Journal of Qualitative Research in Education

Phenomenographic Thinking and Research: A Theoretical and Methodological Perspective

Yilmaz SOYSAL* Vildan SARUHAN**

For citation:

Soysal, Y., & Saruhan, V., (2023). Thinking and researching phenomenographic: A theoretical and methodological perspective. *Journal of Qualitative Research in Education*, 34, 266-295, https://doi.org/10.14689/enad.34.1663

Abstract: In this study, phenomenography as a thinking and research approach is synthesized with a theory-based and practice-oriented approach. In phenomenographic studies conducted in the national context, following steps unsuitable for the epistemology and practices of the approach leads to a false perception of the approach in the external reader, and inconsistent information stacks may occur. This study aims to provide a more accurate understanding of phenomenographic thinking and to use it more appropriately as a research method. Thus, the basic principles, concepts, jargon, and reasoning styles about how phenomenographic research can be carried out are presented in depth. Furthermore, this study aimed to make the phenomenography approach more visible and applicable to the syntheses it offers. Initially, the philosophy, theoretical foundations, and basic concepts of the phenomenographic approach were discussed in this context. Then, syntheses were shared about choosing the case to be researched, determining the participant group, structuring the data collection tool, performing the data collection process, determining the researcher's position, managing, and analyzing the data, and ensuring the validity and reliability conditions. In addition, case studies from leading researchers in the field of phenomenography were examined for exemplification. Finally, suggestions were made to researchers who will carry out studies based on the phenomenographic perspective.

Keywords: Phenomenon, phenomenographic thinking, phenomenographic research.

Article Info

Received: 30 Sep. 2022

Revised: 18 Feb. 2023

Accepted: 09 Mar. 2023

Article Type

Research

* *Yılmaz SOYSAL:* Istanbul Aydin University, yilmazsoysal@aydin.edu.tr, 0000-0003-1352-8421

Introduction

The initiation point of this study is based on specific prior experiences. One of the authors of this study sent research with a phenomenographic design to a national journal indexed within the scope of the TR Index for evaluation, and the referees asked the author to add related studies conducted in the national context. This was rightly perceived as a highly enriching proposal for revision, and the author systematically scanned phenomenographic studies published on national and international platforms. The obtained studies were examined in depth, and the author detected irreparable differences both regarding "thematic (conceptual-theoretical)" and "practical (methodological)" perspectives of phenomenographic research in terms of the use of general phenomenographic jargon, understanding and transferring the theoretical background, constructing and transferring the methodology or research design, reporting the findings, constructing the analysis approaches and stages and transfer, presentation of appropriate methodology bibliography, etc. among the studies that adopt the international phenomenographic literature and the phenomenographic studies published in the national context. This – misunderstanding and transfer of the basic conceptual and methodological principles of FP (phenomenographic perspective) – is very important and can potentially pose severe barriers to understanding authentic FP and for prospective researchers to adopt the qualitative research paradigm in a national context.

This study aims to show how some discourse, jargon, methodical style, etc., included in the research published by Turkish scholars on national or international platforms and claimed to be conducted with a "phenomenographic" perspective, were differentiated from the genuine methodology of phenomenography. In this sense, it points out information pollution, provides constructive explanations for related studies by revealing the nature and how of the principal methods, and offers a methodological therapy for future studies (Åkerlind, 2018). Therefore, the authors of this study took it upon themselves to call for a collective improvement within the national framework of the emerging qualitative research perspective in the new world. The primary purpose here is not to ignore or reject the work of researchers working with FP but to bring them and future researchers together with a universal perspective. Furthermore, in this study, the authors try to express their arguments through Habermas's principle of communicative rationality (McCarthy, 1984). In this context, the authors aimed to avoid "destructive discussions between people" and to emphasize "co-constructive negotiations between ideas" while presenting their descriptions based on evidence and sharing the main methodical principles of FP with external readers. In this context, the primary purpose of this study is to improve FP in the national context and to produce scientific works following the methodical paradigm in which FP takes place.

However, the authors of this study are not inclined to have a simple dialogue about FP with the readers of the content presented here. As Wegerif (2008) points out, the function of establishing a Hegelian (Limnatis, 2010) or Bakhtinian (Wegerif, 2008) dialogue is this: the social construction of meaning requires constant comparison of differences of opinion and choosing one of them. In the final analysis, meaning is a product of difference. The authors of the current study disagree with this. The authors of this study accepted that meaning is the product of dialectics, and they structured this article as an invitation to criticize the contents presented herein. As dialectics involves the collision of competing theories, selecting the most general one is appropriate to synthesize an accountable explanation and reasoning among them. Therefore, this study creates arguments about what and how FP is and awaits its counterarguments.

Theoretical Framework

Key Characteristics of the Phenomenographic Perspective

The word phenomenography is a combination of the Greek words "appearance (phainomenon)" and "descript" (graphein) (Hajar, 2021). The strategy of knowing things through the description of what appears to us is the central claim of FP (Åkerlind, 2012). Although FP cannot find a place in qualitative research, it bases the foundations of thinking and knowledge on the interpretative paradigm (Hajar, 2021). Four words characterize FP: "concept," "experience," "phenomenon," and "conceptual variation." The basic units of thought that represent FP were discussed in depth in this article. This part is the first part, and as this part addressed the "what is the phenomenography?" question, the "what" of the perspective was synthesized. The "how" of FP was discussed in the second part, and the basic principles, concepts, jargon, and reasoning on how phenomenographic research can be conducted were presented. This study also aimed to offer a bibliography reflecting the essentials of FP. Studies written by qualified qualitative researchers, which have significantly impacted the FP literature and have been a serious guide in structuring this study, were highlighted with (*) in the "References" section.

Concept and Experience

What is a "concept"? This is a crucial question from a qualitative research perspective. The concept term to be questioned here is also central to phenomenographic research. Therefore, to make sense of FP on a philosophical dimension, the concept term was examined in this section because phenomenographic studies aim to hierarchically illustrate how people experience phenomena, how they conceptualize what they experience, and the depths/shallows of these conceptualizations (Åkerlind, 2003; Marton, 1981; Marton & Säljö, 1976).

