Chapter 1
Future School:
Personalization Plus Intelligence

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ABSTRACT

What learning content, methods and technologies are the most suitable to achieve better learning quality and efficiency? In Lithuania, we believe that there is no correct answer to this question if we don't apply personalised learning approach. We strongly believe that "one size fits all" approach doesn't longer work in education. It means that, first of all, before starting any learning activities, we should identify students' personal needs: their preferred learning styles, knowledge, interests, goals etc. After that, teachers should help students to find their suitable (optimal) learning paths: learning methods, activities, content, tools, mobile applications etc. according to their needs. But, in real schools practice, we can't assign personal teacher for each student. This should be done by intelligent technologies. Therefore, we believe that future school means personalisation plus intelligence. In this chapter, Lithuanian Intelligent Future School project is presented aimed at implementing learning personalisation and educational intelligence.

INTRODUCTION

In Lithuania, we believe that "one size fits all" approach doesn't longer work in education. We strongly believe that future school means personalisation plus intelligence.

Learning personalisation means creating and implementing personalised learning paths based on recommender systems and personal learning environments suitable for particular learners according to their personal needs. Educational intelligence means application of intelligent technologies and methods enabling personalised learning to improve learning quality and efficiency. Lithuanian Intelligent Future School (IFS) project is aimed at implementing both learning personalisation and educational intelligence.

In personalised learning, first of all, integrated learner profiles (models) should be implemented. After that, ontologies-based personalised recommender systems should be created to suggest learning components (learning objects, activities, methods, tools, apps etc.) suitable to particular learners according to their profiles. Thus, personalised learning paths could be created for particular learners for each

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topic according to curriculum. A number of intelligent technologies should be applied to implement IFS approach, e.g. ontologies, recommender systems, intelligent agents, multiple criteria decision making methods to evaluate quality and suitability of the learning components etc.

Two years' experience of pilot IFS implementation in Lithuania has shown that this personalised intelligent approach is useful and effective. Currently, over 20 primary and secondary schools are involved in this pilot Lithuanian IFS project coordinated by Vilnius University researchers. We create suitable intelligent methods and technologies and validate them at pilot schools in order to create well working intelligent learning system for schools.

IFS approach is based on experience gained in "Future Classroom" projects funded by European Commission and co-ordinated by European Schoolnet (EUN). These flagship European projects in the area of ICT in education were: (1) iTEC (Innovative Technologies for an Engaging Classroom) funded by 7th Framework Programme (7FP) and implemented in 2010–2014; (2) LSL (Living Schools Lab), 7FP, 2012–2014, and (3) CCL (Creative Classrooms Lab), Life Long Programme (LLP), 2013–2015. In Lithuania, these projects were coordinated by the author.

This Chapter is aimed to present several intelligent methods and technologies to improve learning quality and efficiency. They were implemented in IFS pilot schools and validated under the umbrella of EU "Future Classroom" projects.

The Chapter is organised as follows. Section 1 is introductory. Section 2 presents the related research. Section 3 presents integrated IFS learning profile (model) approach based on students' learning styles. In Section 4, we provide intelligent tool based on creating ontologies to interconnect students' learning styles (according to Honey & Mumford (1992) model) with learning activities, methods, learning objects types, and mobile apps. Section 5 presents IFS knowledge-based recommender system to integrate Web 2.0 tools into learning activities according to students' VARK (Visual, Aural, Read/write and Kinaesthetic) learning styles. Discussion and conclusion are provided in Section 6.

RELATED RESEARCH

Personalisation and Learning Styles

Learning personalisation and related issues were very popular in scientific literature in recent years (Bennane, 2013; Yoo et al., 2013; Kim & Lee, 2013; Wallden & Makinen, 2014; Troussas et. al., 2014).

The overview of literature shows that there has not been a concrete definition of personalisation so far. The main idea is to reach an abstract common goal: to provide users with what they want or need without expecting them to ask for it explicitly (Mulvenna et al., 2000). From the educational point of view, personalisation attempts to provide for an individual tailored products, services, information, etc. A more technical standpoint to personalisation is linked with the modelling of Web objects (products and pages) and subjects (users), their categorisation, organising them to achieve the desired personalisation. According to Sampson (2002), personalisation provides training programmes that are customised to individual learners, based on an analysis of the learners' objectives, current status of skills / knowledge, learning style preferences, as well as constant monitoring of progress. Online learning material can be, then, compiled to meet personal needs, capitalising on reusable learning objects.