

Theoretical and Methodological Features of Phenomenography: A Comparative Review

Muhammad Ammar Raza¹
Dr. Azhar Majeed Qureshi²
Dr. Muhammad Aqeel Raza³

Abstract:

Phenomenography is an innovative research approach to investigating the unique modes of perceiving a phenomenon due to individuals' different degrees of awareness. It explores human variation in experiences and discerns the phenomenon from surface to deep level. The current thematic study was supposed to examine the theoretical and methodological features of phenomenography. As a methodology, various articles were selected from Google Scholar and peer-reviewed journals based on predetermined criteria. The data of these studies were analyzed to identify the critical themes of phenomenography. The study's key findings about theoretical features of phenomenography are based on the second-order perspective, non-dualistic nature, internal subject-object relation, and critical aspects. Methodological features discover categories of description and outcome space, which are the distinctive outcomes of phenomenography. This study proposes a wide range of implications to motivate researchers and methodologists to look at the potential benefits of adopting phenomenography as a method in future research practices.

Key terms: Phenomenography; theoretical features; methodological features; categories of descriptions; outcome space

¹Ph. D Scholar, Department of Science Education, Allama Iqbal Open University, Islamabad.

E-mail: ammar_naqvi007@yahoo.com

²Assistant Professor, Department of Science Education, Allama Iqbal Open University, Islamabad. E-mail: azhar.majeed@aiou.edu.pk

³Associate Professor, Department of Education, NCBA&E Lahore, Sub Campus Multan
E-mail: razaaqeel06@gmail.com

Introduction:

Phenomenography emerged as an empirical research paradigm in education, developed by Marton and his colleagues in the early 1970s, describing the qualitatively diverse ways in which individuals perceive and understand the phenomenon (Pang & Ki, 2016; Marton, 1981; Marton & Pang, 2008). Phenomenography describes things as they are visible to us and experienced by the people (Marton & Pang, 1999). Primarily, the focus of phenomenography is on the descriptive analysis of how objects manifest themselves to our perception (Hasselgren & Beach, 1997; Pang, 2003).

Phenomenographers try to find how a group of people feel something about the phenomenon; they can't be sure that all possible ways have been discovered (Koole, 2023). As a distinctive field of inquiry in qualitative research, phenomenography explores the diverse ways in which particular phenomena and aspects of the world are experienced, conceptualized, and apprehended by the people (Marton, 1994). That is why phenomenography is a realistic approach; it explores the various ways of experiencing a specific phenomenon instead of looking for a singular understanding (Cossham, 2017).

Fundamental tenets of phenomenography facilitate our exploring and understanding of the diverse realities explored through human thinking (Hajar, 2021). In phenomenography, the learner does not make or have the world imposed upon them. It describes things from the perspective of others (second-order), focusing on uncovering the different ways in which phenomena are seen, particularly within their educational settings (Marton & Booth, 1997). Phenomenography explores the variation in human experiences regarding their different world perspectives (Yates, Patridge & Bruce, 2012), focusing on the collective meaning of a particular phenomenon (Marton, 2015; Marton & Pang, 2008). Thus, phenomenography elaborates why some individuals understand the concepts differently from others (Svensson, 1997).

Concept of variations arises from distinct facets of a shared entity that become prominent in the consciousness of individuals within specific circumstances (Marton & Booth, 1997). Such variation denotes the state of relationality when a discernible difference exists while simultaneously retaining an element of similarity. Phenomenography has contributed to generating experiential descriptions, namely content-focused and interpretive descriptions that elucidate the distinct qualitative variations in individuals' perceptions and comprehension of their surrounding reality (Marton, 1981).

Researchers utilize phenomenography to investigate individuals' subjective perceptions of the phenomena present in their surroundings (Go & Pang, 2021). Phenomenography does not examine a phenomenon individually from those who experience it (Sin, 2010). The roots of phenomenography lie in people's awareness of the phenomenon. Such awareness is based on how people give meaning to the phenomenon. Consequently, when meaning changes, a change in human awareness occurs about the phenomenon (Akerlind, 2024). So both the meaning and structure of awareness happen simultaneously and intertwine dialectically (Marton & Booth, 1997).

From ontological perspective, an individual's external and internal worlds are not distinct entities (Saljo, 1997), and no dichotomy exists between a tangible external world and a subjective realm of mental representations (Marton, 2000). Instead, there exists a singular world that objectively exists and is perceived and comprehended in diverse manners by individuals. The world of phenomenography possesses both objective and subjective qualities simultaneously. Hence, there is a close internal association between the subject and object to explore the qualitative variations in experiencing that phenomenon (Marton & Booth, 1997). The present study aimed to investigate the distinct features that contribute to the theoretical and methodological development of phenomenography.

