

Designing a Problem-Oriented Multi-Disciplinary Academic Curriculum: Integrating Biomedical, Psychological, and Social Sciences with Ambient Intelligence, Artificial Intelligence and Informatics

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Problem Statement

How can an academic curriculum be designed which is attractive for students with exact skills but with intrinsic interests more focused on humans and their support in society.

Purpose of Study

Develop a curriculum in which a main focus is on human-oriented scientific knowledge and how this can be exploited to develop support for humans by means of advanced devices in the daily environment (such as smartphones). This can provide a study path for those students with exact talents who have no interest to choose for a particular exact study, but instead have an interest in human functioning and society. Usually such students (especially girls) choose for studies in biomedical, psychological or social sciences and do not develop their exact talents further.

Methods

The choice was made to design the curriculum from a problem-oriented perspective. Examples of societal problem areas chosen include supporting patients with chronic diseases (e.g., diabetes) or mental problems (e.g., mood disorders), care for elderly persons in their living environment, support for persons in demanding circumstances (e.g., sporters, air traffic controllers). Subjects in human-oriented disciplines were identified that provide scientific knowledge for human functioning in such areas, offered by other faculties in biomedical, psychological and social sciences. Other subjects were developed on computational dynamical modelling for such human processes, thereby using formal techniques. Moreover, from the area of Ambient Intelligence, Artificial Intelligence, and Informatics subjects were developed that show how to integrate dynamical models based on scientific knowledge of human processes with sensing systems and intervention methods to obtain nonintrusive support, for example through a smartphone.

Findings and Results

For practical reasons the new curriculum was developed as a replacement of an existing curriculum in Artificial Intelligence. The newly developed curriculum has attracted up to this date substantially more (up to a factor 2) students than the original Artificial Intelligence curriculum. Moreover, within a large number of high schools it was investigated how many students (of the prefinal year) would be interested in choosing for such a curriculum in the future. The outcome of this was that 66% had interest to choose for such a curriculum (boys 60%, girls 75%).

Conclusions and Recommendations

A unique problem-oriented multidisciplinary curriculum was successfully developed integrating human-oriented sciences with more exact sciences. It was shown to attract much more interests of students than the more traditional curriculum it was replacing.