

**IDEAL-GAME**

*Improving didactics, education and learning   
in Higher Education with the Online Serious Game Creator*

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**Produced by UPIT**

**Project Title:** Improving didactics, education and learning in Higher Education with the Online Serious Game Creator

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 P2 Ingenious Knowledge GmbH (IK), Germany (DE)  
 P3 Universitatea din Pitesti (UPIT), Romania (RO)  
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 P5 University of Dundee (UoD), United Kingdom (UK)  
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1. **EXECUTIVE SUMMARY**

This Policy Paper summarises the latest situation in the use of Serious Games in Higher Education (HE) from the perspective of their educational and pedagogical significance, as well as how to implement them as effective teaching and learning practices for lecturers and students. The present study finds that, although Serious Games are a widespread type of educational resource, they are not being used to their full potential in European HE.

In order to improve this deficient situation, the ambitious project named ***“Improving didactics, education and learning in Higher Education with Online Serious Game Creator”*** [acronym **IDEAL GAME**] was carried out by a consortium of six partner-organisations from five European countries. The project was financed by the Erasmus+ Programme of the European Union – a Strategic Partnership for Higher Education and has the reference number 2020-1-DE01-KA203-005682. More information is available on the project official website <https://ideal-game.eduproject.eu> . The project consortium is composed of four public universities, one non-public university and one IT company providing educational resources, as follows:

* Universität Paderborn (UPB) – DE (<https://www.uni-paderborn.de/en/university>)
* Ingenious Knowledge (IK) – DE (<https://www.ingeniousknowledge.com/?id=1>)
* Universitatea din Pitești (UPIT) – RO ([www.upit.ro](http://www.upit.ro))
* Wyzsza Szkola Ekonomii i Innowacji w Lublinie (WSEI) – PL (<https://rekrutacja.wsei.lublin.pl/en/>)
* University of Dundee (UoD) - UK (<https://www.dundee.ac.uk/>)
* Universidad a Distancia de Madrid SA (UDIMA) – ES (<https://www.udima.es/es/la-udima.html>)

The IDEAL GAME project aims to support the process of learning in Higher Education Institutions (HEIs) in a modern and innovative manner which is underpinned by the use of serious, intelligent and fascinating games. For this purpose, the project consortium designed an advanced **Online Serious Game Creator** which can create, test and evaluate Mini-Serious Games within learning scenarios. The tool was designed in a way that the Serious Games can be equipped by the users with different content, so they can be easily integrated into modules and lectures and individually adapted to different scientific disciplines and fields of activity.

In addition to the IDEAL GAME Creator Tool,the project consortium developedan **Open Educational Resources (OER) Platform** with more than 50 Serious Games and corresponding learning scenariosin which the games are embedded. The additional OERs include a prototype test integrated into study modules at the participating universities, an evaluation of the designed Serious Games in lectures and a construction of a showcase portal with additional pedagogical tips and insights into ongoing Serious Games designed with the IDEAL GAME Creator Tool.

To make the information available and easy to understand, the project consortium created a **Tool Handbook for Lecturers** and a **Tool Handbook for Students**, describing the use of the IDEAL GAME Creator Tool, along with a **Didactical Handbook for Lecturers,** explaining the concepts involving the combination of the Serious Games with learning materials to provide a Flipped Classroom approach. These handbooks are targeted towards a range of different specialists, like teachers, trainers, researchers, students, technicians and youth employees, working in a vast field of activities.

Finally, the **Policy Paper** and the **Layman’s Report** of the project were created.

1. **STATEMENT OF THE PROBLEM**

**The necessity for innovative motivating learning and teaching resources for HE**

With more than 32.800.000 entries on Google™ until December 2020, the megatrend of digitisation, caused by global change, illustrates the importance of digitisation in every organisational context, especially since the Covid-19 pandemic crisis brought this issue to the forefront. In the field of education, the importance and relevance of digital change are increasing, providing challenges in all walks of life, including the HE` sector. Consequently, **it is necessary to support the education system with innovative knowledge and motivating ways of learning and teaching to meet the challenges of digitisation**. Therefore, the Erasmus+ project IDEAL-GAME aims to enhance learning and teaching in HEIs by creating an Online Game Creator for Mini-Serious Games.

The following are the national perspectives of the project partners regarding the necessity for innovative and motivating learning and teaching resources in HE:

**Germany (UPB & IK)**

In Germany the need for innovative learning and modern didactic and pedagogical approaches is very present. Many HEIs provide specific learning environments for the students and see a specific need to provide motivational teaching and learning settings. In several “Länder” (substates of Germany) there are also networks and cooperation between HEI in Germany like the ´Netzwerk Hochschuldidaktik NRW´, the network on Higher Education didactics of Northrhine-Westfalia (NRW) (Netzwerk Hochschuldidaktik NRW, 2022: Professionelle Lehre für die Wissenschaft). They foster collaboration, offer qualification programmes, network meetings and they are organised in the ´Deutsche Gesellschaft für Hochschuldidaktik e.V. (dghd) (Deutsche Gesellschaft für Hochschuldidaktik e.V., 2022: die dghd), which is in English ´German Society for Higher Education Didactics´.