Method of Literature Review

Google Scholar as the main search engine was used for the literature review. Various research articles published in peer-reviewed journals, such as Sage, Taylor & Francis, Emerald, and Springer, were utilized to search the database comprehensively. Due to the centrality of the review, the term phenomenography was held constant. A variety of terms such as phenomenography and its development, theoretical foundation, methodological reflection, evaluation of phenomenography, critical nature of phenomenography, reflection on phenomenography, phenomenographic description, experiences through phenomenography, nature of phenomenography, and principles of phenomenography were used to search the database. This study's primary data source consisted of several publications, while secondary sources included books and selected chapters from books. The

major source of the review consisted of research papers published in peer-reviewed journals from 1976 to 2024. This review focused exclusively on the existing body of literature about phenomenography.

Initial searching was done from Google Scholar. Various articles from Google Scholar and peer-reviewed journals including some books were also downloaded. Only those articles and book chapters were included, which were related to theoretical and methodological aspects of phenomenography. Researchers conducted in special fields like nursing, engineering, and other disciplines were excluded from the study.

Inclusion criteria

Initially, large numbers of articles and some books were downloaded from Google Scholar and Research Gate. Peer-reviewed journals such as Taylor and Francis, Sage, and Springer were used in searching the articles. The major source of the review consisted of research papers published in peer-reviewed journals. A total of sixty-six papers were selected for the final review. The current literature database about phenomenography was the only subject of this review. The following is a summary of the criteria that were used to determine which papers were included in this review:

- Research articles, books, and select chapters from books that have contributed to the field of phenomenography on a methodological and theoretical level were included.
- The study consists of articles from the social sciences were included as well.
- Articles, books and research papers published between 1976 and 2024 were included.

Exclusion Criteria

The study is based on the contribution of various researchers who have made theoretical and methodological developments in phenomenography. Several research papers and articles were removed from the study because their literature was irrelevant. These studies were excluded based on the following criteria:

- The study excludes various research studies and articles without theoretical and methodological contributions to phenomenography.
- Research articles conducted in different fields other than social sciences like nursing and engineering etc. were also excluded from the study.
- Incomplete published papers were excluded from the study.

The study will investigate the contributions made by different researchers in the field of phenomenography and its subsequent evolution in theoretical and methodological horizons.

Present article will find the following research questions:

1. What is the focus of the literature on the critical features of phenomenography? How do different features contribute to their theoretical development?

2. What is the focus of the literature on the methodological contribution of phenomenography? How do key features contribute as an outcome of Phenomenography?
3. What implications does the information gathered from the literature review have for researchers in Pakistan for developing effective teaching and learning through phenomenography?

Distinct Features of Phenomenography

Synthesized views of various theoretical features identified by various researchers, contribute to the development of phenomenography are discussed in Table 1 along with their representative statements.

Relational and Non-dualistic Nature

Phenomenography embraces a relational approach that contextualizes human experience within the framework of person-world interaction (Akerlind, 2023). An individual's awareness entails what they experience the phenomenon. If a phenomenon is not within their experience or consciousness, they are unaware of its existence. Phenomenography reduces the importance of boundaries asserting that knowledge of the world is fundamentally non-dualistic (Akerlind, 2015). The non-dualistic perspective on human consciousness views the experience and the world as intertwined. There is no objective external reality and a personal internal reality (Marton & Booth, 1997). Phenomenography follows that there is an inherent and inseparable connection between individuals and other elements of their environment (Saljo, 1997). It portrays experience as an inside connection between individuals and their world (Pang, 2003). Phenomenography follows the non-dualistic perspective (Dahlin, 2007) and perceives the phenomenon as an internal connection between a person and a phenomenon (Marton, 1994). So, phenomenography expresses the inseparable subject-object interactions as experiences, which, when combined, reflect the phenomena in their entirety (Yates et al., 2012).

