
Game Based Learning for Enhancement of New Skills Using Micro-MOOCs for Academic Staff

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Abstract

The article presents an Erasmus+ Key Activity 2 project lead by the University of Bari (Italy), in collaboration with the Universities Uniwersytet im. Adama Mickiewicza Poznaniu (Poland), University of Valencia (Spain), IASIS Certified Education Centre, Athens, (Greek), University of Turku (Finland), Serious game Factory – SGF srl. (Foggia, Italy). The theoretical framework is based on gamed-based approach, ubiquitous learning, co-creation approach. GEMMA project (Game based learning for enhancement of new skills using micro-moocs for academic staff) will develop a training course for researchers from PhD students to professors in HEIs aimed at furnishing this academic staff of the digital, entrepreneurial and life skills. These skills are crucial in this new era where the digital tools cover a consistent part of the research/teaching work. The academics have a highly fluid working day, that became more fluid after the COVID-19 outbreak. Improving those skills could improve the work/free-time balance. The target groups of the project are researchers and academic teaching staff (professors, teaching fellows, assistants, etc.); PhD and specialisation courses' students; part-time academic staff (educational tutors for students, peer career advisors, support tutors for students with disabilities, etc.). GEMMA project aims to promote four degrees of innovation: a) Integration of three EU-validated competence frameworks b) Integration of Game-based learning in MOOCs; c) Drafting a training course tailored for academic staff d) Performing a co-creation approach. The project aims to achieve the following result: a holistic training framework and model from the interception of digital, entrepreneurial and life skills, starting from well-known EU frameworks.

Keywords

Gamification, Distance Learning, New Skills, MOOCs, Universities

1. Introduction

Academic personnel within Higher Education Institutions (HEIs) typically concentrate their efforts on scientific metrics, qualitative indicators related to publications, and pedagogical aspects [1, 2]. Researchers, professors, and lecturers are not confined to a set number of hours; their contracts stipulate a fixed commitment. However, due to the inherently comprehensive and mentally engaging nature of their work, their efforts span across the entirety of the day, extending even to holidays [3]. This scenario has been further complicated by the aftermath of the COVID-19 crisis, which has exacerbated the challenge of delineating personal and professional boundaries due to the prevalence of telecommuting [4, 5, 6].

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Moreover, the potential benefits of telecommuting extend beyond enhancing resilience and productivity [4, 6]. It can also facilitate environmentally conscious transformations and promote economic inclusivity, as highlighted in the 2020 European Semester's country-specific recommendations². To achieve these goals, it becomes imperative to ensure universal access to training and certifications.

On a different note, the academic staff within HEIs, encompassing individuals from doctoral candidates to full professors, is immersed in a dynamic and evolving environment. Consequently, there exists a compelling need to amalgamate their knowledge and translate their concepts into practical applications. The urgency is further amplified by the requirement to acquire novel skills, enabling their research to have a substantial impact beyond the academic realm. Hence, a growing number of researchers within HEIs must cultivate entrepreneurial aptitudes, encompassing digital proficiencies necessary to navigate the contemporary challenges of our era [7]. Simultaneously, they require life skills that foster a harmonious equilibrium between their professional and personal spheres.

This aspect is particularly vital when researchers are also expected to invest their time in initiatives such as founding spin-off companies, launching start-ups, or collaborating with external enterprises.

On the basis of all these needs, the academic personnel that includes lecturers, professors and researchers – even at early stages when starts as a PhD student – need of easy way to learn. The time is very condensed in different academical duties and once the responsibilities grow, the timeslot for skill update is reduced. New ways of teaching should emerge that could meet the educational needs of the researchers.

A potential solution could be the inclusion of game-based learning (GBL) aspect in the learning of the academical teachers. The idea consists of providing the academic staff with innovative tools to develop digital and soft skills that could be very useful if applied to teaching and tutoring processes. In addition, the project aims to find efficient ways to make scholars and students more accustomed to entrepreneurial thinking, which could have a significant impact on research activity. Game-based MOOCs have been already tested on educational staff [8], leading to positive results. Being trained through Open Online Courses could represent an ideal way to earn knowledge about digital environments and practical usage of E-learning instruments. Has been demonstrated that, in certain cases, academic staff display a low level of digital skills [9]. Teachers and educational staff have taken advantage of training MOOCs on several occasions, gaining personal, didactical, and even language skills [10].

