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Gamified and ActiveLearning: Portuguese university teachers experience

Gamified and ActiveLearning: experiencia de profesores universitarios portugueses

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Abstract

The *NOOC 3 - Active and Gamified Learning*[2], developed by the Universidade Aberta (Portugal) as part of the ENID-Teach project, aims to enhance faculty skills in active learning and gamification. This study evaluates participants' satisfaction with the course's structure, content, methodology, technology, and overall learning experience. The chapter describe the preliminary results from the feedback from 21 Portuguese-speaking NOOC 3 participants,

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primarily higher education professionals, who completed structured or written interviews. Data were analyzed using descriptive statistics to identify trends in satisfaction and, areas for improvement in the future. Participants rated the course highly, with 90% rating the structure and content as "Excellent". Didactic resources, coherence, and teacher performance received similarly high marks. However, some challenges were noted, including platform usability issues, limited interaction, and course length limitations. Most respondents expressed a strong sense of belonging and willingness to participate in future NOOCs from the ENID-teach program. Results indicate that NOOC 3 effectively supports professional development through well-structured, engaging, and relevant content and microlearning design. However, improving platform functionality, interaction opportunities, and course length could enhance the learning experience. These findings contribute to the refinement of future NOOC offerings and the advancement of digital faculty development methodologies.

Keywords: gamification, active learning, quality satisfaction, learning desig, Nano Open Online Course, flexible learning methodologies, microlearning.

Resumen

El NOOC 3 - Aprendizaje Activo y Gamificado, desarrollado por la Universidade Aberta (Portugal) como parte del proyecto ENID-Teach, tiene como objetivo mejorar las habilidades del profesorado en aprendizaje activo y gamificación. Este estudio evalúa la satisfacción de los participantes con la estructura, el contenido, la metodología, la tecnología y la experiencia general de aprendizaje del curso.

En este capítulo se describen los resultados preliminares de las entrevistas de 21 participantes de habla portuguesa de NOOC 3, principalmente profesionales de la educación superior, que completaron entrevistas estructuradas o escritas. Los datos se analizaron mediante estadísticas descriptivas para identificar tendencias en la satisfacción y áreas de mejora.

Los participantes valoraron muy positivamente el curso, con un 90% que calificó de «Excelente» la estructura y el contenido. Los recursos didácticos, la coherencia y la actuación de los profesores recibieron puntuaciones igualmente altas. Sin embargo, se señalaron algunos problemas, como la facilidad de uso de la plataforma, la escasa interacción y la duración limitada del curso. La mayoría de los encuestados expresaron un fuerte sentimiento de pertenencia y su deseo de participar en futuros NOOC del programa ENID-teach.

Los resultados indican que el NOOC 3 apoya eficazmente el desarrollo profesional a través de un contenido bien estructurado, atractivo y relevante

y un diseño de microaprendizaje. Sin embargo, la mejora de la funcionalidad de la plataforma, las oportunidades de interacción y la duración del curso podrían mejorar la experiencia de aprendizaje. Estos resultados contribuyen al perfeccionamiento de futuras ofertas de NOOC y al avance de las metodologías digitales de desarrollo del profesorado.

Palabras clave: gamificación, aprendizaje activo, satisfacción de la calidad, diseño del aprendizaje, Nano Open Online Course, metodologías de aprendizaje flexibles, microlearning.

Introduction

The European Network in D-flexible Teaching (ENID-Teach) programme, implemented by a consortium of seven European institutions, represents a significant response to the transformation of higher education in the post-pandemic era. This Erasmus+ funded initiative emerged from the urgent need to address two fundamental challenges revealed by the COVID-19 crisis: the fragmentation of academic networks and the inadequate adaptation of traditional teaching methods to digital environments.

