Learning as a Quest: A Novel RPG-Inspired Gamification Method for University Course Design

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Abstract

This paper presents a novel method for applying gamification in university course design to enhance student engagement and allow flexible development paths. Inspired by RPG video game mechanics, the method incorporates six structural elements—main missions, side quests, boss fights, character development, specialization paths, and downloadable content (DLC). The approach was evaluated through surveys and grade analysis from 9 years and 526 students. Results show increased student satisfaction, better grade distributions, and stronger alignment with individual learning paths. The average final grade significantly increased ($p < 0.001$) from 4.22 ($CI = 0.09$) to 4.40 ($CI = 0.05$) thus confirming that the method had a positive impact on student performance.

Keywords: gamification, higher education, student engagement, instructional design, usability evaluation.

1. Introduction

The term *gamification* (also referred to as *gameful design*) emerged around 2004. It refers to the application of game design elements in non-game contexts [3]. The goal of this approach is to increase engagement and focus while performing specific tasks. Although the term itself is relatively new, its components have been successfully used previously. A commonly cited example is the Boy Scouts of America, where badges are awarded for completing certain activities (representing acquired skills) [2]. This technique has been in use since 1910. The obtained badge can be proudly displayed to peers, confirming an achievement and increasing the sense of social acceptance. This aligns with Social Comparison Theory, which posits that individuals assess their skills by comparing themselves to others [2]. Today, gamification is successfully implemented across various domains including business, education, human resource management, and customer service. According to studies [8, 9], applying gamification can increase the acquisition of new skills by 40%. Simultaneously, it raises participant engagement, satisfaction with achieved results, and the overall process experience [5], [16].

The objective of this project was to develop a modern teaching methodology utilizing gamification in the learning process. Preliminary testing over the past few years has confirmed the effectiveness of this approach. Students highly praised the introduced changes, especially the transparent course structure, knowledge-complementing activities, continuous progress tracking, and the modular and flexible assignment selection aligned with individual development paths. The main contributions of this paper to the field of gamification in education are: introduction of a structured RPG-inspired gamification framework; integration of gamification with individualized student development paths; the use of skill trees and level systems enhances motivation, transparency, and monitoring of student progress; empirical validation of the method's

effectiveness trough statistical analysis of academic grades across nine years; as well as a proposal of a fair, time-based grading system.

The paper first introduces literature review of current studies in designing gamified courses. Than the theoretical foundations of gamification are presented with the RPG-based metaphor structuring the educational method. It then details the practical application steps, including visualization and grading schemes. Finally, the method is evaluated through student usability surveys and academic performance analysis, confirming its effectiveness and scalability.

2. Current studies in designing gamified courses

Over the past few years, gamification in education has garnered substantial attention across a range of academic disciplines. Numerous studies demonstrate its potential to enhance engagement, motivation, and learning outcomes. Gmińska and Sokołowska present a comprehensive analysis of gamification in accounting education, emphasizing its role in promoting consistency and engagement across diverse learner profiles [6]. Romero Rodríguez et al. examined the use of serious role-playing games in engineering education [14]. The study found that while prior exposure to specific games slightly reduced perceived fun, overall motivation and academic performance improved significantly. Prior gaming experience had no notable influence, confirming the games' effectiveness for a broad student population. Martín-Rodríguez and Madrigal-Cerezo conducted a systematic review on technology-enhanced pedagogy in physical education, highlighting gamification as a key factor in increasing student motivation, engagement, and promoting lifelong learning behaviors [11]. Their findings demonstrate that gamified approaches consistently improve not only participation rates but also the quality of learning outcomes. Vásquez et al. used a mapping review to assess gamification as a motivational strategy in virtual onboarding processes in higher education [19]. Furthermore, Tabrizi et al. examined the adoption of gamified methods in surgical education, underlining benefits for skill acquisition and learner autonomy in clinical environments [17]. These studies underscore a growing consensus: when designed and implemented thoughtfully, gamification is not only a motivational tool but a structured educational strategy with cross-disciplinary applicability.

