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Primary school students as EU citizens: designing a theoretical framework and an online educational game

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Abstract

This paper presents the design steps of an online educational game, addressed to Primary School students (6-10 years of age). Through the game, the students will be able to develop all those elements which characterize an active EU citizen. This activity is co-funded by the Erasmus+ Programme of the European Union, under the KA2 action (Project acronym WeAreEurope). In this paper, the approach followed in order to construct the underlying theoretical framework as well as the intermediate steps, in the form of decisions made, are presented, reaching the point of presenting a meta-draft game concept. With the term meta-draft we refer to a solid game idea with a draft description of the player's activities and an overall concrete goal. This activity is still work in progress, now at the point of designing in-game activities in detail. This paper presents an empirical approach to the principals of designing an online educational game, serving as a step by step guide for those wishing to create a similar product.

Keywords: Game Based Learning, key competences, EU citizenship education, Primary Education, online game design

Introduction

Citizenship is a notion connected to the membership within an organized community. Several definitions are available in the literature, relying mainly on elements/qualities that constitute citizenship. Thus, a clear definition of what citizenship is cannot be found in the literature. On the contrary, many descriptions on what citizenship includes or what makes a good citizen are available. From Ancient Greece up to today, key features were described as attributes of a good citizen. Some of them remained the same through the ages and others were significantly altered, based on the peculiarities and the social bonding of each period.

The core aim of the WeAreEurope project is the creation of an online digital game for educating 6-10 years old students about citizenship within the European Union context. For this goal to be met, a study of the citizenship notion and Citizenship Education is necessary in order to determine the aspects of the final product which would better serve its purpose.

In this paper, the literature review in order to distinguish the EU citizen's key competences and thus to design the game is mainly presented. The core aim was to initially develop a framework for describing these competences and their interconnections in order to gain a clear scope for the educational design of the game. The diverse and rather generic literature made this attempt intriguing and rather interesting to be presented as a case study. The design process of the game is still ongoing and thus it is presented in this paper in the form of minutes, depicting the communication of the consortium, not correlated with a specific

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game design theoretical model. It is merely a description of how the diverse partners (representing the worlds of academics, in-service teachers and enterprise) reached common ground while designing a game. The academic partner had experience in educational (game design), having also proposed a solid theoretical framework for designing educational games (Kandroudi et al., 2014). The in-service teachers contributed with their everyday experience in teaching the corresponding subjects and the enterprise representatives with their graphic and HCI design expertise, computer programming and cost effective implementation of digital products. The added value of the paper is that this diversified, ongoing collaboration occurred on a realistic basis and not on a purified theoretical one, within a purified research setting and it should be treated as such.
The paper is structured as follows: initially the theoretical framework through a literature review is briefly presented. Then, minutes from the research group communication and collaboration are presented in the form of design steps in order to reach a final game concept, which is described briefly. Finally, the remaining implementation tasks are mentioned, thus fully describing the game creation process.

Theoretical framework

In this section, a literature review of the citizenship notion and citizenship education is presented. The core aim is to identify and categorize the key competences and Citizenship Education (CE) approaches. This is a very important process, as it serves as a needs' analysis activity for identifying what and how should be taught to the target population.
Historically, the notion of citizenship has been linked to the membership privileges of a particular political community kind. In this community, those who enjoy a certain status are entitled to equally participate with their fellow citizens in making the collective decisions that regulate social life (Bellamy, 2008). In every community common–sense understandings of who belongs or not exist (Cesarani & Fulbrook, 2003). However, over time, the qualities needed to be characterized as a citizen have changed. In Ancient Greece the key feature was the equality of citizens as rulers or law-makers. Gender, race and class defined citizenship in Ancient Greece. In Rome it was equality under the law, providing a legal status and introducing a member state aspect to citizenship (Bellamy, 2008). With the rise of nation states, notions of citizenship defined by common ideas and the right to reside in the country of birth began to overlay or displace the kingship primacy (Cesarini & Fulbrook, 2003). After the ethnic revitalization movements (1960s - 70s), ethnic groups have articulated their grievances and pushed for equality and structural inclusion. In addition, international migration has complicated the concepts of citizenship and citizenship education.
Two types of citizenship theories exist in the literature, the normative and the empirical. The former attempt to set out the ideal set of a citizen's rights and duties, while the latter seek to describe and explain how citizens come to possess those rights and the duties they have (Bellamy, 2008). Several component sets have been proposed (e.g. Bellamy, 2008; Marshall, 1991; Ruud, 1997; Hoskins et al. 2012) converging to: a) membership and sense of belonging, b) rights and obligations, c) (active) participation, and d) diversity and respect. Focusing on the EU level, while national public spheres have aspired to be homogeneous, Europe is quite heterogeneous. Heterogeneity is not simply a descriptive statement of the considerable diversity that European societies display along multiple axes, such as ethnicity, nationality, religion, age and gender. It is connected with the consideration of diversity as a source of strength for the EU. "While national citizenships presuppose peoples' rootedness, EU citizenship is intimately linked to citizens' mobility and border crossings. Mobility has personal and collective dimensions" (EC, 2013). Consequently, the EU citizenship attribute

