamification for the professor to base themselves on when creating their own gamification".

The participants expressed their ideas related to improvements that could be made regarding reducing steps to reduce the complexity of the process, improving the descriptions of each step, and giving examples of answers for the designers to base themselves on.

5.2 Identification of Process Improvements

Considering the experts' suggestions, the process was changed. Instead of the professor having to write each step using hints, questions were created for each of the nine stages of the project composition without going into excessive detail to avoid complexity.

However, even with the reduction, Expert 2, who was the participant who volunteered to continue giving feedback after the focus group, considered that it would still be too much work to have to answer each of the steps, which was not attractive for a professional with multiple classes and little time available. After analyzing this possible idea for change, Expert 2 indicated that, for him, the most practical thing would be to "not have to write anything, just select the answers".

After identifying improvements, a new version of the process was designed, taking into account the suggestions for reducing the GDS process, and precisely Expert 2's suggestion of providing a selection of possible answers for each question.

5.3 Implementation of Improvements

Based on the improvements suggested by the experts, a new version of GDS was developed with the aim of optimizing the execution of the steps. Although the number of steps in the process remained the same, the inclusion of the support material made it possible to reduce the time needed to create the gamification project. More specifically, the changes implemented included forms with the possibility of selecting answers and the integration with ChatGPT version 3.5[9] to assist in creating narratives, as follows.

5.3.1 Proposal for Filling out by Selecting Answers

Instead of requiring the gamification creator to manually complete each step of the process, forms were developed that allow filling out using selection fields.

The first form[10] presents the creator with suggestions related to themes, evaluations, feedback, challenges, awards, and other gamification possibilities.

The second form[11] concerns missions, allowing the user to create as many missions as necessary. It is possible to select the desired elements to be applied in the missions, such as type of evaluation, feedback, challenges, score, and other elements that make up a mission. For example, if you want to apply GDS to a single class, you only need to complete the mission form once to create the corresponding mission. On the other hand, if you want to gamify three classes, you need to fill out the form three times or more, as needed.

Both forms will be sent by email so that the creator can respond. As soon as you respond to each form, your answers will be forwarded to your email,

[9] https://chatgpt.com/

[10] First form: https://forms.gle/fxphzHTeWGVofWsg9

[11] Second form: https://forms.gle/r7UM34zFpGxZRXvq8

as a way to help you consult the items previously answered and selected.

5.3.2 Integrating ChatGPT into the Process

During the focus group, Expert 4 reported the need for creativity to integrate the selected information into a narrative. To minimize the problem, Expert 2 recommended using ChatGPT to use the responses from the forms and develop a gamified proposal.

We conducted tests using prompt engineering with ChatGPT to enhance creativity during narrative construction. A document containing the evolution of *prompts* is available for consultation[12].

To test the results of the gamification generated with the support of ChatGPT, the participant was a high school professor who intended to gamify his classes but did not have time to learn gamification methods and did not feel creative enough to create a proposal for such an activity.

A proposal[13] was made available to the professor that present the result obtained with the application of the command prompt that uses the structure of the original process and the answers selected by the professor from the forms about the world of gamification[14] and creation of missions[15].

If the user prefers to develop their plot, he can use the traditional process. However, if you want to automate this task, you can use the command prompt in ChatGPT or another generative AI that supports this prompt.

5.4 Evaluation of the New Version of the Process

To obtain feedback on the new proposal for applying the gamification process, an evaluation was carried out with eleven volunteer participants in an unmoderated format (executed with the participant alone without the presence of the moderator), where all of them generated gamification proposals for the classroom, using topics that they usually teach in their computing disciplines.

The procedure carried out had the following steps:

(i) brief explanation about the new version of the process via a text message;

(ii) time for the experts to answer the new forms based on the process to specify details of their gamification. For this test, everyone had to create a gamification of just one mission;

(iii) the participants received and analyzed their gamification project proposals generated based on the responses to the forms;

(iv) At the end, a satisfaction survey was conducted with the users.

The results generated by the experts[16] helped provide *feedback*, as shown in Table 3. The experts unanimously recommended the process to other professors, highlighting that the system facilitates the creation of gamification.

Table 3: Feedback on the new version of the process.

Expert	Participants' comments
Exp1	I saw the potential of the process to increase student engagement.
Exp2	I consider the process easier and more interesting to apply in the classroom.
Exp5	I highlight the simplicity and speed of the process.
Exp7	I enjoy facilitating the creative process and creating an engaging class..
Exp11	I recommend using the process because it makes the professors job easier.

Despite the positive feedback, some experts also pointed out opportunities for improvement. Expert 1, for example, highlighted that the gamification generation stage could be better integrated into the first phases of the process, making the flow more cohesive. Expert 2 mentioned the need to establish a minimum and maximum number of choices in specific options to prevent the professor from creating a too extensive dynamic or with too few elements, which could impact practical application. The Expert also suggested including example scenarios or a brief explanation before starting the form so the professor can understand what will be generated at the end.

