Ethics Issues of Digital Contents for Pre-Service Primary Teachers: A Gamification Experience for Self-Assessment with Socrative

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Abstract

The knowledge society has brought many possibilities for open education practices and, simultaneously, deep ethical challenges related to the use, sharing and reuse of digital content. In fact, even at university level, many undergraduate students do not respect the licences of digital resources. As part of the contents of a third-year educational technology course for primary teacher training at the University of the Balearic Islands (Spain), prospective teachers learned about these ethics issues. During the 2015/16 academic year, 125 pre-service teachers from two groups of this course were involved in a gamification experience, using Socrative in real-time in the classroom, in which they had to answer different questions related to digital ethics. Its aim was not only to find out what they knew before working directly with the topic – an initial self-assessment – but also to arouse interest and encourage dynamic participation and interaction. At the end of the course, the participants answered a questionnaire in which they were asked about their perceptions of the use of this kind of educational strategy and their transfer in the future. Data were also collected from the same Socrative quiz and the final exam results related to digital ethics. Overall, the assessment from pre-service teachers was highly positive, as well as the scores of the questions related to digital ethics in the final test, and the conclusions of this study highlight both the importance of using more interactive educational strategies in the classroom and the need for training on digital ethics issues in teacher studies.

Keywords: gamification; higher education; teacher training; digital ethics; Socrative; self-assessment.
Introduction

The Internet has made it possible to access information and digital content to be reused in other contexts, which creates important ethical challenges (Farrow, 2016). Open education is especially interesting for future teachers of any level, who can create their educational materials by readapting the already available resources—images, sounds, videos and so on—on the Internet. However, the ethical challenges suggest that many student teachers do not respect the licences of these resources, mainly because they are not aware of them.

Digital ethics is a part of the digital competence that every teacher needs to develop (UNESCO, 2011). Thus, many teacher training programmes consider modules or contents related to this aspect. At the University of the Balearic Islands (Spain), the student teachers in the Primary Teacher Training program must attend a course on educational technology, which includes digital competence and digital ethics, in their third year.

During the 2015/16 academic year, pre-service teachers of two groups of this course were involved in a gamification experience using Socrative—a web 2.0 technology to create interactive tests—in real-time in the classroom to work on concepts and ideas related to digital ethics. The aim of this experiment was to connect teachers with their prior knowledge as an initial self-assessment, arouse interest and encourage participation. After the experiment, the participants were given a questionnaire in which they were asked about their perceptions of the use of this kind of educational strategy and their transfer in the future.

Therefore, the present work describes the educational gamification experiment with Socrative on pre-service student teachers for primary school; the results obtained from the same experiment; a final student questionnaire and the final test scores of the course (questions related to digital ethics). The conclusions show the value of the experiment and future lines of work.

Reference Framework

The educational experiment is based on two main topics: ethics issues of digital contents, as part of the digital competence; and gamification, as the didactic strategy used for the experiment.

Digital Ethics

The new technological and digitalized world comes with deep ethical challenges, especially related to open education (Farrow, 2016). Open education practices are based on four main principles (Valverde, 2010): (a) knowledge should be free and open to be used and reused, (b) collaboration in the construction and re-elaboration of knowledge should be enhanced and promoted, (c) sharing knowledge should be rewarded for its contribution to education and research and (d) educational innovation needs communities of practice and reflection that provide free educational resources. The practices and technologies from educational contexts considered open could include access to educational or published research, software, policies, teaching methods, data sets or other educational resources (Farrow, 2016). However, the Open Educational Resources (OER) which are most considered in Teacher Education, are educational tools, learning contents/resources and implementation resources (licenses and interoperability) (Valverde, 2010). Although there are important advantages of OER, derived from the open education principles, there are also some concerns. Two of the main issues in Digital Ethics, derived from ICT dissemination on a large-scale, are privacy and the protection
of intellectual property (Maggiolini, 2014), which could be included as part of ethics and digital competences.

On the other hand, there is a need for students from different educational levels to develop these kinds of competences, including prospective teachers. New teachers must show competences that allow them to incorporate the digital world into the class—the use level—and enable them to behave coherently with the theory—the sense level (Burguet & Buxarrais, 2013; García-Gutiérrez, 2013). In fact, one of the areas to develop within the digital competences of teacher education (concretely framed in the information literacy) is digital ethics, which considers intellectual property rights, copyrights and ethics (UNESCO, 2011).