is more complex than the national one by having to address the diversity deriving from the freedom of movement and residence. Overall, the notion of citizenship entails a set of rights, obligations, rules and possibilities which support the sustainability of a rather diverse community, allowing interconnection, interdependence and interaction.

Nowadays, CE is part of the official curricula in many modern societies (Eurydice, 2012). Following the general scope of Education which is to prepare the student for becoming a useful future citizen, CE extends knowledge, skills (social, intellectual, technological), attitudes (respect for cultural and political diversity, respect for rational argument, interest in community affairs) and values (democracy justice, rule of law) and stimulates participation (Ruud, 1997; EU, 2006). The EU member states have followed various ways of incorporating CE, mainly using a mix of interdisciplinary and discipline integrated approaches, enhanced by the facilitation of students' active participation inside and outside school. Generally, citizenship curricula cover a wide and very comprehensive range of topics, addressing the fundamental principles of democratic societies, contemporary societal issues, as well as the European and international dimensions (Eurydice, 2012).

Having considered all the aforementioned information, the next step towards the design of the online game was to attempt to identify the key elements of the educational approach, underpinning the online game. For that matter, the notion of competence and the EU proposal to separate it to knowledge, skills and attitudes, was studied.

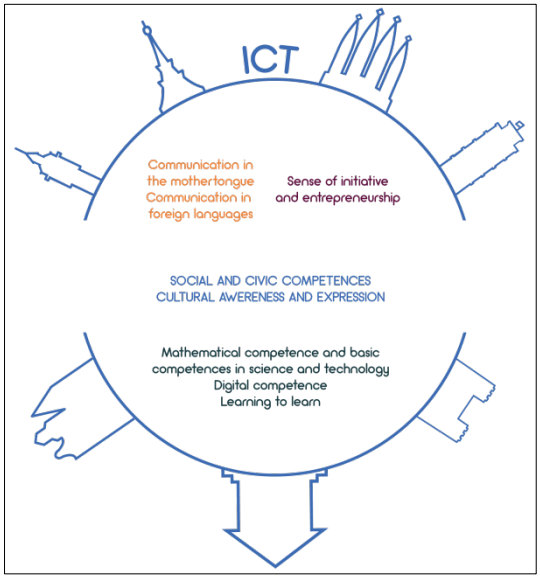

Figure 1. EU citizenship key competence framework

Examining the literature, one may find various initiatives implemented within the EU framework of cooperation which refer to or use the term key competences, or an equivalent. CIDREE/DVO (2008) introduces a European Framework of key competences which is a reference tool for policy makers, education and training providers. It identifies and defines the eight key competences that citizens require for their personal fulfilment, social inclusion, active citizenship and employability in a knowledge based society. Another influencing factor is the ongoing discussion about 21st century skills, which refers to the skills that the

citizen of tomorrow should develop in order to successfully handle future challenges and opportunities. Whereas CE in the past focused on rights and duties, in the 21st century it is gradually shifting towards developing active citizens and emphasizing more on values such as respect of the others, sense of responsibility, caring about the others, social justice and cooperation (Wing on Lee, 2012). CE should allow a holistic focus on students learning by keeping up with UNESCO's four pillars of: learning to know, learning to do, learning to be and learning to live together. In addition, it should match learners' interests to current social, political, environmental and economic affairs (UNESCO, 2014). Therefore, new approaches such as the use of ICTs, Sports-and-Arts based approaches and Community activities are used in the learning process of CE.

