Co-funded by the Erasmus+ Programme of the European Union

NATIONAL REPORTS - GREECE

TABLE OF CONTENTS

INTRODUCTION

The report describes the validation phase organized in Greece to test the Coding4Girls learning approach and the tools developed.

In particular, it explains the main steps of the implementation with all the target groups involved: experts, primary and secondary school teachers and 10-15 years-old students.

Moreover, it reports on the results achieved and collected through the qualitative evaluation tools developed and submitted before and after the implementation.

GREECE

EXECUTIVE SUMMARY

In today's digital economy, there is a pressing need for highly skilled professionals in information technology. This is a result of the evolution of digital technologies, and particularly broadband network speeds, that drive demand for digital tools and services. In the coming years growth is expected to be driven by innovation-related sectors including information technology. To be able to compete in the global market, European SMEs and larger companies in the information technology sector are in need of highly skilled professionals that not only are in a position to use digital services and applications, but also to program. Unfortunately, the engagement of women in the information technology sector is lagging behind that of men. This is not so much a result of the lesser capacity of girls, as the PISA survey demonstrates that girls perform as well as boys in STEAM at the age of 15. Rather, it is a result of perceptions and attitudes that discourage girls from pursuing studies and careers in information technology. The Coding4Girls project aims to build programming capacity of learners aged 10 – 15 years. This is pursued through the development of a learning game that helps build coding skills in an engaging and rewarding manner that provides rich educational experiences. The game is part of a wider learning intervention that aims to demonstrate that information technology is sector in which both girls and boys can excel and express themselves creatively and professionally. This report constitutes a summary of the piloting activities of the Coding4Girls project with external groups of students and their teachers in Greece.

IMPLEMENTATION

The Coding4Girls learning intervention was validated with external groups of students in the area of Magnesia, Thessaly. Magnesia has 150K inhabitants while the broader area of Thessaly has 700K inhabitants and represents the central part of Greece. Thessaly has 4 main towns with populations ranging from 70K to 200K. Outside these urban environments, Thessaly is a broadly agricultural area as it is the biggest valley in Greece that produces agricultural goods for the internal market and for exports. The evaluation activities were

designed to take into account this diverse environment, which includes both urban and rural schools.

In order to select the schools that were engaged in the evaluation activities and to ensure that all rules for the engagement of underage students were followed, the implementation team collaborated with the Regional Center of Educational Planning of the area of Thessaly. The Center is the Ministry of Education's consulting organization on the adoption of innovative learning design and approves all activities taking place in schools before engaging students. The team worked with Mr. Alexandros Kapaniaris, the Coordinator of Educational Planning for Informatics for the area of Thessaly, and Mr. Constantinos Panagiotou, the Coordinator for Educational Planning for Mathematics for the area of Thessaly. Furthermore, the team worked with the Hellenic Mathematical Society Magnesia Division, a professional association that engages all secondary mathematics teachers in the area of Magnesia.

The Regional Center of Educational Planning recommended and gave approval for engaging the following schools in piloting activities:

- The 5th Gynmasium of Volos [1].
- The Gynmasium of Pteleos, Magnesia [2].
- The Saint Joseph Primary School of Volos [3].

Introductory workshops

The first step of the implementation involved engaging the informatics teachers in the selected schools to build their familiarity on the Coding4Girls software and to ensure that they are in a position to deploy the tool for designing educational activities for their students. The activities engaged the information technology teachers in the schools selected by the Regional Center for Educational Planning to participate in the Coding4Girls evaluation listed above.

The 1st session took place virtually and aimed to familiarize the educators with the general objectives of the Coding4Girls project and specifically building programming skills for learners 10 – 15 with an emphasis on engaging girls. The session took place in November 2019.

A 2nd session took place face-to-face in December 2019. In this session educators were familiarized with the Coding4Girls digital learning game. The educators were guided step-by-step through the functionality of the learning game, including both the educator and the student views. On the educator view, the participants reviewed in practice the creation of educational activities in the Coding4Girls environment from scratch as well as by emulating and adapting existing public activities developed by peers. They reviewed how to define objectives, step-wise tasks for students, optionally linking mini-games to tasks for making activities more enticing, and reviewing student progress. On the student side, they reviewed the way students experienced the Coding4Girls learning game. This includes the services for collaborating and brainstorming in a group, reviewing learning activity objectives set by educators, programming in the Snap! environment, reviewing pre-defined correct solutions and comparing their work to those, collecting rewards in the form of coins, using the rewards to personalize their environment, and more.

Another virtual session took place in March 2020 in which another review of the game functionality took place for the benefit of educators.

Data collection tools

Data collection took place through qualitative evaluation approaches. Qualitative methods are deployed when evaluation input cannot be provided with a yes/no or numeric answer but rather is best described descriptively through text and comments. This approach is relevant in the Coding4Girls evaluation as the proposed learning intervention aims to document the evolution of perceptions and attitudes of boys and girls towards programming, which is best achieved in a descriptive manner.

Evaluation took place in the form of learning experiments that engaged external groups of students and their educators. Participatory observation methods were deployed, in which educators undertaking the role of a researcher observed their students during their engagement with the Coding4Girls learning game and documented their reactions, their perceptions, the challenges they faced, and the positive impact of the activities.

The following sections describe the activities that took place and document findings in a qualitative manner.

Materials

The materials used during the implementation of the validation phase were

- the learning scenarios and
- instructions for students

developed by the project partners.

These learning scenarios were re-adapted to the design thinking approach and the structure of the C4G software constituting of two parts:

- the Teacher's Training Platform and
- the Student Game Environment.

Setup models and procedure

At the beginning of the implementation phase, students answered the preliminary questionnaire (S1). After the implementation, they answered the follow-up questionnaire (S2) about their perception and views on the C4G learning approach. Moreover, teachers collected students' qualitative opinions and comments (S3).

The teachers reported on the students' participation and engagement and their learning difficulties during the implementation (T1) and on the accomplishment of the learning objectives, the relevance and effectiveness of the game-based learning, the acceptance of the proposed methodology, the fun achieved and the overall organization of the implementation (T2).

The external experts also gave their qualitative opinions regarding the accomplishment of the learning objectives, the relevance and effectiveness of the game-based learning, the acceptance of the proposed methodology, the fun achieved and the overall organization of the implementation (E).

Participants

Direct participant of the study were teachers of informatics (N_T=3) from 3 schools in Volos, Greece together with their students (N_S=156). All the selected teachers have years of experience in teaching informatics.