But, the focus of the networks and the activities of the HEIs is more on general teaching and learning, assessment, academic and pastoral support of students, feedback and evaluation as well as interrogation of innovation as well as cross-cutting issues, role / values and digitisation (See e.g. Netzwerk Hochschuldidaktik NRW, 2022). The dghd also focusses on research, international issues, politics and policy recommendations as well as accreditation issues as part of its work.

Nevertheless, serious games in HE are not very focussed. There are ~~several~~ HEIs who offer some aspects, but they are rarely integrated into lectures. Serious Games are becoming more important in HE in Germany and the approach fosters a better integration of students in lectures, seminars and courses.

**Romania (UPIT)**

At present, HE worldwide is realized with modern didactical means involving digital environments like Open Educational Resources (OER) and also advanced pedagogical practices like Open Educational Practices (OEP). In the European Union and, by implication, in Romania, the concepts of OER and OEP are present in strategies on the development of education systems and programmes to support the quality of the education in HE, as well as those concerning access for teachers and students to quality educational materials.

At a national level, Romania's Digital Agenda considers the use of Information and Communications Technology (ICT) in the Learning Process and in the Life-Long-Learning Process as a strategic development line, as stated in the Partnership Agreement with the European Union 2014–2020. The Romanian legislative framework, namely the Law of National Education No.1/2011, with subsequent amendments and additions, recognises the need for the development and use of OER and OEP as best practice learning and teaching resources in national education, including HE (<https://edu.ro>).

Also, on 26 October 2020, the Ministry of Education and Research of Romania launched the process of elaborating the Strategy on the Digitalisation of Education in Romania 2021–2027, called 'SMART.Edu', a national plan centred on the following key concepts: Modern School, Accessible, Based on Digital Resources and Technologies. The purposes of this strategy are intended to be achieved through the use of representative OER and OEP items in the context of HE in Romania, namely Serious Games, Virtual Laboratory and Massive Open Online Courses (MOOC), as digital tools incorporated into learning modules and lecturers, and respectively Flipped-Classroom Concept and Web-Based Learning (WBL), as learning and teaching innovating methodologies (<https://www.smart.edu.ro>).

**Poland (WSEI)**

*"Teaching methods and the things we teach date back 200 years"* – as stated by Jack Ma, creator of the Alibaba website, at the World Economic Forum in 2018, reflects the leading challenges facing student learning in universities around the world. A 2018-2019 survey report among students at Poland's largest academic centres confirms the need for change (Włoch & Śledziewska, 2019). Surveyed students emphasise that an excess of lectures and a lack of encouragement for independent research weakens their motivation to learn. The form in which information is communicated / acquired is also important. In the daily lives of young people, image culture, based on Instagram, TikTok and games is displacing other forms of media, attracting attention through the possibility of interaction, replacing the passive reception of textual information. Universities and colleges are generally not following these trends, continuing to be the mainstay of the written and spoken word, although gamification of education is increasingly appreciated by students (Rodwald, 2019). Incorporating a form of games into education that is natural for young people could provide an opportunity to increase motivation to learn, as well as reduce the consequences of the language barrier. A pictorial, game-based message is particularly important for foreign-language students, for example, Ukrainian students who are present at Polish universities in large numbers, as it reduces the language barrier. A challenge for lecturers, however, is the additional workload required in developing~~,~~ short serious games aimed at students. The IDEAL Game Creator can help with by providing tools for constructing simple Serious Games in a graphically attractive form. IDEAL GAME can be particularly useful in connection with Flipped-Learning – natural self-directed strategy.

**United Kingdom (UoD)**

The recent explosion of TikTok related learning material exemplifies the way that digital technologies can be subverted, adapted and used as a vehicle by students to creatively respond to learning challenges, or to create their own learning materials (Oldfield, 2022). The need to view students as agentive learners is an important aspect of enhancing the experience of learners in all settings (Lankshear & Knobel, 2011). The world of computer games is a context in which learner agency has been reported. It is a world that for many years, has been a central context for learning and creative expression for many of our young people (Ulicsak & Williamson, 2010). It can be observed how the world of the commercial-off-the-shelf computer games can impact on attainment and how serious games can impact on learning (Boyle et al., 2016). The potential of learning through games is something that has been recognised by Microsoft™ with their $2.5 billion acquisition of the game Minecraft™ to help lead their educational offerings.

Such digital domains present and offer context that can engage and motivate learners. It is incumbent on us, in all aspects of education, to reflect on the way in which we frame learning through digital technologies. There is a history of evidence that challenges these dominant narratives and orthodoxies of technology use that maintain and perpetuate established methodologies and cultures of learning (Ball, 2016). If educators are serious about creating engaging and motivating contexts for learning, then maybe, they should be recognising the potential of Serious Games (Lameras et al., 2016) and other non-traditional technologies for learning.

**Spain (UDIMA)**

The fourth industrial revolution fully introduces us to an information society in which we have practically unlimited access to all kinds of data, at any time and from anywhere (Vázquez-Cano et al., 2020). This brings changes in our daily lives as citizens, but also in the labour market, as it requires 21st-century skills such as interpersonal skills, interactive communication skills, and technology literacy skills (Vasbieva et al., 2021).