Concepts are the basic thinking unit of minds because people think through concepts or think about/on concepts. Therefore, the basic units of language and thought are essentially concepts. There is a concrete relationship between concepts and experiences. While experiencing things or things in themselves (Özen, 2020), we try to produce and derive the units of delivering them to ourselves or someone else. We can externalize as we have experienced it, externalize to the extent we have experienced it, or convey what we have experienced to someone or a community through concepts (Svensson, 1997).

The concept is "mefhum" in Ottoman; "concept" in French; "begriff" in German; "conception" in English; and Italian, and it is referred to as "concetto" (Hançerlioğlu, 1993; p. 177). When the operational concept definitions are examined, it can be seen that the positivist paradigm is more interested in describing the concept. The concept is "the reflection of objective reality that adds meaning to words" (Hançerlioğlu, 1993; p. 177). Abstract objects are usually covered under concepts. An abstract object is a product of generalization. It may be possible to reach the origin of the concept, abstract object, or imagination, which is synonymous with reasoning with the aim of generalization or induction (Pellegrino & Glaser, 2021). Concepts are a kind of human capacity that can free the mind from the trap of the concrete, making human ideas, abstractions, or symbols instrumental.

For instance, people perceive a cat through their material senses and make it a sensation. The cat is not only in nature; there may be pretty different cats that may or may not be alike, sometimes perceived as unusual. However, the word "cat" is defined in the Dictionary of the Turkish Language Association as "Felis domesticus, a feline, mammal, canine teeth well developed, agile and strong, domesticated, small animal (Felis domesticus)" (Turkish Language Institution [TDK], 2022). The critical thing in apprehending the concept is not that the cat is defined in the TDK dictionary but that all people can think of it, even when there is no cat in the physical environment, per the above conceptual definition. In other words, a cat concept generalization can be made when the cat is conceptualized. The cat is now the concept and is abstracted. With the conceptualization or abstraction of the cat, it is possible to talk about the cat that is not here or anywhere, think about it, plan for it, feel sorry for it, etc. The concept has a material basis in the world of objects. But its source is not in nature, and its origin is in the mind. The concept is not a product of nature but a product of thought (Kozulin, 1990).

Concepts must be created and designed by human minds. For a concept to be created by human minds, people must encounter things of a material nature that will enable them to construct concepts. This process is labeled as experience. Three states characterize experience: (i) the thing that is experienced, (ii) the mind that experiences, and (iii) semiotic mechanisms (e.g., language, alphabet, gestures, signs, etc.) connecting the former states. The subject's experiences and language or language-based semiotic mechanisms are the organic mediators that connect the subject and the object with the external (e.g., thing, nature, object, etc.) and the internal (subject) (Vygotsky, 1978;

1987). Concepts are often a product of the interaction between language and thought. An indicator of what thought is like is the existence of concepts. If there is no language, concept generation cannot occur, and for abstraction or generalization, it must be accepted that language frees minds from the trap of concrete and that language abstraction is the only way to produce thought without objects.

Some proofs show the association between concept and abstraction and that man is a living creature that can live by producing concepts. Beyond that, experiencing the concept does not always mean an abstraction can be made about the experienced phenomenon. For example, suppose there is an artificial island of 1 square meter in the middle of a pool with a depth of 1 meter and 10 meters on each side. On one side of this pool, 9 meters from the artificial islet, there is a water pump, and a chimpanzee was taught to get water from this water pump. In addition, the chimpanzee was taught that if there is a fire in the artificial islet, it can extinguish it with the water obtained from this water pump. The chimpanzee was also introduced to using a primitive raft to extinguish the fire. A fire starts in the artificial islet; the chimpanzee uses the raft to reach the water pump by the pool, fills the bucket with water, then comes to the artificial islet with the raft without pouring the water into the bucket, extinguishes the fire and receives its reward. Whenever a fire breaks out in the artificial islet, the chimpanzee can extinguish the fire with excellent capability. However, the chimpanzee cannot immediately take a bucket of water from the edge of the artificial islet and extinguish the fire without making a raft trip from the artificial islet to the water pump by the pool. Therefore, the chimpanzee does not have the abstraction that "*all water can probably put out this fire.*" Humans, not chimpanzees, as is assumed, can generate concepts (a kind of abstraction, generalization) through their particular experiences.

Creating concepts in which experiences are crystallized by making abstractions can be sensitive to the context in which the concepts are produced. Concepts are often multivocal (Wells et al., 2021). The multivocality of the concept is adjusted continuously, dynamically, and organically according to the context. As the context changes, the concept can gain semantically different tones. In this context, Swedish psychologist Ragnar Rommetveit has an appropriate allegory (Josephs, 1998). A married man got up early and got to work to cut the lawn in his backyard. The phone rang at home, and the man's wife answered. He was a friend of the woman's husband on the phone and said: "Is your lazy husband still in bed?" The wife replied: "No, he is cutting the grass outside." After a while, a friend called, and the man's wife answered the phone again; the voice said: "Is your husband working?" Knowing that the man on the phone and her husband go fishing every Saturday, the woman said: "No, he is cutting the grass outside." As seen, the same form of experience - depicting a man cutting the grass in the backyard with concepts - can give rise to different forms of expression. This shows that the relationship between experience-concept and context is a situation that should be given importance on FP's behalf. The philosophers also considered all the assertions

mentioned above important, and FP was enriched in this sense. These are presented in the following sections.

Concepts can only occur in the Popperian Third World (Popper, 1978). In this world, concepts refer to a social language system or incorporate jargon from a systematic way of thinking (e.g., science). According to Popper (1972; 1978), concepts are the products of the 3rd world and differ from those of the 1st and 2nd Worlds. 1st world is the physical world. The 2nd world is a conscious experience of the 1st world. According to Popper (1972; 1978), concepts are an indicator of objective sensations, and they differ from the more subjective sensations in the 2nd world, whose sources are in the 1st world.