The project's foundational element is a comprehensive Training Programme on Digital Competences in Flexible and Innovative Methodologies, which introduces a pioneering approach to faculty development. The ENID-Teach project implements an innovative training approach through five multilingual and accessible NOOCs (Nano Open, Massive, and Online Courses) focusing on flexible methodologies (D-Flexible Teaching, 2022). These courses emerge as a strategic response to the necessity for specialized faculty training in digital pedagogy, integrating theoretical frameworks with practical applications in a microlearning format.

Each NOOC is designed as a 25-hour learning experience, with successful completion earning participants an ECO Digital Learning certificate and 1 ECTS credit from UNED (Universidad Nacional de Educacion a Distancia), subject to university requirements. The pedagogical framework integrates three innovative elements (Gómez et al., 2022):

- A distributed pedagogical model emphasizing critical and social teaching practices
- A mixed and flexible delivery approach
- A microlearning structure delivered through NOOCs

The courses employ a microlearning strategy based on "learning nuggets" - small, interconnected content units that combine theoretical knowledge with practical applications, self-assessment activities, discussions, and evaluations across multiple formats. This approach enables faculty to integrate learning into their daily teaching practice while maintaining time and space flexibility.

The ENID-Teach programme structure encompasses five key courses: 1. Connected and critical teaching; 2. Collaborative and research-based approaches; 3. Active and gamified learning; 4. Inverted or Flipped methodologies and 5. Design of flexible learning digital programs. This chapter focuses on NOOC3-Active and Gamified Learning. NOOC3 was developed by the Portuguese Open University (Universidade Aberta) and ran three editions from June 2023 to November 2024.

After presenting the theoretical framework of NOOC 3, the chapter analyzes the global satisfaction with NOOC3 by the students who registered in the Portuguese language option and consented to participate in a face-to-face or written interview.

Theoretical framework

Microlearning design approach

Microlearning represents a transformative pedagogical paradigm that has emerged as a response to evolving learning needs in the digital age. At its core, microlearning embodies the principle of cognitive chunking, delivering educational content through concise, targeted units that align with learners' cognitive processing capabilities and attention spans. This instructional approach transcends traditional temporal constraints by presenting knowledge in small segments ranging from 5 to 20 minutes. However, the length ultimately depends on the learning objectives and content complexity (Major & Calandrino, 2018).

The theoretical foundation of microlearning draws from cognitive load theory and information processing models, recognizing that human working memory has limited capacity and functions optimally when processing smaller chunks of information. By segmenting content into focused units, microlearning reduces cognitive overload while maximizing retention and knowledge transfer. This approach particularly resonates with contemporary learners who navigate an information-rich environment characterized by frequent task-switching and multiple demands on attention. (Tufan, 2021)

Microlearning design constitutes a systematic framework for developing these focused learning experiences. It encompasses structural and pedagogical considerations, integrating multimedia elements, interactive components, and assessment mechanisms within a coherent learning pathway. The design process begins with careful content analysis and segmentation, followed by learning activities that promote active engagement and knowledge construction. Microlearning design prioritizes precision and relevance, ensuring each learning unit serves a specific, measurable objective (Tipton, 2020; Hamilton et al., 2021)

A distinguishing characteristic of microlearning design is its emphasis on context-awareness and adaptivity. Learning units are crafted to be self-contained yet interconnected, allowing learners to access content in flexible sequences based on their needs and prior knowledge. This adaptability extends to the delivery medium, with microlearning resources optimized for various devices and platforms, reflecting the increasingly mobile nature of contemporary learning environments.

Furthermore, microlearning design incorporates gamification elements and social learning, recognizing that engagement and motivation play crucial roles in learning effectiveness. Interactive elements, peer collaboration opportunities, and achievement recognition mechanisms are strategically integrated to maintain learner interest and promote active participation. This multifaceted approach ensures that learning experiences remain engaging while meeting specific educational objectives.