Combining all these information, a set of three categories is proposed. Figure 1 provides a graphical overview of the interconnection of the proposed categories and competences and presents an ideal case in which ICTs are fully integrated in CE and digital key competences are treated via cross-curricular activities throughout the curriculum. The latter is the direction pointed by the WeAreEurope project with its proposed final product.

Game specification

Following the proposed framework, the core aim of WeAreEurope is to create an innovative online educational game for European CE which will provide a challenging environment in which children (6 -10 years old) will be able to: a) Learn what it means to be a EU citizen, the rights and obligations that come with it, and how to participate in the EU at different levels; b) Learn about several aspects of the EU and of the member states – politic, economic, historic, among other aspects; c) Learn about diversity and how to benefit from a cultural diverse environment; and d) Exercise and develop transversal competences, including important entrepreneurial skills, like creativity, communication, team work, ICT, etc.

Being a serious game, the proposed product will not be purely entertaining, but should absolutely serve that, as explained further bellow. In matters of general features, the game will (Werbach, 2014): a) use adequate scenarios and a well-constructed storyline in order to enhance engagement, b) define a journey for the player in order to facilitate goal setting and motivation, c) create an environment for the player in order to provide a customizable setting, d) balance difficulty level and choices in order to enhance playability, e) add fun elements, and f) add a social dimension for facilitating players' interaction. In matters of learning approaches, the game will use simulations, problem solving, customization, assessment and feedback. Regarding technical features, it should be platform independent, respect technological limitations often seen in schools and provide adequate, free material.

Having established the framework in the previous section, the consortium was able to select the competences to be taught through the game and thus the game learning objectives. Regarding the learning delivery method, issues to be considered include: a) the game storyboard, b) the graphic design, c) the use of quizzes, riddles and challenges for the players, d) game mechanisms and characteristics (e.g. team play). The next step is to connect key competences to be taught through the game with methods. To provide a couple of indicative examples, it is obvious that communication in the mother tongue and other languages should be served by all delivery methods. Cultural awareness and expression can be served by the storyboard, the graphic design and quizzes. Digital competences can be facilitated by the gameplay and in-game challenges, such as problems, webquests and more.

Another significant issue when designing a game to be use in educational settings is the role of the educator. Following the contemporary learning theories, the educator will undertake the role of a facilitator, intervening when needed in order to facilitate players' interaction

and communication, access to research material and means (e.g. internet resources, books). Moreover the educator will provide research orientation to the players and debriefs on game activities in order to consolidate learning. Finally, the option for educators to prepare and share their own learning materials will be incorporated, thus actively involving them to the game implementation and sustainability, also allowing them to adapt the game environment to the specific needs of their pupils' needs. For that matter, an Implementation Guide with suggestions on the use of the game, additional exercises - activities that may complement the game experience will be prepared.
Another important aspect to consider is that of players' evaluation within the game's concept and context. In this case, the acquisition of competences will be evaluated through: a) game points to provide an overall classification and player ranking, b) right/wrong answers to challenges, riddles and quizzes, c) self-assessment based on a grid available on the Implementation Guide, and d) group assessment based on a similar grid.
All the aforementioned are elements of gamification which are of great importance when designing learning activities, as they facilitate engagements through motivation, gameplay and usability. Some of them are further elaborated in the next section.

