Trends in Technology Education Research

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The concept of 'Didactics'

In the Routledge International Companion for Education a separate chapter was dedicated to 'didactics'. The author, Gundem, explained that the term 'didactics' in the Anglo-Saxon language countries has a negative connotation, because it indicates rigid prescriptions for teaching. But in other languages, such as French and German it has a much more positive meaning. 'Didactique' or 'Didaktik' stands for the systematic and scientific reflection on teaching practice, leading to knowledge that can be used for teachers to improve teaching and learning. Teachers see 'didactics' as a natural component in their training and try to apply in their work, and the research community has accepted it as a serious research field for many school subjects. In physics education in the Netherlands teachers have often been involved in research projects. Those projects were often a combination of research and development work (in business circles this would be indicated as R&D). So it appears to be possible to give content to such a concept as 'Didaktik', 'didactiek' or 'didactique' or whatever it may be called (from now on the term 'didactics' will be used, but the reader should keep in mind that this is not meant in the Anglo-Saxon mode). The idea of this concept is that 'didactics' provides a scientific basis for teaching. This should be reflected in the research agenda for 'didactics'.

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The agenda of 'didactics' should reflect the needs of teachers, as researchers should address them. Gundem presented such an agenda. In this paper that agenda has been adapted to become the following:

(1) What are goals and contents for teaching (and why are these to be regarded as such)?

(2) To whom (pupils and students) and by whom (teachers) is this content taught? What are their characteristics (knowledge, experience, attitudes, etc.)?

(3) How can teaching-and-learning situations be reali-sed to pass on the identified content (see 1 below) to the identified target group by the identified people (see 2 below)?

Several authors have stated a desirable research agenda for technology education. Although differently phrased, their ideas do not differ fundamentally. In fact they present a research elaboration of the 'didactics' agenda as has been used in this paper that can be summarised as follows:

(1) What and why to teach and learn about technology?

- Who defines goals for technology education and what goals are defined?
- How can technological literacy as a goal for technology education be defined?
- What is the nature and role of knowledge and creativity in technology education?

(2) To whom and by whom to teach and learn about technology?

- Who participates in technology education (e.g. pupils, students, and teachers)?
- What are their preconceptions and concepts of technology?
- What subcultures are there (e.g. genders)?

(3) How to teach and learn about technology?

- How was technology taught in the past and in what context?
- How do curriculum changes take place?
- How does curriculum integration take place (relate technology to other school subjects and to the outside world)?

This list only partially coincides with the list of important issues for technology education that Wicklein and Hill found among teachers and teacher educators. They mention: funding, academic content, program vitality (position in the school curriculum), leadership, research as a basis for teaching practice, teacher supply, identity of technology education, and integration in the total school curriculum. Of these issues some appear in the research agenda that was based on Lewis and Petrina, but some do not. Evidently there is a difference between what researchers and what teachers see and relevant issues for technology education. Only when researchers and practitioners (teachers) can agree on research topics, a fruitful transfer from research to practice will become feasible. In this paper the research side will be explored: what issues were covered in actual research studies? An analysis will be offered that focuses on the extent to which the agenda of 'didactics' has been addressed in the research practice of the past decade or so. Then we can compare this with the issues that were mentioned as relevant by teachers.

The outcomes show that the field of curriculum goals and content (the 'what and why') is well covered in the research base that we have investigated. Much less attention has been paid to the field of the teachers' and learners' characteristics (the 'by and to whom'). More than expected from the previous analyses by Zuga and Petrina the field of educational practices (the 'how') was addressed in the research base. Many of the topics in each of the fields at first sight seem to be relevant for teachers and relate to the topics that they themselves mentioned in the survey by Wicklein and Hill: academic content, identity of the subject, integration in the school curriculum, and in 2 articles the research as a basis for teaching practice. But in all fields the outcomes are often presented in such a way that teachers are not directly challenged for action. Some of the topics that were mentioned as relevant for educational practice by teachers themselves do not seem to have been addressed at all (funding, program vitality, leadership and teacher supply in the list that Wicklein and Hill found). So the tension between researchers' and teachers' interest that was already expected when we surveyed the 'didactics' research agenda, was confirmed by the analysis.