Table:1 Synthesized View of Brief Literature Review of Key Distinct Features of Theoretical Features of Phenomenography

Features	Representative Statements	Contributed Scholar(s)
Relational and Non-dualistic nature	Inseparable association between subject and object, and experiences are observed as a person-world internal relationship.	Akerlind, 2023; Bowden, 2000; Kroksmark, 1995; Dall'Alba, 2000; Ekeblad and Bond, 1994; Limberg, 2000; Marton, 1994; 2000, 1992, 1993; Ornek, 2008; Marton, 1988, 1992, 1994; Marton and Booth, 1997; Marton and Pang, 2008; Pang, 2003; Ramsden, 1993; Svensson, 1997; Yates et al., 2012
Second-order perspective	Exploring the phenomenon from the perspectives of participants' experiences rather than researchers' own experiences.	Akerlind, 2018; Cossham, 2017; Hajar, 2021; Koole, 2023; Marton, 1981; 1992; Marton and Booth, 1997; Marton and Pang, 1999, 2008; Richardson, 1999;

		Tan, 2009
Qualitative Differences	Investigate the different ways of people's experiencing the phenomenon with qualitative variations in limited perspectives.	Akerlind, 2018, 2023; Bruce, 1999; Bowden and Walsh, 2000; Collier-Reed and Ingerman, 2013; Cope, 2004; Koole, 2023; Marton, 1981, 1986, 1988, 1994; Marton and Booth, 1997; Marton and Saljo, 1976; Pang, 2003; Pang and Ki, 2016; Tan, 2008
Variation and Collective thoughts	Variation in human experiences and focusing on the collective thoughts rather than individual voices.	Akerlind, 2018, 2023; Bowden, 2000; Marton and Booth, 1997; Marton and Saljo, 1976; Akerlind, 2002, 2012; Akerlind et al., 2005; Go and Pang, 2021 Marton, 2015
Intentional nature	An individual cannot experience something without experiencing it.	Han and Ellis, 2019; Pang, 2003; Marton, 1981; Marton and Pang, 2008
Critical Aspects	Critical aspects of a phenomenon refer to the aim of identifying important aspects necessary to distinguish one way of understanding the phenomenon from the perspectives of others.	Akerlind, 2023, 2024; Collier-Reed and Ingerman, 2013; Marton, 2015; Marton and Booth, 1997; Orgill, 2007; Pang, 2003; Pang and Ki, 2016

Second order perspective

Phenomenographic researchers focus their intentions towards the individuals, how they perceive the phenomenon, and their experiences of it (Marton, 1981). Marton called this second-order perspective differentiated as "from the inside." A second-order description refers to the researchers making statements about the experiences of other individuals (Tan, 2009). This perspective strongly connects with representing an individual's subjective experiences (Hajar, 2021). The second-order approach significantly contributes to two key features fundamental to the investigation: the incorporation of human experiences and the variations within those experiences (Akerlind, 2018). Thus, phenomenography highlights the participants' experiences and relies on their awareness of how they perceive the phenomena.

Qualitative Differences

Phenomenography explores the phenomena through different ways of experiencing, seeing, and understanding from various qualitative perspectives (Marton & Booth, 1997). Different understandings stated as "qualitative differences" pertain to exploring qualitatively distinct differences, not nuanced differences, in how individuals within a sample group understand the same phenomenon (Akerlind, 2023). Phenomenography aims to examine phenomena by exploring their different experiences in specific circumstances. It investigates and analyzes the events within a particular environment and subsequently gives many

perspectives on perceiving those phenomena from a decontextualized perspective (Marton & Booth, 1997).

Variation and Collective Thoughts

The core feature of phenomenography lies in exploring the essence of human experiences and the variations in those experiences (Akerlind, 2018). Phenomenography claims that there is no understanding without exploring variations in the phenomenon. The phenomenographic approach examines the variations in meaning, understanding, and conceptions of humans' awareness of particular phenomena (Marton, 1981). Such awareness occurs when individuals experience variation in those aspects (Hajar, 2021; Marton & Booth, 1997). Phenomenographers study a variety of understandings of human aspects of a specific phenomenon (Marton, 1992), and aim to comprehensively depict how individual learners see a particular event to provide a complete description of all conceivable conceptions (Marton, 1988).

Akerlind (2023) emphasized the participants' collective understanding rather than individual experiences. The variation in experience reflects the shared awareness of occurrences, known as "collective consciousness" (Marton & Booth, 1997). So, phenomenography investigates the individual and collective variations (Stolz, 2020) and typically investigates the variations in that experience (Han & Ellis, 2021).

Intentional nature

Phenomenography follows the principles of intentionality and depicts that without experiencing the phenomenon, one cannot describe the experience in detail (Marton & Pang, 2008). Such intentionality lies in human awareness about the phenomena describing purposefulness and consciousness of reality (Yates et al., 2012). So, phenomenography rejects dualism and understands the phenomenon through relationships that develop among the individuals and the world they experience (Pang, 2003).

