



A phone app as an enhancer of students' motivation in a gamification experience in a university context

Una app móvil potencia la motivación del alumnado en una experiencia de gamificación en contexto universitario

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Abstract

The level of disinterest and lack of motivation in great part of the university student body represent one of the most urgent challenges that the faculty must face nowadays. In this way, there are more and more projects that show the potential of gamification when it comes to increasing motivation and implication of students in their learning process. In close relationship, digital technologies and, specifically, the use of mobile phone devices entail a resource of enormous meaning for young adults and teenagers. Therefore, in the present project we describe the application “\$in TIME”, designed ad hoc with the intention to manage the different elements that defined a gamification project based on the movie “In Time”. This was implemented in the course Basis of Physical Education (a second-year course in the BSc in Science of the Physical Activity and Sports in Granada -Spain-). In the same way, it also shows the repercussion that the participating students had, as well the evaluation they did of it. All of this will allow teaching staff to know a real example, which could help them and inspire them when it comes to designing their future projects and, at the same time, they will count with new evidence of the potential of gamification in education.

Keywords: Physical education, university, motivation, experiential learning, educational technology.

Resumen

Los niveles de desinterés y desmotivación de gran parte del alumnado universitario representan uno de los retos más urgentes que debe afrontar el profesorado en la actualidad. En este sentido, cada vez son más los trabajos que evidencian el potencial de la “gamificación” a la hora de incrementar la motivación e implicación de los estudiantes en su proceso formativo. En estrecha relación con esto, las tecnologías digitales y, concretamente, el uso de dispositivos móviles supone un recurso de enorme significatividad para jóvenes y adolescentes. Por tanto, en este trabajo se describe la aplicación “\$in TIME”, diseñada “ad hoc” con la intención de gestionar los diferentes elementos que conformaron un proyecto de “gamificación” basado en la película “In Time”. Este se implementó en la asignatura Fundamentos de la Educación Física (del segundo curso del grado en Ciencias de la Actividad Física y el Deporte, de la Universidad de Granada-España-). De igual modo, también se muestra la repercusión que tuvo en el alumnado participante, así como la valoración que hicieron de la misma. Todo ello permitirá a los docentes conocer un ejemplo real, que puede servir de ayuda e inspiración a la hora de diseñar sus futuros proyectos y, al mismo tiempo, contar con un nuevo aval del potencial de la “gamificación” en el ámbito educativo.

Descriptores: Educación física, universidad, motivación, aprendizaje activo, tecnología educativa.

1. Introduction

One of the main problems of university education is the lack of motivation of students, which results in a lack of commitment and involvement with their training process (Symonds et al., 2019; Zhao & Hoge, 2005). Due to this reality, approaches that place students at the center of the teaching and learning process are needed to break with the unidirectionality that characterizes the traditional approach and to be able to give them the decision-making capacity to achieve meaningful learning (Gargallo-López et al., 2017; Ituma, 2011). It is in this context that active methodologies emerge to give students the main role in their formative process, bringing the reality of the 21st century closer to the classrooms (McLean & Gibbs, 2010; Crisol-Moya et al., 2020). Scientific evidence shows how, through them, problem solving, critical thinking, analysis capacity, and other complex cognitive skills related to competencies are empowered (Martínez-Hita & Gómez, 2018; Sáiz, 2013).

Gamification, a powerful strategy to motivate and encourage learning, emerged by the continuous search for possible solutions to increase meaningfulness in students (Deterding et al., 2011), understood as the use of mechanics and dynamics of games in non-playful contexts, since, through it, students can increase their interest and commitment to the proposal of the teacher (Kapp, 2012; Zichermann & Cunningham, 2011). In this sense, films and fiction series have now become one of the main and most important sources of entertainment for young people and teenagers (Medina & González, 2013; Scolari et al., 2019). It is in this context that Pérez-López (2018) establishes the concept of “gamification”, i.e., to take advantage in the educational sphere of the key aspects of a film reference to motivate students thanks to the attractiveness and significance that it means to live in first person what they have previously been enjoying as spectators. To do this, the six key aspects that Pérez-López & Navarro-Mateos

(2019) establish in their “Tetris of gamification” must be taken into account: time, esthetics, plots, roles and characters and interactions. This will enhance the credibility of the proposal, causing more “immersion” of students.

