

PHENOMENOGRAPHIC APPROACH: A GUIDE FOR ACTION IN EDUCATION RESEARCH

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This paper is a description of the methodology used for my research in the context of science education, in particular the way that science PGCE students develop understanding about science teaching. The set of basic beliefs that guides the research is the Phenomenographic approach. This paper will give a review of literature about Phenomenography. It will consider the origins, the form and the nature of reality, the relationship between the knower and what can be known, and the characteristics of the research process. The approach is applicable in many fields, including science and mathematics education, where it is required to study phenomena and how they are experienced, conceptualized or understood. Phenomenography also defines new problems for inquiry in educational settings.

Introduction

The content of contemporary science and mathematics teaching has become an important issue of discussion since apparently traditional methods have failed to produce the desired result. Possible causes are the pupil who does not see science or mathematics as relevant to his/her everyday life, or the ineffectiveness of the teacher.

The traditional approaches to teaching science, in which the teacher is the one who delivers the knowledge and the pupils are the receivers of the concepts, can not stay any longer in science classrooms if the community is interested in improving understanding of science. From many science educator teaching and learning science is a partnership and in particular for Millar, 1989 "Science education is not about developing personal theories about phenomena but about coming to share (at some level) in consensually held theories".

The object of inquiry in my research is the PGCE students' interpretations of teaching. The phenomenographic approach "attempts to deal explicitly with the problem of analyzing the meaning that people ascribe to the world and to the concepts and texts they encounter in educational setting" (Saljo, 1988).

The aim of this paper is to describe the phenomenographic approach as an effective methodology in this and other education research contexts. For this reason a set of beliefs that refer to this specific way of looking at the world will be presented

In order to give an idea about what are the principles that guide the action under a phenomenographic approach there follows: a brief description of phenomenography, its historical roots and aims, phenomenography as a theory of ways of experiencing something, ontological and epistemological assumptions, and methodological issues.

Origin, Definition, Foundation and Aims of Phenomenography

Ference Marton first used the word phenomenography in 1981. The word has its etymological roots in Greek ‘phainomenon’ and ‘graphein’, i.e. ‘appearance’ and ‘description’. The combination of these two words means ‘description of appearances’. (Phenomenographica, 1999). Phenomenography has its roots in a set of studies of learning among university students carried out at the University of Gothenburg, Sweden in the early 1970’s. (Husen, T. & Posthethwaite, 1994) Professor Ference Marton and Professor Lennart Svensson were interested in knowing why some people are better at learning than others. Their research approach was designed to answer their questions about learning, thinking and understanding in educational settings. The research group in University of Gothenburg needed to move from an objectivist and intersubjectivist view of knowledge to a more subjectivist and relative view. They made the assumption that, fundamentally, knowledge is a question of meaning in a social and cultural context. In their view a description of knowledge could only be given in terms of individuals’ understanding. This basic belief formed the foundation of what was later named phenomenography. (Svensson, 1997)

The International Encyclopedia of Education (1994) defined this approach as follows: it “is the empirical study of the limited numbers of qualitatively different ways in which various phenomena in, and aspects of, the world around us are experienced, conceptualized, understood, perceived, and apprehended”. Marton (1999) suggests that it is the study of the *variation* in ways people experience phenomena in their world.

The aim of phenomenography is to *describe* a specific kind of object; this object is the *way of experiencing something*. Essentially the aim is clarifying functional relationships between what people do when they engage in learning activities and the nature of understanding they end up with (Saljo, 1997). For Marton, (1981) “the aim is to describe qualitatively different ways of experiencing various phenomena and is concerned with the second-order perspective, which orients towards people’s way of seeing the world around them”.

Phenomenography, as a theory of ‘ways of experiencing something’, can be called a theory of experience, a theory of awareness, or a theory of learning . A way of experiencing a phenomenon can be depicted in terms of the *critical aspects (particular aspects)* of the phenomenon in question that are discerned and focused on *simultaneously* by the experiencer. Key terms in a phenomenographic analysis are “discernment”, “simultaneity” and “variation”.

Discernment: to discern something from its context is to assign it a meaning and see it as a particular thing. Something focused on is something being discerned, something taken for granted is something that has been discerned, that which is ignored has not been discerned.

Simultaneity: simultaneous experience in the sense of experiencing different things at the same time.

Variation: qualitative different ways of seeing, experiencing, and understanding the same phenomena.

As an example of experiencing something Bowden and Marton (1998) describe a concrete one: trying to hit an object with a ball. *“While growing up, we keep throwing things of different sizes and different weights such as toys, different kind of balls, pebbles or pieces of wood. Often we try to hit something, a target, from different directions and different distances. Sometimes it is windy sometimes it is raining. In this way we learn to discern the relevant aspects of situations that are critical in relation to our objective of hitting something; aspects such as distance, weight, position and possibly even wind strength. When throwing, we try to capture all those different aspects simultaneously. If we fail to capture all critical aspects we probably will not succeed. So the experience of trying to hit a target with the ball can be characterized in terms of what aspects of the situation are discerned and are simultaneously in the focus of awareness, and how they are related to each other”*.

Rovio-Johansson (1999) would say, “the ability to learn must be seen as an ability to experience objects, subjects matter concepts and a lot of other things and at the same time constitute a relation between myself and the object (phenomenon)”.