Phenomenography deals with the two ways of a person's awareness regarding experiencing the phenomenon (Ameer, W., et al., 2024). Firstly, an individual cannot learn everything simultaneously, but learning occurs in layers. Second, a person demonstrates the same understanding of a phenomenon but comes up with different experience (Marton, 1986; Yates et al., 2012).

Critical Aspects or Dimension of Variations

A Phenomenographic study sheds light on the critical aspects that possess significant characteristics within the outcome space, exploring variations of the phenomenon from various perspectives (Collier-Reed & Ingeman, 2013; Akerlind, 2023). Such critical aspects pertain to identifying the essential elements required to differentiate between different ways of thinking rather than focusing on the depth of the experience (Akerlind, 2023). Critical aspects denote how peoples' awareness is structured and how they differently experience the phenomenon (Pang & Ki, 2016). Outcomes of phenomenography are represented in the form of categories of descriptions, describing a way of experiencing the phenomenon. These categories are then delimited to their unique features, representing the 'critical aspects of the phenomenon' (Akerlind, 2024).

Variation corresponds to a critical aspect in which a phenomenon is investigated, which applies to experiencing different parts, or dimensions of the phenomenon (Ji, D et al., 2023). Such variation of experience in a part, aspect or dimension is called a dimension of variation (Marton & Booth, 1997). Exploration of critical aspects in phenomenography further corresponds to a new field, also called variation theory (Orgill, 2007), which emphasizes theoretical investigations rather than methodological ones (Pang, 2003).

Methodological contribution in Phenomenography

Phenomenography employs a particular methodological approach for collecting and analyzing data, although with different variances (Tight, 2016). There are different tools for the phenomenographic collection of data discussed as under:

Data Collection

The principal aim of phenomenographic researchers in data collection is capturing the participant's utterances (Cope, 2004). There are several ways of collecting data in phenomenography, such as interviews, open-ended questionnaires, focus group discussions, drawings, documents, written surveys, and observations (Marton, 1994). Each method has multiple strengths and weaknesses for conducting the research process (Han & Ellis, 2019). The entire collection of data is subsequently processed for analysis, emphasizing the collective understanding as compared to the specific attributes of individual responses (Tight, 2016).

Phenomenographic Interviews

The most popular and common method for data collection from the participant's in-depth exploration of the phenomenon refers to semi-structured interviews, sometimes called phenomenographic interviews (Bruce, 1999; Collier-Reed et al., 2009; Koole, 2023; Tight, 2016). Interviews are considered as the main method of data collection in phenomenography (Ashworth & Lucas, 2000; Green & Bowden, 2010); have a distinctive outlook compared to other qualitative interviews due to eliciting the various conceptions of a phenomenon (Bruce, 1994). Interviews are evaluated through multiple readings (Reid, 1997), and usually uncover the variations in the participants' experiences (Yates et al., 2012).

An interview in phenomenography acts as a primary tool and focuses on the participant and object of the study (Bruce, 1997). In light of the purpose of the phenomenographic interviews, every question should be designed to prompt the interviewee, on how they see and experience the phenomenon (Svensson, 1997). Interview questions should be small in number (Hajar, 2021), pre-determined and open-ended, and allow the participants to decide the dimensions of the question (Marton, 1986). Such interviews do not focus on what is in individuals' minds but probe how they experience the world. Instead of an interrogated object, phenomenographers should approach the interviewee as a reporting subject (Francis, 1996).

Participants' Selection in Phenomenography

Many researchers propose that qualitative researchers select the saturation of participants to understand the various aspects of the phenomenon. Qualitative research refers to a small but appropriate group of participants to provide detailed and in-depth descriptions of the phenomenon (Cope, 2004). Mostly, phenomenographers approach the potential participants with a maximum diversity of experiences (Green, 2005). Suitable selection of participants is the core of investigation in phenomenographic studies, inclusively revealing the variation and in-depth investigation of experiences (Collier-Reed et al., 2009).

Like other qualitative researchers, purposive sampling is the critical method, most commonly adopted in phenomenography. Typically, purposive sampling is used in phenomenography because of participants' specific characteristics (Boon, Johnston and Webber, 2007) having a range of experiences to investigate the depth of the phenomenon (Collier-Reed, 2006). Participant's selection in phenomenography should be not too small and not too large but contribute to detailed descriptions of their experiences. Phenomenography suggests that approximately 15 to 20 participants are large enough to explore variations and the detailed description of experiences (Trigwell, 2000; Dunkin, 2000).