An approach to designing gamified courses is presented by Gallo as implementation of gamification as a strategy for teaching research competencies (action-research) to Social Work students [13]. The course includes components such as a scoring system, missions and levels, and collaborative storytelling that enhance the process of reflection and self-assessment. It was based on an iterative approach that integrates feedback and metacognitive elements, making it a reference model for designing courses that teach practical and analytical skills. The methodology combined qualitative and quantitative approaches proving increase in student engagement and critical ownership of the learning process was also observed. In another example, Huang et al. discuss the use of gamification in flipped learning (which can be defined as the application of digital game elements in non-gaming situations to motivate user behavior) [7]. This study covered the use of badges, leaderboards, visual progress trackers and levels. A comparison study was conducted, showing taht the students in the gamification-enhanced flipped learning group produced higher quality results than the non-gamified flipped learning group and scored significantly higher in the post-course test than did their non-gamified counterparts. In contrast, an interesting overview of research in this area up to 2017 is provided by Dicheva et al. where 51 empirical studies of gamification in education were analyzed [4]. The conclusion of this review, in addition to the recurring need for new educational methods, was the lack of universal methods for implementing gamification in the educational process and evidence of the long-term benefits of such an approach. The solution to these problems is presented in this article.

3. The Video Game Narrative Metaphor

The core idea behind the method is based on a metaphor derived from the gameplay style found in a Role-Playing Games. In such games the storyline and narrative context often play a significant role, and the character development of the protagonist, controlled by the player, is deeply embedded within that narrative. To uncover successive segments of the storyline, the player is motivated to enhance their character's abilities. Thus, to reveal the entire story and complete the game successfully, the player is compelled to continuously improve the controlled protagonist. Furthermore, each success within the game is typically rewarded with opportunities to strengthen the character's skills, attributes, equipment, and so forth. This design philosophy aligns with the principles of the *Need Achievement Theory* [12] because the gamified course structure systematically rewards incremental accomplishments, thereby aligning with the theory's emphasis on motivation driven by the desire to achieve and demonstrate competence through task mastery.

The primary components of the video game narrative metaphor, which will be transferred to the educational process as six pillars of the methodology described in this paper are: main missions (storyline) — mandatory, side missions — optional, boss fight, character development, character classes (specializations) and Downloadable Content (DLC). The first two pillars can be found in various forms in the existing literature on gamification. For instance, the effectiveness of introducing tasks or missions into the learning process is discussed in [16]. However, this method goes significantly further — it elaborates on these two pillars in more detail and proposes four additional ones, along with guidelines for their practical implementation and tools that facilitate their deployment.

Main missions are mandatory for completing the game. They form the core of the gameplay, ensuring that any player who finishes a given game has necessarily completed these objectives. In the educational process, this analogy refers to the most essential knowledge and essential skills that a student must acquire in a given course to pass it. In other words, it defines the minimum content that all participants must master to receive a passing grade. This analogy has an additional advantage — it enables clear tracking of progress. If we know how many main missions there are and how many we've already completed, we know where we stand on the path to success (course completion). In gaming terminology, this is referred to as *game state*. Good design practice suggests that it is critical for the player to always have access to this information. At any moment, they should be able to answer: *Am I winning? Is what I'm doing moving me closer to victory? What percentage of tasks have I already completed and how many remain to be completed?*

Side missions typically expand the player's capabilities or provide access to enhanced equipment, narrative content, or background lore. In education, these refer to detailed exploration of specialized topics. Unlike main missions, they are not mandatory for course completion but positively influence the final grade (e.g., elevating a passing grade to a best possible one). Side missions must often be completed after specific main missions. This reflects a foundational learning structure — students must first master the core material before tackling advanced or extended subjects.