If adding the use of mobile devices (used by teenagers on a daily basis) as educational tools, their motivation can increase even further (Brazuelo & Gallego, 2014; Mojarro et al., 2015; Ramírez-Montoya & García-Peñalvo, 2017). In fact, in recent years, the implementation of digital technologies in the various educational stages has increased significantly due to their benefits in the development of creative thinking, problem solving and increased efficiency and productivity, resulting in improved academic outcomes (Adeosun, 2010; Fullan et al., 2018; McMahon, 2009). The university must adapt to this technological development, changing the strategies and activities that arise (Almerich et al., 2021; Fatykhova et al., 2018).

At this stage, it is essential to develop the skills necessary to perform good professional work (Shavelson et al., 2019). This makes the university the perfect stage for the development of digital competence so demanded by today's society, perceiving students that the use of digital technologies is beneficial for their learning and for the development of key competences for their future (Karakoyun & Lindberg, 2020). Therefore, education must create contexts in which students can acquire skills that enable them to critically analyze the information they receive and adapt to the technological developments of our age (Baranowski & Odrowąż-Coates, 2018; Fatykhova et al., 2018; Olszewski & Crompton, 2020; Schmidt et al., 2020).

The aim of this article is to describe a mobile application designed “ad hoc” for the “gamification” project “\$in Time” and to know the student's perceptions, as well as the impact that the student had on motivation.



2. Contextualization

The “gamification” project called “\$in Time” was carried out in the subject called Fundamentals of Physical Education, conducted during the second semester of the second year of the Degree in Science of Physical Activity and Sport (University of Granada). This six-credit subject is compulsory. The main objectives of the project are shown below:

- Know how to plan Physical Education (PE) in the secondary stage following the principles of vertical and horizontal ranking.
 - Know, design and manage the main elements of the curriculum: objectives, content and timing.
 - Plan a school course with teaching units according to the educational objectives
 - Review and analyze reports of innovations and experiences in the PE, applying them to the planning of the PE.
- Contents include:
- Fundamentals of Education. Physical Education.
 - The role of the teacher in the educational framework and society. Core competencies.
 - Sport and physical activity as a vehicle for general training of the individual in society. Intervene to educate on values.
 - Fundamentals of Physical Education Planning.

- Innovation: The Engine of Practical Knowledge in Education.

3. Narrative

The setting of the proposal is based on Andrew Niccol’s film “In Time.” In 2117 the evolution of humanity has reached such a point that it has succeeded in defusing the gene of aging from the age of 18. But, as a counterpart, they only have one more year of life since then, unless they work to accumulate or recover a little more time.

In this learning experience called “\$in TIME” (whose logo can be seen in Figure 1) the “Metronomist” is the owner of the bank of time, conditioning the lives of the inhabitants of the city. He is the one who determines his wages, taxes, interest on any loan, etc., by modifying them to his whim. Its main purpose is to make the rich richer and the poor poorer every day. In this sense, to keep the citizens of the “Ghetto of Feni” (the students) under control they use the “minuterros”, a band of thugs in their service that survive by stealing time from ordinary people so that they do not have to work. Therefore, the idea is that life is time and time is an opportunity to enrich life through learning (to gain life, enjoying it) and, in turn, its “currency” of exchange to be able to buy, for example, food (represented by the performance of formative challenges) and water (creative challenges). Depending on how that time is used, students could increase their life time.

Figure 1. Project logo



4. The role of digital technologies

In the film, people had a time counter on their forearm that was marking their remaining life time. In the project they carried it on their mobile phone, since a web app for the mobile was developed as a complement to the project from which the whole subject was managed (Figure 2).

Thanks to the app, they were able to recreate many of the emotions experienced by the characters of the film, having to plan them-

selves—one of the objectives of the subject—in the best possible way to avoid running out of time and “die” (suspend). In fact, their first objective within the adventure was to prevent their time counter from reaching zero, which would allow them to become “Trojans of Education”, the final goal of the project. At the same time, they had to try to locate the “Metronomist” in order to recover all the time he stole them and to be able to share it among the rest of the inhabitants of the city in order to stop living with the pressure of time permanently.

