TeaEdu4CT project Newsletter 2
July, 2020

Dear newsletter readers, subscribers and followers of TeaEdu4CT project,
Since February, 2020, when the first Newsletter has informed the readers about the start of the international project *Future Teachers Education*: *Computational Thinking and STEAM* (TeaEdu4CT) *(Erasmus+ 2019-1-LT01-KA203-060767)*, the announced in March, 2020 pandemic of COVID 19 and quarantine in most of the TeaEdu4CT Project partner countries has made rethink and replan the work in the project taking into consideration the changed situation. So in this 2nd Newsletter we will inform you about the changes in management and the progress made in the project, we will continue with the series of "TeaEdu4CT Consortium Introduced", inform about the project news and latest developments.

Your TeaEdu4CT team

CONTENT

1. Changes in the TeaEdu4CT Project
2. The Project Consortium Introduced (continued)
3. TeaEdu4CT Project News and Latest Developments
4. Announcement and Partner Activities

1. Changes in the TeaEdu4CT Project

Since the start of the international project *Future Teachers Education*: *Computational Thinking and STEAM* (TeaEdu4CT) (Erasmus + 2019-1-LT01-KA203-060767) in October, 2019, the project has continued in spite of the changes. There were 6 transnational face-to-face partner meetings planned in the project. The announced COVID 19 pandemic and quarantine in most of the TeaEdu4CT Project partner countries in the middle of March have moved the project management and partner meetings into the virtual space, to replace the planned face-to-face meetings at Project partner institutions. We had three online meetings (in April, May and June), they were conducted using online ZOOM platform.

According to the project plan there have to be developed the materials necessary for the development of computational thinking (CT) and STEAM education of future teachers. The project activities have started with the presentation and discussion of the first drafts of to be developed study modules (IOs 1-10).

The first two modules (IO1and IO2) are aimed at introduction of the fundamentals of Computational Thinking (CT) and STEAM education, the development of CT and STEAM competences improvement of future teachers, deepening their understanding of the concepts related to Informatics and digital technologies, the importance of which grow in the present COVID 19 quarantine situation, when university teacher trainers and school teachers are faced with the necessity of remote work and challenges of distant education.

Participants of the online meeting, June 19, 2020

It was agreed on common educational conceptions regarding CT and STEAM of the first two modules (IOs 1 and 2), which, on the one hand, should develop students', future teachers' understanding of the theoretical background of CT and STEAM education and, on the other hand, they will be used as background, framework and fundamental information for the development of the other eight modules (IOs 3-10) of the project, so it was important to have them completed first. Valentina Dagienė (VU) presented the structure of Module 1 (IO1) – *Framework for the development of the modules: CT and STEM for future teachers* - consisting of 6 units: (1) Cognitivism; (2) TPACK Framework; (3) Digital Competence Framework; (4) Inquiry Based learning; (5) Project Based Learning; (6) Constructionism. Future teachers will be able to choose which unit to study. Each unit was presented and discussed. A detailed draft plan of Module 2 (IO2) - *General Introduction of CT: a basic module for all teachers* - was presented by Erik Barendsen from Radbound University in Nijmegen.

There were some worries expressed regarding the piloting and testing of the modules in the conditions of the prolonged quarantine and further distant online implementation of study modules. It was agreed that the developers of the modules should think of the including into the modules the e-learning or blended learning approaches, materials, methods and tools suitable for distant and online implementation of the modules.

It was also agreed that Tallinn University will provide suggestions (and examples) in their Module (IO10) – *Technological, pedagogical and instructional design aspects of teaching CT for STEAM teachers/ trainers /researchers* - how to combine module units according to target groups.

2. The Project Consortium Introduced (continued)

The project partners are a cluster of leading European institutions in computer science education, CT and STEAM education. Eight universities and two research centres are involved. In this Newsletter we would like to continue the introduction of partner institutions of the project, among them there is Ankara University (Turkey), which is actively involved in the activities of TeaEdu4CT project. Ankara University is responsible for the development of two CT modules in this project: (a) a module covering CT thinking aspects for pre-school education; (b) a module for teaching of CT for languages, arts and humanities of prospective teachers.