In the 2nd world, what happens in the human mind is not a concept but a process, and this process is called conceptualization (the beginning of dynamic experiencing for symbolizing or abstracting) or conceptual thinking (Wells, 2008). Conceptualization describes the relationship between the individual and an external situation or event, that is social in nature. In this perspective, concepts are not internal formations because they are now fixed in the 3rd world. Therefore, concepts are not mental structures formed by neurons. The difference between sense and meaning (meaning-making) must be examined and clarified to understand this situation. Sensations are flexible, fluid, and change with context. However, the meaning is fixed and rehearsed; it can provide interpersonality, which means that more than one person can verbally share a single word (qualifying the concept). This argument can be valid even where different meanings are attributed to the words that describe the concepts (e.g., "No, he is cutting the grass outside.").

For example, the concept-x can mean entirely different things to a child and an adult. Likewise, a concept may mean quite different things to the same person at various stages of his/her life. It can be said that experiences about things in childhood are more on the border of sensations or concepts that may not be generalizations for a child. As children grow up, they enter an acculturation process and repetitively experience a concept in different contexts. Over time, the concept becomes more complex, generalizable, and fixed for children. The FP aims to diagram this experience process (Richardson, 1999) descriptively. FP enables the discovery of the conceptual distance between sensation and sense-making or generalization or abstraction (Saljo, 1997). Therefore, concept construction within the scope of FP is not an individual process, and concepts are not individualistic (private). However, concept construction is collective (Lamb et al., 2011), including a set of symbolic systems that interact with things, situations, and events in the outside world (Sandbergh, 1997).

Phenomenon and Conceptual Variation

The phenomenon is *what appears to us* (Marton, 1986; 1995). Things visible to individuals are not seen in their whole or given form (Marton & Booth, 1997). While

interacting with persons, objects, events, situations, etc., individuals cannot experience and express them completely in conceptual terms (Åkerlind, 2008). The object cannot be experienced as a whole; it is experienced partially (Åkerlind, 2012). For example, glass is an object. Individuals experience the glass. Individuals can touch it and describe whether it is solid or rigid, transparent as it is made of glass, has a particular geometric shape, etc. Then that glass can tell people something about their experiences. People can have a dialogue with the glass. The experiences of people with the glass are expressed as concepts.

For example, people may think that yesterday, when they were just about to drop it, they developed a quick reflex and caught it. Suddenly their hearts were beating fast with the worry of breaking the glass, and then they lamented, "It's just a glass, why am I so excited...". This includes an experience-concept couple. However, the way a solid-state physicist experiences the glass may be different because the solid-state physicist has the possibility of experiencing and expressing the microworlds of the glass, not only the macroworld of it. Glass is made of particles, molecules, and atoms; atoms are made up of protons, neutrons, and electrons, and these are made up of lower particles, etc. The fact that people see the electron clouds scattered everywhere in the glass's body when they look at the glass and know their existence by experience-concept even though they cannot see them shows that the conceptual volume of their fragmented way of experiencing is different or more profound than the experience volume of a person who uses the glass only to drink water and get excited (Marton, 1994).

A phenomenon incorporates two parts. The first is the *structural* aspect of the phenomenon. The structural aspect of a phenomenon is its fragmented part that is perceived by anyone (Åkerlind, 2012). The other is *the reference* aspect (Åkerlind, 2012), which is the universal perception of a phenomenon. The universal aspect covers all of the structural aspects (Pherali, 2011). A phenomenon's universal/reference aspect is the last point in that historical time, or the outermost conceptual periphery, at the point of experiencing that phenomenon and transforming it into a concept (Orgill, 2012; Stolz, 2020). For example, while Newton experienced and conceptualized Aristotle's teleological apple falling to the ground while reacting to its desire to reach the essence or soil, Einstein experienced and conceptualized it as an apple navigating the bending curves in warping space-time. Therefore, while embarking on a conceptual and experience-based journey from Aristotelian physics to Einstein's physics, the fragmented (structural) and universal (reference) aspects of the object phenomenon pulled by the ground are exemplified. Therefore, the structural aspect of any event that can be realized is always limited in terms of experiencing-conceptualizing the phenomenon. The other direction is; the universal aspect can be expressed as limitless or the last limit that the human mind has reached in historical times regarding experiencing-conceptualizing any phenomenon. FP has the following research mechanisms : describing the distance between the universal and structural concepts created on behalf of a phenomenon or

accepting that the structural and universal aspects are superficial or more profound parts of the same whole (Hajar, 2021).

Marton et al. (1993) assert that a singular mind cannot approach the universal limits of any phenomenon. Experiencing and conceptualizing are not individual but collective. For example, blindfolded people try to understand, experience, and describe what an elephant looks like. The elephant phenomenon is a whole, and each mind can experience a part of it. To some minds, an elephant might be something hard, possibly light-colored, made of bone because this person has only experienced the elephant's tusk. According to another mind, an elephant is a soft, long thing that can be bent and twisted, through which a liquid can pass. This mind has experienced the elephant's trunk. Neither experience can describe the whole itself. The critical point in this example is that minds having an experience with the elephant phenomenon and externalizing it cannot refine the whole elephant phenomenon (the universal aspect). However, an aggregate of these, or a collective conceptualization, brings the experiencer very close to the whole phenomenon. None of the descriptions of the elephant by different minds reflects the whole elephant, but all of them can reflect the whole elephant, allowing it to be experienced and conceptualized more completely.

There are many examples of the diversified contact of the phenomena with the minds. For example, the matter is a phenomenon. When this phenomenon is considered in an everyday and scientific context, both a hierarchical and linear experiential/symbolic variation can be seen on its behalf. A physicist tries to understand the matter in terms of other phenomena such as velocity, time, and acceleration. The matter is substantive for a chemist and can be converted to other substances by reactions (chemical or nuclear). According to a biologist, matter can be in living form and take shape in a cellular structure. For a pottery maker, the matter must be given aesthetic forms.