Most games conclude with a final, climactic battle against a *boss*. This **Boss Fight** represents a synthesis of previously acquired skills and serves as a final test of the player's mastery. Without sufficient development, defeating the *boss* is nearly impossible. Similarly, in academia, the *boss* is the final exam or evaluation. Importantly, this analogy helps reduce exam-related anxiety. The final test is no longer an isolated, high-stakes event but a natural, logical end to a structured progression of challenges.

To complete increasingly complex challenges, the player must improve their character: increase abilities, unlock skills, and acquire better equipment. Without **Character Development**, tasks become unmanageable. The same applies to students: they need knowledge (attributes),

tools (equipment), and practice (skills). Students can compare their current level with peers. Rewards, badges, or other incentives can be used to reinforce progression. This structure offers transparency and helps students understand their course progress at any point in time.

Games often allow players to choose **Character Classes (Specializations)** — each with distinct strengths and weaknesses. Players may invest in strength, agility, or intelligence, tailoring gameplay to their preferences. Similarly, academic programs cover a range of competencies. Students often focus on subsets relevant to future careers. By tagging academic tasks with specific competencies or specializations, educators enable students to align efforts with their interests. This encourages ownership of the learning path and supports informed decision-making.

Downloadable Content (DLC) refers to content released in addition to the main game, often serving as expansions. In education, DLC includes extra tasks, extension projects, or supplementary materials. These are not required to pass but provide long-term value. DLC can be used to promote optional courses, future research projects, or specialized career paths.

4. Practical Application of the Gamification Method

The entire process can be divided into several sequential steps that enable the application of all six pillars of the gamification method within one's course:

1. Compiling all course activities (assignments, exercises, projects, reports, tests, evaluations, etc.).

2. Identifying the core activities required to pass the course – these will constitute the **main missions** (first pillar). If these activities should be completed in a specific order (e.g., knowledge acquired during one is needed for another), they should be organized accordingly (sequentially or hierarchically). You may also group them into levels – progressing to the next level requires completing all tasks from the current level the student is in.

3. The remaining activities will become **side missions** (second pillar). If some of them require completing certain main missions, they should be linked accordingly (hierarchically or within a sequence). If a level-based structure is used, it's enough to assign them to the corresponding levels.

4. All forms of assessment represent the culmination of prior activities and correspond to **boss fights** (third pillar). They should also be included in the structure of main and side missions so that the conditions required for assessment are clearly defined.

5. Each activity (main and side missions) should be assigned a *reward* value such as a number of points or portion of the final grade (fourth pillar). A proposed grading method is described in a separate chapter.

6. If possible, assign each activity a **specialization** or potential career path in which the acquired skills are applicable (fifth pillar).

7. (Optional) Prepare a set of activities showcasing further development in the area addressed by the course or promoting future courses/graduate programs in the topic (sixth pillar).

8. (Optional) Create a visual representation of the entire process. Although optional, this step is recommended to help clarify the course structure.

The method can be applied to any subject whose content and requirements can be broken down into incremental elements according to the pillars described in the article. The authors' experience so far shows that both technical (e.g., computer science), mathematical, humanities and design subjects easily apply the algorithm described in this section. Additionally, one may consider including one or more of the following ideas:

- Missions can be mapped directly to learning outcomes and evaluation methods listed in the syllabus. For example, one mission = one learning outcome.
- Exams and assessments naturally serve as *boss fights*, reinforcing the sense of achievement and progression.
- Points or grades can be treated as experience points (*EXP*), emphasizing that every task is a step toward gaining practical knowledge for academic or professional use.
- Side missions should span diverse thematic areas. This allows students to choose tasks based on their interests and supports exploration and self-directed learning.
- Main missions can be group assignments (since all students must complete them), while side missions may remain individual. This ensures common program outcomes are met, while enabling individual specialization.
- One-time events (e.g., contests, lectures, workshops, projects, deployments) can be introduced dynamically and treated as special side missions, with appropriate *EXP* and prior notice.
- Both single tasks and the entire course may incorporate other gamification techniques such as badges, challenges, and more.