A potential way to integrate MOOC and game-based learning is the application of serious games embedded in the e-learning platform. It has been applied in many studies [11, 12]. Serious games seem a potential pedagogical tool in order to teach soft and life skills [13, 14].

2. GEMMA project

In a present paper the authors presents a study that is part of a broader Systematic Review and aims to investigate, through an initial Scoping Review, the need in the university context to develop digital, entrepreneurial and soft skills. This work is part of the needs analysis actions of the Erasmus+ project GEMMA (Game based learning for Enhancement of new skills using Micro-MOOCs for Academic staff) of which the University of Bari is the lead partner.

The main motivation for this project stems from the observation of the need, at the European level, for flexible, accessible and affordable learning tools that can help the vast majority of workers access informal learning paths for the improvement and development of 21st skills in relation to the evolving challenges in the workplace, enhanced by the COVID-19 situation, which has revealed a lack in some cases of some basic and transversal skills.

The main objective of the Erasmus+ GEMMA project is to develop a training course aimed at providing academic staff with digital, entrepreneurial and life skills, building on the well-known EU frameworks (DigComp 2.2 [15]; EntreComp [16]; LifeComp [17]) through the use of flexible, accessible and affordable learning tools. The GEMMA training course will apply the MOOC paradigm, developing miniMOOCs complemented by a game-based learning approach. This paper aims to present

² https://commission.europa.eu/publications/2020-european-semester-country-specific-recommendations-commission-recommendations_en

a systematic review of the scientific literature aimed at analyzing the need in the university context to develop digital, entrepreneurial and soft skills.

These skills are crucial in this new era where digital tools cover a large part of research/teaching work. In addition, academics have a very fluid workday, which has become more fluid since the COVID-19 epidemic. Improving these skills could improve the balance between work and leisure.

The GEMMA project aims to promote four degrees of innovation:

1. Integration 3 eu-validated frameworks. The goal of the project is to derive, identify and develop an integrated, holistic, cross-curricular educational model from EU-validated frameworks (DigComp, EntreComp, LifeComp).
2. Game-based approach to learning: The model will be implemented with a new, innovative and multidisciplinary MOOC, which will be integrated with a serious game based on role-playing. The game may be integrated within the MOOC by representing the hands-on activity of the course, the part where students and trainers will be able to apply in an experiential mode and with hands-on activities the concepts and information learned during the MOOC.
3. Ubiquitous learning: The training course will be designed to be very usable, with focused content, giving researchers the opportunity to learn even when they have little time. The learning environment will be designed (and co-designed with them) from the paradigms of ubiquitous and mobile learning.
4. Co-projecting: In the project, end users will be directly involved in all phases of the project. Researchers will be primarily involved during the drafting of the holistic framework, with focus groups held in all countries and in the co-creation of the serious game scenarios.

This model will subsequently serve as the pivotal nucleus for forthcoming focus groups, where diverse perspectives, beliefs, and comments will converge to contribute to its refinement.

Subsequently, the project orchestrates the convergence of diverse stakeholders, encompassing esteemed higher education institutions and significant players like SMEs and associations. These entities are collaboratively engaged through a co-creation strategy, aimed at formulating an all-encompassing model that efficaciously addresses well-being within professional contexts. Drawing inspiration from diverse European frameworks, encompassing soft skills, digital skills, and entrepreneurial skills such as DigComp, EntreComp, and LifeComp, this model will be meticulously crafted.

Within the ambit of these strategic collaborations, the project spearheads the creation of a novel, interdisciplinary training curriculum. This curriculum is slated for integration into higher education programs and is conceived through the cooperative efforts of external partners.

