

Chapter 6

Scientific Realism and the Scholarship of Learning and Teaching in Higher Education

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ABSTRACT

In this chapter, the use of Structural Equation Modelling (SEM) in the analysis of the effects of curricula designs on student learning and experience in higher education is explored. The origins, fundamental assumptions, metaphysical and ontological commitments of SEM, are explicated. This is followed by an exemplification of the method by use of a case study. The chapter includes an argument for the adoption of a realist account of latent variables on the basis that the constructs they represent are in principle manipulable, even though experimental manipulation is not typically a feature of research on curricula in higher education. The chapter concludes with the application of these ideas to the scholarship of learning and teaching (SoLT). It is asserted that only by the adoption of a realist perspective on the data collected in the pursuit of SoLT goals can these goals be adequately attained.

INTRODUCTION

The study of higher education students' experiences and learning outcomes is a substantive field in its own right, but it has many variants, in both method and purpose. For instance students have been surveyed or observed for a range of purposes, including to address the following themes, goals and issues: quality and nature of teachers' practices (Chau & Hocesvar, 1994; for an example and a review of the literature see Marsh & Roche, 1994); assurance of learning or the outcomes thereof (Barrie, 2006; Barrie, Hughes, Smith, & Thomson, 2009; Biggs & Collis, 1982; Griffin, Coates, McInnes, & James, 2003; Wilson, Lizzio, & Ramsden, 1997); and students' approaches to studying (Entwistle, Hanley, & Hounsell, 1979; Entwistle & Ramsden, 1983). In this chapter, the use of Structural Equation Modeling (SEM) for the exploration of the impact of aspects of curriculum design on student learning and satisfaction is explored. Along the way, there will be an exploration of the philosophical commitments that such an approach implies.

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PHILOSOPHY OF SCIENCE

A Debated Issue

The existence of the current volume attests to the fact that in the social sciences in particular, but across all of the scientific enterprise, philosophical analysis of the logic of scientific inquiry, and the claims made about the methods and processes of science, has created considerable divisions, at least among those engaged in this debate, if not among the practitioners themselves.

The philosophical discourse on the logic, sociology, politics, ontology and epistemology of scientific inquiry is rich and engaged in earnestly. The debate ranges from Marx's structuralism to Weber's *verstehen* sociology, through Polanyi's and Schutz's phenomenological and ethnomethodological expositions, to Kuhn's synthesis of "normal science" and "revolutions," to Harding's stand-point epistemologies and feminist critiques, to Feyerabend's and Latour's sincere and contrary skepticisms (Feyerabend, 2010; Hacking, 1981, 1992; Harding, 1986; Harding & Hintikka, 1983; Kuhn, 1962; Latour, 1986, 1999; Pickering, 1992; Polanyi, 1966; Schutz, 1962).

These debates have played out in many disciplines, but in the discipline of higher education the debate seems to be comparatively, and surprisingly, muted; the current volume addresses this gap in a direct and pragmatic way by linking "approach" or "method" to the range of ontological, epistemological and metaphysical commitments that approaches imply. An account of the assumptions implicit in one approach to analyzing higher education students, in context, using quantitative data and methods, is presented in this chapter.

These debates have various themes but four key themes in the philosophy of science are:

- **Objectivity:** Is it possible to do science in a way that is defensibly or incontrovertibly based on unbiased measures and interpretations that are not influenced by the perceptual or theoretical preconceptions or political prejudices of the researchers?
- **Realism:** Is there a real world that persists independently of and which is beyond instances of human perceptions of it?
- **Causality:** Does it make sense and is it reasonable to assume, and is it possible to "see" or measure the causal mechanisms that are thought to operate between things in the world?
- **Latency:** What is the ontological status of latent variables, i.e., theoretical constructs or ideas whose presence in the world is only known through one or more manifest measurable variables?

A tension persists, within the social sciences generally, as to the legitimacy of empiricist and positivist approaches to inquiry. As Sayer puts it:

At the centre of social science's internal crisis have been attacks on orthodox conceptions usually termed 'positivist' or 'empiricist'. So many different doctrines and practices have been identified with these terms that they have become devalued and highly ambiguous, or even purely pejorative. Those who want to continue using them increasingly find that they have to preface arguments with tiresome digressions on 'the real meaning of positivism' and these often generate more heat than what follows. (Sayer, 1992, p. 7)

This tension is not limited to social sciences. In the philosophy of science, the debate remains unresolved, though some writers can be found who commit to this or that perspective, offering cogently

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