Figure 2. Home screen and main menu of the “Sin TIME” app



The app made it possible to manage different activities typical in the life of a person, or a future teacher in this case, divided into six major categories with their corresponding subsections. Each of these will be described below to understand its operation and potential:

Work

- Work day: students could track through “Twitter” the accounts of relevant people in the field of PE and Education in general, with the aim of taking advantage of the learning provided by this social network, at the same time, share what has been lived and learned, which are essential aspects in a future teacher. The use of “Twitter” helps to positively predispose students and share through this network “microblogging” fragments of their lives, communicate with other colleagues and experts in certain fields, foster collaboration, organize the class, reflect and evaluate (Tang & Hew, 2017).
- Labor inspection: The “Guardian of Time” (professor of the subject) sent a question from time to time (which came to them as



a message/warning) and they had to answer it as soon as possible by entering the corresponding section of the app. After the first six correct answers the app indicated that the response time had ended, and those who had responded on time would increase their life time.

- Extra pay: The “Guardian of Time” proposed a challenge and those who wanted to accept it should enter the appropriate section of the app and check OK. After the first six affirmative answers, the possibility of accessing this bonus of life time that was

achieved by those who resolved it properly was closed.

- Innovation project: in this section “districts” (groups) were to upload their innovation project (Figure 3), where all the learning acquired during the adventure was collected, and which had to be presented to the “Clan of the Temporizers” (former students and students who had studied the Master for Professors), who determined, together with the “Guardian of Time”, its quality and the corresponding increase in their life.

Figure 3. Example of two innovation projects carried out by the students



Leisure

- Sport: this section was connected to the “Runtastic” application and allowed players (students) to download the sessions they were doing, running or riding a bike, and to get time bonuses for it.
- Bets: they had the possibility to bet on life time on the different group activities that

were done in practical sessions, which consisted of physical-sports challenges.

- Holiday: There was the possibility of getting a letter that allowed to stop the time counter for a week.

Altruism

- Donate: They were given the opportunity to give time to other colleagues whose time counter was approaching 0.
- Mines: it consisted of locating a “mine” (QR code) around the city before a certain time to prevent everyone from reducing their life time. They had the possibility to

buy a track in exchange for time or to buy the corresponding chart. If they did, the lifetime bonus was divided by the number of players who had located it during the set time.

- Friends: They could communicate with other colleagues through a chat without



leaving the app, or upload photos of what they did in the different face-to-face sessions they had, or those relevant moments

they would like to share with the rest of the citizens of the “Ghetto of Feni” and with the “Guardian of Time.”

Feeding

Here is a parallelism between eating with the conduction of formative challenges and the need to be hydrated with the approach of creative challenges, where they could buy food/challenge, considered most appropriate at each moment

(thus favoring the rhythm of learning of each one), as if they were in a supermarket, and after it they would obtain a longer life according to its quality.

Loans

Players could submit a loan application to the “Metronomist” with the amount of time requested and the number of repayment terms. Depending on the amount of life time requested, the counterpart—interest—was different.

Life time increased after the approval of the “Metronomist”, but failure to comply with the counterpart adequately within the time limit increased the penalty.

Appointment

In this section they had a calendar to be able to request appointments with the “Guardian of Time” and to solve, for example, any question related to the different challenges they had to overcome in the adventure. One important aspect, and highly valued by the participating students, is that they did not have a single chance of delivering the challenges they decided to face.

As they were learning and improving their training, they could try to solve again any of those already done by encouraging their creativity, among other things. Moreover, these appointments costed life time, which increased their value and use, giving the value that it deserves to the time invested in training aspects.

Happiness

This section gave students the opportunity to make people around them a little happier (family and friends). For this, they committed themselves to making “PDFs” (happiness projects) altruistically, with all the planning and dedication required (Pérez-López, 2019).

In addition, there is also a “Player” section in the application that includes an individual and “district” (group) classification, the level of each participant based on the achievements and evidence they showed of their learning, or points of experience. The latter could be exchanged for different letters of privilege to make life more wearable within the adventure, such as:

- The letter “free of minutereros”, thanks to which it was not necessary to “hide” for a week, since during that time they could not “steal” time.
- The “dual benefit” letter, which allowed anyone who had it to double their time in the last challenge.

5. Analysis and Interpretation of Student s’ Perceptions

To learn about the students’ feelings, learning and reflections, a link to “Google Drive” was available in which they could anonymously share everything they liked. In addition, many of them



referred to the project in their personal social media accounts. Below are some examples that they shared on “Twitter” about what this learning experience meant for them, in short:

- “A real way to learn. Thank you #Isaac for all you have made us live #ProjectSinTime”.
- “This is just the beginning!! Education Trojan with a lot to learn and with a desire to do it!! #ProjectSinTime”.
- “The end is at the beginning! Incredible learning experience lived in this semester; this is education! #ProjectSinTime”.

