

CRISS: a Digital Ecosystem for the Acquisition and Certification of Digital Competences

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Abstract. CRISS is a flexible and scalable cloud-based digital learning ecosystem that has the potential to allow the guided acquisition, evaluation and certification of digital competences in primary and secondary education. This demonstration will highlight some of the key activity scenarios under development, their underlying pedagogy and how the platform's features support the acquisition, assessment and certification of digital competences as the project will be approaching the end of its second year. We will focus particularly on the role of the learning analytics and the adaptive intelligent tutoring system parts of the platform demonstrating their potential.

Keywords: Digital competencies, e-portfolio, Certification

1 Introduction

There is an increasing demand for digital skills to be able to function effectively in modern societies. Moreover, with an estimated 90% of jobs requiring digital skills in the near future, it is essential that education and training systems provide individuals with the required competences[1]. However, the definition, identification, support and evaluation of digital skills have been proven to be a real challenge for existing educational systems. Unfortunately, in many schools and classrooms, 21st century ICT tools and skills are still used and taught as add-ons to business-as-usual type of teaching. We fail to initiate innovative and effective teaching and assessment of those important skills that are at the same time transforming the way we work, learn and interact [2]. This demonstration contribution presents the underlying theoretical framework, pedagogy and the cloud-based CRISS platform designed to support and assess digital competencies.

2 Pedagogical background

2.1 Digital Competences Framework

Digital competencies are comparable to the literacy and numeracy of the past. They are equally needed and equally essential for people to function effectively in modern societies. As social interaction including with services and institutions is ever more dependent on technology, being digitally competent is a requirement and a right for every citizen [3]. Moreover, digital competence is one of the 8 key competences for lifelong learning identified by the European Union [4].

According to Digital Skills Working Group (2010), digital competence is a set of knowledge, skills and attitudes (including abilities, strategies, values & awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socialising, consuming, and empowerment [5].

The majority of digital competence frameworks are based on skills development and on the ability to use a specific set of tools and/or applications. As the above definition highlights, skills are only part of the learning domains that are included in Digital Competence; and the ability to use specific tools or applications is just one of the several competence areas that need to be developed by users in order to function in a digital environment [6].

The CRISS project, uses DigiComp 2.0 [6] and other frameworks across Europe to define 12 competences grouped in 5 digital skill areas, 1) Digital Citizenship, 2) Communication and collaboration, 3) Search and Manage Information, 4) Digital content creation, and 5) Digital Problem solving.

2.2 Integration pedagogy

The CRISS evaluation system builds on a pedagogy that allows assessing students' digital competences embedded within disciplinary or interdisciplinary problem situations rather than testing them as individual skills out of context (see [7] for more details). As such, the project team is developing mostly cross-disciplinary scenarios that expect project- or problem-based learning but at times are even more open ended as in inquiry-based learning.

3 Technical background

3.1 CRISS Platform

CRISS is an adaptive and flexible cloud-based ecosystem where different technological learning solutions and services can be developed, integrated and interconnected to offer new learning experiences for the support for acquisition and evaluation of digital skill. The platform includes two components named Core Solution where the main technological ICT solution and services offered to the end-user are aggregated and the Analytic Solution that is a support component to offer real-time assessment based on evaluation of student skills. Teachers and other educators will be able to create new assets to be used in the tools or to devise novel approaches to utilise existing educational content and learning tools. At the same time, harnessing students experience using learning analytics will enrich the entire process of deploying, analysing, learning, and adapting based on the actual student performance indicators., thus allowing them to co-create the next generations of educational approaches and learning frameworks. (see Figure 1)

