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# The SECURE Project Research on Science Curricula and Teachers' and Learners' Opinions on Science Education

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## Abstract

The SECURE project has been founded under the 7<sup>th</sup> Framework Programme to make a significant contribution to the European knowledge-based society by providing relevant research data and translate them into recommendations that contribute to the public debates on mathematics, science and technology (MST) curricula and their objectives in view of balancing the needs between training future scientists and broader societal needs. A rigorous research program conducted by the SECURE consortium scrutinizes and compares current MST curricula for pupils aged 5,8,11 and 13 in ten member states, as they are intended by the authorities (legal documents), implemented by the teachers and perceived by the learners. The research at all three levels is designed in accordance to the curricular spider web (van den Akker, 2003). The instruments used to this end consist of a transnational comparative screening instrument for MST curricula, as well as teacher and learner questionnaires and interview protocols. Research in altogether 150 classes of each age has been done by the middle of the project lifetime. Currently the elaboration of summaries of national curricula documents takes place and the analysis of the school collection data at the national level is carried on. The results will be delivered in the last six months of the project lifetime.

**Keywords:** MST education, European program, research in science education, curriculum, teacher, learner, perception, curriculum spider web, questionnaire, interview, recommendations

## Introduction

In its latest policy initiatives and outputs in education and training the European Union restated the importance of science literacy and numeracy as fundamental elements of key competences (European Commission 2010; European Council, 2009, 2010). It was recognized that more investment should be undertaken to increase the number of graduates in science, technology, engineering and mathematics (STEM) so as to create the right conditions to deploy key enabling technologies, essential in the R&D and innovation strategies of industry and services. (European Commission, 2010)

## Rationale

SECURE is founded as a collaborative project under FP7 to provide research results of current mathematics, science and technology (MST) curricula across Europe. The overall aim of the SECURE project is to make a significant contribution to the European knowledge-based society by providing relevant research







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A large part of the students and the majority of the teachers expressed thanks for the quality of the questionnaires and the opportunity given to them to reflect on some curricular aspects in a guided way. Teachers remarked also their interest in dissemination of the results and were curious to compare the situation of their own classes with the other. An analysis method on the interviews is adapted and is carried out now.

The final research report is planned to be prepared in the following months. Almost five months before the end of the project, a meeting of the external expert group will take place to study the results, to give feedback on study conclusions and forthcoming recommendations and to give an opinion of the relevance of the project findings from the perspective of other countries, mostly from the EU.

Other European projects will benefit from the SECURE outcomes, adapting their strategy and the implementation methods of the research done. The dissemination of the results is foreseen from the beginning and the length of the 2013 and aim at returning the results to the schools that cooperated, inform local and national authorities on the outcomes and inform the European educational MST community as well.

Documentation of data collected, its analysis and the production of reports on the aspects of the curricular spider web for math, science and technology will be disseminated. To reach this goal, seminars and scientific happenings will be organized inside the involved school, in the partners' organizations and through mass media.

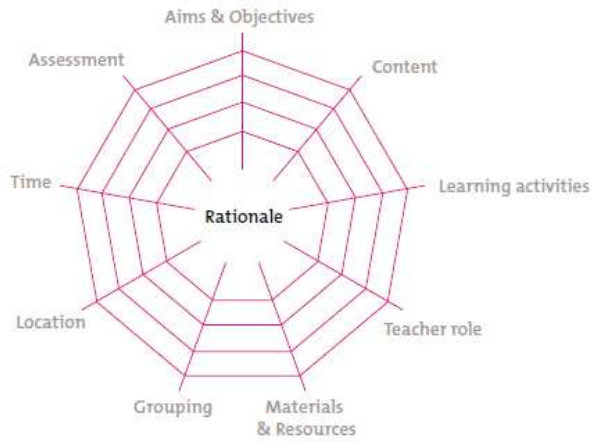
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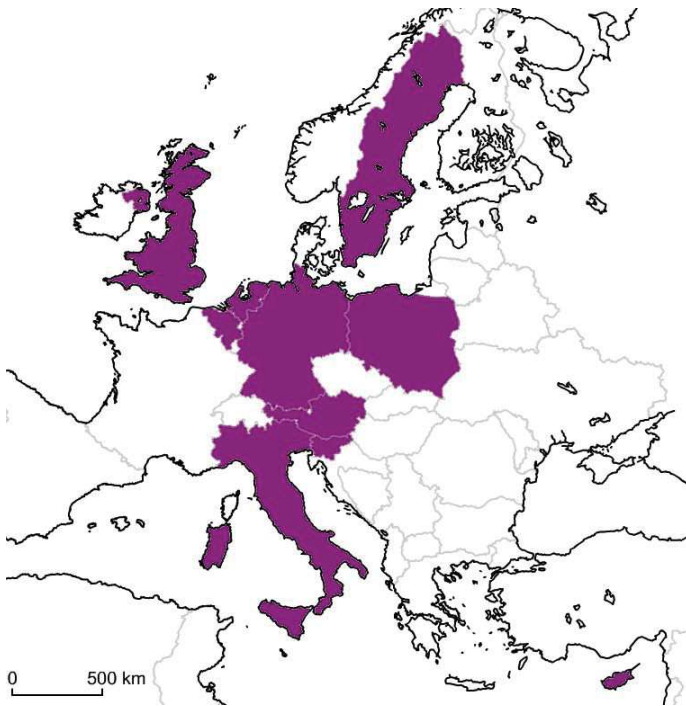
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**Figure 1.** Curriculum spider web



**Figure 2.** SECURE member states

**Table 1.** Curriculum representations

Intended	Ideal	Vision (rationale or basic philosophy underlying a curriculum)
	Formal/written	Intentions as specified in curriculum documents and/or materials
Implemented	Perceived	Curriculum as interpreted by its users (especially teachers)
	Operational	Actual process of teaching and learning (also: curriculum in action)
Attained	Experimental	Learning experiences as perceived by learners
	Learned	Resulting learning outcomes of learners