

ePlanning: an Ontology-based System for Building Individualized Education Plans for Students with Special Educational Needs

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The *Individualized Education Plan (IEP)* is a document that defines academic/life goals for a pupil with special educational needs. The IEP is built specifically for the pupil, and it is the result of a collaborative activity that involves the school special education team, the parents, other relevant educational stakeholders, as well as, whenever possible, the student. In details, an IEP specifies the student academic/life goals and the methods/kind of educational intervention to obtain these goals. The IEP also identifies activities, supports and services that students need for being successful in their school activities in the perspective of the “special normality” principles, as required by the Italian Law 104/92 for students certificated for a disability. Besides the wide employment, in the last years, of IEPs in several Italian schools of any educational level (kindergarten, primary school, middle school, high school), the development of a IEP for a given pupil is a manual, complex and time-consuming activity.

To support and facilitate the building of the IEP, we developed a web-based decision support system, called *ePlanning*: users input relevant aspects of the profile of a pupil (e.g., age, diagnosis, observations) into the system, and based on this content the system guides the users in defining the more appropriate academic/life goals for the pupil, suggesting also activities and educational material that may help in achieving these goals. Semantic Web (SW) technology plays a key role in *ePlanning*, as well as in its development.

First, *ePlanning* is an *ontology-based application*, i.e., the content the system uses to support the construction of an IEP is encoded in an *OWL 2 ontology*, which formalizes: (i) *processes*, that represent functional abilities; (ii) relevant *features* of pupil profiles (e.g., age, school grade, a diagnosis in terms of a ICD¹ or ICF² code) and their relation with functional abilities; (iii) proposal of *goals* that can be set in the presence of an impairment of some functional abilities; and, (iv) *activities* and *educational materials* that can be used

¹ <http://www.who.int/classifications/icd/en/>

² <http://www.who.int/classifications/icf/en/>

to achieve the proposed goals. The system iteratively access the ontology content via querying, also exploiting inferred content materialized via OWL-DL reasoning.

Second, to favour the construction of a high-quality ontology, a heterogeneous team of (~20) users having complementary competencies and skill was involved in its development:

- *Psychologists and Educators*: to define the taxonomy of processes and sub-processes (more than 400) referring to different functioning areas of the students: Cognitive – neuropsychological; Communication – language; Affective – relational; Motor skills; Sensory; Autonomy (personal and social); Learning.
- *Teachers* (from: kindergarten, primary school, middle school, high school): to define goals (long, medium, short term range) and related activities established on the base of the level of impairment (more than 9000).
- *Knowledge Engineers*: to provide the modelling expertise to properly model the rich content to be represented.
- *Application Engineers*: to bring in the application perspective, in particular for what concerns the requirements in terms of application-specific content to be modelled in the ontology.

The modelling was performed with a customized version of MoKI,³ the Modelling Wiki, that was extensively used by the modellers: in over a one-year modelling period, we tracked more than 6500 editing operations from 13 distinct users.

ePlanning will be released in September 2014 as a commercial tool⁴ edited by Edizioni Centro Studi Erickson,⁵ having as target audience the schools of all the national territory.

In this talk we will discuss the experience of adopting Semantic Web technology in a key product of the enterprise, including a report of the lessons learned (i) in collaboratively building an ontology (a first experience for the enterprise and most of the users involved in the modelling activities) in a concrete and multidisciplinary context, as well as (ii) in developing an ontology-based decision support system.

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³ <http://moki.fbk.eu>

⁴ commercially released as “SOFIA”

⁵ an Italian Small-Medium Enterprise in the Publishing Domain