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MURTONEN, MARI: Learning of Quantitative Research Methods - University Students' Views, Motivation, and Difficulties in Learning

Abstract

The aim of this dissertation was to study the difficulties that some students of education, psychology and social science experience in their quantitative research courses at university. The problem is approached from the perspectives of anxiety studies, studies on conceptions and beliefs, orientations in learning situations and theories of conceptual change.

In Study I, it was found that research, especially quantitative methods and statistics, appeared to be more difficult for education and sociology students to learn than other academic subjects, for example their major subject studies and language studies. The students reported difficulties with superficial teaching, linking theory with practice, unfamiliarity with and difficulty of concepts and content, constituting an integrated picture of the parts of scientific research in order to really understand it, and negative attitude toward these studies

By selecting less and more advanced students with the questionnaires developed on the basis of Study I, it was found in Case Study II that anxious students' concept map of research, drawn in an interview situation, was more fragmented than the concept maps of less anxious students and experts. On the basis of Case Study II, it could be hypothesised that difficulties experienced are connected to students' content knowledge.

It is often assumed that the difficulties experienced in the learning of quantitative methods and statistics could reflect earlier bad experiences with learning of mathematics. Study III revealed that the high school mathematics grade was only partly associated with difficulties experienced. A belief in one's low ability in mathematical subjects was connected to other difficulties experienced in the learning of research, so there is a mathematical factor involved in difficulties in learning of quantitative methods. Difficulties experienced were not related to success in university statistics or research courses, as has also been shown in previous studies.

In Study IV, different views on research methods were found in Finland and USA with regard to students' appreciation of quantitative, qualitative, empirical and theoretical methods. Students could be said to have different research orientations toward methods, meaning a combination of appreciations of, and readiness to use certain methods. Some of the students had a dichotic attitude toward quantitative and qualitative methods; they seemed to "choose their side" between these methods. In both countries, a negative research orientation toward quantitative methods was found which was associated with a positive view on qualitative methods. This qualitative research orientation was connected in some Finnish students with difficulties in learning of quantitative methods. When asked about difficulties experienced in learning of quantitative methods, 58% of the Finnish students and 21% of the US students reported such difficulties

Study V looked at students' views on the need for research skills in their future working life in comparison to their motivational and learning orientations and difficulties experienced in learning of quantitative methods. It was found that in both Finland and the U.S.A., the students who were not convinced that they would need research skills in their future work, were less task- and deep-oriented in their study situations, and experienced more problems with learning than the students who agreed that they would need research skills.

Together, these five studies showed that students' difficulties experienced in quantitative methods courses, research orientations and motivational factors, do constitute an interconnected web that may also have implications for content learning and to students' views of the importance of research skills for their future work.

Keywords: Learning of research methodology, learning of quantitative methods, statistics anxiety