The C4G approach for building programming skills was applied in classes, involving a total of 156 students aged from 10 to 15 years (5^{th} and 6^{th} grade of primary school and 1^{st} to 3^{rd}

grade of secondary school). Table 1 shows number of students – participants of the study by age/grade.

Table 1 - Number of students by age/grade

Years of age	Grade	Classes	Number of students
10-11	5	1	25
11-12	6	1	25
12-13	1	1	12
13-14	2	1	12
14-15	3	5	82
	Total	**9**	**156**

Descriptions of activities at the 5th Gymnasium of Volos

The 5th Gynmasium of Volos enrolls students aged 12 – 15 years. It is the only school in the centre of the town of Volos, which has 120K inhabitants, and it is significant as it addresses urban educational needs. The school's student body is very representative for a medium sized town out of the capital city of Athens. The other Gymnasiums of the town of Volos are located in the city outskirts.

Figure 1. Students arrive for class at the 5th Gymnasium of Volos.

The school has a computer lab with 12 workstations. The workstations operate on Windows®. The lab is used for informatics but also for digital activities related to any course in the school curriculum. This means that the lab is used by most teachers in the school. The lab also has a server that is used for sharing software with the students.

Figure 2. Students work in the computer laboratory at the 5th Gymnasium of Volos.

The Coding4Girls software was used in the context of the informatics course in the 3rd year of studies. The course aims to build general digital literacy for students focusing mostly on the deployment of typical and common digital tools and less on programming. Informatics is a heavily lab-based course. Even the underlying theory is delivered through lab activities, encouraging students to deploy concept graphs, spreadsheets, text processing, and more. However, Mr. Christos Christoforidis, the informatics teacher of the school, engages students in programming activities through tools such as Scratch, Logo, and code.org, an on-line environment for programming exercises that has the feel of the Scratch tool. Through these activities the teacher aims to go beyond the strict requirements of the formal curriculum for further fostering experimentation and exploration among students with a focus on programming and not only basic digital literacy. This is not uncommon for teachers in several, who research options for increasing interactivity in the classroom through games and simulations.

The evaluation activities took place in January, February, and March of 2020. 4 groups of learners were involved for a total of approximately 70 students. The activities took place in the context of obligatory information technology courses that address all students and are part of the formal curricula dictated by the Ministry of Education. The students worked in teams on the lab computers using 6-7 accounts Coding4Girls. The students were actively engaged not only in using the Cording4Girls software but also in setting up the learning activities. A series of sessions took place. In the 1st session the students installed the software on the lab computers. In the 2nd session the students created accounts in the Coding4Girls software. In the 3rd session the students connected to the Coding4Girls application and starting deploying the Chameleon activity. In subsequent sessions the students reviewed the Chameleon activity objectives, explored the mini games, and brainstormed on a potential solution using the related functionality of the game. Finally, students worked on programming a solution to the Chameleon activity using the Snap! environment that is integrated into the Coding4Girls learning application. Notably, students were already familiar with Scratch. This allowed them to become easily accustomed to the similar Snap! environment.

One of the challenges that were faced was the size of the Coding4Girls application, which made it difficult to download to the laboratory computers due to their limited capacity and the low bandwidth of the network. The reason why the software is heavy is because it includes very nice 3D graphics that allow students to immerse into the learning activities and to have a more enjoyable educational experience. To overcome the challenges introduced by the size of the application, the implementation team provided the school with 14 USB sticks on which the software was stored. With the USB sticks it was no longer necessary to download the software as students could directly run it from the storage device that was attached to the computer.

The experience of the students from using the Coding4Girls learning tool was very positive. The teacher observed student reactions and engagement and reported that the software was attractive, enticing learning to want to explore it further. Part of the attractiveness is the 3D graphics of the application that are very similar to what students are used to when playing digital games for entertainment. The graphical environment and the user movement in the digital world is comparable to popular commercial games in terms of quality and fidelity and this is one of significantly positive aspects of the application. Furthermore, the students enjoyed the actual learning activities themselves and particularly the brainstorming and programming as they were challenging but within their reach. They further enjoyed the narrative of the game, specifically the Chameleon vacation theme, which introduced a fun and intuitive wide level objective for them to achieve through programming. Girls and boys participated equally in the activities, becoming aware that information technology is not gender specific and that all learners have the opportunity to think creatively through computer science.

For the teacher, one of the benefits was the fact that the tool provides some learning activities that are already complete, such as the Chameleon educational scenario. This allowed the teacher to directly engage with the tool immediately. The scenario further could be used as a good practice example that helped the teacher understand the functionality of the learning application and was used for inspiration towards designing additional educational activities for the class.

Descriptions of activities at the Gynmasium of Pteleos

Pteleos is a village at the south part of the region of Magnesia, which is one of the 4 smaller geographical regions of the wider area of Thessaly. The school engages 40 learners in total aged 12 – 15 years, approximately equally divided in the 3 academic years. Due to the small size of the school only one group of students exists for each class from the 1st to the 3rd. The school was selected because it is located in a village and out of urban areas. The students enrolled in the school are representative of rural populations. As such the information collected through the evaluation activities in this school is complementary to that collected in the urban 5th Gynmasium of Volos.

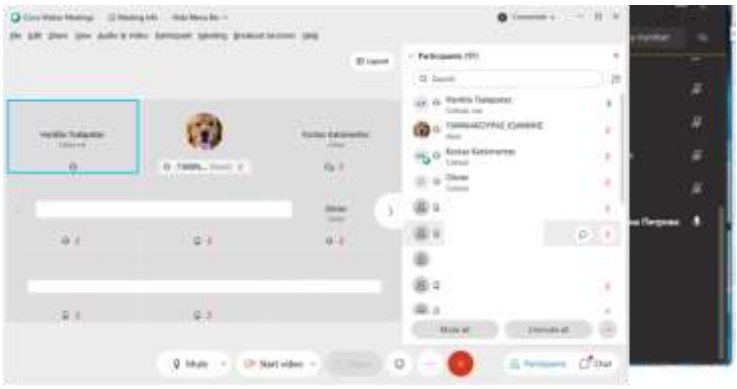

Figure 3. Students of the 3rd grade of the Gynmasium of Pteleos log into the information technology class session to deploy the Coding4Girls learning game.

