MaS: Bringing Modeling To Schools

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Abstract—The main aim of the Erasmus+ MaS (Modeling at School) project is to promote skills and competences needed in the 21st century by introducing modeling as a teaching and learning strategy and tool in several school subjects. This is an innovative approach to teaching computational thinking and problem solving across the subjects that can also foster creativity, not only in schools but also in higher education. In order to support teachers without computational background innovative materials and practices are needed, hence, we will develop and provide free Open Educational Resources (OER). The development and implementation of and educational pyramid system will allow to bring our innovation to a broad audience in school practice and higher education. With my presentation at BENEVOL I would like to gather some awareness on this initiative, to collect comments and feedback on our effort and to drive a discussion on what models lack to be more present during software evolution.

Index Terms—Modeling, diagrams, schools, UML

I. INTRODUCTION

The Erasmus+ project "Modeling at School" aims at bringing two innovative issues to school practice. The first one is computer science modeling as a powerful tool and strategy for teachers and learners that can train 21st century skills like computational thinking, problem solving or creativity. The second one, the educational pyramid scheme, is a new didactical concept that allows integrating this innovative method - and innovation in general - in a relatively short time to a broad audience.

This project aims at integrating modeling in different subjects and different schools by offering a new curriculum and framework "Modeling across the subjects" with instructions (guidelines) and useful hints for teachers of all subjects as well as workshops and varied cross-curricular and/or multidisciplinary teaching materials suitable for all subjects. The main aims of the project are:

- Fostering 21st century skills (problem solving, computational thinking, text comprehension, etc.) in different subjects and as preparation of programming.
- Introducing modeling techniques in school practice as effective teaching and learning tools suitable for all subjects, especially for STEM and STEAM.
- Developing a supplementary curriculum / framework for the integration of modeling in existing curricula of primary and secondary education.
- Developing and providing cross-curricular and/or multidisciplinary teaching units and materials based on findings of educational neuroscience respectively neurodidactics.
- Pedagogical training and game development for playful (COOL) and active learning of modeling through various games (board games, puzzles, dance and body movement).

In this project we develop several outputs that address different target groups, mainly teachers, teacher educators, students, pupils and all stakeholders in the field of education. Besides an analysis of existing curricula in different subjects of primary and secondary education we develop ready-to-use guidelines for teachers that introduce the basics of modeling techniques and explain how to use them at school in different subjects.

II. WHY AT BENEVOL?

One would be surprised about presenting something related to models (and education) at a software evolution venue. But I think this is a topic where software evolution researchers have seldom thought (and researched) about. And in my humble opinion there is a lot more we could do in this field. And having some information on how we plan to introduce it in schools can foster new ideas and thoughts. So, the aim is to provoke discussion, while initiating challenging new avenues.

Modeling has historically been seen as a complex, high-level competence that software engineers acquire in higher education institutions, in some cases at master's level. Although there are industrial areas where modeling is widely used, and modeling (at least the UML syntax) is taught in all computer science degrees, there is evidence that for instance in Free/Libre/Open Source projects models can hardly be found [1]. On the other hand, we lack models in software evolution, even if many of us think it would be beneficial to have them. All in all, I think there are many issues that are valid for a discussion on the MaS project and modeling that would perfectly fit in a venue such as BENEVOL.

ACKNOWLEDGMENT

REFERENCES

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