Innovation assumes paramount importance as the project endeavors to conceptualize and assess an Information and Communication Technology (ICT) platform. This platform is envisioned to encapsulate a gamified Massive Open Online Course (MOOC) alongside a mobile application. This amalgamation culminates in a modular training regimen targeting both academic and corporate personnel. Its principal aim is to fortify their proficiencies while nurturing their well-being within their respective professional spheres.

Beyond the immediate purview, the project aspires to broaden the reach of its training model. This expansion is informed by a partnership-driven paradigm, underscored by dedicated events and comprehensive guidelines. These guidelines will facilitate the seamless adaptation and implementation of the model within diverse contexts and sectors.

The basis of the Gemma project is faculty training from a faculty development perspective.

Faculty development actions are aimed at generating transformational organizational change involving both the teaching staff called to rethink their practices in order to ensure the improvement of training processes, and the institutions themselves, which must be able to respond proactively to the process of innovation and change through the promotion of continuing education interventions for teachers in order to strengthen teaching-learning skills.

Thus, the teaching qualification of university teachers becomes a key aspect of ensuring the quality of educational provision and coping with the multiple and continuous transformations of the context, student body, and teaching-learning activity.

Just think of the period of epidemiological emergence from Covid-19, which has accelerated the process of digitization of the university, changing learning environments through the creation of more flexible and widespread virtual spaces in which faculty and students interact. This requires teachers to adapt their teaching strategies to the changes brought about using technological tools and devices in teaching and the ability to act in different contexts, in presence and at a distance [18]. Teaching in these environments, in fact, requires new and different pedagogical approaches and sophisticated knowledge not only of a strictly disciplinary and/or pedagogical nature, but also technological [19].

Teachers, moreover, through a more active, experiential and reflective teaching action, must be able to respond to the learning needs of an increasingly heterogeneous student body and able to promote problem solving, team working and metacognition skills, skills these increasingly required by the world of work [20].

These changes lead to a redefinition of the professional figure of the teacher characterized by different roles: "information provider and coach; facilitator and mentor; curriculum designer (planner and implementer); evaluator and diagnostician; role model as teacher and practitioner; manager and leader; scholar and researcher; practitioner" [18, 21]. Thus, there emerges a need for university faculty to hybridize their knowledge, acquire new skills that enable them to meet the challenges posed by the changing workplace and be able to generate an impact of their research outside the university.

For this reason, the GEMMA project will promote through training the acquisition of such skills and in particular stimulating faculty's entrepreneurship and business skills and soft skills of leadership, negotiation, problem solving, etc. through a multidisciplinary and holistic approach.

This study is intended to be an initial exploratory investigation aimed at investigating, the need in the university context to develop digital, entrepreneurial and soft skills, also, to understand how to set up methodologically and in terms of criteria a future Systematic Review; in the future, in fact, the focus will be on quantifying the impact and determining which criteria produce it.

3. Methodology

In the research and analysis stages, the methodology of Arksey and O'Malley was used [22]. This methodology is characterized by the following 5 steps:

3.1. Identification of the research question

The research question arises from research interests related to the investigation of issues related to higher education and the ability to promote digital, entrepreneurial, and soft skills in the academic context and in this interception between the two or more of these dimensions. The request is to find the overlapping between the three dimensions, highlighting the needs of teachers in HEI in previous studies. Based on this information the research question that emerges is:

RQ1: What are the educational needs in higher education when there is an overlapping between digital, entrepreneurial and life skills?

RQ2: How much game-based learning or gamification is applied in the panorama?

3.2. Identification of relevant studies

After establishing the research question, the first phase of searching the Scopus database was initiated using the keywords that consent the intersection of the overlapping of almost two dimensions between (digital, entrepreneurial and life/soft skills). Both qualitative and quantitative studies have been considered. Study design included comparative randomized, prospective randomized, multi-arm parallel group randomized, interventional trial with historical controls, pre post studies, observational studies. The criterion of inclusion regards all the studies that involve the definition of a model, a pedagogical strategy, an intervention or a study in education that involve the overlapping between two or more of the mentioned dimensions.