The evaluation activities took part in the school computer lab. The lab has 12 computers that operate on a Windows environment and a server that operates on a Linux thin client. Similar to the 5th Gymnasium of Volos, the lab is used for the informatics course but also for all curriculum courses when there is an opportunity or need to deploy digital tools for enriching student experiences.

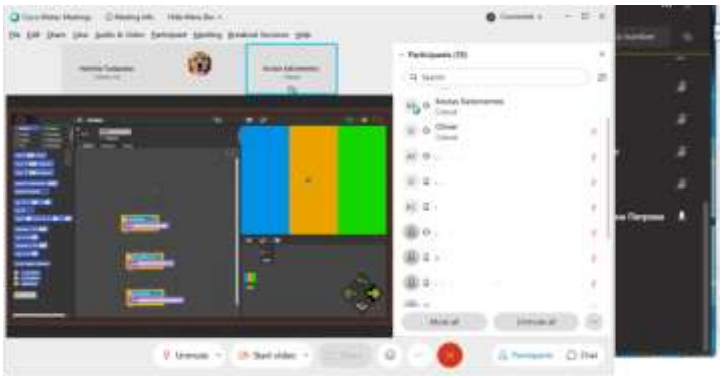

Figure 4. Students of the 3rd grade of the Gynmasium of Pteleos work on building programs in the context of the Chameleon learning scenario.

The informatics course is taught based on the curriculum that is dictated by the Ministry of Education. Students engage in programming by using the Scratch environment as well as the Logo programming language.

Evaluation activities started in the spring of 2020 engaging all 3 classes, namely 1st to 3rd. The educator, Mr. Giannis Giannakouras, presented to students the objectives of the Coding4Girls project and demonstrated the software application. The Coding4Girls software was installed on the school computers in the spring of 2020.

Figure 5. Students of the Gymnasium of Pteleos deploy the brainstorming tools of the Coding4Girls learning game.

Activities resumed in the fall of 2020. Unfortunately, activities were interrupted as a result of schools closing in March 2020 in the context of COVID-19 prevention measures.

The implementation team provided this school as well with USB sticks that include the software application in order to facilitate easy execution directly from the storage device, overcoming downloading speed challenges that are faced by the school due to its rural location. The USBs were also used to distribute the software to students for home deployment. More evaluation sessions took place in December 2020. The sessions took place virtually as school were again closed only a few weeks after opening in September 2020.

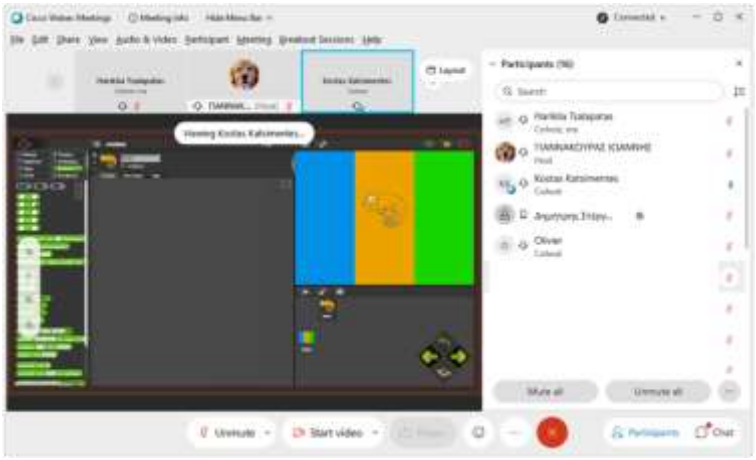

Figure 6. Students at the Gymnasium of Pteleos explore movement functions of programming through the Coding4Girls learning game.

The sessions engaged the 1st grade (12 students), the 2nd grade (12 students), and the 3rd grade (12 students). In other words, almost all students in the school engaged in programming games through Coding4Girls. The activities took place in the context of information technology courses in the context of the formal school curriculum.

During the sessions the students had the opportunity to experience the software tools. They were familiarized with account creation, logging in, entering a course room, reviewing the course objectives, and executing the course activities as these were defined by the educator. The students used the Chameleon learning scenario, similarly to the 5th Gymnasium of Volos. They students followed the tasks of the scenarios that involve playing a mini-game that demonstrates a programming concept and then programming in a step-by-step manner the behaviour of the Chameleon. The programming steps include motion, i.e. making the Chameleon move, sound, namely making the Chameleon speak, colour, namely making the Chameleon take the colour of his surroundings, and putting everything together. The students also explored the gamification elements of the software application, through which a user gains rewards in the form of coins that she may exchange for personalizing the game environment, for example adapting the colours of the lobby, changing the music, and more. Finally, the students experienced how they may adapt the parameters of the game appearance through the application menu.

Figure 7. Students at the Gynmasium of Pteleos explore the personalization of the Coding4Girls environment through the use of gamification elements and specifically the use rewards in the form of coins gained as a result of their engagement in the learning game.

The students engaged in a discussion in which they asked both practical questions related to the execution of the game in diverse environments and devices as well as more high-level issues related to the importance of programming in the digital age. They further were able to understand that the evolution of technology, and more specifically of network speeds, is a driver for demand for ever evolving digital applications which in turn drives the need for qualified programming professionals. The students reflected on how girls and boys have equal opportunities in engineering careers and more specifically the software industry and that it is important for society to put all innovative minds to work for addressing emerging challenges.

Descriptions of activities at the Saint Joseph Primary School in Volos

The Coding4Girls software was evaluated with students in the 5th and 6th grades of the Saint Joseph primary school of Volos that enrol approximately 50 students. Primary schools in Greece enrol students aged 6-12 years. Saint Joseph is an innovative private primary school in Volos that aims to integrate innovation in all aspects of learning, including digital education.

Figure 8. Students at Saint Joseph Primary School engage in STEAM activities.

USB sticks with the software were provided to the informatics educator of the school, Ms. Zoi Stellou, who provided valuable insight on student needs as well as feedback. The teacher commented that one of the key advantages of the software is that it is developed in the form of a game that entices students to engage with building programming skills. In addition, the educator commented that the design of the software application took into account the needs of girls, aiming to bring them closer to computing. This is particularly important because the fact is that girls, although they do not lag behind boys in terms of mental development, do not choose learning paths related to science and in particular to computer science, mathematics, and engineering.

The teacher commented that in the Saint Joseph school, as well as in other schools, the number of girls that participate in technology workshops that go beyond the school obligatory activities are very few. For example, very few girls participate in after school activities related to robotics and STEAM skill development as compared to boys. This is a result from informally conveyed from generation to generation of attitudes, perceptions, and stereotypes that technology is exclusive to boys.