On the other hand, in the fragments shared below, it can be seen the motivation that the students had to have an application created “ad hoc” for the project, facilitating them the follow-up of the adventure, as shown by Julio (all the names used are fictitious, since the source of the information was anonymous):

Every day I get more motivated with the app. It is something I would have never expected of a professor, who would design something like that for students. One example is that I have never liked to run, but today I have done it motivated by the app and I loved it, and I have been able to enjoy beautiful viewpoints. Another highlight is the large number of sections it includes. We can manage everything related to the subject from it, it seems incredible, it is great!

In this same line is the testimony of Lucia:

The app is amazing, it takes care of every detail. It was time for a professor to show me that there is another way to do things and more importantly, I would like to return to class as soon as I leave. Each class goes so fast. Thank you for letting me see me and reflect on how different things can be done. In addition, between the time counter and the history of all our movements during the adventure I had never had so much “feedback” or so detailed feedback in a subject. It is great!

One of the main challenges of every professor is to connect the student to the subject (beyond class hours). Taking advantage of what is significant for students, such as the use of mobile devices, can increase their willingness and motivation to do so. In fact, a good example is Peter’s reflection:

I know that you are getting me to spend a lot more time on this subject than any other, but thanks to the app you have made us being permanently connected to the subject. Also, it has so many sections and many of them are so common, that I almost use them more than “WhatsApp” or “Instagram”. I don’t believe it haha!

Rosa indicates the same:

I’m looking forward to having the app on my mobile now! It is incredible the hard work it has, but it is more incredible that WE ARE ALL looking forward to getting to work and being really hooked on the subject. Personally, this is the first time that I have a subject like this and it has motivated me a lot. I have already told you that I will do my best!

These results agree with other research in which different apps and mobile devices were used to improve the motivation and quality of learning in different university courses (Pechenkina et al., 2017; Weibs et al., 2019).

As indicated at the beginning, in “gamification” it is key to recreate the sensations and emotions of the film to increase “immersion” and credibility (Pérez-López & Navarro-Mateos, 2019). As stated by Fernando, thanks to the time counter included in the app, students lived emotions similar to those of the protagonists of “In Time”:

What a tension is generating the app for me! If you wanted us to manage emotions, you got it. You’re getting me to take advantage of the time like I’ve never done it before, I already



plan the smallest detail of my day. If I ever tell my parents they would not believe it.

The latter shows the great acceptance of the mobile app within the project. In addition, it should be noted that the group that participated in the “gamification” proposal significantly improved its cardiorespiratory fitness, an important parameter to the health of the students, compared to the group that followed a traditional learning methodology (Mora-González et al., 2020). In this regard, more and more research is found in the scientific literature that take advantage of mobile devices and the use of game elements to improve the levels of physical activity (Cotton & Pattel, 2019) and the health and quality of life of different populations, such as elderly patients or with conditions such as hypertension, obesity or autism (Cechetti et al., 2019; Kappen et al., 2016; Lee et al., 2018; Mâsse et al., 2020; Ryan et al., 2017).

6. Conclusions

The possibilities offered by the use of technologies and mobile devices in the educational field are evident, thus enriching a “gamification” experience. By including significant aspects for the students, their motivation and involvement are influenced, which leads to an increase in learning. Thanks to the application that was designed for this project, the students had the opportunity to be continuously connected to the subject, going beyond class time. In addition, it was possible to manage all aspects related to the project and, in particular, the adventure they were experiencing (requesting tutorials, delivering challenges, receiving “feedback”, consulting with other colleagues, etc.).

Finally, it is necessary to highlight the importance of generating sensations and emotions similar to those of the protagonists of the film in this type of project, since it will increase the “immersion”, favoring their involvement and commitment with their training. In this case,

the main emotion lived by the protagonists of the film “In Time” is the continuous pressure of time and its necessary use to continue alive. The students had to manage many emotions and plan their time appropriately in order to be able to enjoy the experience to the maximum. All these learning, when relating them to different emotions, as expressed by neuroeducation (Mora, 2017), are more rooted and significant.

Looking at future lines of work, it would be interesting to continue to analyze the potential of narrative and esthetic elements in apps that aim to influence health-related variables, and where adherence is a fundamental factor. Building an “immersive” experience, which goes beyond extrinsic elements such as points or classifications, motivation and the different sensations lived will increase that commitment with the idea that it will favor the acquisition of the stated objectives.

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