However, as Burguet and Buxarrais (2013) point out, training in the ethical dimension is lacking not only in the study program of teacher education but also in schools in general. According to the same authors, teacher training should include the development of the ethical capacities of educational professionals, who can in turn, secure the development of the autonomy of young students so that they can think and reflect by themselves, considering ethical issues of digital content. In this study, we focus on the work done within the university program for primary teacher training related to digital ethics in the module of technologies applied to education.

**Gamification**

Gamification is defined as the use of game dynamics, mechanics and elements in non-game contexts (Deterding, Dixon, Khaled, & Nacke, 2011). As the main advantages in the educational context, gamification affects students’ behaviour, commitment and motivation, which can lead to improvement of knowledge and skills (Hsin Yuan Huang & Soman, 2013).

The game elements are shown in Figure 1:

![Game Element Hierarchy](https://example.com/game_element_hierarchy.png)

**Figure 1. The Game Element Hierarchy, adapted from Werback and Hunter (2012, p. 82)**

Some of the more accepted game elements that can be used in the learning context are: points, numerical values given for any single action or combination of actions; ranking, a classification or comparison among students from the same class or year; levels, a system to show student’s progress in the assigned activities; badges, distinct awards for the consecution of an objective; and progression, a dynamic in which success is granularly displayed.
In the educational context, gamification includes a range of activities that cover: (a) the incorporation of game rules and structures into class activities or management, (b) learning activities through didactic games or serious games and (c) the gamified development of complex didactic strategies, which include different activity sequences such as the resolution of a case in a learning problem/project-based methodology. The latter is associated with a gamification vision that differs from the classical vision called game thinking in which the goal of gamifying is to present a learning-teaching process centred on the students, where they (as players) get involved, make decisions, achieve progress, assume new roles, participate in a social environment and receive immediate feedback (Gallego, Molina & Largo, 2014).

In recent years, the number of courses that implement gamification strategies in higher education for different kinds of studies has been growing. These strategies are an effective way of maintaining undergraduate students’ motivation, concentration and engagement in the curriculum, such as in technical studies (Barragán, Ceada, Andújar, Irigoyen, Gómez & Artaza, 2015; Iosup & Epema, 2014; Villagrasa, 2016), economics (Arias & Djundubaev, 2015), medicine (Martin, Martin, Sanz, & Martín, 2014) or educational sciences, including teacher training (Villalustre & del Moral, 2015; Shiota & Abe, 2015).

Among the ICT tools that can be used to introduce game mechanics and dynamics into educational contexts are webtools, platforms and software (commercial and free). Some of them are Badgeville (http://www.badgeville.com), Openbadges (http://openbadges.org/), Classdojo (http://www.classdojo.com), Atta (http://www.attacommunity.com), Schoology (https://www.schoology.com/home.php), Kahoot (https://kahoot.it) and Socrative (http://www.socrative.com/).

Socrative is a free webtool that allows teachers to create quizzes and use them in real-time to empower the engagement and assessment of students, individually or in teams. While the students are answering, the results are aggregated and visualised in real-time, which enables teachers to have instant insight into students’ level of understanding concerning a specific topic related to the curriculum. This tool is very accessible as any device that has internet connection can use it (the teacher needs to provide students with a code).

In the current experiment, Socrative was used to identify the initial knowledge and possible misconceptions regarding digital ethics.

**The Educational Experiment**

**Context and Methodology**

The experiment was carried out with 125 third-year pre-service teachers in the Primary Teacher Training program at the University of the Balearic Islands in the course Media and Technology Resources for Teaching and Learning in Primary Education during the 2015/16 academic year. Student teachers were organized into two groups with different teachers. The course was organized using a blended modality: mostly face-to-face classes and the virtual learning environment Moodle. This support basically consisted of the delivery of online materials that were used for in-class work, study preparation or assignment submissions. The final assessment of the course included a final exam, which was focused on the theoretical aspects of the contents, and different practical activities.

The activity (described below) was done by using a computer, a projector, a whiteboard and the student teachers’ personal technological devices (laptops and smartphones) and was
focused on a part of the theoretical aspects of the contents of the course. As in the whole studies program, the teaching and learning language for the activity was Catalan.

A gamified quiz was created using Socrative with 27 items related to digital ethics, including copyright and the right to use and reuse digital information, as part of the second content module of the course. The student teachers had previously worked in the first module with the concept of digital competence and its areas, one of them being information literacy in which digital ethics is included.

The quiz was composed of twenty-five statements about student teachers’ knowledge, beliefs and personal use of digital information, in which twenty-three are a “True or False” type and two require multiple-choice responses. The remaining two were short answer questions. See Figure 2 for a template on the quiz in appendix 1.

Student teachers entered their names, answered questions and could not skip items or change their answers. Some of the student teachers worked in pairs to answer the quiz because not all of them had their devices in class.