The above-mentioned situation also applies to social facts (which may include subjective judgments). How a bio-psycho-socio-cultural person experiences human phenomena includes both universal and structural aspects. For example, a teacher has experienced the phenomenon of teaching over the years. Many parameters will shape a teacher's teaching experience and determine the degree of shallowness or depth of his/her teaching concept. The primary purpose of FP in this context is not to deal with these parameters. The primary purpose of FP, for example, is to describe teachers' depths of experience and expression about the teaching phenomenon (Feldon & Tofel-Grehl, 2018). A teacher may have experienced teaching moments as transferring information from the most abundant source to the least abundant source in a school with students at a certain developmental level through a specific curriculum while carrying out instructional activities. As well-known teaching theories assert, it expresses a structural/fragmentary aspect of the teaching phenomenon and shows a relatively shallow degree of experiential knowledge and apprehension. When teachers experience and express the teaching phenomenon as the transfer of knowledge from one mind to

another, they operate their instructional activity chronologically. The monological approach refers to monophony in the classroom environment; since this voice belongs to the teacher, it is not inclusive. The basic principle in FP is the data-based depiction of the inclusivity of conceptual awareness (Barattucci & Bocciolesi, 2018). Therefore, it can be asserted that the above-mentioned form of experience is far from the conceptual depth that the universal aspect has produced on behalf of the teaching phenomenon. Because the experience-expression pair, which appears as knowledge transfer, covers only the teacher, not the presence/voice of the student (Souleles, 2012).

Other teachers can carry out the transfer of knowledge by supporting various visuals and using pre-organizers and facilitators. These teachers may believe they need to use certain pre-organizers and facilitators because they carry out instructional activities with a group of students with individual differences since this is their experience. Rather than sharing the subject knowledge of the course directly with the students, such teachers may have enriched them with various instructional ideas. Therefore, although knowledge transfer experience and conceptual expression are essential in the pedagogical repertoire of these teachers, they were able to experience the teaching phenomenon more profoundly compared to the above-mentioned teachers to a certain extent. Here, the most critical point for FP is that the conceptual shallowness or depth of "an experience" is shaped and determined according to "another experience" (Hajar, 2021). In other words, for the researchers to be able to decide that experience-based concepts of the second group of teachers for teaching have a higher inclusiveness, there is a need for verbal expressions of another mind that expresses the concept of teaching, which has a lower conceptual inclusiveness (Hasselgren & Beach, 1997).

A third group of teachers may have experience and the concept that teaching can be done with the intentional cognitive contributions of students. According to these teachers, pedagogical actions should be performed to construct meaning with students in the classroom. According to them, students can speak in class or have a dialogic speaking space. These teachers also make advocacy: students evaluate what is proposed by their peers, contribute to determining the criteria for accepting an idea, and act as an authority or decision-maker. From the point of view of the third group of teachers, the inclusiveness of the awareness created by the teaching experiences in the mind of the teacher has increased. Class members' voices have become visible as teachers can have a body of instructional experiences involved in including their own mind/will and other minds in the instructional flow. In addition, dialogic and dialectical space is open for alternative reasoning styles, and the instructional flow exceeds student-teacher interactions. It is handled in a format with student-student interactional patterns; the experience-concept dyad of the third teacher group incorporates the experience of the other two teachers about the teaching phenomenon as it has become more diversified, deepened, and approached the universal direction. The third teacher group may prefer direct lecturing in some parts of their lessons or create instructional configurations that

consider the students' differences, but the third group of teachers can also try to open up ways for students to contribute to the social interaction and verbal exchanges that take place in the classroom. This aspect indicates a deeper experience-based conceptual periphery or affirms a deeper inclusive awareness that logically encompasses all the other aspects mentioned by the first and second groups of teachers.

On the other hand, a fourth group of teachers may have a more complex experience-expression dyad than the three teacher groups whose concepts of teaching are presented in a logical and hierarchical order above. According to this group of teachers, teaching is a research process. These teachers were able to experience an association between research and acquisition. To grasp the concept of research-teaching, they may have experienced the teaching phenomenon through their studies at the graduate level. When this group of teachers engaged in collecting data, analyzing, interpreting, and sharing the results with other experts, they might have noticed that they learned from others, so the teachers may have experienced the need to teach in this way. As a result of the intellectual activities they experienced, this group of teachers may have reached the following concept: "Scientists engage in systematic processes to learn and explain the truth, so if this is how students learn, I should plan and execute my teaching in this way." Thus, the fourth group of teachers has the conceptualizations the other three teachers hold and beyond.

In summary, considering the basic concepts, instrumentalist, epistemological and ontological assumptions of the phenomenographic approach, it can be concluded that it is a research approach used to map out the qualitatively different ways in which individuals experience and conceptualize various aspects of the world in which they live (Marton, 1986). Furthermore, this approach incorporates the fact that individuals perceive the same phenomenon differently under different conditions, revealing a logically inclusive structure in which these different meanings are associated, involving looking at the collective human experience as a whole (Åkerlind, 2012). In this scope, in the second section, some procedural steps that stand out in conducting phenomenographic research are presented to the attention and criticism of the reader in light of the basic assumptions and foundations of the research approach summarized above.

Conducting Phenomenographic Research

As in all scientific research, research in which PR is centralized must have a consistent method (way of knowing/strategy), and it must be well-designed and managed from the beginning of the research process (Bowden, 2000a). This section includes the question: "How can phenomenographic research be conducted?" It is structured under the following sub-headings to answer the question: "selection of the content/theme to be explored," "participant selection," "structuring of the data collection tool," "data collection and researcher position," "processing and management of data," "data analysis," "validity" and reliability." However, before synthesizing the basic steps listed

above, "phenomenological" and "phenomenographic" research with similar names will be briefly compared.