Learning is seen as a change in the learner’s capability of experiencing a phenomenon in the world around them. It amounts to being able to discerns certain aspects of the phenomenon and present them in focal awareness simultaneously. (Marton & Pang, 1999)

Ontological and Epistemological Assumptions

What is the form and nature of reality? Reality is considered to exist through the way in which a person conceives of it. Reality is experience. Experiencing a phenomenon is neither physical, nor mental. A way of experiencing a phenomenon is seen as an internal relationship between the person (the experiencer) and the object (the experienced). Phenomenography represents a non-dualistic position. It is neither subjective nor objective. It is both. It is located in the world experienced, in people’s awareness. (Svensson, 1997)

What is the nature of the relationship between the knower and what can be known? If theory emanates from the organization of our experience and if such experience is all we have access to, then reality is constituted of this interpretative activity. The essence of reality lies in the whole range of individual experience. There is not a direct relation to an object but the relation always dependent upon how is treated by an individual mind. (Svensson, 1997)

Methodological Issues

A phenomenographic research study needs to have a coherent methodology, well planned and managed from the beginning to the end. The most central characteristic is the explorative characters of the data collection and the contextual analytic character of the treatment of data.

The phenomenographic research process implies the following:

- a) There is a clear purpose for the research.
- b) Data collection - the question from whom?, Why? , How? and What is in relation to the purpose. The dominant method is the interview, but there are other options like observation, drawing, written responses, historical documents, and artifacts.
- c) Analysis - the powerful instrument of analysis is looking for variation in relation to the purposes of the research.
- d) Interpretation - the interpretation of the data must be in the context of the study and in the context of application.(Bowden, 1996)

To analyze data with a phenomenographic point of view requires “development of categories of descriptions denoting different ways of understanding a phenomenon, with these then giving a map of a collective mind” (Hasselgren, 1996).

The general process of categorization is describe in a “number of reports and in Marton’s own paper in term which capture the practices of grounded theory research describe by Glaser and Strauss, 1967” (Francis, 1996)

The phenomenographic process “entails the continual sorting of data, definitions for categories are tested against the data, adjusted, retested, and adjusted again. There is decreasing rate of change and eventually the whole system of meaning is stabilized” (Bowden, 1996)

Analyzing qualitative data with a phenomenography approach.

It is important to become thoroughly familiar with the data and to consider the data in the context of the study. The unit of research is the “way of experiencing something”(Rovio-Johansson, 1999). Statements are made about meaning (Marton, 1988). Since the meaning may not be predefined, it has to be found (Svensson, 1997). All transcripts should be read and re-read always with regard to the purpose of the study. The same focus, which guided the interview, should apply to the analysis of the transcripts (Bowden, 1996). Look for critical aspects based on criteria of relevance for the research question (Marton & Pang, 1999). Identify, pick and mark the comments with seemed in any way relevant to the enquiry (Marton, 1988). The aim is to do the first differentiation in order to locate the phenomenon to be described (Svensson, 1997). Once the limits of the phenomenon in question is narrowed and interpreted in terms of interview extracts, the quotes selected make up a pool at this stage, a data pool which forms the basis for the next crucial step in the analysis (Marton, 1984)

The researcher’s attention is then shifted from individual subjects to the meaning embedded in the quotes. The interest now is focused on the “pool of meaning” consisting of the relevant quotes selected and the boundaries between individuals are thus abandoned (Marton, 1984)

In this way, each quote has two context in relation to which it has to be interpreted: the interview from which it is taken, and the pool of meaning to which it belongs (Marton, 1988). Working with a pool of meaning, a second differentiation is made

step by step. “There are two different ways in which the message of the text can be understood: when two expressions which are different at the word level reflect two different meaning and when two expressions reflect two different meaning, two ways of understanding may be thematized” (Phenomenographica, 1999).

The basis for the analysis is that different parts of data may refer to different phenomena or part of a phenomenon and a differentiation of part may be made on the basis of an interpretation of data concerning their referential meaning. In differentiation of significant parts of the data, comparisons between cases are important. The significant parts make up a whole and this is summarized in a description in the form of a category (Svensson, 1997).

After the relevant quotes have been grouped, the focus of attention shifts to the relation between the groups. The critical attributes of each group are established and the distinguishing features between the groups determined. In this way “We develop the set of categories of description in terms of which we can characterize the variation in how a certain phenomenon is experienced, conceptualized, understood” (Marton, 1988).

Phenomenographic results and applications

a) The results of empirical research are then presented in terms of “categories of descriptions”. The categories of descriptions are the researcher’s way of expressing the different ways of functioning. The essence of the phenomenon under study is described in terms of categories of descriptions. (Phenomenographica, 1999)

b) Where are logical relations to be found between the categories of descriptions and they represent different capabilities for seeing the phenomenon in question, in relation to a given criteria, a hierarchy can be established. This ordered complex of categories of descriptions is called the outcome space.(Phenomenographica, 1999)

c) The study can be focused on “what”, the content or the object, or it can be focused on “how”, in thinking. So phenomenographic research can be applied in order to study the experience of learning, different ways of understanding the content learned or describing conceptions of the worlds around us.

The pedagogical implication, in Marton’s view, is explained in term of a question “How can we bring different ways of experiencing something about?” (Marton &Pong, 1999)

Summary

The phenomenographic approach is a research methodology appropriate to certain questions concerning learning and thinking. Its aim is to describe and compare people’s conceptions, in order to study the way people conceive the world. The data collection is explorative and with a variety of methods but interview is the most important one. Data analysis has an interpretative character and the main results are the categories of description and the hierarchy that can be built from those categories.

Phenomenography is searching for what are the critical aspects of a certain phenomenon that a person is aware of and how a particular way of experiencing can be understood in term of particular features of a person's awareness. From this point of view a study is phenomenographic if: it takes a non-dualistic view on person-world relationships, simultaneity and discernment of variation are applied in the analysis and its results are applied to improve learning.

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