The educator commented that for the 7 years that she works at the school as an IT teacher, and while she expected girls to be encouraged to come to the afternoon non-obligatory STEAM and programming workshops, there are rarely more than 1 to 2 girls in a class of 10. This is something that is of particular concern. Furthermore, many girls in obligatory computer science classes that take place in the context of the formal school program in the morning become stressed if an exercise they are assigned proves to be challenging and will rarely try for a 2nd time without the teacher's encouragement and support. Girls tell the

teacher that they are afraid that they will damage the computers. This may reflect an attitude of distancing themselves from an activity that they are not yet familiar with; it may also reflect attitudes that have been subconsciously passed on to them by their immediate environment that they cannot obtain this knowledge and, as such, should distance themselves from the equipment without even making an effort.

The Coding4girls software enables children in general and girls in particular to build and apply programming skills. Some of the benefits of the software include the attractive environment, its graphics, and it's the simplicity that makes it accessible. On the other hand, the application design, which integrates girls' preferences on engaging in digital games based on related research encourages the participation in programming of all children and aims to increase the participation of girls in digital activities.

More specifically, the school chose to apply the Coding4Girls software not only in the afternoon non-obligatory workshops but also in the morning formal curricula to which all students have access, in order to allow all students to familiarize themselves with the tool. Coding4Girls allows the design through an easy interface of educational activities by teachers for the benefit of their students. It may be deployed not only in the context of digital education but also for building STEAM skills. The software can help students demystify technology and to understand that it is not only a choice for boys but also for girls allowing them to participate equally in information technology.

The school aims to continue deploying the Coding4Girls application for the rest of the 2020 – 2021 academic period after schools reopen to live instruction. In addition to that, it aims to deploy the software in the coming years documenting the expectations and experiences of all students, with an emphasis on girls. More specifically, the school aims to evaluate the degree to which girls overcome their fear of technology as a result of using the Coding4Girls interventions and other digital tools, overcome difficulties, and move past stereotypes on information technology developing a more positive outlook towards it. Also, the school will evaluate the degree to which the Coding4Girls activities help attract more girls to the STEAM and digital competences afternoon workshops.

RESULTS

Results of questionnaires for students

Two questionnaires for students were used:

- S1. Preliminary questionnaire about the use of digital devices and perceived level of programming and
- S2. Follow-up questionnaire about satisfaction with programming and coding activities, satisfaction with the organization of the implementation, and perception on the acquired coding skills.

Students were asked to self-assess their current level of programming skill. Based on this question, the difference between students' self-assessed initial and final level of programming skill was calculated (the answers from the questionnaires were paired based on the code that students have entered).

Teachers' observations and comments

After the implementation activities, teachers were asked to express their qualitative opinions about the C4G methodology and the implementation process using the forms T1 and T2.

Using the form T1, teachers reported that the students were interested and actively participated in the activities. Most of the students successfully completed all the tasks with the help of prepared materials. Moreover, they stated that the students were actively engaged in discussion, asking both practical questions related to the execution of the game in diverse environments and devices as well as more high-level issues related to the importance of programming in the digital age. They further were able to understand that the evolution of technology, and more specifically of network speeds, is a driver for demand for ever evolving digital applications which in turn drives the need for qualified programming professionals. The students reflected on how girls and boys have equal opportunities in engineering careers and more specifically the software industry and that it is important for society to put all innovative minds to work for addressing emerging challenges.

Teachers' comments

Using the form T2, teachers reported on accomplishment of learning objectives, relevance, effectiveness and acceptance of the proposed methodology by the students, and the overall organization of the implementation.

The opinion of the teachers is that game-based learning is fun for students. The students fully accepted the C4G methodology and felt motivated to solve tasks (problems) which makes this way of learning effective for learning programming. All teachers stated that the gamified learning and the serious game approach are very suitable and motivating for the students. C4G projects had a positive effect on their desire and motivation to eliminate all mistakes.

Game-based learning always attracts the attention of students and is particularly effective in areas where mental activities such as programming are intense. Serious game design and approach with proof of concept can be problematic, especially for low-level students (in groups where the concept of abstract concrete is not very clear). However, with the concept-proven serious game approach, the usability of coding training is extremely high. The approach of the coding4girls project seems positive, as gamification and design emerge as sub-skills in the acquisition of coding skills.

Regarding the overall organization of the implementation, teachers reported that it was fully aligned to the teaching needs (achievement of the outcomes related to programming). Created materials for implementation of C4G activities are comprehensive and clear. During the implementation, logistical support from project team members was efficient and available at any time.

Experts' comments

External experts (N_E=3) were also asked to give their qualitative opinions regarding the accomplishment of learning objectives by the students, relevance, effectiveness and acceptance of the proposed methodology by the students, and the overall organization of the implementation.

All three experts agreed that for developing basic programming skills in among students from 10-15 years, the C4G methodology is very suitable. Game-based learning and design thinking is considered as very effective. Students feel more motivated to complete the

assigned tasks, since Snap! interface allows them to create interactive stories and games which is fun and stimulating for them.

According to the experts, the C4G learning scenarios are well designed and enable accomplishment of learning objectives. Topics included in the projects are interesting to the girls and motivate them to solve the given problem using newly acquired programming knowledge.

Overall, the students definitely enjoyed learning the programming concepts. They were very often motivated to understand and learn the concepts so they could solve/program the solutions of the activities. The learning materials are well designed and excellently presented to the participating students.

DISCUSSION AND CONCLUSIONS

In addition to the above schools, Coding4Girls was demonstrated to 30 secondary education teachers at the multiplier event that took place on October 15, 2020. The event was organized in collaboration with the Regional Centre for Educational Planning of the area of Thessaly. The Centre is the Ministry of Education's coordinating regional authority on innovative educational design. In addition, the event was organized in collaboration with the Hellenic Mathematical Society. The co-organization of the event with authorities and professional bodies ensures the broad dissemination and adoption of project results. Notably, the University of Thessaly consciously organized a relatively small in audience event in order to comply with COVID-19 rules that dictate that no more than 50 individuals be in the same room at any given time. With the organizers, invited speakers, and service professionals (such as caterers and photographers) the event was planned to have a total attendance of 40 individuals.

Figure 9. Educators explore the Coding4Girls learning game.