The Basic Differences Between Phenomenography and Phenomenological Studies

Although phenomenology and phenomenography share the word "phenomenon" as a common root, the suffixes -graphy and -logos distinguish both approaches (Stolz, 2020). Phenomenographic studies hierarchically diagram how any phenomenon is experienced and conceptualized and the depth/shallowness of these conceptualizations (Marton, 1981). Phenomenology, conversely, aims to reveal the essence that defines the phenomenon rather than the individual experiencing the phenomenon (Giorgi, 2008). Although the result obtained when approaching any phenomenon around us with a phenomenographic perspective shares certain commonalities and relations with the phenomenological essence of that phenomenon, both approaches have different purposes, methods, and, therefore, different results (Larsson & Holmström, 2007). Unlike phenomenology, phenomenography is not concerned with the phenomenon itself but with the differences in how people understand, experience, and conceptualize the relevant phenomenon. This quadratic perspective explains people's experiences or ways of thinking about any phenomenon (Marton, 1981). Phenomenology, on the other hand, aims to capture what is transcendent, essential, or immanent that surrounds intuition, with its first-order perspective and the use of phenomenological reduction and bracketing. Therefore, it refers to the intersubjective (interpersonal) meaning of a particular aspect of reality. In phenomenography, how the subject experiences and conceptualizes the phenomenon is more important than the facts. Thus, phenomenographic research is the name of a methodology of knowing in which different aspects of phenomena are qualitatively experienced and expressed in many different contexts (Marton, 1981; Stolz, 2020).

Content/Theme Selection for a Phenomenographic Research

There is phenomenographic research in various fields, which includes a diversified presentation of an experienced phenomenon. One is the concept nurses have formed through their experiences with medical technologies (Barnard et al., 1998). Given in a hierarchical and logical order, nurses, in the most shallow format, perceived medical technology as the sum of a set of equipment. Another group of nurses (included in the same study) experienced and conceptualized technology as a lever to develop medical and operational knowledge and skills. Another group of nurses (included in the same study) experienced and conceptualized medical technologies as a tool of autonomy, a set of tools that control medical practice, and a means of better expressing the outcomes of medical processes to patients and their relatives. In the study above, nurses with experience on the conceptual periphery of the highest medical technology expressed the phenomenon as the source of nurses' free will in medical decisions. As can be seen, from the lowest conceptual periphery to the highest conceptual periphery, experiences related to medical technology have intensified and crystallized.

Considering PR in a narrow pattern, such as a research design, overshadows PR's capacity to reveal the experience-concept duo. PR can even be considered a teaching method (or even a philosophy). Because the instructional activities in or out of the classroom are considered modern, the thesis that learning or conceptual acquisition occurs when the organism is active is more verifiable. The fact that the organism, that is, the learning mind, is active means that it can initiate and continue the instructional activity through its existing mental setups or schemes for any subject. However, one of the most critical points in this context is: What is the conceptual, ontological, or epistemological distance(s) between what is "to be taught" and what is "so-called learned"? This distance is so significant that it profoundly affects the design of an instructional activity in or out of the classroom. It would be appropriate to explain this abstraction with examples. In a classroom, the teacher asks, "Is there a difference between heat and temperature?" upon which a student might reply, "Warmth, uh, is wearing a thick woolen sweater…" In this sense, in the context of the concept that characterizes the teacher's question, the teacher must compare and contrast the teacher's PR with the PRs of the student or other students who answered the question and identify the perceived conceptual distances. For the teacher, wearing a sweater to keep the body warm may mean "placing the sweater as a thermal insulation material between the body's inner world and the environment's outer world." This illustrates the conceptual difference between the students' mental setup and the mental setup the teacher wants to bring them, and for this to be best described or embodied, the teacher should at least do a phenomenographic analysis at the beginning of the lesson. Therefore, PR is a research design that includes all subjects, concepts, themes, etc., that may lead to conceptual, epistemological, ontological, or axiological differences. It is a suitable way of thinking and a research design. For instance;

- An examination of the depth/shallowness of students' conceptualizations of the atomic phenomenon in science education,
- An examination of the depth/shallowness of prospective physicians' conceptualizations of patient rights in medical education,
- An examination of the depth/shallowness of conceptualizations developed by participants in a science and research ethics course on moral and ethical phenomena,
- An examination of the depth/shallowness of the conceptualizations developed by a psychologist working in industrial psychology on the phenomenon of collaboration and altruism in factory workers.

As seen in the examples above, quite a variety of experience-concept dyads may be the subject of phenomenographic research.

Some phenomenographic research questions can be expressed as follows:

1. What is the diversity and depth of experience-based conceptualizations of medical technology used by doctors working in a hospital?
2. What are the dimensions and depths of the moral responses of primary school students to the Heinz dilemma?

3. How and in which hierarchical steps, and to what extent did the conceptualizations of physics department students regarding the relationship between matter and energy diversify?
4. What are the preschool teachers' experiences with the play concept, and in what ways and degrees do they differ from the game and preschool literature?

The Selection of Participants

The participants selected in the phenomenographic design must be appropriate people for the study's research questions because it is expected that the diversity of most ways of experiencing the phenomenon investigated in a phenomenographic study will be revealed inclusively (Collier-Reed et al., 2009). Therefore, the fact that participant selection is research-oriented is central to maximizing the diversity of experience styles (Green, 2005). In short, it is appropriate in PR to identify participants who show a wide variety in terms of specific indicators (age, gender, subject area of the participant, etc.) - maximum diversity sampling - purpose-oriented - purposive sampling- (Åkerlind et al., 2005). Purposeful sampling occurs when the researcher selects individuals who understand the research problem or the phenomenon being investigated (Creswell, 2007). In determining the number of participants in phenomenographic studies, it is commonly preferred that 20-30 participants capture the variety and shallowness/depth of experience concept (Åkerlind et al., 2005). In phenomenographic studies, Bowden (2005) states that there are two criteria for determining the number of participants: (i) reaching the number of participants that will provide sufficient diversity in visual styles, (ii) reaching some participants that will not make it challenging to manage the data. Since phenomenographic research aims to describe a set of participant experiences related to the phenomenon studied, it is functional to select participants who are likely to have different experiences with the phenomenon. However, this situation (the researcher's "intuition" that participant "A" may be informative for the study) may be based on some preliminary assumptions of the researcher. Therefore, the possibility of incomplete or wrong researcher assumptions should be considered (Ashworth & Lucas, 2000).