Educators must respond to the changes that occur since the possibility of accessing any knowledge prevents the teacher monopolizing and transmitting said knowledge (Blázquez et al., 2017; Martín-Padilla et al., 2013; Vasbieva et al., 2021). Now that students can stay informed through their electronic devices, the focus is on guiding them to acquire the necessary skills to use these devices to consult appropriate sources of information, create new knowledge and collaborate (Blázquez et al., 2017). In this way, the role of the teacher happens to be the organizer or coordinator of the teaching-learning process, acting as a guide for the student, who will be the centre of attention and will take an active part (Blázquez et al., 2017; Vasbieva et al., 2021).

It is important to keep in mind that students use technology outside of the classroom and expect to use it inside as well (Mehisto et al., 2008). Companies and content creators attract their recipients using highly visual and innovative forms of information to ensure their attention. As a number of students are used to this, it is necessary to use innovative formulae to motivate them and capture their interest and attention. Educators must be in line with their environment’s needs and reality (Martín-Padilla et al., 2013). As a consequence of this great challenge, ICT and student-centred methodologies are beginning to gain presence in the classroom.

Serious games focus on the student and allow their participation through the use of digital tools. They are, therefore, a current and optimal resource to meet the demands of today’s society and education. Supported by the software, they present a series of tasks with an educational purpose that are supported by the game components (Maheu-Cadotte, et al., 2018). In other words, they use punctuation, are presented through a story, and have a system of rules and codes that guide the player to a goal. When applied with an educational objective, these game elements naturally achieve the player’s immersion and favour the students’ engagement (Lameras et al., 2016).

1. **CURRENT POLICIES**

**Common European approach on Flipped-Classroom designs in HE**

The European Credit Transfer System (ECTS) states that the accounting for the time spent in learning has two essential parts: classroom teaching (work with the professor) and distance learning (work without the professor, whether in an individual or collective way). Due to the COVID-19 crises, the importance of distance learning was brought to the fore, so the Flipped-Classroom designs in HE currently represents the predominant didactic strategies, including on the acceptance of modules from other European universities. In this way, the transmission of information is carried out with aids that the professor prepares, so that the student works independently before the classes, thus being able to dedicate more effectively the classroom teaching time to a more complex learning.

The project partners already had experience with the use of Common European approach on Flipped-Classroom designs in Higher Education, as can be seen below:

**Germany (UPB & IK)**

The Flipped-Classroom approach is becoming more and more popular in German HE. But, the numbers of lecturers who use it in their modules and courses can still be increased. It is mentioned as one of the most important methods of contemporary teaching (Aissaoui, 2022).

In HEIs in Germany we recognised the there is more time in the lecture if Flipped-Classroom settings are used and that discussion becomes more detailed and specific which fosters the students’ learning. This often goes hand in hand with an increasing motivation and greater interaction in modules, courses and lectures. These approaches of inverted-classrooms were discussed in different fields. A prominent example is Christian Spannagel, a professor of mathematics and didactics with focus on informatics at the ´Pädagogische Hochschule Heidelberg´, who was the one who introduced this approach to a broader German audience (Werner et al., 2018).

Important here, is the focus on the learner, centred in Higher Education in Germany, which means a shift from teaching to learning and which should be enhanced in the coming years. This is also mentioned in the quality standards for Higher Education of the *´*Deutsche Gesellschaft für Hochschuldidaktik e.V. (dghd) (Deutsche Gesellschaft für Hochschuldidaktik e.V., 2022: Qualitätsstandards).

**Romania (UPIT)**

In Romania, during the COVID-19 epidemic, HE`s activities were carried out online, which led to the use of the Flipped-Classroom Concept on unprecedented scale. Teachers and students used a rich source of OER archives, many teachers created OER for the national director, EDUCRED Academic, and shared their online teaching experiences via social media communities, such as Facebook CRED (<https://www.facebook.com/groups/574392349703069>) or The Coalition for OER (<https://www.facebook.com/groups/REDRomania>). For online teaching and learning activities, a large number of teachers used the Google Education Suite (<https://www.eduapps.ro>) or the Office 365 Web App (<https://www.logicnet.ro>), integrating various OER. Several educational sessions were recorded, uploaded, and shared as OER for general (re)use. Students participated in both individual and group activities, creating projects and presentations, for which they sent photos and multimedia content to their classes’ online platforms.

In the University of Pitesti (UPIT), for both online and on-site teaching activities, the **eLearning MOODLE platform**(<http://learn.upit.ro>) is used - a software package developed for creating and organizing courses, as well as coordinating student activity. UPIT students can access the learning materials through UPIT’s Moodle educational platform, designed to support classical teaching, distance learning and assessment activities. The platform facilitates the loading of the content of the courses, seminars and laboratory works, which the student can access and study before the beginning of the classes, thus facilitating the familiarization of new notions and concepts. Also, the student can upload problems solving and data processing and these are evaluated individually by the teacher. So, all these teaching-learning-assessment processes design an online Flipping-Classroom Concept.