During the event the teachers had the opportunity to reflect on the needs of both society and industry to develop programming skills for the 21st century. Educators reflected on the fact that there is a significant shortage on skills programming professionals in Europe which reaches 900K empty positions.

Figure 10. Mr. Alexandros Kapaniaris, Coordinator of Educational Planning for Informatics for the Regional Center for Educational Planning for the area of Thessaly addresses educators in a Coding4Girls event.

This is a result of the evolution of network speeds that lead to ever increasing demand for on-line applications and services in today's digital age. As a result, Europe has a very active information technology landscape with SMEs and larger companies striving to meet the demand for digital tools and services. To effectively pursue business opportunities, the information technology sector relies on the development of a pool of skilled professionals. In other words, growth in the coming years will be very positively affected by information technology and will be heavily dependent on the development of human capital. The shortage of qualified information technology professionals requires that society and industry do more to attract all bright minds to innovation related sectors, such as the digital economy, including both girls and boys.

The feedback from educators was very positive. Educators perceived the software to be of great value for introducing programming to wider audiences and for attracting all children, including both girls and boys, to information technology studies and careers. In addition, the teachers found the application functionality on allows teachers to review and reproduce courses and activities produced by others as value adding features that help individuals that have less experience with the deployment of serious games to design activities for their students by being inspired and guided by activities designed by others and made public for all to use. Finally, the educators found the link between programming and STEAM particularly useful as both fields help build critical and analytical thinking and combined

offer opportunities for positive multiplier effects on student transversal, soft skill development.

ANNEXES

S1. PRELIMINARY QUESTIONNAIRE FOR STUDENTS (in Greek)

S1. ΠΡΟΚΑΤΑΡΚΤΙΚΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ ΓΙΑ ΜΑΘΗΤΕΣ

Πρόκειται για μια προκαταρκτική έρευνα σχετικά με τη χρήση ψηφιακών συσκευών και την εμπειρία στον προγραμματισμό που πραγματοποιείται στο πλαίσιο του έργου CODING4GIRLS που στοχεύει στη δημιουργία ενός σοβαρού παιχνιδιού για την ανάπτυξη δεξιοτήτων προγραμματισμού.
Οι απαντήσεις σας θα είναι **ανώνυμες** και θα χρησιμοποιούνται μόνο για ερευνητικούς σκοπούς. Σας ευχαριστούμε για το χρόνο και τη συνεργασία σας!
Αρχικά, γράψτε τον **κωδικό** που λάβατε από τον καθηγητή σας παρακάτω.

ΚΩΔΙΚΟΣ ΚΑΙ ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ

Κωδικός: _____ Σχολείο: _____
Ηλικία: _____ Τάξη: _____
Φύλο: Α Γ

ΧΡΗΣΗ ΨΗΦΙΑΚΩΝ ΣΥΣΚΕΥΩΝ, ΔΙΑΔΙΚΤΥΟΥ ΚΑΙ ΒΙΝΤΕΟΠΑΙΧΝΙΔΙΩΝ

1. Για πόσο καιρό χρησιμοποιείτε υπολογιστές, tablet ή άλλες ψηφιακές συσκευές;	_____ χρόνια
2. Πόσες ώρες την εβδομάδα χρησιμοποιείτε υπολογιστή, tablet ή άλλη ψηφιακή συσκευή;	_____ ώρες
3. Πόσες ώρες την εβδομάδα χρησιμοποιείτε το Διαδίκτυο;	_____ ώρες
4. Πόσες ώρες την εβδομάδα παίζετε βιντεοπαιχνίδια;	_____ ώρες

ΕΜΠΕΙΡΙΑ ΣΤΟ ΓΡΑΨΙΜΟ ΚΩΔΙΚΑ ΚΑΙ ΣΤΟΝ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟ

5. Ποιο είναι το επίπεδό σας στον προγραμματισμό, τώρα; *Κυκλώστε την πιο κατάλληλη απάντηση*.
   a) Δεν έχω γράψει κώδικα ή δεν έχω προγραμματίσει ξανά
   b) Είμαι αρχάριος προγραμματιστής (έχω βασικές ιδέες)
   c) Μπορώ να γράψω κώδικα για απλά προγράμματα
   d) Είμαι πολύ καλός στον προγραμματισμό (μπορώ να δημιουργήσω ολοκληρωμένο πρόγραμμα)
   e) Μπορώ να σχεδιάσω μια λύση ενός προβλήματος σε μορφή προγράμματος

6. Αν έχετε ξαναγράψει κώδικα, ποιες από τις παρακάτω έννοιες σας είναι οικείες; *Τσεκάρετε μια ή περισσότερες απαντήσεις.*
   ☐ Βρόχοι ☐ Μεταβλητές ☐ Συμβάντα
   ☐ Συνθήκες ☐ Τελεστές ☐ Παραλληλισμός
   ☐ Statements (ήχοι, κίνηση, εμφάνιση, ζωγραφική)

7. Τι σας παρακινεί να μάθετε να προγραμματίζετε; *Τσεκάρετε μια ή περισσότερες απαντήσεις.*
   - ☐ Δεν έχω κίνητρο
   - ☐ Θέλω να επιτύχω στο μάθημα της πληροφορικής
   - ☐ Θέλω να δείξω στους άλλους μαθητές ότι μπορώ να προγραμματίζω
   - ☐ Θέλω να ακολουθήσω μια καριέρα στο επάγγελμα του προγραμματισμού
   - ☐ Μου αρέσει να επιλύω λογικά προβλήματα και γρίφους
   - ☐ Άλλο _____

S2. FOLLOW-UP QUESTIONNAIRE FOR STUDENTS (in Greek)

S2. ΣΥΝΕΧΕΙΑ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟΥ ΓΙΑ ΜΑΘΗΤΕΣ

Πρόκειται για μια συνέχεια της έρευνας σχετικά με την ικανοποίηση με τη μεθοδολογία μάθησης C4G και την υλοποίηση δραστηριοτήτων για την απόκτηση δεξιοτήτων προγραμματισμού και εγγραφής κώδικα.
Οι απαντήσεις σας θα είναι **ανώνυμες** και θα χρησιμοποιούνται μόνο για ερευνητικούς σκοπούς. Σας ευχαριστούμε για το χρόνο και τη συνεργασία σας!
Γράψτε τον **κωδικό** που λάβατε από τον καθηγητή σας παρακάτω (είναι ο ίδιο κωδικός που χρησιμοποιήσατε στο προκαταρκτικό ερωτηματολόγιο).