The effectiveness of microlearning design relies heavily on balancing content, technology, and pedagogical strategies. Successful implementation requires attention to various elements, including content sequencing, multimedia integration, assess-

ment design, and learner engagement mechanisms. This holistic approach ensures that microlearning experiences contribute meaningfully to knowledge construction and skill development while accommodating the constraints and preferences of modern learners.

NOOC3 - Active and gamified learning

NOOC3 - Active and Gamified Learning is an innovative educational initiative that fosters active participation and engagement in learning through active methodologies and gamification. NOOC3 introduces participants to active learning principles, contrasts it with traditional transmissive teaching, and explores gamified learning to enhance interaction and collaboration in higher education contexts.

At its core, NOOC3 emphasizes active learning, a pedagogical approach characterized by student-centered activities promoting engagement and deep knowledge processing. This contrasts with transmissive teaching models, which focus on unidirectional knowledge delivery. A key component of active learning is interaction and interactivity between students, instructors, and content and benefits from the team's in-depth knowledge of the UAb pedagogical model which applies these principles (Pereira et al, 2008). Building on this foundation, NOOC3 integrates gamification to create dynamic and engaging learning experiences, where elements such as challenges, goals, rewards, and collaboration contribute to increased motivation and learning outcomes.

Transactional distance and control

The theoretical framework of NOOC3 is informed by Moore's (1993) concept of transactional distance, which emerges in distance education due to the absence of physical co-presence between learners and educators. Transactional distance is defined by two variables: structure (course design) and dialogue (interaction). The balance of these variables significantly influences the learner's perception of support and autonomy. For example, when structure and dialogue are lacking, students may experience higher transactional distance and lower satisfaction.

Building on Moore's work, Dron (2007) introduced the concept of transactional control, emphasizing the need for negotiation between teacher and student in determining the locus of control in the learning process. This negotiation influences interaction, autonomy, and communication dynamics, critical aspects in gamified and active learning scenarios.

Gamification as a catalyst for engagement

Gamification, the application of game-like elements in non-game contexts, is a powerful mechanism for active learning. Research demonstrates that gamification can enhance learner motivation, foster collaboration, and improve knowledge retention (Hamari & Koivisto, 2015). In NOOC3, gamification principles encourage teamwork, creativity, and personalized learning through interactive and rewarding experiences. By simulating real-world scenarios and providing instant feedback, gamification aligns learning outcomes with practical, real-world applications.

Pedagogical principles of NOOC3

NOOC3 design adheres to microlearning principles, offering participants modular, bite-sized learning content. Its pedagogical framework includes the following key principles:

- *Increased engagement*: Gamified elements make learning enjoyable and interactive, leading to higher student involvement.
- *Enhanced retention*: Enjoyable and meaningful activities help learners retain information more effectively.
- *Personalized learning*: Learners progress at their own pace, tailoring their educational experience to individual needs.
- *Collaboration and teamwork*: Gamification fosters community-building through shared challenges and collaborative tasks.
- *Real-world application*: Simulated scenarios allow learners to apply theoretical knowledge to practical situations.
- *Reduced anxiety*: Gamified environments offer low-stakes settings for experimentation and error, reducing learning-related stress.
- *Long-term motivation*: Clear goals and incremental achievements sustain learners' motivation over time.

Objectives

This analysis aims to provide a global view of Portuguese language participants' satisfaction with *NOOC3 - Active and gamified learning*, highlighting the main improvement suggestions. The data was collected through structured interviews or written structured interviews, and responses were analyzed using descriptive statistics. The interview covered various aspects of the course, including structure, content, methodology, technology, cohesion, and overall satisfaction.

Sample

The sample consists of 21 participants[3] enrolled as students in *NOOC3 - Active and gamified learning* in Portuguese who accepted to complete an online written interview or participate in a structured interview about the NOOC. For this study, 21 responses were analyzed, and participants were predominantly female (71.4%) higher education professors (71.42%) from Portugal (80.95%), with an average of 25.92 years of teaching experience.

