Classifying information systems education by method engineering

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Abstract

Method engineering (ME) deals with the selection and assembly of situation-specific methods for information systems development. In this short paper we propose to use ME with an educational goal, that is to evaluate information systems curricula.

Keywords

Information systems, curriculum (general), taxonomies, educational profiles

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1 INTRODUCTION

Developing information systems (IS) requires a sensible selection of methods from a broad spectrum of various possible methods for design, project management, quality management, information planning, etc. Method engineering (ME), being part of the informatics discipline, offers approaches to do such a selection for specific situations on a solid basis. ME also facilitates the assembly of situation-specific methods (e.g. see Brinkkemper *et al.*, 1996). In this way ME can be helpful for IT-professionals in their practice of systems development.

On the other hand educators are confronted with the question: 'How should a curriculum in informatics or more specific in IS be in order to educate state-of-the-art IT-professionals?' We have seen quite a number of influential proposals in the past thirty years. However, not much effort has been put into comparing and characterizing the different model curricula in a systematic way. This can be useful not only for the educators themselves but also for the potential students and for the professional field which receives the graduated students as input. An example of such a study for informatics curricula in a broad sense is Mulder and Hacquebard (1998) where an instrument is used called UCSI (Unified Classification Scheme for Informatics). In this short paper we focus on the IS development area only. We apply ME based upon a framework for IS development as a classification tool by which one can show in detail the completeness and specific emphasis in the IS part of a curriculum.

2 METHOD ENGINEERING: THE A/L-FRAMEWORK

ME frameworks are meant to give an overview of the process of IS development and are mostly based upon a combination of empirical experience and theoretical views. Over the years several frameworks have been proposed mainly related to the analysis and design process in IS development. This limited scope also holds for our A(spect)/L(evel)-framework (Figure 1) which is based on the work of Essink (1988).

	goal structure	environmental interaction	functional structure	entity structure	process structure	system dynamics	allocation aspect	realization aspect
OSM								
CIM								
DSM								
IPM								

OSM = Object System Modelling
CIM = Conceptual Information System Modelling
DSM = Data System Modelling
IPM = Implementation Modelling

Figure 1 The A/L-framework.

Each element of the A/L-framework stands for one particular aspect (A) on a specific modelling level (L) of IS development. The framework has 8 x 4 = 32 entries. We indeed observe that the A/L-framework concentrates mainly on the analysis and design aspects of IS. The strength of the framework is that it forces the same set of aspects at each modelling level.

The four modelling levels are:

- OSM, describing the part of the organization for which an IS should be designed and realized (the 'why' question);
- CIM, viewing the IS as a set of (functional) components by which the information requirements of the users should be fulfilled (the 'what' question);
- DSM, considering the IS as a data processing system (the 'how' question);
- IPM, viewing the IS as a concrete, operative and maintainable system (the 'with what' question).

With respect to the eight different aspects we can conclude that five of them (the shaded area in the framework) concern the architecture of the system, starting from a conceptual view (OSM, CIM) up to and including the implementation view (DSM, IPM). The remaining three aspects: goal structure, allocation and realization, should be considered in order to be able to identify the goals, meaning and feasibility of the chosen architecture and to view the system as an operational and functional system. More details on the framework can be found in Lemmen *et al.* (1993).

Now using the A/L-framework ME proceeds as illustrated in a simplified way in Figure 2.

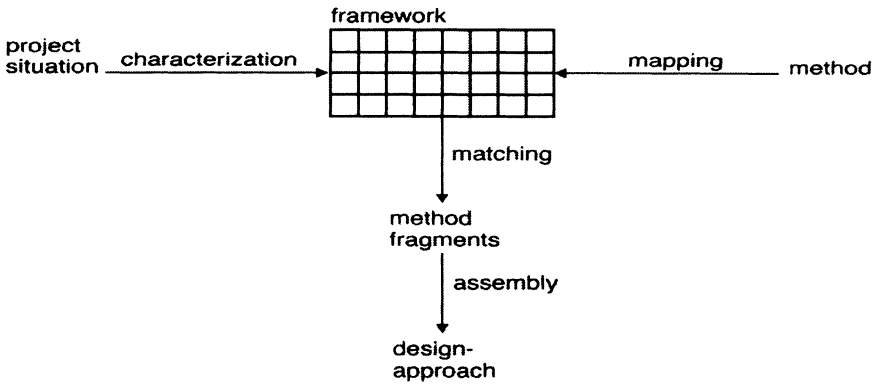

Figure 2 ME based on the A/L-framework (simplified view).

The A/L-framework is used in different ways. First of all in a generic sense the existing methods for IS development are mapped onto the framework. Second in a specific sense each particular project situation is to be characterized through the framework. And finally the project situation can be matched within the framework

with the range of available methods resulting in a 'best fit' method or mostly 'best fit' construct or assembly of parts of different methods.

3 CURRICULUM EVALUATION

Each entry in the A/L-framework defines an important step in designing IS as viewed from the field of ME. Accepting this view leads to the statement that each IS curriculum should pay attention to any of these topics. As an example we evaluate the recently published IS'97 undergraduate curriculum (Davis *et al.*, 1997).

On the basis of an overview of the recommended body of knowledge, IS'97 can be mapped globally onto the A/L-framework. Figure 3 shows the result. It can be concluded from Figure 3 that IS'97 mainly concentrates on the architecture of IS. There is for example less attention for the organizational context (OSM), the goal structure and the allocation and realization aspect. On the other hand IS'97 contains two curriculum areas that go beyond the scope of the A/L-framework: project management and interpersonal skills (teams). And of course the IS'97 curriculum assumes prerequisites in computer use skills, presentation skills, quantitative and qualitative analysis and organization functions.

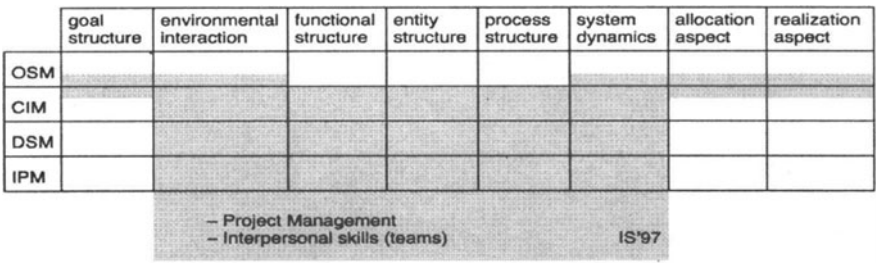

Figure 3 IS'97 mapped onto the A/L-framework.

We could perform a similar evaluation for other curricula and then draw comparative conclusions. This will be done in a future paper.

4 CONCLUSION

In our opinion ME is promising with respect to evaluating IS curricula. Similarly ME could also be used as a tool for designing IS curricula. It would be natural then to give ME a prominent position in the curriculum as a topic itself. Future research will concentrate on a further elaboration of ME in an educational setting.

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6 BIOGRAPHY

Karel Lemmen studied mathematics at the Technical University of Aachen in Germany. He has taught informatics in higher professional education before he went in 1985 to the Dutch Open University (Faculty of Engineering). He has specialized in information systems and databases and has chaired course teams and developed course material in those areas. His research interests are: IS curricula, method engineering and the application of IT in an educational setting. He is preparing his dissertation on the first two themes.

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