ΚΩΔΙΚΟΣ ΚΑΙ ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ

Κωδικός: _____ Σχολείο: _____

Ηλικία: _____ Τάξη: _____

Φύλο: Α Γ

ΜΕΘΟΔΟΛΟΓΙΑ ΜΑΘΗΣΗΣ C4G

8. Ταξινομήστε τις ακόλουθες δηλώσεις:	*Διαφωνώ απόλυτα*	*Διαφωνώ*	*Ουδέτερο*	*Συμφωνώ*	*Συμφωνώ απόλυτα*
a) Βρήκα τον προγραμματισμό σαν μια πρόκληση.	1	2	3	4	5
b) Βρήκα τον προγραμματισμό ενθαρρυντικό.	1	2	3	4	5
c) Βρήκα τον προγραμματισμό εύκολο.	1	2	3	4	5
d) Μου άρεσε ο προγραμματισμός.	1	2	3	4	5
e) Κατάλαβα τις περισσότερες από τις έννοιες προγραμματισμού.	1	2	3	4	5
f) Η εκμάθηση με αυτόν τον τρόπο είναι διασκεδαστική.	1	2	3	4	5
g) Ένιωσα αφοσιωμένος με αυτόν τον τρόπο μάθησης.	1	2	3	4	5
h) Οι δραστηριότητες ήταν σχετικές στο να τις μάθεις.	1	2	3	4	5
i) Ανά πάσα στιγμή, ήταν σαφές τι έπρεπε να κάνω.	1	2	3	4	5
j) Αυτό που έμαθα θα είναι σχετικά με το μέλλον μου.	1	2	3	4	5

ΑΝΤΙΛΗΠΤΟ ΕΠΙΠΕΔΟ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟΥ

9. Ποιο είναι το επίπεδό σας στον προγραμματισμό, τώρα; *Κυκλώστε την πιο κατάλληλη απάντηση*.

f) Δεν έχω γράψει κώδικα ή δεν έχω προγραμματίσει ξανά

g) Είμαι αρχάριος προγραμματιστής (έχω βασικές ιδέες)
h) Μπορώ να γράψω κώδικα για απλά προγράμματα
i) Είμαι πολύ καλός στον προγραμματισμό (μπορώ να δημιουργήσω ολοκληρωμένο πρόγραμμα)
j) Μπορώ να σχεδιάσω μια λύση ενός προβλήματος σε μορφή προγράμματος

ΧΡΗΣΙΜΟΤΗΤΑ ΤΟΥ ΠΕΡΙΒΑΛΛΟΝΤΟΣ ΤΟΥ ΠΑΙΧΝΙΔΙΟΥ					
10. Ταξινομήστε τις ακόλουθες δηλώσεις:	*Διαφωνώ απόλυτα*	*Διαφωνώ*	*Ουδέτερο*	*Συμφωνώ*	*Συμφωνώ απόλυτα*
a) Θα ήθελα να χρησιμοποιώ συχνά αυτό το παιχνίδι.	1	2	3	4	5
b) Βρήκα το παιχνίδι πολύπλοκο.	1	2	3	4	5
c) Το παιχνίδι ήταν εύκολο στη χρήση.	1	2	3	4	5
d) Χρειάζομαι την υποστήριξη ενός προσώπου που γνωρίζει από τεχνολογία για να μπορώ να χρησιμοποιήσω αυτό το παιχνίδι.	1	2	3	4	5
e) Οι διάφορες λειτουργίες σε αυτό το παιχνίδι ήταν καλά ενσωματωμένες.	1	2	3	4	5
f) Υπήρχε πάρα πολύ ασυνέπεια σε αυτό το παιχνίδι.	1	2	3	4	5
g) Οι περισσότεροι άνθρωποι θα μάθουν να χρησιμοποιούν αυτό το παιχνίδι πολύ γρήγορα.	1	2	3	4	5
h) Το παιχνίδι ήταν πολύ «δυσκίνητο» στη χρήση.	1	2	3	4	5
i) Αισθάνθηκα πολλή αυτοπεποίθηση χρησιμοποιώντας το παιχνίδι.	1	2	3	4	5
j) Έπρεπε να μάθω πολλά πράγματα πριν μπορέσω να ξεκινήσω με αυτό το παιχνίδι.	1	2	3	4	5

GAME EXPERIENCE					
11. Ταξινομήστε τις ακόλουθες δηλώσεις:	*Διαφωνώ απόλυτα*	*Διαφωνώ*	*Ουδέτερο*	*Συμφωνώ*	*Συμφωνώ απόλυτα*
a) Ένιωσα ικανοποιημένος.	1	2	3	4	5
b) Ένιωσα επιδέξιος.	1	2	3	4	5
c) Με ενδιέφερε η ιστορία του παιχνιδιού.	1	2	3	4	5
d) Μου φάνηκε διασκεδαστικό.	1	2	3	4	5

e) Μου άρεσε πλήρως το παιχνίδι.	1	2	3	4	5
f) Ένιωσα χαρούμενος/η.	1	2	3	4	5
g) Μου έδωσε κακή διάθεση.	1	2	3	4	5
h) Σκεφτόμουν άλλα πράγματα.	1	2	3	4	5
i) Το βρήκα κουραστικό.	1	2	3	4	5
j) Ένιωσα ικανός.	1	2	3	4	5
k) Νόμιζα ότι ήταν δύσκολο.	1	2	3	4	5
l) Ήταν αισθητικά ευχάριστο.	1	2	3	4	5
m) Ξέχασα τα πάντα γύρω μου.	1	2	3	4	5
n) Ένιωσα καλά.	1	2	3	4	5
o) Ήμουν καλός/ή σε αυτό.	1	2	3	4	5
p) Ένιωθα ότι βαριέμαι.	1	2	3	4	5
q) Ένιωσα επιτυχημένος/η.	1	2	3	4	5
r) Ένιωσα ότι έχω φαντασία.	1	2	3	4	5
s) Ένιωσα ότι μπορούσα να εξερευνήσω πράγματα.	1	2	3	4	5
t) Το απόλαυσα.	1	2	3	4	5
u) Ήμουν γρήγορος στην επίτευξη των στόχων του παιχνιδιού.	1	2	3	4	5
v) Ένιωσα ενοχλημένος/η.	1	2	3	4	5
w) Ένιωσα πίεση.	1	2	3	4	5
x) Ένιωθα ευερέθιστος/η.	1	2	3	4	5
y) Έχασα την αίσθηση του χρόνου.	1	2	3	4	5
z) Ένιωσα πρόκληση.	1	2	3	4	5
aa) Το βρήκα εντυπωσιακό.	1	2	3	4	5
bb) Ήμουν βαθιά συγκεντρωμένος/η στο παιχνίδι.	1	2	3	4	5
cc) Ένιωσα απογοητευμένος/η.	1	2	3	4	5
dd) Ένιωσα ότι ήταν μια πλούσια εμπειρία.	1	2	3	4	5
ee) Έχασα τη σύνδεση με τον έξω κόσμο.	1	2	3	4	5
ff) Ένιωσα πίεση χρόνου.	1	2	3	4	5
gg) Έπρεπε να κάνω πολλή προσπάθεια σε αυτό.	1	2	3	4	5