In the process of study selection, we exported the studies in both CSV and RIS formats. Two sets of reviewers utilized the online tool Rayyan.ai to identify and eliminate duplicate entries, as well as to assess the suitability of titles and abstracts for inclusion or exclusion. In cases where the title and abstract lacked clarity, certain papers were accessed in full. However, papers with unavailable full documents were subsequently excluded during a secondary evaluation. The excluded papers were when the studies lacking empirical data, in presence of methodological biases, and those lacking peer review. Finally the inclusion criteria is the involvement of the study aimed at (or performed) for (or in) the higher education. Moreover, another aspect of inclusion was that the target of the paper must cover the teachers in broad sense (researchers, lecturers, professors, etc.).

We considered papers in English. In addition, was included all studies in English and produced since 2018 were also selected to have the most recent publications in this field. This research extracted 88 documents using the following string:

TITLE-ABS-KEY (((digital AND skill) AND (entrepreneurial AND skill*) AND ((life OR soft) AND skill*)) OR ((digital AND skill*) AND (entrepreneurial AND skill*)) OR ((entrepreneurial AND skill*) AND ((life OR soft) AND skill*)) OR ((digital AND skill*) AND ((life OR soft) AND skill*)) AND ((teacher OR lecturer OR professor*) OR (higher AND education) OR (university)) AND (gamification OR game)) PUBYEAR > 2018 AND PUBYEAR < 2024*