Ankara University, founded in 1946, was the first institute of higher education to be established in the modern Turkish Republic (www.en.ankara.edu.tr). Today it is known as one of the leading research universities having 18 university faculties. Ankara University, a public university with more than 60,000 students, it offers a large academic portfolio with courses in a number of scientific disciplines, including social, medical, natural and applied sciences, as well as teacher education, arts and sports. It also offers associate, undergraduate, master's and doctoral level programmes. Distance and continuing education courses are also available.

According to the data of the year 2018, Ankara university researchers were involved in 1096 projects. Their research results were presented in 3369 publications only for the year 2018, beside the university's teaching mission. Computer Education and Instructional Technology (CEIT) department of Faculty of Educational Sciences is directly engaged in this project. CEIT graduates computing teachers as well as well-donated human resource for information technology and computer science sector for many years from now. The priority areas include computer science education, instructional technology, instructional design, e-Learning and research.

Yasemin Gülbahar Güven, involved in activities of this project, is a professor, who is responsible for both teaching and research. She published over 100 scientific papers, textbooks and conference papers in the field of computer education and instructional technologies specifically on e-Learning and computer science education (http://cv.ankara.edu.tr/kisi.php?id=gulbahar@ankara.edu.tr&deger=2). Professor Gülbahar worked with the Ministry of National Education between 2011-2012 and 2016-2018, she has coordinated the development of a national curriculum, a computing course for children (ages 1-10). Besides, she has been acting as the editor of the books and materials prepared for this computing course.

University of Turku, established in 1920, is the second largest university in Finland (utu.fi/en). It is a truly international and genuinely multidisciplinary research institution, with ranking in top one percent in general. UTU offers study and research opportunities in faculties of business, economics, education, humanities, law, mathematics and natural sciences, medicine, and social sciences. *Centre for Learning Analytics* is a research unit concentrated on digital learning and learning analytics. The unit consists of researchers, teachers and technical experts with mutual interest on pedagogically clever utilization of digital tools in learning. In addition to high quality research, the Centre develops a collaborative learning tool called ViLLE, which is already utilized in one third of all schools in Finland and in various other countries. Centre has participated in

various groundbreaking projects about utilizing digital technology in pedagogical context. These include, for example, the first experiences with a digital matriculation exam, the national assessment of Mathematics and the Finnish language and also electronic entry exams for health education in Finland. In this project University of Turku (Finland) is developing a module of *Educational environments for CT and STEAM*. It corresponds to the experience the university has in this field acquired in recent projects:

1. *Growing Mind*: a project that aims at producing means for the renewal and development of schools, teachers and students on the personal, social, and institutional level.

2. *Analytics Intelligence*: a joint project of Finnish universities concentrating on developing new methods for learning analytics.

3. *eMath* – EU-funded project where new, pedagogically groundbreaking digital teaching methods and tools were developed

4. *National Assessment of Mathematics, Finnish Language and Sustainability in Finland* – the digital version of the assessment done with the 8th graders.

5. *APOA* – a nationwide project where learning analytics for universities of applied sciences is developed and utilized.

The researchers involved in this project are **Mikko-Jussi Laakso** and **Mikko-Ville Apiola. Mikko-Jussi Laakso** has published 78 international refereed journal papers, conference papers, and other publications. Laakso has been working in the field of educational technology and learning, especially automatic assessment accompanied with immediate feedback, software visualisation, and learning management systems. Laakso leads the Centre for Learning Analytics, which has the key role in executing the research project. Laakso held a visiting scholar position (January 2009 - June 2011) at several universities in Melbourne, Australia; namely Monash University, Melbourne University and RMIT. **Mikko-Ville Apiola** is a postdoctoral researcher in learning analytics at the University of Turku, Finland, Department of Future Technologies. His formal education includes studies in computer science, mathematics, statistics, psychology, social psychology, software business, and media communication. He received his PhD in computer science education from University of Helsinki, Department of Computer Science, which is the highest ranked computing department in Finland. He completed his PhD on the topic of creativity and contextualising computing education for open-ended problem solving in higher education.