After each response, student teachers received immediate feedback on the answers chosen—the system showed them if they were correct or incorrect providing a self-assessment. The feedback included a brief explanation of the correct answer and some references to consult related to the answer. As student teachers answered the quiz, the display of their progress with a table of results was shown on the class whiteboard in real time. At the end of the quiz, student teachers received information on their scores in relation to the scores of their peers.

Figure 3. Screen of real time results of the Socrative quiz

The purpose of the quiz was to connect student teachers with their prior knowledge, arousing interest and encouraging participation. The didactic sequence was developed through two main activities in a 1.5-hour session:

1) First, the Socrative quiz was applied in the face-to-face class session. The student teachers answered the quiz individually or in pairs using their personal technological devices in 15–20 minutes. This part was related to self-assessment because student teachers received the feedback on their answers immediately.

2) After student teachers had completed the quiz, the teacher presented and assessed the global results by starting a dynamic participatory class on the topic. Once the questions were discussed and the answers justified, the student teachers posed new questions in the form of examples of use of digital information with the aim of consolidating their learning.
Results and discussion

To assess the experience, information was obtained and analysed based on: (a) the opinion of the student teachers through a final online questionnaire and (b) the score obtained by the student teachers in the Socrative quiz regarding prior knowledge of the ethical use of digital information aspects and examination of the subject.

The data obtained showed that the experience allowed pre-service teachers to connect with their prior knowledge and encourage them to reflect on it. The results of the quiz showed little prior knowledge and false belief, but the good grades obtained in the final test show the improvement of their knowledge of digital ethics.

About the Gamification Experiment

Data Gathered from a Questionnaire

Seventy-eight student teachers (out of 125) that participated in the educational experiment with Socrative answered a final questionnaire.

One of its sections was directed at assessing the learning activity carried out with Socrative, by focusing on its usefulness for encouraging learning and reflection, boosting participation and the student teachers’ attitudes towards gamification strategies, which were the issues that the teachers wanted to enhance in their class (see Table 1).

Table 1. Questionnaire statements on the educational experiment with Socrative

<table>
<thead>
<tr>
<th>Statements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The use of quiz or games to detect previous knowledge encourages learning and reflection</td>
<td></td>
</tr>
<tr>
<td>The use of tools to manage student participation in classes (random selection of students who will participate) would speed things up in a fun way.</td>
<td></td>
</tr>
<tr>
<td>Using badges in the working sessions of workshop (in the computer lab) would be a good strategy to motivate and track our activity in class</td>
<td></td>
</tr>
</tbody>
</table>

Therefore, first, student teachers were asked to score (from 1 to 5) their agreement with the statement *the use of quizzes or games to detect previous knowledge (as the quiz used on the topic of ethical uses of digital information) encourages learning and reflection*, 1 indicating disagreement and 5 indicating agreement. As can be seen in Figure 4, student teachers’ answers (groups 1 and 2) show a high agreement (79.3%). To indicate if there were significant differences between the two groups, student teachers were also asked about their perceptions of the use of gamification strategies in other activities, such as for managing participation in classes and monitoring by using badges. The results show less agreement with the statements.
Figure 4. Results from the questionnaire on the agreement with the statement *the use of quiz or games to detect previous knowledge encourages learning and reflection.*

Sixty percent of respondents showed a high degree of agreement with the statement *the use of tools to manage student participation in classes (random selection of students who will participate) would speed things up in a fun way* with a deviation of 1.18 points in group 1 and 0.95 in group 2. Thus, there is greater variation among the responses of group 1 (see Figure 5).

Figure 5. Results from the questionnaire on agreement with the statement *the use of tools to manage student participation in classes (random selection of students who will participate) would speed things up in a fun way.*

Similarly, 65.9% of their answers show a high degree of agreement with the statement *using badges in the working sessions of workshop (in the computer lab) would be a good strategy to motivate and track our activity in class* with a deviation of 0.8 points for group 1 and 0.7 for group 2 (see Figure 6).
Figure 6. Results from the questionnaire on the agreement with the statement Using badges in the working sessions of workshops would be a good strategy to motivate and track our activity in class.

These results indicate that there are low expectations of student teachers in certain gamification strategies. Perhaps this could be explained by the lack of experience with this type of activity and the association of these aspects with games. This might shed light on the lack of knowledge related to gamification strategies in education.

Class Scoring

The total, averaged score of the Socrative quiz was 64% (64.3% in group 1 and 63.7% in group 2) with 16 correct answers out of 25 (15.4/25 in group 1 and 15.9/25 in group 2) (Table 2).

