

Submitted to IOSTE Symposium Hammamet, November 2012

SECURE – Science Education CURriculum REsearch Project under the 7th Framework Program

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Theoretical Framework

The definition of “curriculum” has different meaning in different context of educational research (Beauchamp, 1986; Jackson, 1992; Pinar et al., 1995; Walker, 2003) and also there are few substantive distinctions between them (Jackson, 1992; Clements, 2007). To have a clear overview of the curriculum the analysis of it had to be done at levels depending by the audience for which they are addressed: Supra (international), Macro (national), Meso (school, institute), Micro (classroom, teacher), Nano (individual, pupil). Curriculum and curricular modification involve several different subject that are interrelated one with each other. To emphasize this aspect van den Akker (2003) propose in his work to represent curriculum as spider web (Figure 1) in which the main subject and aspect of the curriculum and the curricular research take place. Rational of the curriculum was put in the center of the spider web and the components involved by the curriculum are placed around becoming the nine threads of the spider web which relevance components varies by the five curriculum levels.

Rationale

Processes of curriculum development are focused on the improvement and innovation of education. Usually processes of curricular development take place in several years and, as Van den Akker & Kuiper (2007) shown, are usually characterized by multi components cyclical structure. Based on scientific research, the SECURE consortium will make a number of recommendations to policy makers who have an impact on curriculum development as well as on teacher education. These recommendations address the question how the interest in Math, Science, Technology and ICT (MST) can be enhanced among youngsters and in particular their future teachers, whilst at the same time optimizing the preparatory learning of those pupils. The specific objective of the SECURE project is to provide relevant and rigorous research data and translate them in recommendations that contribute to the debate among policy makers on science curricula and their objectives: balancing the needs between training future scientists and broader societal needs. The SECURE research will focus on 5, 8, 11 and 13 years old learners, their science curriculum and their teachers. The choice of these ages was done to investigate in the curricular research the bridges and the gaps that there are between kindergarten, primary school and middle school.

Context Instruments and methods

The cores of the project are: the analysis, the comparison and between the objectives and contents of the current scientific curricula in member states. Identify common ground among existing MST curricula, identify good practice in the various member states, establish how curricula are put into practice by MST teachers and how current curricula affect learners' competences, motivation and perception of the relevance of science had to be investigate deeply.

To do so, after a pilot study done in 4 Countries (German, Italy, Netherlands and United Kingdom), was decided to collect data through multi-choice questionnaires and interview.

Questionnaires involved all the classes participating to the project, while interviews will be done with groups of children of all the participating classes of 5 years old pupils and representative samples of 8, 11 and 13 years old pupils and their teachers of the MST subjects.

Documentation of data the collected, their analysis and the production of reports on the aspects of the "curricular spider-web" for math, science and technology will be then disseminated to the all participating interview and the work of dissemination of the findings will be done also through seminar an scientific happening organized into the schools.

A total of 11 partners in 10 countries, of which 7 universities and 2 pedagogical institutes are involved: Katholieke Hogeschool Kempen University College, Dienst Katholiek Onderwijs vzw, Universität Graz, University of Cyprus, Technische Universität Dresden, Università degli Studi di Udine,, Nationaal expertisecentrum SLO, Uniwersytet Jagiellonski, Univerza v Ljubljani, University of Gävle, Nottingham Trent University.

Data and Results

The comparison of the official curricula is undergoing, while the data collection will be done during the spring of the 2012. After a pilot study in Germany, Italy and UK, the instruments for data collection are revised and a new questionnaire for Mathematics, Science and for Technology will be submitted to the teachers of pupils 5, 8, 11. 13 years old of 15 schools (180 teachers per Country). In the same period three specific questionnaires for Mathematics, Science and for Technology will be submitted to pupils 8, 11. 13 years old of 15 schools (about 3500 pupils). Interviews will be conducted with 5 year olds pupils. The relative protocol for interview is matter of research. Another specific protocol for semi-structured interviews will used for a selected group of pupils and teachers in the sample.

Conclusions

Some unexpected results comes from pilot studies and from the way of working on the research by the network of cooperating partners: a real collaboration occur in blue meeting where instruments and methods are discussed in depth. The questionnaires and the protocols for the interviews are in this phase of the research the main outcomes, which will be discussed in the contribution. A partial data analysis will be discussed in November.

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