In addition to and in support of the MOODLE platform, UPIT also uses the **vlearn platform** (<https://vlearn.upit.ro/index.php/apps/dashboard>) developed as a platform for storing audio, video, photo recordings to enhance effective implementation of the teaching activities as well as to provide students with learning support. Developed entirely by UPIT, the platform gives the possibility for each teacher to upload the video or photo presentations of the achieved teaching activities. vlearn is a stand-alone in-house storage platform, but can easily migrate to the cloud. Each user (i.e., each teacher) can organize their database according to the subjects taught or to the period of development of these disciplines, as the platform structure is of Windows Explorer type.

All these online teaching and learning activities are currently an important OEP experience in Higher Education in Romania, forming a range of best practice for the widespread use and development of the Flipped-Classroom concept (Erasmus+ Project: `Flip your classes through multimedia enriched apprenticeship simulations and develop e-skills for VET teachers and students to enhance youth employability’; Project Acronym: E-Classes; Reference number: 2017-1-RO01-KA202-037344; Project start date: 01.10.2017 ; Project end date: 30.09.2019; Official site at: <http://e-classes.eu>).

**Poland (WSEI)**

The Flipped-Classroom method has become considerably more popular in Poland as a result of the COVID-19 pandemic. The lack of opportunities for typical classes has led to an interest in exploratory teaching. The Flipped-Classroom model is also natural in the final stages of Higher Education: according to the International Standard Classification of Education (ISCED), it is suitable for bachelor but long studies (ISCED 6), such as Faculty of Medicine, also for master studies (ISCED 7) and doctoral studies (ISCED 8). Last year, even a subject “Gamification Studies” was launched at the Adam Mickiewicz University in Poznan. The Flipped-Classroom model fits perfectly into the ECTS system, in which the ability to learn independently is one of the important competences (Równiatka, 2020). The ECTS regulations emphasise that students are to master not only the ability to solve problems that have been indicated to them, but should also be able to perceive and define these problems independently. The competence to formulate questions and critically examine collected data can be developed primarily through independent, attentive observation of reality in a motivating learning environment, such as e.g. serious games, especially taking into account the need to focus on details, recognised and analysed in the context of the framework rules of conduct in the game and the motivational regularities of coping with the task.

**United Kingdom (UoD)**

A Flipped-Classroom design, one where the student engages with the learning materials prior to attending a live class, lecture or workshop and then uses the time in class to deepen understanding and develop applications for the learning, has become increasingly common in HE (O’Flaherty & Phillips, 2015). The opportunity for deep and active learning in the classroom environment makes flipped learning designs popular with both students (McNally et al., 2017) and HE professionals (Long, Cummins & Waugh, 2017).

In the UK, Advance HE, which is a sector-owned charity that works with institutions to improve HE for all stakeholders, endorses flipped learning as a pedagogical approach that can support deep learning and engagement (Advance HE, 2020). According to the European Credit Transfer System (ECTS), which is used by most UK HE institutions, credits are allocated for all aspects of a course, including classroom time, placements, and individual work, highlighting the potential for Flipped-Classroom learning.

**Spain (UDIMA)**

The change of roles that has been taking place in students and teachers in response to the demands of society is given by two factors: on the one hand, the freedom of access to information, on the other, the need to educate individuals to be capable of continuing to learn throughout their lifetime and putting this learning into practice.

In this sense, active teaching-learning methodologies have been gaining presence according to the current situation and the skills that it demands. One of the models that stands out between these methodologies is the Flipped-Classroom for being student-centred and actively involving students so that they become knowledge generators. This system raises learning based on personalization, higher order thinking, self-direction, and collaboration (Joyce, 2019).

Thus, the demands of society and the consequent incorporation of active methodologies lead to the formalization of these requirements in study plans in the form of competencies. It increases potential for practical learning and is thus reflected in the Bachelor's and Master's plans. The European Credit Transfer System (ECTS), promoted by the Socrates-Erasmus student mobility plans, allows the comparison of educational systems and the recognition of professional qualifications, for which it allows comparison of competencies worked on in each university course and learning module, as legislated in the Royal Decree 1125/2003, of September 5 (R.D. 1125/2003), establishing the European credit system and qualification system in official university degrees valid throughout the national territory of Spain. Among these competencies, some of the transversal nature ones are established, so they must be present in all official degrees in Higher Education, as legislated in the Royal Decree 1393/2007 (R.D. 1393/2007), establishing the organization of official university education in Spain. These generic competencies or transferable skills are settled through the Tuning Project (González & Wagenaar, 2005) and groups them into three areas:

* Instrumental competencies: cognitive, methodological, technological, and linguistic abilities.
* Interpersonal competencies: It refers to individual abilities such as social skills which include social interaction and cooperation.
* Systemic competencies: It regards abilities and skills which involve and combine all systems (understanding, sensibility, knowledge, instrumental and interpersonal, etc).

On the other hand, reality and educational regulations feed off each other constantly, since the demands of society cause new mechanisms to be put into operation in the classrooms and this leads to reflecting it in the regulations. Similarly, the regulations require the inclusion of these competencies, which leads to the use of new methodologies and establishes a new step from which to continue advancing (Vázquez-Cano et al., 2020).