Table 2. Scores of the Socrative quiz on the ethical use of digital information

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Group 1 Score</th>
<th>Group 2 Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>64%</td>
<td>64.3%</td>
<td>63.7%</td>
</tr>
<tr>
<td>Total Correct Answers</td>
<td>Group 1 Correct Answers</td>
<td>Group 2 Correct Answers</td>
</tr>
<tr>
<td>16</td>
<td>15.4</td>
<td>15.9</td>
</tr>
</tbody>
</table>

As illustrated in Table 3, items with the highest percentages of correct answers relate to broader issues in digital ethics, and items with the lowest percentages include procedures or more precise aspects of the ethical use of digital information, which is especially important to incorporate in their educational practices as future teachers.
Table 3. Questions in the quiz with higher and lower percentages of correct answers

<table>
<thead>
<tr>
<th>Statements with higher percentages of correct answers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Using a fragment of a text segment to quote authorship is a communication act against an author’s rights.</td>
<td>96.7%</td>
</tr>
<tr>
<td>16. Authors can authorise to distribute, copy or reuse the work.</td>
<td>92.7%</td>
</tr>
<tr>
<td>1. An author’s rights of a work recognises intellectual property as a natural right to the individual creator.</td>
<td>92.2%</td>
</tr>
<tr>
<td>19. Creative Commons allows the authors to distribute their works with specific rights under certain conditions.</td>
<td>92%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statements with lower percentages of correct answers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12. A work is protected with copyright when the author registers it as such.</td>
<td>3.7%</td>
</tr>
<tr>
<td>6. Author rights allow the authors to adopt measures to preserve their authorship of the work—for example, in the promotion and recognition of authorship.</td>
<td>5%</td>
</tr>
</tbody>
</table>
| 20. Which one of these uses of information is adequate?  
A) Publishing a document that belongs to another person on a website or blog  
B) Making a copy of a musical work that is public domain  
C) Accessing and downloading free content  
D) Distributing our works with a Creative Commons license  
E) Creating a website or blog with links to other pages | 12% |
| 8. Making a copy of a CD is a reproduction act against author’s rights. | 18% |

The final exam of the course, which was a multiple choice quiz, included questions on the topic of digital ethics. The scores of these exams are high (around 90%). Group 1 included two questions (out of 20) with 94% and 83% of correct answers, respectively. Group 2 included one question (out of 20) about digital ethics with 94% of correct answers.

Conclusions

The educational experiment with Socrative has been an interesting experience that has achieved the expected objectives of the teachers and authors of the current paper, which were: (a) to expose the prior knowledge of student teachers on the topic of digital ethics while removing misconceptions, (b) to motivate learning and (c) to encourage participation. In fact, the answers to the questionnaire resulted in a dynamic participatory class that addressed these aspects in-depth and in response to student teachers’ interests and/or their false beliefs.

The ludic/gamified elements in the learning activity seemed useful to student teachers to be willing to verbalize and participate. In the activity, some of the dynamics, components and elements of games were identified (Werback & Hunter, 2012), i.e., progression in the quiz (a dynamic), competition among peers or collaboration in the case of working in pairs, immediate feedback (components) and the existence of a leader board and punctuations (elements).
However, student teachers’ perceptions of the educational possibilities of gamified elements were rather low. This is probably related to the fact that they had not experienced this kind of activity during their studies, so they did not know what the educational possibilities related to gamification are or how to design educational experiences that use these strategies in an effective way. Or, perhaps, they considered that these elements cannot be useful in other contexts. Perhaps they consider the technology to not be for academic purposes. Therefore, for future research, it would be interesting to go deeper into the reasons for these scores and see the actual motives, contrasting with successful gamification experiences, like the one explained in Villalustre and del Moral (2015), which show a high level of motivation and satisfaction by the undergraduate students and the development of generic competences.

Despite the limitations related to the coverage of the educational experiment on gamification, this study has shed light on the importance and need of teaching pre-service teachers about aspects related to the use of digital information, as they will be the future teachers (Burguet & Buxarrais, 2013; García-Gutiérrez, 2013). Technology is becoming increasingly more present in every aspect of life, so it is essential that every citizen now and in the future uses digital contents and manages licensing in a proper way, being respectful to others’ authorial rights when using contents and conscious of the rights of their own works when creating new content. Of course, this also applies to any educational resource: images, videos, audio, activities, documents and so on that teachers use and/or create. This idea is also one of the trends that were included in the Horizon 2016 report for university teaching (Johnson, Adams Becker, Cummins, Estrada, Freeman & Hall, 2016).