The Construction of The Data Collection Tool

The most common data collection tool in PR studies is one-on-one interviews (Åkerlind, 2005a, Green, 2005; Hajar, 2021; Marton, 1986). However, Åkerlind (2005a) points out that written reflection forms can also be used as data collection tools, and even using them makes data management relatively easy. Interviews in phenomenographic studies differ somewhat from those in other qualitative research approaches (Green, 2005). In PR, data collection takes place within the framework of a conversational partnership in which the participant assists in expressing the phenomenon (Ashworth & Lucas, 2000). The dataset in phenomenographic studies is obtained from interviews in which the participant is invited to express all aspects of their experience with the investigated phenomenon. In phenomenographic research, interviews do not require a question-answer process in which the participant answers the imposed questions but a flexible

ground where participants can explain based on their frame of reference (all the experience-related processes of the phenomenon) (Entwistle, 1997). Therefore, in addition to the content of the questions to be asked in the phenomenographic interviews, how they are directed to the participant is also essential. Asking the questions as open-ended and not as limited as possible may allow the participant to reflect on the relevance of the researched phenomenon in all its aspects (Marton, 1986). Phenomenographic interviews are of a nature that involves relatively few predetermined interview questions. This is because most of the interview questions are organic and dynamic, or the interview questions follow what the participant said or develop from it (Hajar, 2021). In other words, interview questions are contingent. "Contingency" means that the researcher constructs the subsequent follow-up or deepening question based on responses from the participant or strategically forwards additional questions using the conceptual content of the participant's answer. Therefore, although there is a particular set of questions at the beginning of the interview process, they may differ somewhat during the interviews (Marton, 1986).

The questions in the interview protocol should be designed in such a way as to capture the dimensions of diversity for the investigated phenomenon and the nature of the relationship between them (Cope, 2004). Creating a relaxed atmosphere that encourages sincere verbal interaction at the beginning of the interview process can provide the basis for the participant to give more dynamic and voluntary answers to the main questions. This can be regarded as a stimulating process in which civic-social relations are enhanced (Åkerlind, 2005b). During interviews, questions can be asked in order from action to experience, from concrete to abstract (Entwistle, 1997). In the phenomenographic interview, the nature of the phenomenon investigated (how it is experienced, and therefore how it is perceived) can be asked directly to the participant, and it can often be requested that the answers include a recent experience of the participant. The content of a series of answers to the question "What do you think?" or "What does this mean?" was directed to the participants and is expected to be narrower compared to the content of "How did you experience …"? (e.g., Could you tell me about an instant that you assume to be learning in the classroom?)." (Bowden, 2005). Also, the direct request for concrete examples is essential in clarifying the context in which the participant's experience of the phenomenon is determined. Because the individual's experience of the researched phenomenon is embedded in the context, different contexts can provide the individual with concepts about different aspects of the phenomenon (Åkerlind, 2005b). In addition, the underlying meaning of participant statements should be revealed through effective follow-up/probing questions. Follow-up questions can elaborate on the subject and check the meaning based on the expressions or keywords presented by the participant in the interview (Åkerlind, 2005a; 2005b). Therefore, the follow-up questions asked to the participant during the interview must be based on the participant's expressions, idioms, and concepts (Cope, 2004). Examples of questions used in phenomenographic interviews by Bowden (2005) and Green (2005) can be seen in Table 1.

Table 1.
Question Examples Used in PR Interviews

Bowden (2005)	*Neutral questions aimed at getting the participant to say more about the phenomenon being studied* Ex.; "Can you tell me a little more about this?", "Can you explain it again using different words?"
	Specific questions to ask the participant for more clarification on the issues stated in the previous stages of the interview *Ex.; "You talked about X and Y, but what do you think X and Y mean?"*
	Questions that lead the participant to think about the relations between the conceptions they have given Ex.; You mentioned A, and then you mentioned Y. How do these two perspectives relate to each other?
Green (2005)	*Seeking clarification* *Can you tell me a little more about X?* *Can you describe it thoroughly?* *Can you tell me how you feel about that?*
	Pretending as a novice data gatherer What do you mean here? Here are some things that are not clear to me. Can you define the X expression you used for me?
	Exploring contradictions You talked about X before, but now you talk about Y, which interests me. These seem to contradict each other. Can you explain a little bit?

In addition, scenarios that are specifically selected and shared with the participants in phenomenographic interviews can also provide in-depth data. Since scenarios that can be used as conversation starters (e.g., Soysal & Radmard, 2019) can direct the data to be obtained by researchers, they should be focused on producing the data that is appropriate to the focus of the research and be avoided the possibility of the researchers adding their ideas and concepts to the interview with scenarios (Green, 2005). In this context, the most crucial control mechanism is pilot interviews. In pilot studies, it can be meticulously checked whether the interview questions and scenarios provide sufficient and necessary information to the researcher about the investigated phenomenon from the perspective of possible participants (Åkerlind, 2005a; Åkerlind et al., 2005).

Data Collection and Researcher Position

Since phenomenographic data collection aims to reveal the conceptual/experimental diversity created in the minds of the researched phenomenon, the interview process is a process in which the participants are invited to explain, and the diversity in their way of seeing is expressed (Green & Bowden, 2009). In this process, it is essential for the researchers to put themselves in the place of the participants and to be careful not to put their thoughts in brackets (Green, 2005) and to be careful not to let their personal beliefs and assumptions guide the interview process (Ashworth & Lucas, 2000). Bowden (2005) drew attention to the importance of some points about investigative roles in obtaining data in phenomenographic studies.

1. If the interview process is to be started with a scenario, this opening scenario should be identical in all interviews,
2. Except for guiding the participant to make a more detailed explanation about the researched phenomenon, the researcher/interviewer does not bring an interfering element or discourse to the interview process,
3. Before proceeding to the data analysis, the researcher must limit and convince themselves to use only participant discourses in written transcripts and avoid over-interpretation.