CESIE – a European Centre of Studies and Initiatives (cesie.org/en/) - is a non-profit, apolitical, and non-governmental organisation based in Palermo (Italy) and established in 2001. CESIE is committed to promote the cultural, social, educational and economic development at local, national, European and international levels. CESIE contributes to growth and development through the active participation of people, civil society and institutions, always valuing diversity. CESIE as organisation is inspired by the work and theories of sociologist Danilo Dolci (1924-1997), a social activist, a popular educator and a poet. He was called "Gandhi of the Sicily", a protagonist of the non-violence movement in Italy, who is best known for his opposition to poverty, social exclusion and the Mafia on Sicily. CESIE of today breaks with an ethnocentric global drive and focuses on individuals and diversity. Doing so, they apply the teaching of Danilo Dolci, who developed innovative educational nonviolent methods (such as the "strike in reverse" –working without pay- through which individuals initiated unauthorized public works projects, by and for the grass-roots in the '50 in Sicily).CESIE focuses its work on the research of social needs and challenges and the use of innovative learning approaches. In this way, CESIE actively connects research with action through the use of formal and non-formal learning methodologies. The organisational structure is divided into 6 thematic units working in cooperation and managing activities in their specific fields: Higher Education and Research; Rights and Justice; Adult,

Migration; School; Youth. The units are supported by 3 geographical departments (Local, European and International) and 4 transversal offices (Visibility and Communication, Networking, HRs, Financial). Moreover, CESIE benefits from a broad network of partners with more than 3000 civil society organisations, universities, schools, research centres, public authorities and private entities, youth centres, companies and entrepreneurs in the world. CESIE staff is composed of 60 people with a wide range of qualifications, skills and professional profiles, united by a deep sharing of ideals that lead our activities. The team has an international character being composed not only by Italians, but also by people from the UK, Germany, France, Spain, Serbia, Lithuania, etc. At the same time, CESIE relies on about 150 external experts that collaborate for specific activities in their offices: three in Sicily and three abroad. Equally important is the contribution from around 100 interns and volunteers engaged in internships at this organization per year. Along with other institutions and organisations, CESIE is currently implementing over 120 projects cooperating with more than 80 countries.

People from CESIE partner organisation, who are actively involved in the TeaEdu4CT project, are **Jelena Mazaj** and **Alessia Valenti**. They both are working in CESIE *Higher Education and Research Unit* (HERU), its work is based on qualitative and quantitative research methods to a wide range of sectoral and transdisciplinary activities, maximising their impact at local and international levels. Their responsibility in this project is the creation of Quality Assurance (QA) system of TeaEdu4CT project, planning of QA activities, development of quality criteria and evaluation tools.

Jelena Mazaj acquired PhD at University of Palermo (from 2017 – areas of research: open / social innovations, RRI, governance). - Master's Degree in Knowledge Management Since 2006, she has been working in the field of Higher Education and Research, strengthening Europe's and Partner Countries' educational and R&I areas through transdisciplinary research.

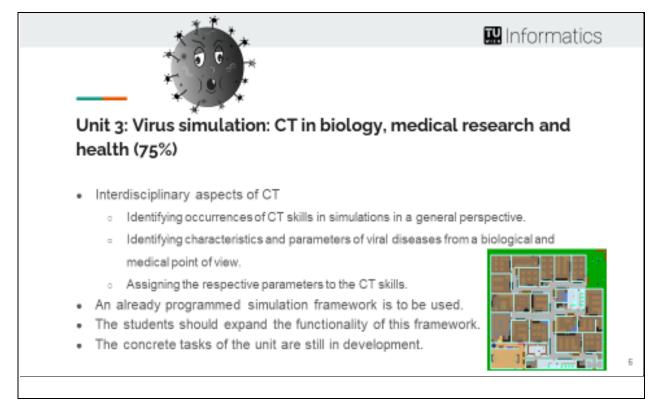
3. TeaEdu4CT Project News and Latest Developments

The TeaEdu4CT project is successfully progressing, in spite of the difficulties caused by the COVID-19 pandemic. The remote work policy in project partner institutions have influenced the coordination and management of the project. All activities of the project follow the project management plan, QA plan and the time line.

