

A Qualitative Approach to Understanding Variations in Experiences and its Relationship to Learning: An Introduction to Phenomenography

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Abstract— Phenomenography has been increasingly used to explore important questions and complex phenomena in engineering education. However, as a relatively new research method (it was introduced in 1981) with unique and nuanced methodological underpinnings, it is not always well understood. In this special session, we will provide an overview of phenomenography methodology. In addition, participants will gain experience in conducting phenomenographic analysis and interacting with real data. Finally, participants will discuss implications of phenomenographic analysis and potential applications in their teaching and research activities.

Keywords— *Phenomenography; Qualitative research; Variation*

I. PURPOSE STATEMENT

Phenomenography is a fast-growing research method in engineering education. It has achieved this position because of its ability to unpack and demonstrate nuance within complex topics and phenomena—such as human-centered design [1], cross-disciplinary teamwork [2], and innovation [3]—and to clarify ways to assess how students understand these phenomena. These capabilities make understanding phenomenography a valuable tool for the engineering education community as we continue to investigate and improve the complex process of teaching and learning. This session will provide an interactive and immersive experience for participants, allowing them to deeply engage with the method and gain first-hand experience with phenomenographic analysis.

II. BACKGROUND

Phenomenography is a qualitative and empirical research method that has its roots in educational research, arising from recognition that the qualitatively different ways in which learners experienced or understood a phenomenon were related to the qualitative differences in the outcome of that learning [4,5]. By exploring the variations of the experienced phenomena from diverse experiences in multiple

dimensions, phenomenography enables researchers to develop a comprehensive conceptualization based on collective meaning [6]. This differs from phenomenology, which emphasizes individualized meaning making [7]. Phenomenography has been used widely in educational research [8], and more recently, has been applied to analyze challenging problems in engineering education [1-3, 9-11] and computer science [12,13].

A. Data Collection and Participants

Phenomenographic studies typically use interviews as the primary source of data. Most phenomenographic studies include between 20 and 30 participants [14]. Since the goal of phenomenography is to understand the variations of the experiences of the phenomenon, it is important that participant are selected to maximize variability of experiences of students within the phenomenon context based on relevant criteria, such as demographic data, role or nature of the experience, or length of experience. In phenomenographic research, it is preferred that all interviews are conducted by one person. Since the object of study is the relationship between the subject and the phenomenon, it is important that the researcher does not allow his or her own relationship with the phenomenon to influence the object of study. Bowden [14] advocates the following practices to limit the probability of that occurring:

- 1) *Use identical opening scenario for each interview*
- 2) *Do not introduce further input to the interviews except in regards to issues that participants have raised*
- 3) *Use only the evidence from the transcripts to develop the categories of description*

Often in a phenomenographic study, the opening scenario involves asking the participants to describe an experience that concerns the issues under consideration and follow-up questions are used to prompt the participant to expand on their discussion of the experience, especially as related to the phenomenon of interest [15]. According to Bowden [14],

those questions could be neutral questions, such as “Can you tell me more?” or “Why is that?” They could also ask questions about aspects that they have already mentioned, such “What did you mean when you said ___?” Or, they can be reflective questions, asking the participant to relate different things they had said. However, it is important that the interviewer not introduce new ideas into the interview through the follow-up questions themselves, unless it is a planned as part of interview and consistently done. Interviews of the participants should be transcribed verbatim.

B. Phenomenographic Analysis

Phenomenographic analysis is an iterative process that involves sorting participant descriptions into explicit categories that represent distinct ways of experiencing the phenomenon of interest, identifying suitability of responses within the current categorization, redefining the categories, describing the relationships between categories, and subjecting the categories and relationships to collaborative internal and external critique. While a way of experiencing might be unique to the individual and the setting in which they experienced the phenomenon, a category of description refers to a coherent grouping of similar ways of experiencing the phenomenon among (typically) more than one individual. Through this iterative process, researchers seek to identify a limited number of categories of description that represent a hierarchy from less to more comprehensive ways of experiencing or understanding the phenomenon. Thus, the results of phenomenographic research form an **outcome space** that contains (i) *categories of description* and (ii) the *structural relationships* among them. This analytic process is further supported by developing “themes of expanding awareness,” which represent key features of each category that manifest in different ways for each category [6,15].

III. SESSION OVERVIEW AND AGENDA

This session will offer several types of interaction. First, participants will interact with the session facilitators, each of whom has developed expertise in phenomenography through conducting and planning one or more studies and producing methodological scholarship. The facilitators will act as instructors and then as coaches to participants as they perform phenomenographic analysis. Second, participants will interact with each other as they analyze data, discuss results, and share methodological insights. Finally, participants will interact with phenomenographic data. The session agenda is as follows:

A. Introductions (10 minutes)

The facilitators and participants will introduce themselves.

B. Overview of Phenomenography (15 minutes)

To provide context for the session, the facilitators will present a brief overview of phenomenography, addressing the following topics:

- History of method, including discussion of pure and developmental approaches

- How phenomenography compares and contrasts with other qualitative analysis methods (such as phenomenology)
- Philosophical perspective and underlying assumptions
- Overview of data collection and analysis
- Examples of phenomenographic studies and discussion of the topics and research questions it can address

C. Small Group Analysis of Interview Excerpts (30 minutes)

Participants will then break into groups of 4 – 6 and analyze a series of interview excerpts using phenomenographic analysis techniques. Interview excerpts will come from the session facilitators’ own studies, and thus represent authentic phenomenographic data. Facilitators will act as coaches as participants sort the data, form categories, and describe outcome spaces.

D. Small Group Report Out (15 minutes)

Groups will report their results to the larger audience and discuss findings from the mini-analysis as well as insights about phenomenographic analysis.

E. Discussion (10 minutes)

The session will finish with a discussion of implications of phenomenographic studies and how they can inform education practice. In particular, we will focus on and discuss how phenomenography can provide framework for assessment.

IV. ANTICIPATED AUDIENCE

We envision the audience of this session to be researchers and educators with no, limited, or even moderate experience planning and conducting phenomenographic studies. The session will provide them with firsthand knowledge of phenomenography that they can use to better understand phenomenographic research they encounter or to initiate their own phenomenographic studies.

V. EXPECTED OUTCOMES

The primary expected outcome of this session is for participants to gain knowledge about phenomenography, to experience with phenomenographic analysis, and to provide a framework for understanding variations in learning. In addition, we will collect contact information from participants so that we can begin to create a community of researchers and educators who use or are interested in phenomenography.

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