Results

This chapter examines participants' satisfaction with NOOC3 by analyzing participant feedback, statistical data, and thematic insights. The results reveal significant trends in satisfaction, underscoring the course's strengths and areas for refinement.

Structure and organization of NOOC3

The structure and organization of NOOC3 were highly valued, with 90% of participants rating this aspect as "Excellent" and 10% as "Good". Participants consistently highlighted the logical progression and linear course content arrangement, facilitating

3. The number of interviews presented in this chapter is still provisional (21) as the collection process has not yet been finalized. For this chapter, only this number has been considered for analysis.

seamless learning. This rigorous organization enhanced the user experience and contributed to the intuitive navigation of the course material. Overall, the course structure and organization were well-received, particularly by those with more teaching experience who rated the course structure as "Excellent," indicating a generally positive perception. For example, participants commented: *"The content is of a very high standard and the course is very well organized for 25 hours."* [Participant 6]

Content of NOOC3

Didactic resources quality

The didactic resources in NOOC3 were praised for their quality, interactivity, and alignment with course objectives; 85% of participants rated these resources "Excellent" and 15% "Good." The high level of satisfaction underscores the pivotal role of well-designed educational materials in enhancing engagement and comprehension. For example, participants commented: *"The course is good, it mixes theory and practice, offering resources that we can implement directly in the classroom or Virtual Learning Environments"* [Participant 10].

Content and learning activities quality

The coherence and quality of the course content received a 90% "Excellent" rating, while the appropriateness of the learning activities was rated as "Excellent" by 85% of the respondents. Content quality emerged as a hallmark of NOOC3 with feedback highlighting the coherence, scientific rigor, and alignment with learning objectives. Learning activities also garnered strong approval, with respondents describing learning activities as engaging and well-balanced with course content and 85% rating them as "Excellent". For example, participants commented: *"They were complete, had all the necessary information, which we had to notice to do the course. It was perfect for me."* (Participant 17) and *"Content suited to my needs and the chance to put it into practice and evaluate it"* [Participant 20].

The methodology of NOOC3

The course methodology received positive feedback, especially concerning teaching staff performance and evaluation.

Communication and interaction

The course's communication mechanisms were highly valued; 80% of participants rated this aspect "Excellent." Teachers expressed slightly greater satisfaction (80%) compared to students (70%), highlighting the potential for further enhancing student engagement. However, some comments suggest the need for improvement in this domain. For example, participants commented: *"As it's a NOOC, there's less interaction, less sharing of experiences, less evaluation - these are the points I missed the most."* [Participant 21].

Learning activities and teaching staff performance

The evaluation of the learning activities and the performance of the teaching staff were both rated as "Excellent" by 85% and 90% of the respondents, respectively. Evaluation methodologies were commended for their clarity and alignment with learning objectives and described as fair and well-balanced to measure learning outcomes effectively. Teaching staff performance was a standout feature of NOOC3, receiving an "Excellent" rating from 85% of participants. Respondents with a teaching profile rated teaching staff performance particularly highly (90%), emphasizing the support provided throughout the course. For example, participants commented: *"It is important to note that feedback and interactive activities are very important in this type of learning."* [Participant 10].

Technology and learning experience of NOOC3

Concerning the technical experience 80% of the respondents reported having no technological issues indicating a generally smooth user experience with the platform and resources. However, isolated instances of platform rigidity and minor technical issues were noted (20% of the respondents) and, a recurring critique involved the platform's mixed-language forums, which some users found confusing or inconvenient. Data suggests that while the technical experience was mostly positive, there is room for targeted improvements. For example, participants commented: *"The platform is opaque and the forums are very bad because all the languages are mixed up, making communication difficult."* (participant 6); *"The platform is not very user-friendly."* (participant 8); *"There came a time when I did the activities but the platform wasn't counting/registering them."* [Participant 13].

The overall learning experience, including satisfaction, the effort required to pass the course, and the practical application of the learned content was positive for most respondents (95%).