Phenomenographic Data Analysis

The ultimate product of phenomenographic analysis is the formation of categories of descriptions, which exhibit qualitative distinctions from one another, constituted from several critical aspects (Collier-Reed & Ingerman, 2013). Phenomenographic data refers to data analysis, providing an in-depth, holistic, and varied understanding of how subjects conceptualize the phenomenon (Cossham, 2017). The focal point in phenomenographic analysis should be the collective understanding of the phenomenon rather than focusing on participants' responses (Akerlind, 2012).

Iterative in Nature

Phenomenography is an analytical approach that involves an iterative process where categories continuously change as their meanings gradually become prominent (Entwistle, 1997). That is why, phenomenographic analysis involves iterations consisting of reading and re-reading, leading to modifications to the categories until saturation is achieved (Bowden & Green, 2010). As the tradition imposed in many qualitative researchers, phenomenography focuses on iterative data analysis (Cope, 2004). Phenomenographic analysis focuses on participants' utterances, and iterative nature is the face value in phenomenography (Richardson, 1999). Phenomenographic studies commonly examine small groups of individuals and employ an open and exploratory approach to gather data to investigate the different qualitative variations in how utterances between the participants are seen and understood (Booth, 1992).

Different Steps in Phenomenographic Analysis

Phenomenographic analysis follows the hermeneutic procedure in which the investigator tries to explain the unique modes of perceiving the phenomenon in the light of participant's experiences (Booth, 1992). Different researchers proposed the key stages of phenomenographic analysis depict how to analyze and process the data to approach the categories of descriptions to unveil the human experiences and variation in their experiences (Edwards, 2007; Walsh, 2000). So, it is crucial to provide an in-depth overview of the procedures involved in establishing categories of description with relevant quotes (Hajar,

2021). Different steps of phenomenographic analysis are elaborated from the perspective of different researchers are discussed as follows:

Familiarization

The first stage commences with familiarizing oneself with phenomenographic data to develop a detailed understanding of the subject's responses (Dahlgren & Fallsberg 1991). The familiarization process aims to allow the researcher's comprehensive understanding of the participants' responses, covering both the breadth and depth of experiences (Han & Ellis, 2019). In this step, the researchers' approach is to familiarize themselves with the collected data. For example, in phenomenographic interviews, the audio recordings were first transcribed. Because the transcriptions constituted the foundation for the study, then they were double-checked against the original audio recordings to prepare the data (Collier-Reed & Ingerman, 2013). At this stage, participants' utterances were investigated for the questions to draw the meaning of utterances (Akerlind, 2012).

Condensation/ Identification

The second step involves data reduction, selecting the most important and relevant parts within the responses, and enabling the identification of patterns of responses (Han & Ellis, 2019). The phenomenon under investigation is specifically focused on and analyzed through carefully selected interview excerpts (Akerlind, 2012). This second stage was named 'identification' by Marton, Carlsson, and Halasz (1992) and Säljö (1975), also called the condensation phase by Dahlgren and Fallsberg, (1991). Usually, the pattern of the data is identified through the most representative and significant statements (Dahlgren & Fallsberg, 1991; Svensson, 1997).

Comparison/Contrasting

The selection of quotes makes the pool of meaning and shifts the attention from individual subjects towards selected quotes. This selection serves as a crucial step for further analysis of data (Akerlind, 2012). This third stage refers to developing categories with their appropriate descriptions by comparing and contrasting the pool of meaning (Marton et al., 1992). The 'comparison' stage, as mentioned by Dahlgren and Fallsberg (1991), defines that a pool of meaning is generated based on similarities and differences, and then focuses on the collective variation of human experiences. This stage is also called 'sorting the data' in which data are categorized into pools of meaning based on their similarities (Marton et al., 1994; Saljo, 1997). Subsequently, the pool of meaning forms the foundation for further analysis (Marton, 1994). In the interview framework, the transcript of the interviews is constantly compared based on similarities and differences with other transcripts and explores the whole meaning within the context of the same sample group (Akerlind, 2012). The selection of a group of quotes is organized, rearranged, and condensed into categories (Marton, 1986).

Labeling the Categories

The last stage involves assigning labels to categories using suitable descriptors that accurately indicate the central theme of each category (Han & Ellis, 2019). Due to its iterative nature, the process of categorizing is frequently repeated, and categories are continuously labeled as their meaning becomes prominent. This involves refining and modifying the initially formed categories and their descriptions to approach the final set of

categories that accurately reflect the qualitative variations in the phenomenon (Han & Ellis, 2019).