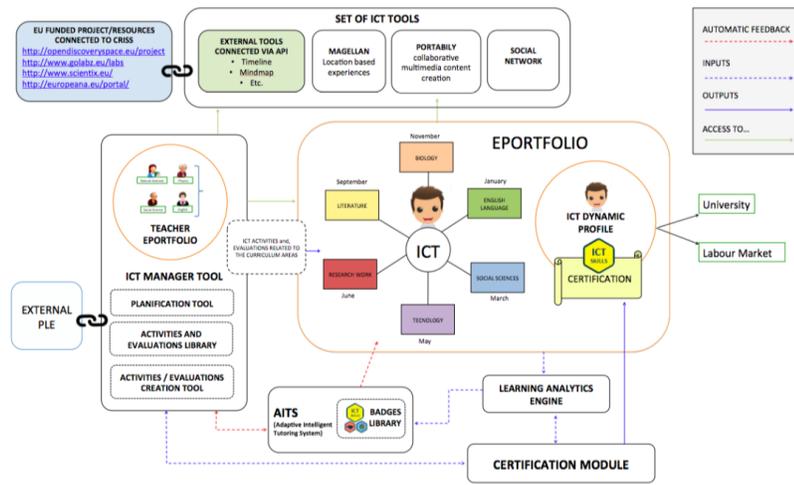


Fig. 1. CRISS Platform's Diagram

3.2 ePortfolio

The core of the CRISS platform is a web-based ePortfolio environment where students and teachers can perform all their actions, follow the work, get access to all the other modules and see the results of evaluations and the progress in the acquisition of digital competences and their certification. See Figure 2 for an example of content shared through the ePortfolio.

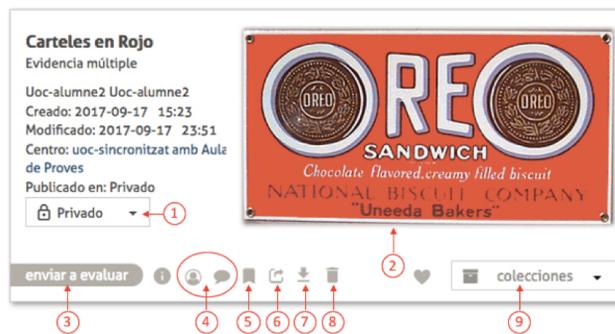


Fig. 2. Content creation for the ePortfolio of a student. Students have the possibility to change the content's privacy level (1) visualize or revisit their work (2) send the work for evaluation (3) access messages and private consultations associated with the content (4) highlight some specific contents (5) share (6), download (7), or hide (8) content and create collections around a interesting (usually) teacher-led content.

3.3 Learning Analytics and Adaptive Intelligent Tutoring System

Learning analytics contribute to the assessment of learning processes including students' skill development and evaluation. Currently, digital skills is one of those educational areas to which learning analytics has yet to contribute significantly. In CRISS this takes several forms. At the very minimum, the metadata of the scenarios and tasks are used to perform a "gap analysis" where missing or incomplete work is identified and fed back to both the student and the teacher with suggestions. As the project will be applied at scale, a large number of students are going to undertake activities within CRISS in the next year of the project. The data collected will be displayed through tailored dashboards to enable users to forecast tutoring needs, monitor the progress of delivered tutoring assistance and measure the system's impact and effectiveness.

4 Use case

CRISS is going to be available to thousands of students across Europe in the next academic year. The platform is introducing new approaches for the support and evaluation of student digital competencies. made possible through innovate assessment and certification techniques and an adaptive learning solution combined with robust pedagogical methodologies. The demonstration will make available scenario across the five areas of digital competencies but gives particular attention on Digital content creation, Digital problem solving.

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7 Demonstration plan

During the demonstration and interaction session the conference participants will be first and foremost introduced to the CRISS Digital Competence Operational Concept a framework of Areas, Competences and Criteria related to digital competences (c.f.[7]) and the CRISS assessment process, strategies and instruments. This will be done through a Competence Assessment Scenario that will allow conference participants to be introduced to the system as students and interact as if they are undertaking a scenario. We will focus in one of our scenarios that focus on Area 5 of the framework: *"5. Digital problem solving: Identify needs, solve technical problems, configure environments and digital elements, and program"* that should appeal to many of the EC-TEL 2018 participants. The scenario is inspired by Paul Curzon's and cs4fn "Computational Thinking: Searching To Speak" that shows computational thinking integrated in a story about helping people with disability. <https://teachinglondoncomputing.org/resources/inspiring-computing-stories/computational-thinking-searching-to-speak/>

We will share our insights on early pilots of students and teachers experience after the summer school that is under preparation. Depending on the day of the demo slot, we will use the rest of the conference to encourage participants to complete the challenge, challenge them to reflect on their digital competences, and get a taste of the certification process during or after the conference.