Structural Sustainability of Academic Curricula as a Key Feature in Future Higher Education

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Academic education is playing an important role in the shaping of future generations as it lays the foundation of societal changes based on the gained knowledge and experiences during their studies. Moreover in theses dynamic times education, also at the level of Higher Education Institutions (HEI) is subject to a more agile development that anticipates new ways of learning, new technologies and the concept of interconnected and lifelong learning. This is especially the case for new entrepreneurial ventures that are often created from academic basic research and that also feed back into academia by providing challenging research questions.

The curriculum of an academic programs forms the nucleus of the body of knowledge to be taught or to be learnt. Curricula are arranged at different levels of abstraction (e.g. program, module, lecture) and the connection between them is made by using learning outcomes or competences. For most of those programs the connection between those elements is only made in an implicit way and use varying representations.

This situation leads to the effect that the body of taught knowledge is often not precisely understood by the different stakeholders (students, lecturers, program managers, cooperation partners) that are having different points of view. Furthermore, the consistency of the learning outcomes is hard to manage due to the lack of connected concepts, which creates challenges during the execution of those programs.

The author believes, that for the sake of sustained education an increased form of interdisciplinary cooperation within and among HEI is needed to address the challenge of the transformation to a sustainable society. Interdisciplinarity can be reached with consistent and interoperable curricula that are centred around the competences of a program.

In order to reach this goal of connected and consistent course programs, the author designed the concept of hierarchical concept matrices (HCM), which will be use a unified and simple for of expressing competences in a similar form at different levels of a curriculum, The repeated use of the same pattern should foster the simplicity and the transparency of curriculum. Connecting the matrices at different levels creates explicit links and makes contributions of the individual parts more visible.

The contribution will explain the concept of HCM, introduced in [1] in more detail, describe

the current development and will highlight application examples on selected curricula to demonstrate the impact of the applied concept.

Such connected curricula are the are the first step towards a Prebuild Information Space for educational content, which can be understood as a backbone of connected learning objects. Such a linked data source will become a valuable and big data source that could be exploited further for advanced analytics: it can be a subject to Big Data analysis and artificial analysis such as the recommendation of the next learning step in an ongoing course program.

[1] Böhm, K.:"Agility and Semantic Structures to Scaffold Modern Academic Education Supporting the Digital Transformation in HEI" in Proceedings of InfoSys/ICAS, Venice, Italy, 2022.
Online:https://www.researchgate.net/publication/360261153_Agility_and_Semantic_Structures_to_Scaffold_Modern_Academic_Education_Supporting_the_Digital_Transformation_in_HEI