Outcomes in Phenomenography

Synthesized views of various distinct outcomes identified by various researchers contribute to the analysis of phenomenography and are discussed in Table 2 along with their representative statements.

Categories of Descriptions

The outcome of phenomenography represents the categories of descriptions representing the different ways of experiencing which phenomenon is being explored (Marton & Pong, 2005). Such categories are analyzed logically and develop hierarchical inclusive relationships to understand and develop the many realities or conceptions of which phenomenon is being experienced (Marton, 1994; Marton & Booth, 1997; Marton & Pong, 2005). Such categories of descriptions generate the meaning from more simple to complex ways of experiencing that phenomenon (Hajar, 2021). These categories are constantly compared for the appropriate description of the phenomenon (Marton, 1994). These categories are the collective voices of the individuals extracted from individuals' voices (Bowden & Green, 2010) and exhibit qualitative distinctions, formed through several critical aspects (Collier-Reed & Ingerman, 2013).

According to Han and Ellis (2019), each category of descriptions differs in the referential and structural dimensions. Both these referential and structural dimensions are used to determine the variation in individuals' experiences (Harris, 2011). Hence, both these dimensions provide a unique analytical framework to explore the part-whole structure of the phenomenon.

Table:2 Synthesized View of Brief Literature Review of Key Distinct Features of Methodological Features of Phenomenography

Features	Representative statements	Contributed Scholar(s)
Categories of descriptions	Developing logically connected and hierarchically related categories focusing on the collective voices of individuals.	Akerlind, 2012; Collier-Reed and Ingerman, 2013; Cope, 2004; Dahlgren, 1997; Hasselgren and Beach, 1997; Koole, 2023; Marton, 1981, 1994; Marton and Booth, 1997; Marton and Pong, 2005; Säljö, 1997; Tight, 2016
Outcome space	It represents the possible ways a phenomenon is perceived and illustrates the relationship within these different categories of description based on their logical complexities and hierarchically inclusiveness.	Akerlind, 2012; Akerlind et al., 2005. Barnard, McCosker and Gerber, 1999; Bruce, 1997; Dahlin, 2007; Koole, 2023; Marton, 1994, 2000; Marton and Booth, 1997; Marton and Pang, 2008
Referential aspect	Overall meaning of the experience is	Akerlind, 2005; 2024; Harris,

	embedded (inherent) in its structure.	2011; Marton, 1988; 1994; Marton and Booth, 1997; Marton and Pong, 2005; Pang, 2003
Structural aspect	It focuses on the meaning and structure which mutually contribute to the act of experiencing the phenomenon.	Akerlind, 2005, 2023, 2024; Harris, 2011; Koole, 2023; Marton and Booth, 1997; pang, 2003

Outcome Space

Outcome space is a “logically structured complex” representing the unique outcomes of phenomenography (Marton, 2000). Phenomenographers present their results in hierarchically structured, finite sets of categories of descriptions and represented in various formats like tables, figures, and diagrammatic forms called outcome space (Akerlind, 2005; Yates et al., 2012). It represents the categories of descriptions, organized from lower order to higher order. The lower order depicts the most naïve view of experiencing, while the higher order indicates the more developed and sophisticated way of seeing the phenomenon (Tight, 2016). Moreover, outcome space describes the ‘part-whole hierarchical structure’, representing the most simplistic to complex ways of experiencing the phenomenon (Akerlind, 2024).

Outcome space acts as a vehicle for communicating how individuals experience or conceive a particular phenomenon and every single category shows one way of experiencing that phenomenon (Cope, 2000, 2004). These phenomena can be categorized hierarchically within an outcome space based on identifying and simultaneously analyzing similarities and differences in their discernible parts (Pang & Ki, 2016). Furthermore, Marton and Booth (1997) described that it is not feasible to claim that outcome space covers all possible ways a specific event might be experienced or conceptualized.

Marton and Booth (1997) proposed that awareness of a phenomenon is related to a person’s way of experiencing it. Awareness is related to the 'what' aspect (corresponds to the object) and the 'how' aspect (relates to the act) (Harris, 2011). It may be conceived in terms of the dynamic interaction between the structural and referential (or meaning) parts of human knowledge. Marton and Booth shed light on the anatomy of experience and developed a unique analytical framework called a referential and structural framework, formerly called the what/how framework (Harris, 2011). Both of these aspects are tightly interrelated, dialectically intertwined, and occur simultaneously (Marton & Booth, 1997; Tight, 2016).