Game concept and description

Considering all the aforementioned aspects, the game concept arose. The players will embody the role of young children group that inadvertently go back in time and thus have to find a way to return to the present. During their journey, they will be taken to designated and relevant periods in European history: a) The Dawn of Citizenship, b) The Middle Ages, c) The Age of Discoveries & Renaissance, d) The Industrial Revolution, e) The XXth century World Wars, and f) My Europe. Each era represents a level. Levels make the players' journey more engaging and fun overtime, enabling for them to be challenged every step of the way. In each historic period, the group will have to travel through European countries and territories, solving challenges, riddles and quizzes that take them a step closer to their objective of returning home. To succeed, the children must work as a team taking advantage of different skills sets (selected at the beginning of the game) that will be required in specific situations in the game. Throughout this adventure, there will be a character helping the group find its way back, but also opposing forces, attempting to prevent time travel. The main game objective is to go through all historic periods (levels), reaching the present time, using the minimum of turns. In Figure 2 a representative main screenshot of the game can be seen. All the game elements are elaborated hereinafter.
The map (Figure 2) will be updated in each time period so as to represent the designated era. The aim is for the children to solve four challenges, each one rewarding them with a key, in order to reveal the location of a time portal. A fifth challenge will activate the portal, allowing them to warp to the next era, thus gradually reaching the present time. To acquire the "keys" for accessing the Time Portal (and the next level), the players have to travel between countries/territories in the map. A movement between countries/territories is a turn. In each turn, players will have a challenge to solve. They may select the difficulty level of each challenge. By solving the challenge, they will be given one "key" and a certain number of points, according to the challenge's difficulty level (weighted score). By solving the challenge, player will also get a clue (riddle) to find where to move next (to find a "key"). Each "key" is an achievement. The players are part of the same team and have to work together throughout the game play. However they will have different attributes that will be called out in specific instances of the game.

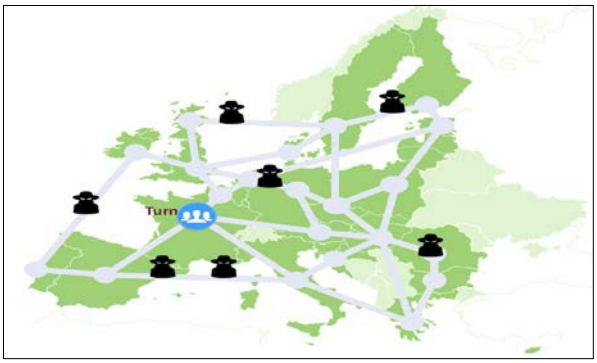

Figure 2. Game main screen

Players will have a helper (character within the game) that will assist during playing by revealing the game purpose and by providing specific information about the game context. In case the players misinterpret the clues (riddle) and end up in the wrong country/ territory, they will be informed and have to examine the riddle again to find the correct answer/move. This will cost them points, but it will not prevent them from pursuing the game's objective. While moving between countries/territories, the players can be caught by Time Agents (black characters in Figure 2). These are an opposing force to time travel and try to obstruct the players' journey. Upon being caught by Time Agents, the players have to prove they belong to the designated time period by answering to a quiz. Failing to provide the correct answer, the player will be sent back to the previous country/territory and lose points. Players will also get badges along the game by reaching certain milestones.

As aforementioned, 4 player types are incorporated, thus encouraging the game to be played by a team of 4; all working together towards the same final goal. Each player will have special attributes that will be called out during the game. These are the person of letters, the mathematician, the scientist who will answer to challenges related to literacy, mathematics, and sciences, respectively. They can involve other team members in finding the solution, but their decision can be overrun by the wise. The adventurer conducts the team movements. Also, a 5th character type is introduced, the wise, a person elected within the team at the beginning of the game, using whatever method they agree on. The wise will accumulate this role along with one of the other 4. Apart from having the last word in every occasion, overrunning other players' decisions in challenges and riddles, he/she also answers the quizzes, although with the help of the other team members if he/she wants.