1. **IDEAL GAME PROJECT PROPOSED SOLUTIONS**

**Change of policy approach in learning and teaching practices in Higher Education regarding the use of the Serious Games**

E-learning and digitisation in Higher Education become more and more important. Additionally, there is a high interest in the development of new and innovative teaching and learning environments for HE globally, but the support for lecturers and learners is still to be improved. For this, **the use of the Serious Games in modern Higher Education is very suitable, because in this way teachers and students can combine the latest ICT technologies with the requirements of best practices in learning and teaching**. Therefore, a change of policy approach in learning and teaching practices in HE regarding the use of the Serious Games is absolutely necessary in the sense of actively engaging students in lectures by incorporating a motivational game-based learning approach as an integral part of the Flipped-Classroom concept.

Next, the project partners consider why a change of policy approach in learning and teaching practices in HE might be relevant:

**Germany (UPB & IK)**

There is a strong need to foster the integration of Serious Games in HE on a German and European level. Serious games are a crucial part of modern digitisation, offer direct learning experiences and focus on competence orientated approaches. Such approaches are also demanded by the quality standard for HE provided by the ´Deutsche Gesellschaft für Hochschuldidaktik e.V. (dghd) (Deutsche Gesellschaft für Hochschuldidaktik e.V., 2022: Qualitätsstandards).

Serious games and gamification are playing an increasing role in the didactic considerations that are being made about digital learning environments in Germany. This can be explained, not least by the fact that gamification is an integral part of work in business, and that digitisation of further training approaches in business is increasingly incorporating serious games into in-company training. The positive effects of serious games as a unique model are their stimulation of mind, the possibility to strengthen self-confidence, the connection of serious games to authentic situations and real life as well as the immediate feedback, interactivity and the chance to enhance collaborative learning. The growing engagement and increasing motivation of the learners by the use of serious games is fostering the development processes of the students but also in HE in general.

**Romania (UPIT)**

A suitable approach of Flipped-Classroom concept is mixing the traditional classroom activities with Mini-Serious Games, which can be integrated into modules and lectures and also provided as OER.

3D and VR virtual laboratories enable students to conduct different experiments in a secure environment in order to observe, study, demonstrate, verify and measure the results of the phenomena studied. Through virtual experiments, students can experience any real-life situations, regardless of the degree of complexity and danger of the experiment. Processes can be repeated until fully understood in an attractive and easy way to use. Virtual laboratories involve both compliance with pedagogical specifications and curricula, as well as specific recommendations, standards, norms and conventions for the design of digital educational content.

In Romania, at the University of Pitesti, in the Department of Environmental Engineering and Applied Engineering Sciences, students study physical phenomena in applied physics courses through verifiable practical experiments with the **Pintar InterACTIVE VirtuaLab computer application**, accessible free of charge for download from the site <https://pintar-interactive-virtualab> . This application is a virtual interactive laboratory with specialized software for every fundamental domain of applied physics, designed to easily integrate in the practical laboratory work.

Serious military games are used as tools for military self-training in a virtual environment where mistakes are not catastrophic. They give the opportunity to experiment in realistic environments and allow the user to repeat an action whenever they wish, until a complete understanding is gained.

Serious military games develop players' ability to integrate sensory data in real time to receive real-time information about weaponry and robotic military vehicles on the ground in order to support tactical and strategic decisions. At the same time, these serious games train players to collaborate as a team to accomplish tasks and goals by transmitting complex information through better memorization of specific messages. Feedback provided immediately motivates and stimulates the right actions, as players can see the consequences of their actions and are instantly assessed whether they have acted correctly or not.

In Romania, the National Defence University "CAROL I" in Bucharest, through the Department for Distance Advanced Distributed Education, gives students access to the **Serious Game VBS2 NATO developed by Bohemia Interactive** (<https://www.bohemia.net>). considered one of the most powerful instruments of individual or collective military training. This Serious Game supports and develops training by providing a virtual sandbox where participants can perform tasks taken from real scenarios and then learn from their mistakes in a safe virtual environment.

**Poland (WSEI)**

Updating and expanding academic curricula has long failed to master even part of the rapidly growing body of knowledge. The increasingly broader competences acquired at university are of little use in everyday work and need to be supplemented at the beginning of one's career with skills specific to the working environment. A key competence is therefore the ability to learn independently and selectively. Such a competence can largely be acquired through the use of a Flipped-Classroom, directed by the lecturer and supported by gamification to accelerate the mastery of material prepared in an attractive, motivating way. In order to fully exploit the potential of serious games in HE, it would be important to clearly link serious games to the learning objectives, so that they do not feel like an add-on, but become an essential working tool. For lecturers, it is important to consider the facilitation that games will bring to teaching, rather than the additional burden of preparing them. An example of a long-lasting strategy to support the achievement of the above goals could be to formally regulate the implementation of primarily serious games in HE that meet the RETAIN (Relevance, Embedding, Transfer, Adaption, Immersion and Naturalisation) criteria (Ulicsak & Wright, 2010).

