Making Possible by Making Visible

Learning through Visual Representations in Social Science

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Abstract

This thesis focuses upon the relationship between teaching and learning of dynamic phenomena and processes in social science and the use of visual representations in social science teaching. Teaching in social science uses many visual representations, such as models, flowcharts and diagrams, in order to help students to grasp phenomena, structures and processes in society. However, it is a challenge to use a visual simplification of a complex reality without reducing its complexity, and we often do not know what understanding is facilitated or even hindered through the use of different visual representations. We thus need to identify the relationship between how the content is visually illustrated and composed (compositional structure) and how students understand the content visualised. We also need to improve our understanding of the relationship between visual representations used in teaching and the teaching-learning practices established in the classroom. This thesis aims to contribute to these areas, with a focus on visual representations of pricing in economics, as an example of a complex and dynamic process in social science.

Paper I uses phenomenography and variation theory to investigate students' conceptions of causal relationships in pricing. Causality was identified as a central dimension of variation in understanding pricing. Different conceptions of causality in pricing were identified in upper secondary students' written answers and critical aspects of causal relationships in pricing were identified. Paper II compares the outcome of using two different visual representations of pricing. This paper draws attention to the ways in which these representations helped students to discern the critical aspects identified in Paper I. A causal loop diagram was considerably more effective than supply/demand graphs in helping students to discern the critical aspects of causal relationships in pricing. A conclusion drawn is that the compositional structure of a visual representation used in teaching plays a vital role for how students understood the content visualised and which aspects of the phenomenon are more easily discerned, and which are not. Paper III uses a practice theory perspective to deepen the understanding of the results from Paper II. Results from Paper III suggest that the causal loop diagram, to a greater extent than the graph, contributed to the establishing of an epistemic practice, a practice where knowledge was developed and transformed. This was for instance seen in the causal loop diagram affording discussions concerning the causal relationships and encouraging further questions and reflections. A conclusion drawn is that a visual representation as an action-mediating tool plays a central role in forming the teaching-learning practices established in the classroom.

The results from the three papers are also discussed in relation to two challenges: (i) how simplified visualisations of complex processes and structures may facilitate students developing a qualified understanding of such processes and structures and (ii) how disciplinary developed visual representations, when used in social science teaching, may be used with a different goal than when used in the discipline, where they were developed. The contributions of this thesis are both empirical, theoretical and practical and several practical implications for teaching and learning in social science were identified.

Keywords: *social science teaching, visual representation, pricing, causal relationships, teaching and learning, phenomenography, variation theory, practice theory, teaching-learning practice, epistemic practices, upper secondary school, design research, graphs, economics, social studies.*

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