Other gamification features

Apart from the elements presented in the previous section, several of which are still in the design phase (e.g. the exact storyboard of each era, the location of the keys and the time portal, etc.), there are other gamification elements worth discussing. Achievements, is a key characteristic of the gameplay, corresponding to the "keys" acquired by solving challenges, thus translating milestones in the players' journey. To make them more realistic and with a tangible nature, they will correspond to an actual key or a piece of a map which will be completed when concluding an era/level. Achievements are connected to challenges, which are generally exercises/problems for the players to solve. Players will be able to choose the difficulty of each challenge: easy, medium, hard. To each level correspond different earning

points (+5, +10, +20 respectively). "5" points will be deducted each time players fail to answer correctly to the quiz or fail to find the right destination. When there are no points to deduct, the point score will remain at "0", thus avoiding a frustrating negative score.
The challenges will be typified to meet the learning needs and allow introducing a random factor into these activities. Randomness is important for making the game less predictable and urge players to come back to play again and again. The challenges will cover the following topics: literacy, basic math, basic sciences, other (where all other areas fall into, as for instance: geography, economics, nutrition/health, etc.). These challenges must be primarily answered by the player of the corresponding role. The solution may require players to conduct research (e.g. in books, internet, etc.) and collaborate. This research in a group setting is crucial for developing important transversal competences. Finally, the challenges will facilitate training of specific citizenship skills (e.g. basic mathematical skills), will be appropriate for the age group (in terms of knowledge, skills etc.), will allow to be checked within the game and will use elements of the specific historical period.
By solving a challenge, besides the "key" and the points, players will be presented with a riddle. Riddles are clues that players must solve to find their next destination (country/territory). The riddles will be randomly selected from a corresponding list, related to the specific country/territory, once again ensuring players' engagement and interest. The riddles' levels of difficulty will also increase according to the game level.
Another gamification element is the Quiz, appearing whenever players are caught by Time Agents. The quiz (one question each time) will be about the corresponding time period and will be randomly selected from a list of questions, covering different aspects: history, geography, economy, culture. Questions will be of increasing difficulty as the player progresses through the game. In case of failing to answer correctly, points will be deducted and the players will be returned to the country/territory they just left from.
An interesting gamification element is Badges, which enhance player status. They will be awarded for accomplishing achievements, allowing players to feel successful and rewarded regardless of their score. For example, the "Quiz 10" badge will be awarded when answering correctly to 10 quizzes. These provide milestones for the players, increasing motivation to replay the game, as one can finish the game without receiving all the badges.
Finally, some technical aspects need to be considered. For example, music and sound effects must be relevant to each era. Sound effects will be introduced depending on the particular environment the player is standing at each time. The objective is to facilitate players to identify, by sound, time periods and particular situations, and make the game more engaging. A Leader board will be available, allowing to foster competition among players and to encourage them to return to the game and play it again in order to improve their performance. The game will be delivered online, incorporating user control access, thus allowing record keeping. Offline delivery is a considerable option for the future.

Discussion

In this paper, an online game for teaching EU citizenship key competences to 6-10 y.o. students was presented, revealing all the intermediate steps of the design of an educational game. Attempting to recap, the first step should be an extensive literature review of the core discipline in order to perform something similar to the user needs of any product. This would allow the definition of the learning goals of the game, forming a theoretical framework. A brief description of the corresponding framework is presented in this paper.
The next step would be to start actually designing the game which should incorporate two features, being a serious game. The first one is that of entertainment; after all it is a game.

The second is that of serving an additional purpose, learning in this case. Attempting to enumerate the design aspects to be considered, they are: learning objectives' definition, learning delivery method, role of the educator, players' evaluation elements, game overall concept, gamification elements and technical considerations. The overall game concept includes: gameplay, storyboard of the game, game goal definition and timeline (setting, route, and ending). The gamification elements relate to the motivation, entertainment and the engaging factors of a game. In this case, a ranking and a grading procedure is introduced. Point acquisition and milestone reaching processes are designed, along with rewards and goals. Technical aspects include graphic and user interface design, along with sound and visual effects which should also be considered.

Overall, this paper intended to present an empirical, step by step, still ongoing game design process, serving as a practical guide for similar attempts. It represents the result of collaboration between theory treating academics, practice oriented in-service teachers and the enterprise which aims at designing sustainable products, also from a financial point of view. Thus, it does not follow an ordinary theoretical presentation format, incorporating added value within this context, as it aims to present the practical perspective.

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