S3. STUDENTS' COMMENTS (in Greek)

S3. ΣΧΟΛΙΑ ΜΑΘΗΤΩΝ
Μετά την εφαρμογή της προσέγγισης C4G με βάση το παιχνίδι για την ανάπτυξη δεξιοτήτων προγραμματισμού, οι εκπαιδευτικοί συλλέγουν τις ποιοτικές απόψεις και σχόλια των μαθητών σε μια ομαδική συνέντευξη και τις μεταγράφουν. Παρακαλώ, ομαδοποιήστε όλους τους μαθητές και συλλέξτε τις ποιοτικές απόψεις και σχόλια. Ρωτήστε τους μαθητές σχετικά με τις απόψεις που αναφέρονται παρακάτω και μεταγράψτε τα σχόλιά τους χρησιμοποιώντας αυτήν τη φόρμα. Σας ευχαριστούμε για το χρόνο και τη συνεργασία σας!
ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ
Εκπαιδευτικός: _____ Τάξη: _____ Σχολείο: _____ Ημερομηνία: _____
ΣΥΝΟΛΙΚΗ ΟΡΓΑΝΩΣΗ ΚΑΙ ΑΝΤΙΛΗΨΕΙΣ ΤΩΝ ΦΟΙΤΗΤΩΝ
Μπορείτε να ρωτήσετε τους μαθητές για τη συνολική οργάνωση της υλοποίησης, την αντίληψή τους για τις γνώσεις που αποκτήθηκαν, την αντίληψή τους για τη συνάφεια και την αποτελεσματικότητα της μάθησης με βάση το παιχνίδι και την αντίληψή τους για την επιτευχθείσα διασκέδαση.
ΜΑΘΗΣΙΑΚΕΣ ΔΥΣΚΟΛΙΕΣ ΚΑΙ ΠΡΟΒΛΗΜΑΤΑ
Μπορείτε να ρωτήσετε τους μαθητές για τυχόν μαθησιακές δυσκολίες ή προβλήματα που αντιμετώπισαν κατά τη διάρκεια του μαθήματος και τι έκαναν όταν βρήκαν αυτά τα προβλήματα.
ΑΠΟΨΕΙΣ ΜΑΘΗΤΩΝ ΓΙΑ ΤΗ ΒΕΛΤΙΩΣΗ ΤΗΣ ΜΕΘΟΔΟΛΟΓΙΑΣ, ΤΩΝ ΕΡΓΑΛΕΙΩΝ ΚΑΙ ΤΟΥ ΠΕΡΙΕΧΟΜΕΝΟΥ ΤΟΥ C4G
ΟΤΙΔΗΠΟΤΕ ΑΛΛΟ ΘΕΩΡΕΙΤΕ ΣΧΕΤΙΚΟ

T1. TEACHERS' OBSERVATIONS (in Greek)

T1. ΠΑΡΑΤΗΡΗΣΕΙΣ ΕΚΠΑΙΔΕΥΤΙΚΩΝ
Κατά τη διάρκεια των συνεδριών εφαρμογής, οι εκπαιδευτικοί παρατηρούν και τεκμηριώνουν την αντίδραση των μαθητών και την πρόοδό τους στην οικοδόμηση δεξιοτήτων προγραμματισμού χρησιμοποιώντας την προσέγγιση C4G που βασίζεται στο παιχνίδι. Παρακαλώ, χρησιμοποιήστε αυτήν τη φόρμα και υποδείξτε τις παρατηρήσεις σας σχετικά με τις απόψεις που αναφέρονται παρακάτω. Σας ευχαριστούμε για το χρόνο και τη συνεργασία σας!
ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ
Εκπαιδευτικός: _____ Τάξη: _____ Σχολείο: _____ Ημερομηνίες(από-έως): _____
ΣΥΜΜΕΤΟΧΗ ΚΑΙ ΔΕΣΜΕΥΣΗ ΜΑΘΗΤΩΝ
Συμμετέχουν ενεργά οι μαθητές; Συνεργάζονται; Διασκεδάζουν; κλπ.
ΜΑΘΗΣΙΑΚΕΣ ΔΥΣΚΟΛΙΕΣ ΚΑΙ ΠΡΟΒΛΗΜΑΤΑ
Οι μαθητές αντιμετωπίζουν δυσκολίες με το περιεχόμενο ή/και την τεχνολογία; Ζητούν υποστήριξη; κλπ.
ΟΤΙΔΗΠΟΤΕ ΑΛΛΟ ΘΕΩΡΕΙΤΕ ΣΧΕΤΙΚΟ

T2. TEACHERS' COMMENTS (in Greek)