Other experts raised questions about the clarity and detail of the instructions provided. Expert 3 suggested including a more robust initial explanation of the process, which would better contextualize the use of the form. Expert 4 suggested adding help buttons to guide users unfamiliar with specific gamification terms. At the same time, Expert 5 recommended creating a manual with examples that could clarify items that seem similar or overlap in the form. In addition, he highlighted the need to include more detailed feedback for all types of challenges in the process.

Some experts, such as Expert 10, highlighted that using forms, although functional, can harm the interaction experience. The suggestion was to create a more contextual environment, with graphics and visual elements that would facilitate understanding and the creation of the artifacts necessary for gamification.

[12]Prompts: https://encurtador.com.br/7wWcu

[13]Proposal: https://encurtador.com.br/vWIX4

[14]Response 1 Form: https://encurtador.com.br/0AFUt

[15]Response 2 Form: https://encurtador.com.br/YKjIx

[16]Results: https://encurtador.com.br/mxuuB

Finally, Expert 11 suggested testing the process with professors from other areas of knowledge to provide a broader perspective on the tool's applicability in different educational contexts.

These points of improvement indicate that, although the new version of the process has made it easier to create gamification, there is still room for adjustments, especially in terms of ease of use, clarity of instructions, and visual and contextual support.

To support the validation of the process, incorporated quantitative metrics to provide data on the ease of use and adoption of the proposed improvements by participants. The metrics collected during the study were:

- **Time Reduction.** The process time has been reduced from 120 minutes to 7 minutes. Previously, users had to stop and develop the entire gamification proposal manually, but now they only need to select the relevant options in the form, making the process much faster.
- **Recommendation Rate.** 91% of participants stated they would recommend the process to other educators.
- **Adoption Rate.** 73% would apply the process in their classes.
- **Average Satisfaction Score.** 4.2/5 average satisfaction rating from participants. 85% rated the process as "easy" or "very easy" to use.
- **ChatGPT Efficiency.** 100%. Percentage of participants who found ChatGPT helpful in creating narratives.

6 CONCLUSION

This study held a focus group with five computer science experts to evaluate the GDS process. We developed a new version after identifying the original process's limitations and potential improvements through the focus group. This version incorporated the suggestions for improvement to make it more practical and accessible. The complexity of the process was reduced, and a response selection system was also incorporated to facilitate the completion of the steps, as suggested by one of the experts. In addition, ChatGPT was integrated into the proposal to help create narratives, offering creative support so that professors can develop gamification proposals practically. The new version of the process was subsequently reassessed.

After implementing the suggested changes and introducing a more simplified method for completing the process steps, the experts were receptive to the new version of GDS process.

The accessibility of the new version of the process was evidenced by the positive feedback from the experts when presented with the results generated by ChatGPT, reducing a favorable perception regarding the usefulness of the automated approach. The suggestion to use ChatGPT to gather information and develop gamified proposals was also well received, demonstrating a willingness to adopt new technologies and approaches in the classroom.

However, there is still room for adjustments, such as including limits on selection options, improving the clarity of questions, and integrating more specific feedback. Although ChatGPT has demonstrated the potential to automate the generation of narratives, alleviating part of the workload for professors, its use still requires validation by the professor. With these improvements, the process aims to assist in a practical and helpful way in implementing gamification in educational environments.

It is important to list three limitations of this research as threats to validity:

1. A limited sample of experts because although they provided important feedback, more participants would be needed to obtain a more comprehensive view of the feedback.
2. The lack of a practical application test for the projects generated a more extensive evaluation.
3. The selection of experts only from the computing area since the application with professionals from other areas can result in different views and feedback, knowing that professionals from the computing area have daily experience with issues such as process detailing and structure.

Some experts have highlighted the GDS process's potential to test beyond computer science disciplines. While this study focused on computer science educators, future research could explore how can adapt GDS process to various fields of knowledge. For instance, history classes could use narrative-based gamification to bring historical events to life through engaging storytelling. Similarly, biology educators could employ game elements to simulate ecological challenges, engaging students in solving real-world problems. This broader applicability underscores the versatility of GDS, suggesting that its narrative-driven framework could enhance learning experiences across different disciplines. A future longitudinal study could assess the impact of GDS on student learning outcomes in the long term.

In future work, an experiment will be conducted to evaluate GDS as a process to support the creation of gamified classes. This experiment will compare students' performance in gamified classes supported

by the GDS process versus traditional classes. The research will be conducted with professors and undergraduate students of computing courses. More in-depth studies should also be conducted to evaluate the use of ChatGPT and other AI tools in education, including quantitative analyses to measure the impact of the narratives generated on student learning.

DATA AVAILABILITY

The dataset and the material used in the research, such as the forms, GDS guide, material produced by the experts and others, are maintained as an open source project accessible at:

https://doi.org/10.6084/m9.figshare.27740928

If you have any questions, please contact one of the authors.

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