Referential Aspect

The referential aspect in phenomenography focuses on ‘what is experienced’, associated with the meaning embedded in its structure (Marton & Pong, 2005; Marton & Booth, 1997). This aspect concerned with the whole meaning of the phenomenon. This aspect helps to understand what the phenomenon is; an individual must have identified and discerned and attributed a specific meaning to it (Marton & Booth, 1997). Phenomenography entails that we cannot understand the experience without given name to these experiences and cannot delimit it from the context.

Structural aspect

Phenomenography answers the question of how someone experiences the phenomenon (Marton & Booth, 1997). This experience refers to structural aspects to which several different understandings are perceived to be inextricably linked due to a shared awareness of specific aspects of the phenomena (Akerlind, 2023). Human experience also possesses a part-whole structure, in which various holistic understandings of a phenomenon are formed through shared awareness of different parts of the phenomenon (Akerlind, 2023). The structural aspect is the collection of various features perceived and concentrated on by the subject (Marton & Pong, 2005). The structural component describes deeper levels of phenomenal awareness and is related to an individual's perspective on what they have experienced (Marton & Booth, 1997). A structural relationship is needed to develop the connection among the categories of descriptions (Akerlind, 2005).

Akerlind (2023) describes that the organization concept is predicated on a part-whole framework in the context of collective understanding, wherein diverse perspectives within a given group are regarded as interrelated components of whole knowledge. Structural aspect focuses on part-whole nature, divided into two parts called external and internal horizons (Marton & Booth, 1997). Structural aspects establish the relationship between the phenomenon and its different parts. These parts are further split into two horizons, namely, external and internal horizons (Marton & Booth, 1997; Marton, Dall'allba & Beaty, 1993). These two horizons mutually contribute to understanding the internal and external relationship of the phenomenon. These two aspects are discussed below:

External Horizons

External horizon illustrates the understanding of phenomenon as a whole to differentiate the experience from its context and background (Marton & Booth, 1997). External horizon describes the phenomenon as a whole structure and distinguishes it from its surroundings. It depicts how a phenomenon is delimited and associated to its surroundings (Marton, Dall'allba and Beaty, 1993).

Internal horizons

The internal horizon corresponds to the awareness of the different parts and how they relate to the whole (Marton, Dall'allba, & Beaty, 1993). There is an internal link between the constituent components of the phenomenon and its cohesive whole, which is thematised or in focus. It encompasses an understanding of how these parts are distinctive from each other and how the distinctiveness of each component comes together to form a whole cohesive entity (Marton & Booth, 1997). So, internal horizon is the discernment of part-whole relationships where researchers analyze the different parts of the phenomenon and their relationships within the whole.

Bracketing

A researcher can gain insight into the personal lives of each participant by constructing personalized profiles for each individual, which fosters empathy before examining the comparative experience. So, the primary objective of phenomenographers is to immerse themselves in the life worlds of their participants to investigate their reflections and understanding of certain phenomena (Hajar, 2021). As highlighted by Marton and Booth (1997) in his book, emphasized the importance for phenomenographers to deliberately exclude or suspend their own experiences of the phenomena under investigation. This is because their pre-existing knowledge of the phenomenon has the potential to bias or shape

the research direction. The concept of bracketing in phenomenographic research is characterized by deliberately avoiding preconceived notions (Marton, 1994). It involves avoiding pre-categorizing data during interviews.

Phenomenography prevents the researchers from pre-categorizing the data during interviews ((Ashworth & Lucas, 1998) and refrains them from staying away from data somewhat called ‘suspending judgment’ (Marton & Booth, 1997). Hence, it is essential for researchers to carefully consider the specific aspects of a concept that participants choose to focus on. This requires the practice of bracketing, wherein researchers must consciously set aside any preconceived ideas or personal judgments they may have (Hajar, 2021).

Rigour in Phenomenographic Research

Cope (2002) stated that maintaining trustworthiness in a phenomenographic study entails conducting a fair and transparent audit of research procedures while conveying research data and findings clearly and transparently. Marton and Booth (1997) developed the standards for judging and ensuring the worth and rigor of phenomenographic study. They outlined three approaches for presenting more dependable and significant results while retaining quality in the outcome area:

- The link between categories should demonstrate distinctness and diverse ways of seeing the phenomena.
- Description categories are logically constructed, resulting in inclusive connections.
- Results or the number of categories should be conservative, considering critical variances in the data.