T2.2 ΣΧΟΛΙΑ ΕΚΠΑΙΔΕΥΤΙΚΩΝ
Συλλέγονται ποιοτικές απόψεις και σχόλια των εκπαιδευτικών σχετικά με την προσέγγιση C4G που βασίζεται στο παιχνίδι για την ανάπτυξη δεξιοτήτων προγραμματισμού. Παρακαλώ, χρησιμοποιήστε αυτήν τη φόρμα και υποδείξτε τις παρατηρήσεις σας σχετικά με τις απόψεις που αναφέρονται παρακάτω. Σας ευχαριστούμε για το χρόνο και τη συνεργασία σας!
ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ
Εκπαιδευτικός: _____ Ημερομηνία: _____ Σχολείο: _____
ΣΥΜΒΟΛΗ ΤΗΣ ΠΡΟΣΕΓΓΙΣΗΣ ΤΟΥ C4G ΣΤΗ ΔΥΝΑΜΙΚΗ ΑΠΟΔΟΧΗ ΤΩΝ ΣΤΟΧΩΝ ΜΑΘΗΣΗΣ ΑΠΟ ΤΟΥΣ ΜΑΘΗΤΕΣ
ΣΧΕΤΙΚΟΤΗΤΑ ΚΑΙ ΑΠΟΤΕΛΕΣΜΑΤΙΚΟΤΗΤΑ ΤΗΣ ΜΑΘΗΣΗΣ ΠΟΥ ΒΑΣΙΖΕΤΑΙ ΣΤΟ ΠΑΙΧΝΙΔΙ ΓΙΑ ΤΗΝ ΑΝΑΠΤΥΞΗ ΔΕΞΙΟΤΗΤΩΝ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟΥ ΚΑΙ ΤΗΣ ΕΙΔΙΚΗΣ ΜΑΘΗΣΙΑΚΗΣ ΠΡΟΣΕΓΓΙΣΗΣ *CODING4GIRLS*
ΠΙΘΑΝΟΤΗΤΑ ΑΠΟΔΟΧΗΣ ΤΗΣ ΠΡΟΤΕΙΝΟΜΕΝΗΣ ΜΕΘΟΔΟΛΟΓΙΑΣ ΑΠΟ ΤΟΥΣ ΜΑΘΗΤΕΣ

ΔΙΑΣΚΕΔΑΣΗ ΠΟΥ ΘΑ ΕΧΟΥΝ ΟΙ ΜΑΘΗΤΕΣ ΧΡΗΣΙΜΟΠΟΙΩΝΤΑΣ ΑΥΤΗ ΤΗΝ ΠΡΟΣΕΓΓΙΣΗ
Η ΓΝΩΜΗ ΣΑΣ ΓΙΑ ΤΗ ΣΥΝΟΛΙΚΗ ΟΡΓΑΝΩΣΗ ΤΗΣ ΕΚΠΑΙΔΕΥΣΗΣ ΤΩΝ ΚΑΘΗΓΗΤΩΝ
ΧΡΗΣΗ ΚΑΙ ΑΠΟΔΟΧΗ ΤΗΣ ΠΡΟΣΕΓΓΙΣΗΣ ΤΟΥ ΣΟΒΑΡΟΥ ΠΑΙΧΝΙΔΙΟΥ (που σχετίζεται με το εκπαιδευτικό πλαίσιο σχεδιαστικής σκέψης που βασίζεται στο παιχνίδι CODING4GIRLS)
ΟΤΙΔΗΠΟΤΕ ΑΛΛΟ ΘΕΩΡΕΙΤΕ ΣΧΕΤΙΚΟ

E. EXPERTS' COMMENTS (in Greek)

Ε. ΣΧΟΛΙΑ ΕΙΔΙΚΩΝ
Μετά την εφαρμογή της προσέγγισης βασισμένης στο παιχνίδι C4G για την ανάπτυξη δεξιοτήτων προγραμματισμού, συλλέγονται οι ποιοτικές απόψεις και σχόλια των ειδικών σε μια δομημένη συνέντευξη. Παρακαλώ, χρησιμοποιήστε αυτήν τη φόρμα και υποδείξτε τη γνώμη των ειδικών για τις απόψεις που αναφέρονται παρακάτω.
ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ
Όνομα ειδικού: _____ Θέση: _____ Οργανισμός: _____ Ημερομηνία: _____
ΣΥΜΒΟΛΗ ΤΗΣ ΠΡΟΣΕΓΓΙΣΗΣ ΤΟΥ C4G ΣΤΗ ΔΥΝΑΜΙΚΗ ΑΠΟΔΟΧΗ ΤΩΝ ΣΤΟΧΩΝ ΜΑΘΗΣΗΣ ΑΠΟ ΤΟΥΣ ΜΑΘΗΤΕΣ
ΣΧΕΤΙΚΟΤΗΤΑ ΚΑΙ ΑΠΟΤΕΛΕΣΜΑΤΙΚΟΤΗΤΑ ΤΗΣ ΜΑΘΗΣΗΣ ΠΟΥ ΒΑΣΙΖΕΤΑΙ ΣΤΟ ΠΑΙΧΝΙΔΙ ΓΙΑ ΤΗΝ ΑΝΑΠΤΥΞΗ ΔΕΞΙΟΤΗΤΩΝ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟΥ ΚΑΙ ΤΗΣ ΕΙΔΙΚΗΣ ΜΑΘΗΣΙΑΚΗΣ ΠΡΟΣΕΓΓΙΣΗΣ *CODING4GIRLS*
ΠΙΘΑΝΟΤΗΤΑ ΑΠΟΔΟΧΗΣ ΤΗΣ ΠΡΟΤΕΙΝΟΜΕΝΗΣ ΜΕΘΟΔΟΛΟΓΙΑΣ ΑΠΟ ΤΟΥΣ ΜΑΘΗΤΕΣ
ΔΙΑΣΚΕΔΑΣΗ ΠΟΥ ΘΑ ΕΧΟΥΝ ΟΙ ΜΑΘΗΤΕΣ ΧΡΗΣΙΜΟΠΟΙΩΝΤΑΣ ΑΥΤΗ ΤΗΝ ΠΡΟΣΕΓΓΙΣΗ

Η ΓΝΩΜΗ ΣΑΣ ΓΙΑ ΤΗ ΣΥΝΟΛΙΚΗ ΟΡΓΑΝΩΣΗ ΤΗΣ ΥΛΟΠΟΙΗΣΗΣ
ΧΡΗΣΗ ΚΑΙ ΑΠΟΔΟΧΗ ΤΗΣ ΠΡΟΣΕΓΓΙΣΗΣ ΤΟΥ ΣΟΒΑΡΟΥ ΠΑΙΧΝΙΔΙΟΥ (που σχετίζεται με το εκπαιδευτικό πλαίσιο σχεδιαστικής σκέψης που βασίζεται στο παιχνίδι CODING4GIRLS)
ΟΤΙΔΗΠΟΤΕ ΑΛΛΟ ΘΕΩΡΕΙΤΕ ΣΧΕΤΙΚΟ

REFERENCES

1. The 5th Gynmasium of Volos, on-line at: http://5gym-volou.mag.sch.gr/site/
2. The Saint Joseph Primary School of Volos, on-line at: https://www.saintjoseph.gr/cgi-bin/pages/index.pl?arlang=Greek&type=index&landing=true
3. The Gynmasium of Pteleos, on-line at: http://gym-pteleou.mag.sch.gr/index.php/component/content/?view=featured&start=25