To avoid adversely affecting the data set during the interview process, researchers may need to control their relationship with both the phenomenon and the participants. This control, in one aspect, requires that all interviews provide explanations only about the phenomenon under investigation. These interviews can be achieved by having a flexible but planned syllabus for all participants to a certain extent and not allowing unrelated items to enter the process (Bowden, 2005; Green, 2005). By emphasizing this discursive relationship between the researcher and the participant, Ashworth and Lucas (2000) summarized the aspects that the researcher could pay attention to during the interview process as follows;

1. The use of predetermined/prepared questions should be minimized,
2. Unrestricted, open-ended questions should be used,
3. Researchers should be able to listen effectively to capture the concepts, understandings, and comments of the participants about the researched phenomenon,
4. Researchers should be able to consciously silence their issues, presuppositions, and evaluations about the phenomenon under investigation,
5. Researchers should be able to follow or clarify the participants' flow of thought about the phenomenon, use appropriate, encouraging statements, and provide a basis for the participants to explain, elaborate on and discuss the events in detail.

Since phenomenographic studies aim to reveal the participant's way of experiencing, making sense of, and comprehending the researched phenomenon, in short, the participant's relationship with all aspects of the researched phenomenon, the transcripts should reflect this relationship at the time of the interview. The emotions, emphasis, and intonations in their verbal expressions that the participants reflected during the interview should be stated in the transcripts (Bowden, 2005; Ashworth & Lucas, 2000). In phenomenographic studies, the researcher must be open to all participant interpretations of the phenomenon being investigated (Collier-Reed et al., 2009). For example, a researcher may have developed deep expertise in the phenomenon of classroom questioning strategies. However, its judgmental use of participant responses during interviews can have a severe negative impact on a productive data collection process. Therefore, in phenomenographic interviews, an environment should be created where the participants can comfortably express their experiences. Maintaining an

environment free of the researcher's early assumptions and inappropriate discourse is essential during the interviews (Ashworth & Lucas, 2000).

In conducting a phenomenographic interview, the researcher must constantly review the interview strategies. Reviewing the first few interviews improves interview processes (Ashworth & Lucas, 2000). However, in some interviews, the researcher's opening new and different topics or entering a position that will weaken the value of research findings (praising/criticizing the participant's statements) may cause conceptual deviations (Bowden, 2005). In addition, researchers may often find themselves commenting on or discussing something said by the participant in their first interview. Therefore, it is essential to conduct pilot interviews to acquire the necessary interviewing skills and ensure that the research outputs reflect the phenomenon at the highest level (Åkerlind, 2005a; Bowden, 2005).

Data Processing and Management

In phenomenographic studies, verbal interview content recorded and deciphered is the focus of data analysis (Åkerlind, 2012; Marton, 1986). Meanings or categories abstracted in data analysis can only be extracted from the data through the researcher's interaction with the data (Åkerlind, 2012). Therefore, at what stage of the research process would data analysis start is controversial. Before all interviews are completed, switching to data analysis or analyzing the first interviews may cause the researcher to change or shape the interview content without realizing it during the remaining interview processes (Green, 2005). Therefore, the logic of analysis centralized in qualitative research, from inductive or particular (part; code) to universal (whole, theme) logic, may be sufficient to a certain extent in phenomenographic analysis.

On the other hand, using hypothetical-deductive (or hypothetical-deductive) data processing logic may be more functional. This logic includes inductive validation and deductive verification. Since the basic functional logic in phenomenographic analysis is "the way to portray the depth or shallowness of an individual's discourse in terms of X phenomenon is to constantly compare a personal verbal expression with another verbal expression," only a partial analysis is functional up to a certain point. Intentionally zigzagging (e.g., back-and-forth movements) between the "whole" and "individual/analytical/fragmented" verbal expressions of the data set brings forward both the whole-to-part and part-to-whole thinking logics. Therefore, the inductive function that qualitative research has generally adopted and centralized should be expanded to hypothetical-deductive in PR.

Also, focusing on the meanings in a particular transcript may lead to overlooking a deeper pool of meanings in which multiple meanings are embedded when considered separately from the rest of the data. Therefore, it is decisive for the management and processing of data that the researcher takes a position as consistent and oriented toward a particular focus throughout the analysis process, makes use of the similarities/differences in the whole verbal data set while abstracting the

meaning(s)/concept(s) forms, and that the meanings to be revealed include all verbal expressions (Walsh, 2000). In conclusion, data analysis refers to a zigzag process that aims to constantly compare and contrast the data with their inner existence, to end the conceptual differences that arise afterward, or to reach satisfaction with semantic differences. In this context, the phenomenographic analyst should constantly ask: When I use the conceptual categories I have obtained as a perspective and look at the data I have not yet processed, is there a particle of meaning that transcends my conceptual categories?

In phenomenographic data analysis, a holistic or collective approach is essential. However, it is difficult for the researcher to remember the entire verbal data set simultaneously. Therefore, the researcher needs to find appropriate ways to manage large amounts of data without destroying the integrity of the data. The "iterative approach" enables data to be analyzed from different perspectives at different times, ensuring effective data management (Åkerlind, 2005a; Åkerlind, 2012; Bowden & Walsh, 2000). Moreover, more than one case can be handled in any phenomenographic study. While processing the verbal outputs, the researcher may realize that verbal expressions also include ways of experiencing other phenomena apart from the phenomenon being researched. In this context, the important thing is that the researcher maintains the logic of continuing analysis by focusing on a single phenomenon (the phenomenon under investigation). Including other phenomena in understanding the phenomenon under investigation may distort qualitative interpretations (Åkerlind et al., 2005). In this context, the presence of strict external auditors has the feature of preventing those mentioned possible interpretation-based deviations (Bowden, 2000b; Walsh, 2000).