5. Usability Evaluation of the Method

5.1. Methodology

The study was conducted by collecting data for 9 years in the subject of the *User Interface Design* course (Applied Computer Science, Bachelor's level), and this subject will form the basis of the analysis. Both quantitative and qualitative data were recorded during the survey according to HCI testing standards [10], [15], [18]. The quantitative data covered the final evaluations of the nine years of the course. Qualitative data, on the other hand, were collected through a SUS questionnaire and a focus group in two consecutive years after the gamification method was implemented (2019-2020). There were no program changes in the years before the method was introduced, nor in the years after. The subject was taught by the same teachers at the time. At the same time, the method has been successfully implemented in other subjects (in those strictly technical like *Computer Games Programming* and from the graphic design area: *Visual Identity Design*) and at various faculties yielding analogous results.

The group of respondents for the qualitative study consisted of students from the year of introduction of the method (2019) - 19 people, and the following year (2020) - 8 people. The respondents filled out the SUS form, additional questions on gamification, and then constituted the focus group participants. The study group consisted of 12 women and 15 men between the ages of 20 and 22. The survey followed established usability and user experience (UX) standards, based on the System Usability Scale (SUS) questionnaire [18]. In the SUS format, questions are formulated in alternating positive and negative statements. This alternating structure helps mitigate response bias from participants who might otherwise default to extreme values. Because scores are evenly distributed between positive and negative statements, the effect of such patterns is neutralized. Responses are provided using a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The first ten questions were based on the SUS questionnaire, while questions 11-14 are additional questions on gamification functions of the method. In addition to this, the survey included open-ended questions asking what participants liked and disliked about the method.

A further aspect of the quantitative evaluation compared final grades of 526 students in total from nine academic years (2015–2023). The study group consisted of 114 women and 412 men

between the ages of 20 and 25. To assess the effectiveness of the gamification-based method, a statistical comparison was performed between final grades from the pre-implementation period (2015–2018, 200 students) and post-implementation period (2019–2023, 326 students).

5.2. Results and discussion

The mean **SUS score** was **87.6** with a standard deviation of 11.9, indicating excellent system usability and a high level of satisfaction among students. According to the industry-standard interpretation scale [1], this result is classified as *Excellent*, and corresponds to the *A* grade on the curved SUS scale. Scores in this range suggest that users find the system intuitive, easy to use, and highly satisfying. It also places the solution in the top 10% of all systems evaluated using SUS. The low standard deviation indicates consistent perceptions of usability across the respondents. Such results are considered indicative of mature, well-integrated design with minimal usability issues.

The results of the **focus groups** indicated strong approval from students. Out of 27 respondents, 26 (96.3%) appreciated the freedom to choose tasks; 24 (88.9%) favored the clear division between mandatory and optional tasks; 22 (81.8%) transparency of grading; 21 (77.8%) ability to pass by completing only the required tasks; and 20 (74.1%) positively evaluated the visual course structure. At the same time, students provided significantly fewer negative opinions about the method. Only two aspects received more than a few mentions: disproportionate point values assigned to tasks — 6 responses (22.2%), and performing tasks in groups — 5 responses (18.5%). While the second concern may have resulted from poorly matched group compositions (as students formed teams independently), the first issue was already addressed in previous chapters along with a proposed solution. These responses demonstrate high acceptance of the method and its potential for wider adoption.

A common concern raised by students in surveys and discussions abouth this method is the mismatch between the scale of tasks and their contribution to the final grade. In other words, time-consuming or challenging tasks may account for too small a portion of the overall grade. Balancing tasks and assessment is indeed complex and often requires iterative adjustments. Solution is to assign points to each activity based on the estimated time required for completion. Using a point-based system, one point can be equated to one unit of time. This approach also maps well to the number of hours allocated to a course, as specified in course syllabus.