Discussion and Conclusion

The following research questions in this literature review were:

1. What is the focus of the literature on the critical features of phenomenography? How do different features contribute to their theoretical development?
2. What is the focus of the literature on the methodological contribution of phenomenography? How do key features contribute as an outcome of Phenomenography?
3. What implications does the information gathered from the literature review have for researchers in Pakistan for developing effective teaching and learning through phenomenography?

This literature was comprised of 66 research articles downloaded from different peer-reviewed journals. This paper provides an in-depth review of phenomenography and its various features contributing to theoretical and methodological developments. Overviews of critical features of phenomenography identified in the literature are summarized as follows:

- Follow the non-dualistic relational epistemology ascribing the individual relationship with the world they experience (person-world relation) and the inseparable and internal association between the subject and object of the phenomenon;

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- Phenomenography believes in the existence of only one reality which is objective and subjective at the same time;
 - Phenomenography pursues the second-order approach to describe the perspectives of others who experience that particular phenomenon;
 - Qualitatively variations of differences refer to how different people understand and interpret the same experiences in different ways;
 - Phenomenography explores the variations in participants' experiences and re-organise their collective thoughts;
 - The intentional nature of phenomenography indicates that a phenomenon is experienced when something is experienced. Without experiencing the phenomenon, one cannot understand it;
 - Critical aspects or dimensions of variations in phenomenography refer to the minimum number of awareness of aspects discerning the one way of understanding the phenomenon in qualitatively different ways.

Different features were found in the literature review, which shows how phenomenographic methodology communicates the result. Prominent features of phenomenography are summarized as follows:

- Understanding the phenomenon of part-whole relationship to collectively understand the phenomenon, including both its referential and structural aspects;
- Phenomenographers not only study to discern the meaning of the whole (external horizon) conception but also its different parts (internal horizon) and the relationship between them;
- Hierarchical relations between the categories of descriptions develop the outcome space, expanding the awareness of meaning with increasing aspects from simple (surface approach) to complex (deep approach);
- Outcome space represents the logically connected categories of description that describe the results in qualitatively different ways.

Phenomenography is an innovative research approach aimed at providing a comprehensive outlook of the different features contributing to the theoretical and methodological foundation of phenomenographic research. Phenomenography offers the researcher deep and diverse insights into how individuals conceptualize the phenomenon. This methodology not only focuses on the collective thoughts of the individuals but also explores the human variations in their experiences (Hajar, 2021). Phenomenography uses the categories of descriptions and outcome space to characterize how people see and understand reality (Pang, 2003).

Recent advancements in the field of phenomenography, namely variation theory, have made significant advances in the theoretical understanding, analysis, and pedagogical application of phenomenographic findings (Tan, 2009). Marton and other researchers in the field of phenomenography were attracted by the fundamental aspects of experience, awareness, and discernment, which constitute the foundation of variation theory (Dahlin,

2007). Phenomenographic study establishes the phenomenographic descriptions that examine how individuals understand the same phenomenon but come up with different experiences (Pang, 2003). Variation theory is based on understanding new features, structurally investigating the parts and wholes of the phenomenon in new ways, and finding new meanings in the phenomenon (Booth, 2008).

Implications for Future Research

Phenomenography originated in education but is currently used in various professions, including medicine, nursing, engineering, mathematics, management, computer science, and library science (Han & Ellis, 2019). Phenomenography delivers various implications for approaches to teaching and learning, particularly within higher education (Åkerlind, 2023). The focus of phenomenography on variations in individuals' experiences renders it a valuable tool for interpreting the users' perceptions of any subject matter. This approach is beneficial in presenting the unique outcomes in a qualitatively different manner. This approach will be very attractive for the newly inducted science educators that interested in understanding why some students learn the concepts more deeply and successfully than others (Marton, 1994) and adopt the learning from surface to deep knowledge.

Phenomenography is helpful in science teaching and learning for Pakistani science teachers and students. This approach will allow future researchers to profoundly investigate science teachers' and students' conceptual teaching and learning in Pakistan and probe questions like how science students and teachers conceptualize their scientific knowledge and transform their teaching and learning from the surface approach to the deep one. This approach will benefit and appeal to science education to meet various challenges of science teachers and students. Future researchers in Pakistan should be familiar with the philosophical, theoretical, and methodological underpinnings and recent advancements like the variation theory of phenomenography.

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