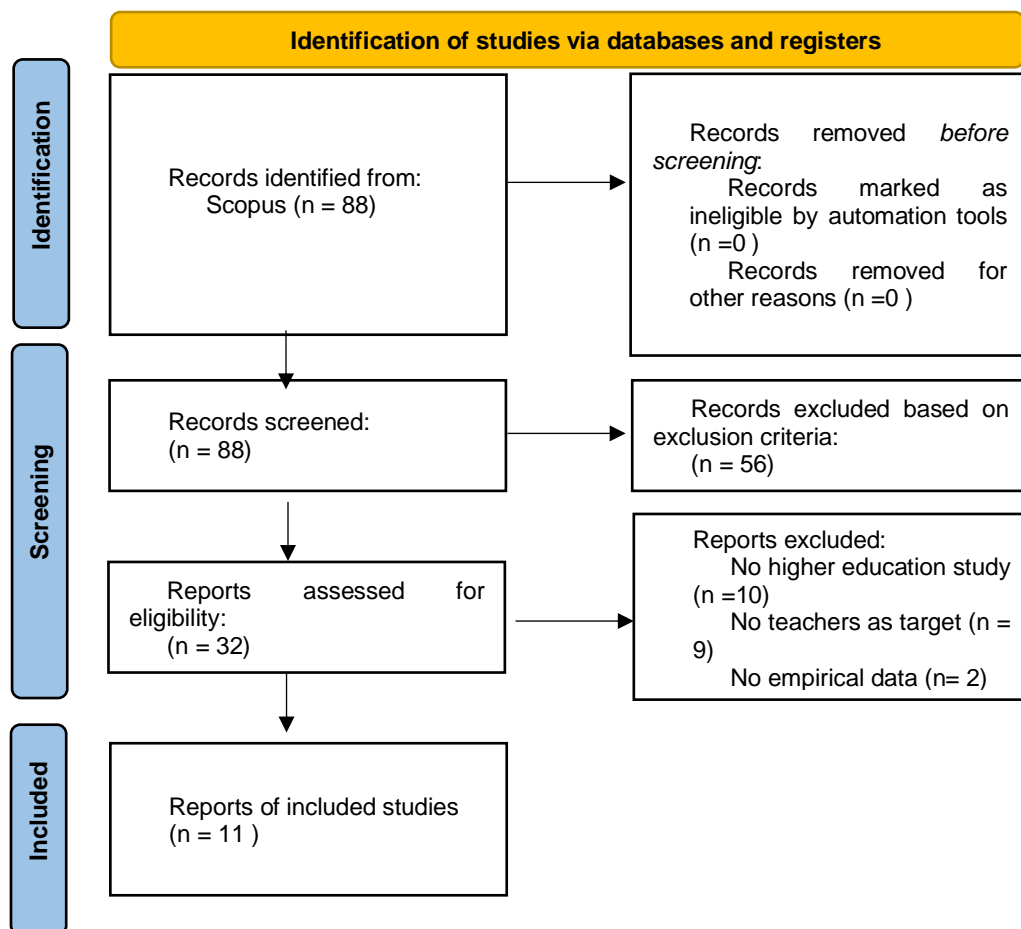


Figure 1: Paper selection modified and based on [34]. For more information, visit: <http://www.prisma-statement.org/>

3.3. Selection of studies

Next, the abstracts of all selected articles were read and analyzed according to the inclusion criteria of this scoping review: studies describing the need in the university context to develop digital,

entrepreneurial, and soft skills. At this stage, 32 articles were selected based on the research questions and inclusion criteria. Other criteria of inclusion are the relevance in the higher education sector, for this reason were excluded the papers that referred to the school education or vocational education. Data collection

At this stage, all 32 articles were read. From this group, 21 were excluded because they did not follow or not deemed relevant based on the inclusion criteria were selected for final review and analyzed.

3.4. Compilation of the results

The 11 selected articles were schematized in a reference table and take into analysis the needs that emerged in the recent literature. Regarding the second research question, the authors focus on the presence of elements of gamification or game-based learning on the papers, with the tentative aim to reply to the RQ2.

4. Results

From the analysis and selection, 11 papers were extracted and discussed for the RQ1. All the papers are reported in Table 1. The main overlapping that is present is related to the entrepreneurial skills with the digital skills. Only in a case this overlapping was not significant [24]. Three of the eleven papers covered all the three dimensions [23, 27, 33] at the same time. The life skills appeared in 4 papers, the digital in 10 and the entrepreneurial in all the selected papers.

Finally, regarding the second research question was checked if the gamification aspects or game-based learning framework were considered. This was covered by a couple of papers [27, 29] where the game-based learning were discussed as a pedagogical strategy in order to enhance entrepreneurship through digital media in higher education. In the case of the Roy's work [28], the digital and entrepreneurial skills are applied using storytelling. Among the selected papers, only two studies include gamification aspects. In particular, the study made by Shutikova [29] includes the game elements but the paper shows the results of tool called KABADA that support the acquisition of knowledge on business plan building with a simulative approach. The other paper that presents gamification aspects is Taratukhin et al. [32], where the authors elaborate a conceptual framework that include scenarios for the entrepreneurial skills acquisition that involve gamification aspects and in particular industry-supported hackathons.

Table 1
Papers selected in the scoping review

Authors	Year	Covered skills
Sousa et al. [23]	2023	Entrepreneurial, Digital
Ranta et al. [24]	2022	Entrepreneurial, Life
Al Yakin et al. [25]	2022	Life, Digital, Entrepreneurial
Denys & Klimczuk [26]	2022	Digital, Entrepreneurial
Garcez et al. [27]	2022	Life, Digital, Entrepreneurial
Roy [28]	2021	Digital, Entrepreneurial
Shutikova [29]	2020	Digital, Entrepreneurial
Kurilova et al. [30]	2019	Digital, Entrepreneurial
Rosyadi et al. [31]	2019	Digital, Entrepreneurial
Taratukhin et al. [32]	2018	Life, Digital, Entrepreneurial
Stolze et al. [33]	2018	Digital, Entrepreneurial

5. Discussion

The assessment of needs to cultivate entrepreneurial skills among students has revealed significant insights. This analysis underscores the importance of certain key aspects. Regarding entrepreneurship education it appears evident the importance of the integration of comprehensive entrepreneurship education into the curriculum is a paramount requirement. The entrepreneurial skills are covered by all the selected papers, representing the main structure where digital and life skills could be added [24, 26, 27, 32]. This integration has been linked positively to teachers' intentions to pursue entrepreneurial ventures. By arming this target with relevant knowledge and skill sets, this form of education acts as a catalyst, motivating them to stride confidently toward their entrepreneurial aspirations.