Table 1. Mean and median final grades in the User Interface Design course before (2015–2018) and after implementing gamification method (2019–2023, bold) - grades of 526 students in total. Improved and more consistent performance is reflected in rising averages and reduced variability. SD - standard deviation; CI - Confidence Intervals at $p = 0.05$

	2015	2016	2017	2018	**2019**	**2020**	**2021**	**2022**	**2023**
Mean	4.38	4.29	4.12	4.04	4.58	4.49	4.34	4.33	4.44
Median	4.50	4.50	4.00	4.00	4.50	4.50	4.00	4.50	4.50
SD	0.62	0.77	0.64	0.45	0.19	0.37	0.46	0.36	0.47
CI	0.14	0.25	0.20	0.12	0.10	0.08	0.08	0.09	0.17

Results of **quantitative study** of final evaluations from 9 years show a consistent increase in both mean and median grades, alongside a significant drop in standard deviation and much smaller values of the Confidence Intervals —indicating not only improved performance but also more uniform achievement across students (Table 1). In the pandemic years (2020-2022) where many of the classes were held remotely, we can see a gentle decline in overall results - nevertheless, they are still overall better and more consistent than before the method was introduced (Figure 1). In addition, when returning to the contact form of teaching, the results

increase again.

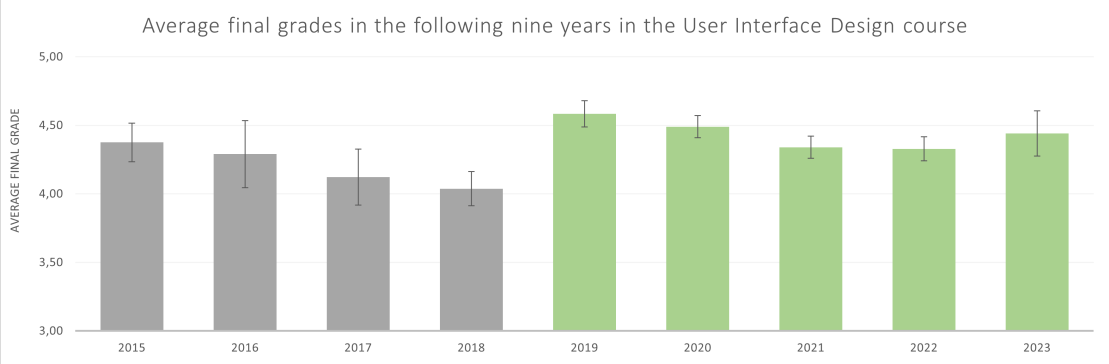

Fig. 1. Mean final grades of 526 students in total over nine academic years in the User Interface Design course. Green indicates the years gamification was implemented. One can see a significant increase in scores after the introduction of the gamification method as well as more stable results (smaller Confidence Intervals) while in the four previous years the trend was clearly downward with high deviations (fewer people had very good scores, most had good or sufficient). The error bars present Confidence Intervals at $p = 0.05$.

Difference between final grades from the pre-implementation period (2015–2018) and post-implementation period (2019–2023) was calculated using Welch's t-test (due to unequal sample sizes and variances) resulting with $t = 3.65$, $p < 0.001$. The average final grade before implementation was 4.22 ($CI = 0.09$), while after the implementation it increased to 4.40 ($CI = 0.05$). The result is statistically significant and confirms that the method had a positive impact on student performance.

6. Conclusion

The developed methodology introduces a structured and engaging approach to course design using gamification principles. Its modular structure, visual clarity, and focus on individual student development paths provide flexibility for both instructors and learners. The study results confirm the method's potential to enhance motivation, learning outcomes, and user experience in higher education. The only disadvantage of the method noted so far is the increased burden on the handler due to the variety of side tasks (side missions). Nevertheless, our experience so far shows that the advantages of the method outweigh this disadvantage in the eyes of the instructors, because they do not give up using the method after its introduction.