In the comments received on an open question in the interview participants expressed high satisfaction (overall satisfaction) with the course, appreciating the content, structure, and overall experience (for example, Participant 21 commented: *"I was very pleased with the course. In just a few units, it introduced me to technologies and methodologies that I already used in my daily teaching practice quickly and easily."*); some participants noted the challenge (effort required) of balancing personal and professional commitments with the course requirements but considered that the workload in NOOC3 was adequate and manageable (for example, participant 1 and 20, commented respectively: *"I really enjoyed taking part in this course. My only regret is that my personal and professional life didn't allow me to devote more time to the process."* and *"It was enriching and the proposals were adjusted to the complexity and time required.")* and, valued the practical application of what they learned, highlighting the relevance of gamification and active methodologies in teaching (for example, participant 10, commented: *"In terms of learning, the course provides a balance between theory and practice in active methodologies and gamification in real teaching contexts."*). These aspects are visually represented in a word cloud (Figure 10.1).

Figure 10.1. overall learning experience with NOOC3 (source: the authors, 2024).

Cohesion and affiliation in NOOC3

Sense of belonging and group cohesion

The respondents were asked to indicate the extent to which they felt like a member of the course group, including their sense of belonging, connection with other members, and whether the group had similar needs and goals. Most respondents (70%) considered that a high sense of belonging to the group was developed in NOOC3. For example, Participants 3 and 16, commented respectively: *"Fellowship"* and *"Bonding and sharing"*. Respondents were also asked to indicate the degree of cohesion they developed within the group, including their intention to continue participating in the course and their willingness to participate in future virtual courses. The responses reveal the majority (70%) of respondents rated cohesion within the course group as high. For example, Participant 17 commented: *"The assumption is that the course members have similar needs and it is great to be part of an education that meets the needs of the participants"*. Though results indicate a strong sense of belonging and cohesion within the course group, a small percentage of respondents (10% each) did not feel as connected or cohesive.

Most positive and negative aspects of NOOC3

Respondents were asked to indicate both positive and negative aspects of the NOOC3, which were organized into categories in Tables 10.1 and 10.2.

Table 10.1. Positive aspects

Category	Positive Aspects
Practical tools, content and resources	Participants value the availability of various platforms and tools that can be directly applied in their teaching practice. The content is well-organized and cohesive, making it easy to understand and use. The themes and contents are interesting and align well with the competencies to be developed. Participants find the content relevant to their needs and appreciate the ease of access. For example: *"Available tools and content covered."* [Participant 1]; *"Really interesting topic. Content in line with the skills to be developed."* [Participant 5]; *"The content is very well organized and cohesive. The resources very well chosen to be presented and addressed."* [Participant 21].
Structure and format	The course is well-structured and effectively implemented within a 25-hour length. The systematic approach to learning helps participants follow the course content easily and retain information better. For example: *"... the course is very well organized for 25 hours."* [Participant 6]; *"Well-structured course and interesting examples."* [Participant 7]; *"Systematized learning."* [Participant 12].
Fellowship	The course fosters a sense of bonding and sharing among participants, enhancing the overall learning experience through collaboration and mutual support. For example: *"Fellowship."* (participant 3); *"Bonding and sharing."* [Participant 16].
Multilingual materials	Materials in different languages make the course accessible to a broader audience, ensuring language barriers do not hinder learning. For example: *"The use of materials in different languages."* [Participant 9].
Learning methodology	The course provides high-quality training and learning experiences, focusing on active methodologies that engage participants and enhance their knowledge, by connecting theory with practice. For example: *"Connecting theory and practice by offering resources for the classroom or VLE"* (participant 10); *"Quality learning. Active methodology."* [Participant 15].
Institutional credibility	The course is offered by reputable institutions, adding to its credibility and making it more appealing to participants. For example: *"...value the fact that the course is offered by several renowned institutions."* [Participant 17].