As the main focus of the Project is the development of 10 modules for integrating of different aspects of computational thinking (CT) to university future teachers' education, i.e. course units which can be integrated into university future teachers' education courses for STEAM. This August marks the end of the first and the most important stage of the Project - Development and design of the modules. We are glad to inform you, that there are the drafts of all the modules completed. They are as follows:

- **M1** Framework for the development of the modules: CT&STEAM for future teacher education
- **M2** General introduction of CT: a basic module suitable for all teachers
- **M3** CT for pre-school (kindergarten) prospective teachers: specific features, approaches and practical solutions
- **M4** CT for primary education prospective teachers: specific features, approaches and practical solutions
- **M5** CT for STEM prospective teachers: specific features, approaches and practical solutions

- **M6** CT for informatics (computing) prospective teachers: specific features, approaches and practical solutions
- **M7** CT for language arts and humanities prospective teachers: specific features, approaches and practical solutions
- **M8** Educational environments for CT: design and aspects of integration
- **M9** Using Constructivism, and Project and Challenge Driven Pedagogy for learning CT
- **M10** Technological, pedagogical and instructional design aspects of teaching CT for STEAM

The COVID-19 pandemic caused not only difficulties, but inspired the University of Wien team (Gerald Futschek, Philipp Prinzinger, Matthias Rausch, Ulrike Schäfer, Merve Sen), developing Module 6**:** *CT for informatics (computing) prospective teachers: specific features, approaches and practical solutions,* to design a game teaching the simulation skills. See below the slide from their ppt presentation during the online meeting on May 15, 2020.

The next stage, the reviewing of the developed modules will start in September.

Much attention was given to discussion and confirmation of the criteria and components of the quality assurance. CESIE & Vilnius University, responsible for QA, have developed the QA plan with annexes including instruments for internal & external quality evaluation. The planned Reviewing stage includes the internal and external evaluation of the modules of the project. The results of internal and external evaluation will be used for improvement of the quality of the modules. This has to be completed before the module piloting stage, which will start in February, 2021.

The good news, providing the evidence about the timely progress made in the project, is the Interim Report, which was handed in June, 2020, it was positively evaluated by the National Agency.

4. Announcement and Partner Activities

The next online partner meeting is planned at the **end of August** to discuss the readiness for the Reviewing Stage.

Regarding partner institution activities the most important one is the ISSEP, 2020 international conference. The TeaEdu4CT project partners have agreed to participate in ISSEP conference (2020), in a round table, dedicated to presentation and discussion of theTeaEdu4CT project, besides each partner is going to make a poster presentation of their modules.

ISSEP - The international Conference on Informatics in Schools: Situation, Evolution, and Perspectives (issep2020.tlu.ee) is a forum for researchers and practitioners in the area of Informatics education, in both primary and secondary schools. This year (November 16-18, 2020) the ISSEP conference is organised by Tallinn University, which is the partner institution in the TeaEdu4CT project.

The aim of the round table session - *Challenging Future Teachers Education by focussing on Computational Thinking with integrated STEAM* - is sharing perspectives towards the current status of implementation of CT in teacher education.

Teachers play a key role throughout the school change, because they are the ones who will embed the skills that contribute to the development of CT skills in addition to practice the integrated activities. The awareness of CT skills of current teachers in the field of informatics (or computer science) is questionable. Moreover, the relationship between these skills and other subject areas are considerably weak. To strengthen that relations, teacher education programs and their curricula need revisions. It is expected that CT skills will become transferable, demanded, fundamental skills regardless of the subject areas of teachers. The ability of future teachers to transfer these skills into their field of practice can be listed as one of the crucial teacher competencies in the near future. One of the innovative aspects of the development, testing and implementation of the training courses is the common understanding of CT. Another special feature consists in the ability to connect across several educational levels. The target group of future teachers ranges from kindergarten to primary and secondary schools. Various focal points, the project members are developing, include CT learning, which can be organised for kindergarten, for prospective primary school, secondary school Informatics, foreign language and art teachers. This is done taking into consideration the specific features, approaches and practical solutions, giving attention to pedagogical and instructional design aspects, as well as having in mind a constructivist understanding of teaching-learning, not forgetting technical aspects.

With an interactive short presentation of some modules the round table discussants, representatives of the TeaEdu4CT project consortium, would like not only to make conference participants curious about our project, but also involve conference participants into critical and constructive academic discussion of the following research questions: How can we teach CT at various school levels? How much informatics knowledge does a non-informatics teacher need to teach CT? Do we need to change curricula of teacher education? How can different disciplines profit from CT and each other? Why is it important to integrate CT and STEAM?