**United Kingdom (UoD)**

There is much work to be done if we are to elevate the place and purpose of Serious Games as a valued strategy for learning in HE. There needs to be a concerted and sustained effort to raise the profile of Serious Games with those who work on HE programmes and recognition of the effectiveness of serious games by the relevant accrediting professional bodies. Such an approach would acknowledge the challenges presented by a landscape informed and influenced by the dominant orthodoxies of educational technology use (Ball, 2016).

It is important that any policy documentation about the place and purpose of educational technology in teaching and learning, consistently refers to Serious Games as one of a range of important strategies for teaching and learning. Such a change could play a part in helping to increase interest in this area, and in giving implicit permission for such an approach to be used. It would be helpful for a series of case studies of the effective application of Serious Games in HE contexts to be made available. This would support those who are considering the use of Serious Games to develop an awareness of how such an approach may fit in with their curricular architecture and their developing pedagogical understanding.

**Spain (UDIMA)**

Social reality forces educational institutions to propose a series of solutions, which are reflected in the educational norms and regulations. The incorporation and formalization of these needs and the educational responses that are given in the legislative documents make these answers effective in all the degrees of the different educational institutions. At the same time, this implies establishing a new ladder from which to continue moving forward, which will cause changes that will have to be incorporated back into the official regulations to maintain updates.

Students live in an interconnected society in which it is increasingly common to study in other countries or work abroad after completing a Bachelor’s or Postgraduate degree. The educational system which tries to establish equivalences to allow this mobility and the response by the European Higher Education Area (EHEA) to this situation is the European Credit Transfer System (ECTS) by which a series of points are established to achieve a unit of common measurement in the degrees of different countries (Ferrer-Torregosa, 2016). This regulation means that all HE Institutions must adapt to common guidelines.

On the other hand, the construction of official qualifications is established around a series of competencies, among which it is worth remembering are those of a transversal nature, which are common to all degrees and postgraduate degrees and which respond to the demands of today's society (González & Wagenaar, 2005; Royal Decree 1393/2007).

The competencies are centred on the student and give them a prominent position in the learning process. However, the ECTS system ignores the autonomous work of the student, but, when it comes to establishing relationships, it seems to be governed rather by the teacher's class hours, establishing a relationship of 10 class hours per credit (Ferrer- Torregosa, 2016). In addition, as a consequence of the rapid digitization and the Covid-19 pandemic, the number of degrees offered in online and blended learning models is growing (Duncan & Young, 2009; Ruiz-Morales et al., 2017), which in many cases are asynchronous and place a much greater weight on self-directed learning on the part of the student.

Serious games are gaining ground in the educational sector by responding to the demands of society by including both technologies with an educational purpose and focusing on the student. The increase in number of degrees that involve learning through the screen makes this resource have even more of a presence. The competencies take into account this new approach in learning (student) more than in teaching (teacher), but the ECTS does not award credit according to the participation required by the student. Therefore, the need to adapt the way of measuring and transferring credits between degrees from the students’ point of view and not from the teachers’ perspective is highlighted.

1. **RECOMMENDATIONS FOR A COURSE OF ACTION**
   1. **Recommendations on the use of the Serious Games in Flipped-Classroom concept in HE**

Current best practices in learning and teaching in HE demonstrate there is a need for a strong emphasis on the development of topics and learning activities in e-learning. Due to this, **the Flipped-Classroom concept, as well as the development of Serious Games in HE, offered by IDEAL GAME, is welcome**.

To ensure that use of the Serious Games in Flipped-Classroom concept is relevant and useful to lecturers and learners in HE, project partners make the following recommendations:

**Germany (UPB & IK)**

With regard to our IDEAL GAME project, we made the experience that the Mini-Serious Games created can easily be adopted to different HE settings, to different study programmes and that the flexibility of our *Online Serious Game Creator* provides the opportunity to bring the serious game approach also into lectures where currently no full Serious Games exist, and can be easily used by lecturers who are not so experienced in creating a digital tool.

Policy should foster the integration of easy to adapt serious game approaches which can be used in different fields and topics. This helps provide a solid basis for the integration of game-based approaches in HE. Moreover, the pedagogical and didactic ideas to create such types of serious games should be fostered. There is a need for a broader variety of adaptable serious game approaches which can be integrated in European HE and to support their academic recognition, to developing exchanges of information and experience in the use of mini-serious games and big serious games in HE. This will also provide a possibility to encourage the idea of the European Higher Education policy of the development of distance education.

Serious Games offer an additional methodological approach to focus on in-depth knowledge and understanding. The motivation which accompanies learning with Serious Games also provides students with the chance to focus on new frontiers of knowledge without feeling patronised. The course of action has to go towards a didactic and pedagogic supported use of serious games and digital approaches in HE.

