

# **Eco/Logical Learning and Simulation Environments in Higher Education - ELSE**

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## **1 Summary of the Project**

The ELSE project aims to design and disseminate a strategy and appropriate ICT tools to achieve the fundamental European goal of redesigning Higher Education, facilitating the application of Bologna principles across Europe [1, 2]. Two fundamental principles of Bologna remain unrealised: 1. Students continue to be peripheral to the process of knowledge co-construction; 2. the potential for true pedagogical innovation through new technologies that can enhance the learning experience is underexplored.

The ELSE project aims to design an innovative (ELSE) e-learning environment based on learner-centred pedagogies which can activate students' learning process through problem-solving, learning-by-doing, gamification, and digital information research. The Flipped Classroom paradigm is used where homework activities are moved from after the class to before the class, students have a first touch with the subject at home, and practice, extra material and questions are conducted later during the class. The project also aims to demonstrate to teachers that these opportunities can be realised through the application of Higher Order Thinking ICTs.

## **2 Summary of Current Project Results**

The ELSE learning environment offers teachers with the opportunity to structure their courses using multiple Moodle activities, three of which are novel and offered by the ELSE project via three tools: EVOLI (<https://evoli.altervista.org/>), E-Core and E-Dash (currently not accessible online). EVOLI is a video-tagging tool that enables teachers to upload their own videos that students can access before class. Students can tag specific time points of the video to demonstrate their comprehension, which teachers may access and review. With E-Core teachers create their own game scenarios based on the course they teach. By their performance in playing the game, students demonstrate their comprehension of the specific subject. The E-Dash tool aims at harmonizing Moodle with the flipped classroom concept. Moodle needs to accommodate the innovative

activities that will be assigned to students for studying at home prior to the class. This requires the integration of new external flipped classroom tools via Moodle's LTI. With E-Core and EVOLI integrated into ELSE Moodle, teachers can provide students with links within each course's content, enabling them to use these tools. A teacher is allowed to combine the different tools within the same course and section. Consequently, students' learning data such as grades, progress and comments need to be retrieved from the external tools and stored in the Moodle course, in order for the teacher to have a complete image of the students' performance and needs. This has led to the need for the development of a comprehensive dashboard. The E-Dash tool thus offers combined and mixed learning data, including grades, comments, questions and more for each student. These data assist teachers to gain an overall picture of their students' performance, grades, and whether the students have tried the various activities or not. For a teacher, a board combining the data of all students of a specific course, and a separate personalized board for each student of the course are offered. For students, their learning data for each enrolled course are presented separately. All learning activities are categorized based on: (i) whether the activity is "mandatory", "optional" or "recommended", and (ii) whether the activity is used as "flipping", "during" (the class), or "after" (the class). By selecting an activity, teachers and students have access to a visual aggregated overview of the accomplishments, in different formats depending on the data produced by each activity/tool.

The ELSE e-learning environment was recently presented to teachers across Europe through a workshop. The aim was to collect initial feedback on design, functionality and usefulness of the tools. Regarding the E-Dash tool in particular, the feedback collection process included a large focus group session discussing aspects of the tool, and a user survey (i.e. questionnaire). The responses to the user survey (70 participants) suggest that the usefulness of the tool is evident. Due to space limitations, we will mention a few key points on the results related to visualisation of data, since this is a key aspect in monitoring and comprehending progress. Qualitative and quantitative feedback collected on this aspect further illustrate the tool's overall influence. We are currently in the process of improving this aspect by considering qualitative comments, such as: "improve visualisation", "need of an achievement bar for students", "data shown by the tool is not exhaustive" in alignment with quantitative results such as: 93% prefer mixed data (e.g. rubrics mixing quantitative and qualitative data) to better understand a student's progress in a course, and 78.6% prefer a combination of text and charts to view student data. Beyond the project scope alone, results and improvements on visualisation aspects will lead to contributions to the research, scholar and student communities in terms of designing more effective, useful and pleasing data visualisation for student self-monitoring and teacher monitoring of student progresses' within e-learning platforms.

## References

- Framework for the Qualifications of the European Higher Education Area (EHEA) including the Dublin descriptors (2005)
- Recommendation 2008/C 111/01/CE of the European Parliament and Council of Europe, which introduces the European Qualifications Framework for lifelong learning (EQF) (2008)