On the other hand, in the current knowledge society, where information is available everywhere, every educational institution needs to find ways to engage students with the course content, arouse interest in them and motivate students’ dynamic participation and interaction in the classroom. This educational experiment has shown a successful way to do this based on a small-scale gamification experience focused on higher education. As future work, a large-scale gamification experience could be considered including different courses in the academic year.

Acknowledgments

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References


### Qüestionari Aspectes Ètics

1. Els drets d'autor sobre una obra reconeixen la propietat intelectual com a dret natural a la persona creadora
   - A. True
   - B. False

2. Dret d'autor és sinònim a Copyright
   - A. True
   - B. False

3. Els drets d'autor permeten que el titular de l'obra obtengui compensació econòmica per la utilització de la seva obra per altres persones
   - A. True
   - B. False

4. Els drets d'autor permeten que sigui sols l'autor qui tengui drets sobre l'explotació de l'obra: reproducció, distribució i comunicació pública
   - A. True
   - B. False

5. Els drets d'autor permeten que sigui sols l'autor qui tengui drets sobre la reutilització i transformació de l'obra.
   - A. True
   - B. False

6. Els drets d'autor permeten que l'autor adopti mesures per preservar la seva autoria sobre l'obra, per exemple en la divulgació i reconeixement d'autoria
   - A. True
   - B. False

7. Escanear o fotocopiar un text és un acte de reproducció contra els drets d'autor
   - A. True
   - B. False

8. Fer un cópia d'un CD que hem adquirit és una acte de reproducció contra els drets d'autor
   - A. True
   - B. False
9. Compartir còpies d'aquest CD és una acte de distribució contra els drets d'autor
   A True
   B False

10. Utilitzar un fragment d'un text citant l'autoria és un acte de comunicació contra els drets d'autor
    A True
    B False

11. La llei de propietat intelectual contempla que es pugui transformar una obra per millorar-la
    A True
    B False

12. Una obra està protegida per drets d'autor quan l'autor la registra com a tal.
    A True
    B False

13. Les imatges disponibles a la xarxa a través de google estan lliures de drets d'autor, per tant es poden utilitzar de forma ètica.
    A True
    B False

14. Indica quines d'aquests obres estan protegides per drets d'autor segons la llei de propietat intelectual
    A Programes informàtics
    B Fotografies, Gràfics, Mapes, Esquemes
    C Llutes, Conferències,
    D Notícies del dia, Informaciones de premsa
    E Música sense lletra, obres teatrals

15. La informació que es troba a Internet disponible per descarregar és de Domini Públic. Es a dir lliure de drets d'autor.
    A True
    B False

16. L'autor pot autoritzar a distribuir, copiar o reutilitzar l'obra
    A True
    B False
17. Donat un cas en el que hem creat i distribuïm un audiovisual a partir de material de la xarxa (hem descargarat imatges de la xarxa i les hem modificat; descargarat alguns vídeos dels quals hem seleccionat fragments per incorporar al nostre muntantge i hem incorporat una música de fons també descargarada de la xarxa). Hem incumplit els drets d’autor?
A True
B False

18. Per descargar una imatge o document de la xarxa necessitem disposar del vist i plau del autor/a
A True
B False

19. Creative Commons permet als autors distribuir les seves obres amb alguns drets sota certes condicions
A True
B False

20. Quins d’aquests són usos adequats de la informació
A Publicar a la nostra web o blog un document que pertany a una altra persona
B Fer una còpia d’una obra musical de domini públic
C Accedir i descargar continguts gratsuits
D Distribuir les nostres obres amb llicència creative commons
E Crear una web o bloc amb enllaços a altres pàgines

21. Domini Públic. Es considera que són de domini públic totes aquelles obres disponibles a la xarxa per a la seva descàrrega.
A True
B False

22. Les obres passen a ser de Domini Públic després de 70 anys de la mort de l’autor.
A True
B False

23. Les obres de música classica són de Domini Públic
A True
B False

24. La utilització de recursos a l’àmbit educatiu -aula- té un tractament especial i ens permet la reproducció de material sempre que no s’alteri el sentit o forma inicial
A True
25. Com podem localitzar obres amb llicència per reutilitzar o lliure de drets?


26. Voleu publicar una planificació d’una activitat educativa (e-recurs) i permetre que altres mestres la facin servir, modificin i millorin amb la vostra llicència i deban constància. Quins procediments heu de seguir?


27. Com a membre d’una comunitat, per exemple la universitària, teniu accés a recursos electrònics disponibles per a la investigació, docència i estudis. Aquests recursos estan suscrits a llicències d’ús per consultar, imprimir i descarregar.

A True
B False