**Romania (UPIT)**

In Romania, Serious Games can improve learning outcomes, but they also create certain challenges in terms of their implementation in HE, which depends on various aspects, and for each aspect it is advisable to address appropriate measures, as specified below:

From an institutional point of view, it may be difficult for some faculties to adapt the teaching method so that the inclusion of Serious Games in lectures corresponds to the interest shown by students in an interactive form of teaching. The opinions of the students questioned about their preferences regarding the method of teaching courses depend on factors such as: faculty specialization, year of study, form of schooling, size of the university centre etc. So, the implementation of the Serious Games should take into account all these factors above.

With regard to the teachers, a number of them are afraid of losing control of the teaching process when they invite their students to make their own contributions to the course activities and to actively participate in their course development by using interactive teaching methods, including Serious Games. On the other hand, some teachers do not have the digital skills to incorporate Serious Games into their courses. For these teachers, digital skills training should be organized along with training courses in the use of OER and OEP, including the use of Serious Games in lectures.

With regard to the students, a number of them are more familiar with traditional approaches to teaching and learning, and therefore it is difficult for them to adapt to a modern interactive course, which also includes Serious Games, as this would force them to make an extra effort to become more active, participatory, communicative, innovative and autonomous. These students should be advised by teachers and educators to make this initial effort to discover the advantages of interactive methods of education in order to evolve towards higher learning performance.

**Poland (WSEI)**

Increasing the benefits of using serious games in the Flipped-Classroom can be achieved by popularising simple tools for creating serious games, such as IDEAL Game. It would be important to ensure methodological support for the implementation of such tools in university classes, using example scenarios and case studies. It would be valuable to provide opportunities for asynchronous team play of serious games. Gamification in support of contemporary HE also requires strong support for real-time collaboration between students, which can be achieved by integrating games with communication tools, including online and offline (Mayer et al., 2015). It also seems important to ensure the easy transfer of points obtained in the game into assessment systems, e.g. similar to grading in the Moodle platform. The flexibility of the games themselves, allowing lecturers to modify basic game parameters, such as time to answer or compatibility of the games with adaptive learning quiz systems, such as in the Moodle environment, or even the development of a serious game construction tool in the form of a plug-in for Moodle-type Learning Management Environments (LMEs) may convince a significant group of lecturers to use serious games in HE.

**United Kingdom (UoD)**

The IDEAL Game project has been useful in developing an Online (mini) Serious Game Creatorthat can be used by educators in HE. The IDEAL Game project provides opportunities for lecturers to use a Flipped-Classroom approach because of the learners’ potential motivation to engage with Serious Games in their own time and learning space. It also provides lecturers, with little or no experience of constructing games, the option to use the creator to gamify and use play pedagogy for their course content/classes.

On this basis, two types of policy level changes can be envisaged. The first one is at a local level where HEIs could implement a policy of developing skills related to the creation of Serious Games, which can then be embedded into the HE programmes’ curriculum, for example as part of the PG Certificate Academic Practice in Higher Education (PGCAPHE) and equivalent in UK universities. Similarly, Advance HE, which provides a professional membership scheme and HE fellowships, could promote the creation and use of Serious Games as one of the key skills that a lecturer could demonstrate as part of their portfolio when applying for a fellowship.

**Spain (UDIMA)**

Serious games respond to a range of demands such as: the need to focus the learning process on the student, the use of digital tools, and to motivate and engage students for educational purposes. These aspects should be reflected in the educational regulations because the qualifications must respond to the demands of society, be measurable and based on the real situation, and be comparable with those of other educational institutions across the nation or other countries.

In addition, among the degrees that are regulated, some HEIs train future teachers at different educational levels. Taking into account this new reality in which we find ourselves and emerging methodologies such as serious games, will allow future teachers to know and apply them effectively in the future. Therefore, teachers need training, but also resources to implement this type of action. The IDEAL GAME project aims to provide the resources that enable the creation of serious games.

* 1. **Recommendations on the professionalisation of lecturers with regard to the IDEAL GAME Creator Tool**

Teachers and education designers are the decision-makers of tomorrow's policies and those who will shape our common future and that is why the support of lecturers is needed in HE in ongoing and sustained professional development in their pedagogical knowledge and expertise. The IDEAL GAME project aims to enable the creation of Serious Games, but also provides the resources to support the lecturers’ professional development in implementing this type of action.

To further enhance the pedagogical skills and understanding of lecturers with regard to the IDEAL GAME Creator Tool, the consortium of the project recommends the following three-steps-algorithm:

1. **Studying didactical background and practical guidelines from the IDEAL GAME Handbooks**

To make sure that the use of the IDEAL GAME Creator Tool is easy to understand and also that the didactical concepts are made available and usable by the designated users (assistants, lectures, professors and students), three different handbooks were developed:

**Didactical handbook for lecturers**: provides lecturers in HE with the knowledge to create the curriculum behind the Serious Games Creator Tool and how the tool can be integrated into the planning of learning scenarios and lesson plans. It offers didactical materials and resources, overviews and examples of teaching scenarios, along with learning outcomes matrices. In addition to these, curriculum and learning outcomes matrix-templates are provided, which lecturers only need to complete.

**Handbook for lecturers**: offers lecturers in HE a guide on how to use the Serious Games Creator Tool to create contents for Serious Games suitable for their courses and students' level of understanding. It enables the lecturers to choose from the different Serious Game formats the most appropriate one for a specific subject addressed in a certain course, so that their new created Serious Game can integrate seamlessly into the didactical setting of a Flipped-Classroom approach.