The benefits of applying the method include: increased student engagement and easier acquisition of new knowledge through gamification techniques; reduction of exam-related stress, greater transparency in course structure and flexibility in individual development paths; improved student satisfaction with the learning process; a practical guide for teachers and mentors at university to adopt this methodology in their courses; seamless integration with existing tools at the university (like Moodle platform - which will be discussed in detail in future work); enhanced promotional and reputational value through the use of modern teaching approaches.

References

[1] Bangor, A., Kortum, P., Miller, J.: Determining what individual sus scores mean: Adding an adjective rating scale. Journal of Usability Studies 4(3), pp. 114–123 (2009)

[2] Costa, W.P., Lima, J.C., Ferreira, J.C., Silva, E.S.: Contribution of microlearning in basic education: A systematic review. Education Sciences 15(3), pp. 302 (2025)

[3] Deterding, S., Dixon, D., Khaled, R., Nacke, L.: From game design elements to gamefulness: Defining "gamification". In: Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments. pp. 9–15. ACM (2011)

[4] Dichev, C., Dicheva, D.: Gamifying education: what is known, what is believed and what remains uncertain: a critical review. International Journal of Educational Technology in Higher Education 14 (12 2017)

[5] Glac, W.: Gamifikacja w edukacji — tedxgdynia. $https$: $//www.youtube.com/watch?v = O_DvbOtxBTQ$ (2018), accessed June 22, 2025

[6] Gmińska, R., Sokołowska, K.: Gamification as a tool to enhance engagement and consistency in accounting education. World Scientific Business Journal of Business and Finance (2025)

[7] Huang, B., Hew, K., Lo, C.K.: Investigating the effects of gamification-enhanced flipped learning on undergraduate students' behavioral and cognitive engagement. Interactive Learning Environments 27, pp. 1106–1126 (09 2019)

[8] Huang, W., Soman, D.: Gamification of education. Tech. rep., University of Toronto, Rotman School of Management (2013)

[9] Kiryakova, G., Angelova, N., Yordanova, L.: Gamification in education. In: 9th International Balkan Education and Science Conference (2014)

[10] Lazar, J., Feng, J.H., Hochheiser, H.: Research Methods in Human-Computer Interaction. Wiley Publishing (2017)

[11] Martín-Rodríguez, A., Madrigal-Cerezo, R.: Technology-enhanced pedagogy in physical education: Bridging engagement, learning, and lifelong activity. Education Sciences 15(4), pp. 409 (2025)

[12] McClelland, D.C.: The Achieving Society. Van Nostrand, Princeton, NJ (1961)

[13] Perez Gallo, V.H.: Gamification as a teaching strategy to develop action-research competencies in social work students. Preprints.org (05 2025)

[14] Romero Rodríguez, L., et al.: Serious games in engineering education: Assessing novelty effects and the influence of prior gaming experience. Computer Applications in Engineering Education (2025)

[15] Sauro, J., Lewis, J.R.: Quantifying the User Experience: Practical Statistics for User Research. Morgan Kaufmann Publishers Inc., San Francisco, CA, USA (2016)

[16] Sobociński, M.: Grywalizacja to mit — tedxbydgoszczsalon. $https$: $//www.youtube.com/watch?v = 2bEykjfndDI$ (2015), accessed June 22, 2025

[17] Tabrizi, N., Lin, N., et al.: Gamification to enhance clinical and technical skills in surgical residency: A systematic review. The American Journal of Surgery (2025)

[18] Tullis, T., Albert, B.: Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics. Elsevier, 2nd edn. (2013)

[19] Vásquez, J., Moreno, P., et al.: Systematic mapping review of induction resources for first-time students in virtual learning environments. IEEE Access (2025)