Overall, the course is highly regarded for its practical tools, effective structure, engaging content, and active learning methodologies. Participants appreciate the sense of community, accessibility, and credibility of the institutions offering the course. These elements contribute to a positive and valuable learning experience.

Table 10.2. Negative aspects

Theme	Negative aspects
Platform issues	Participants experienced dissatisfaction with the course platform, citing issues with its organization and overall user experience. For example: *"The platform is outdated and interactions are lost as the forums are very bad because all the languages are mixed up. I took a course on this platform a few years ago."* [Participant 6].
Lack of interaction and collaboration	The NOOC format resulted in less interaction and collaboration among participants. For example: *"A lack of collaborative work."* [Participant 9].
Time constraints	Time limitations prevented participants from fully engaging in community activities and exploring the course content in-depth. For example: *"Little time available to go into depth."* [Participant 20].
Certification issues	Concerns were raised about not receiving certificates of participation. For example: "The fact that I completed the course and still haven't received my certificate of attendance. The same situation happened with another colleague who attended the course". [Participant 13].
Course duration	Some participants felt the course was too short and suggested extending it for more interaction and deeper learning. For example: *"I'd like the training to be longer."* [Participant 17].
Initial complexity	The initial complexity of the course left some participants feeling lost and overwhelmed. For example: *"I felt lost."* [Participant 19].

This analysis highlights the areas where participants consider the NOOC could improve, such as enhancing the platform experience, increasing interaction and collaboration, addressing time constraints, ensuring timely certification, and simplifying the initial complexity of the course procedures.

Conclusion

The analysis of participant satisfaction (mainly higher education teachers with extensive experience) with *NOOC3-Active and Gamified Learning* reveals a predominantly positive response to the course, underscoring its innovative methodologies, high-quality resources, and effective pedagogical framework. However, some areas for improvement emerged, particularly concerning technological infrastructure, interaction opportunities, and structural enhancements.

Main insights from NOOC3

Participants expressed high satisfaction with the course structure, content, and methodology. This is consistent with research showing that microlearning promotes engagement by providing concise, focused, and practical knowledge (Buchem & Hamelmann, 2010). The course's microlearning design and gamification strategies were particularly well received, increasing participant motivation and engagement. Studies suggest that gamified learning design can improve motivation, participation, and learning outcomes (Deterding et al., 2011; Kapp, 2012). Participants highlighted the immediate applicability of the content, tools, and methods presented, confirming the practical value of the course. This supports the findings of Schunk (2012), who emphasized that practical, contextualized learning enhances transferability to real-world situations.

Despite its pedagogical strengths, the platform used for the course presented significant usability challenges, such as poor navigation, multilingual barriers in forums, and an outdated interface. Usability issues are a well-known deterrent in online learning environments, with research suggesting that poor user experience can negatively impact learning outcomes (Sun et al., 2008).

While the NOOC format allowed for flexibility and scalability, participants noted a lack of real-time interaction, echoing Garrison, Anderson, and Archer's (1999) findings on the importance of social presence in online learning environments. Participants found time constraints challenging as they sought to

balance work and personal commitments with course requirements. In addition, delays in certification reduced satisfaction for some participants. These challenges are consistent with broader findings in online education regarding time management and administrative processes (Anderson, 2008). Despite limited interaction, many participants reported a strong sense of belonging and collaboration within the course community. This echoes research by Rovai (2002), who emphasized the importance of community building in online education for increasing learner satisfaction and retention.

Final remarks

NOOC3-Active and Gamified Learning delivered a high-quality, innovative learning experience customized to contemporary educational needs. While participants consistently appreciated the course design, content, and applicability, addressing the challenges identified can further enhance its impact and sustainability. Through improvements in technology infrastructure, greater interaction, and enhanced administrative processes, NOOC3 can continue to represent an innovative model for flexible teacher training in digital environments.

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