**Handbook for students**: offers students an explicit guide on how to use the Serious Games and their different formats provided with the IDEAL GAME Creator Tool, as well as the learning scenarios.

These handbooks are provided as OER at <https://ideal-game.eduproject.eu/?page_id=16> and represent useful guides for users to enhance the quality of learning and teaching in their courses.

1. **Experimenting with the designed Mini-Serious Games and learning materials on the IDEAL GAME OER Platform**

Using the IDEAL GAME Creator Tool, the partners created over 50 different Mini-Serious Games for their modules and lectures. Moreover, they developed corresponding learning scenarios in which the games are embedded. The innovative element of this concept was to combine Mini-Serious Games with learning materials to provide a Flipped-Classroom approach.

The designed Mini-Serious Games and learning materials are available on the IDEAL GAME OER Platform at <https://ideal-game.eduproject.eu/?page_id=16> . There, users can find and play a variety of games, such as*: (a) Raining Words, (b) Collecting Words, (c) Memory, (d) Build a Bridge, (e) Crane, (f) Quiz Game, (g) Conversation Game* and *(h) Explore Campus*. All these various types of Mini-Serious Games are useful to lecturers not only as they enable various approaches with the students on the same subject, but also as they offer a mix of Serious Games within a course to ensure additional engagement and motivation.

1. **Implementing new Serious Games in HE modules and lectures by using the IDEAL GAME Creator Tool**

Serious Games developed by IDEAL GAME project are digital tools especially designed to improve the processes of thorough understanding, easy memorising and in-depth learning and also to reduce stress during these intellectual activities. The lecturers can implement new Serious Games in HE courses using the IDEAL GAME Creator Tool in order to promote student’s digital learning, improve their intellectual activity and also incorporate a motivational game-based learning approach combined with a Flipped-Classroom approach and other similar best practices in learning and teaching~~.~~

The Online Serious Game Creator is an important outcome of the project designed as a flexible tool, so that the Serious Games can be equipped by the users with different content and individually adapted to different scientific disciplines and fields. Therefore, the lecturers can use it to create different types of new Mini-Serious Games, which can be properly integrated in their HE modules and lectures, such as the following:

* serious games for learning professional and subject related vocabulary,
* serious games for assignment of corresponding facts and terms,
* serious games which focus on process flows,
* competitive serious games to enhance learning,
* puzzle serious games to learn models and theories, etc.

The successful implementation of the Mini-Serious Games Creator Tool in partner HEIs strengthened the idea to offer it on a broader basis. Therefore, at the moment, the IDEAL GAME Creator Tool is developed as a browser tool and its improved final version is made available for free in all project languages at <https://ideal-game.eduproject.eu/?page_id=16> .

* 1. **Recommendations on the use of the IDEAL GAME OER Platform and Creator Tool**

IDEAL GAME OER Platform and Creator Tool, as the result of a research of best practices in the design of e-learning environments, have the specific purpose to support lecturers in creating different types of Mini-Serious Games, which can be integrated into modules and lectures. Following, this will support teachers with appropriate innovative learning resources, as well as learners with innovative modern ways to deal with topics and learning activities.

Next, the consortium of the IDEAL GAME project recommends a basic framework for developing an effective e-learning environment in HE by using the IDEAL GAME OER Platform and Creator Tool, based on the experiences and lessons learned during the IDEAL GAME project:

* There is a need for an emphasis on the development of topics and learning activities in the e-learning settings in HE.
* There is also a need to combine Serious Game with some parts of the HE courses, because it is always helpful to rethink the content and to provide feedback to the learners, who are keen on receiving additional information from the lecturer.
* The content of the IDEAL GAME Flipped-Classroom concept and the IDEAL GAME Mini-Serious Games have to be specific to lecturers and learners with information and guidance on dealing with innovative learning resources in HE.
* The pedagogical and didactical elements within the additional IDEAL GAME learning materials (Power-Point-Presentations, Texts, Graphics and Audios) have to be designed according to the criteria: motivation and engagement of students, structure, clarity, different perspectives, reflection elements, feedback possibilities and assessment.
* The content of the IDEAL GAME OER Platform and the Online IDEAL GAME Serious Game Creator Tool have to meet with the European Standards for Open Education and Open Learning Resources (EU-StORe).
* The legislative framework concerning the European HE`s sector has to be absolutely considered in the IDEAL GAME concepts and outcomes.
* Concerning the creation of the Mini-Serious Games, interactive elements have to be integrated in order to create a broader perspective and to attract a larger audience.
* Concerning the Flipped-Classroom concept and the interactive tasks for the Online IDEAL GAME Serious Game Creator Tool, the collection of best practice of teaching resources should be addressed. Relevant examples are H5P (abbreviation for HTML5 Package) tasks, a free and open-source content collaboration framework based on JavaScript, especially designed to easily create, share and reuse interactive HTML5 content, such as interactive videos, interactive presentations, interactive timelines, quizzes, etc.

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