Another crucial issue is incorporating successful entrepreneurial models, that includes the adoption of thriving entrepreneurial models plays a pivotal role in boosting students' self-assurance concerning their ability to initiate and manage businesses [24, 26, 28]. The strategic infusion of established models substantially heightens students' self-confidence, thus fostering a proactive mindset toward entrepreneurship [29].

Regarding the advancement of digital skills, from the literature reviewed in appear relevant to enhance proficiency in digital security. There is an urgent demand to amplify competences in digital security. Furthermore, increasing the allocation of training hours for cultivating digital proficiency holds critical significance. Recognizing the educational landscape, it becomes imperative to amalgamate pedagogical expertise and technological acumen, crucial components for effective instruction in digital competence.

At the same level another central point refers to empower educators as technology advocates [26, 30, 32, 33]. Empowering educators to nurture technological prowess among students stands as a foundational pillar for their personal, social, and professional progression. Given the intrinsic role of technology in enhancing quality of life, specialized training for teachers becomes essential. This equips them to adeptly guide students through the intricacies of the digital realm, especially in the context of online learning environments [24].

Nevertheless, in order to permit a congruent level of knowledge regarding these competencies is needed to enable the educations to work with the e-learning tools and with the online teaching, giving them the right educational keys [25]. Succeeding in virtual teaching environments hinges on educators possessing specific technical proficiencies and practical tools. This adaptive skill set ensures that their teaching methodologies remain potent and captivating within digital learning landscapes [29].

Finally, also the soft skills are important even these are less covered in the performed scoping review [24, 25, 27, 32]. Regarding the life skills, it emerges the needs of elevating this transversal competence by cultivating collaborative communities of practice. A pivotal avenue for nurturing soft skills involves fostering collaborative communities of practice. These platforms underscore the collective co-creation of practical solutions for everyday challenges. This approach not only bolsters problem-solving acumen but also nurtures interpersonal skills and collaborative teamwork.

Another aspect that is relevant from the selected literature represents the overlapping between well-being and soft skills, by using a comprehensive approach [24, 27]. Elevating individual and collective well-being through targeted training and experiential learning assumes a central role in nurturing human attributes and soft skills. By investing in activities that enhance emotional intelligence, communication, and adaptability, individuals are better equipped to excel in both their professional and personal spheres.

Finally, replying to the RQ2, it appears evident that the impact of the gamification aspects in that system is not relevant and the question has a low impact. The authors decided to maintain this question in order to show the lack of relevant results on terms of gamification in pedagogical strategies in higher education that presents and overlapping between more than one dimension between digital, entrepreneurial and life/soft skills knowledge.

only a paper presents an explicit reference to the game-based learning [29], although also the paper of Taratukhin et al. [32] refers of innovative methods as hackathon that includes also gamification aspects. This aspect is not included in the analysis, and it brings a complete novelty for the GEMMA project.

5.1. Future work

This pivotal analysis reinforces the importance of the work in the GEMMA project that brings to investigate how to provide a significant education to lecturers, professors and researchers in HEI augmenting their well-being within workplace environments through a comprehensive approach.

The initial phase of the project entails the meticulous completion of a systematic review, serving as the foundational groundwork for the development of an integrated model that will expand the work presented in this paper.

Looking ahead, the GEMMA project, initially calibrated for the higher education domain, envisages an expansive trajectory. While its core framework is tailored to academia, the project envisions the potential transference of its principles to other sectors. By synergizing entrepreneurial, digital, and life skills, this integrated model can be adroitly repurposed to engender benefits within an array of industries extending beyond education. This adaptive capacity underscores the project's ambitious endeavor to affect a sustained and meaningful enhancement of workplace well-being across diverse sectors.

In the next months, the project will analyze the needs of the target groups by executing some focus groups that will enable the collection of representations, beliefs and comments useful for the subsequent integrated model.

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