Data Analysis

The presentation of phenomenographic analyzes aims to share increased conceptual coverage with an external reader in a schematic way. This process is different from fundamental qualitative analyzes (probable flow: open coding, axial coding, selective coding) that aim to reveal a descriptive and generally simple thematic-conceptual structure (Trigwell, 1994). The categorization of participants' verbal expressions in fundamental qualitative analyzes is a priori. In phenomenographic analysis, conversely, a process involving meanings that develop through the collection (collectivization) and constant comparison of the participant discourse and the expressive form of experience is operated (Marton, 1986). One of the critical points is how the situation of the person researching to experience and conceptualize the phenomenon studied will be reflected in the data analysis process. Therefore, the researcher's perspective can affect the meanings obtained from the data (Ashworth & Lucas, 2000). In this context, the researcher's being "vigilant" or accepting the existence of experience-based concepts for the researched phenomenon can minimize possible biases that may interfere with research outputs. This situation can be explained by the term "bracketing" in phenomenology, one of the qualitative methodological approaches. Bracketing advances the analysis processes without contaminating or distorting the analyst's

thoughts, experiences, and discourses about the phenomenon being studied during the analysis (Chan et al., 2013; Tufford & Newman, 2012).
Moreover, in phenomenological research, the analyst can be informed about the phenomenon studied, and conceptual vocabulary can increase. This should not change the analyst's view of the data at hand. This is mostly about bracketing self-concepts. Although it seems unlikely, according to the hermeneutic (interpretive, interpretive) phenomenological argument, to bracket one's own experiences and concepts in data collection, analysis, and interpretation, interpretive (hermeneutic) phenomenology analysts have developed various ways of bracketing oneself (Tufford & Newman, 2012): the analyst's preparing oneself mentally ("Can I bracket myself enough to do this phenomenographic study?"), having a limited literature review or being extremely cautious about integrating this into the data collection, analysis, and interpretation processes if the analyst is well-versed in the literature, deliberately avoiding all kinds of acceptance or rejection mimics, gestures, intonations, and persistently maintaining a neutral position, etc. Similar tactics can also be used, especially in data analysis processes. Bowden and Walsh (2000) and Bowden and Green (2005) present studies reflecting on how to conduct PR-based research from start to finish. Generally, in studies where PR is centralized, the analysis process includes the three stages detailed below.

1. Discerning the Ways of Experiencing

The primary purpose of this stage is *discernment*. At this stage, the researcher(s) starts the process by reading the interview transcripts repeatedly. The researcher can check whether the inferences and interpretations obtained reflect the participant's meaning in repeated readings. This cycle (from the researcher's mind to the data, from the data to the researcher's mind) increases the rigor (solidity, crystallization) of the researcher's analytical inferences about the data (Åkerlind et al., 2005). At this stage, Åkerlind's (2012) suggestion regarding "*a kind of selection procedure based on the criteria of relevance*" mechanism can be operated. Participant statements that can be qualified as essential/relevant regarding the researched phenomenon are selected and marked in the written transcripts. These expressions emphasize how participants experience, make sense of, and perceive the phenomenon, and are embedded in the meaning(s) in the context in which this reflection occurs. These expressions of the participants shape (narrow or expand) the set of meaning(s)/concept(s) covered by the phenomenon under investigation. The selected participant expressions form the pool of meanings as a whole, and now the researcher can direct all focus to the meanings embedded in these expressions. It is essential to focus on the pool of meanings, which includes all forms of understanding, rather than the individual meanings of the selected expressions. This means knowing or interpreting a fragmented meaning (individual) by constantly comparing it to the whole (research group). Thus, each participant's statement reflecting the researched phenomenon is structured based on these two contexts (part-whole) (Marton, 1986). In other words, the "what" and "depth" of an individual's fragmented meaning are determined by the "what" and "depth" of all meanings in the pool of meanings. Thus, linear and hierarchical layers of meaning are created based on collective perceptions, not individual (fragmented) ideas (Åkerlind et al., 2005).

This process is similar to the inductively operating *open coding* process in primary qualitative research. However, phenomenographic analysis involves several specific analysis strategies due to "discernment": (i) controlling the frequency of expressions, (ii) controlling the ramifications of expressions, (iii) controlling the place of expressions in the speech system (Sjostrom & Dahlgren, 2002). These strategies should be used to analyze the data obtained from each individual. Controlling the frequency of statements means that the participant consistently begins their speech with a similar theme of expression, although in different parts of the transcript and frequently, the researcher asks questions about different aspects of the phenomenon under investigation. For example, the scientific perception of participants who work as professors in a phenomenographic study can be described.

One participant stated that "science is for society." This participant may believe in their thesis or have experienced the phenomenon of science in this way. This participant was asked, "What do you think science is?", "What do you think are the similarities and differences between science and technology?", "Do you think the truth can be known?" etc. The participant can answer questions such as consistently by centralizing an experience-based perception (one's big thinking) based on "science for society." Therefore, at least, the concept of "science for society" should be added to the pool of meanings on behalf of this participant, or this participant differed from other participants with the theme "society is for science."

In a phenomenographic analysis, participants may have branching sub-thoughts and several big ideas. Therefore, it is essential in phenomenographic studies that discernment is sought in the main (nuclear/central) ideas and the sub-ideas (branching ideas) that feed them. Finally, discernment needs to check the parts where the expression occurs in the transcript. For example, the participating professor mentioned, "As I always say, no matter how many different ideas I present, science makes sense to me when it is done for society in one way or another." This professor may have conveyed the last statement during the talks. In other words, at least in this example, the participant conveyed experiences with a central pattern of experience both at the beginning and at the end of the transcript and returned to the idea expressed at the beginning (position, section, chapter). Therefore, "science for society" has been differentiated from other meanings in the pool of meanings, at least for this participant.

2. Constructing of Categories of Description

At this stage, each analytical participant's expression is grouped into categories according to their similarities in terms of meaning. A descriptive category includes analytical meaning particles that are as homogeneous as possible, which must be heterogeneous with the meaning particles in another category. In other words, in the first stage of the analysis, the participant statements about the phenomenon construct a descriptive category by creating conceptually homogeneous stacks within themselves.

The creation of descriptive categories is based on conceptual similarities and differences in meaning fragments obtained from the previous analysis stage rather than on the hierarchy between possible categories. The similarity of participant expressions that come together in a particular descriptive category enables that category to become evident in the context of its internal features. Focusing on the differences between the elements that comprise each descriptive category makes distinguishing categories more apparent and distinguishable (Walsh, 2000). The constant comparative process used in all phases of phenomenographic analysis ensures this discernment and clarification. In distinguishing each category from the others, sharing participant statements with the external reader may also be functional, reflecting the special meaning that the descriptive categories represent.

In some cases, descriptive categories created by abstracting from participant discourses may not be unambiguous to the external reader. It may be functional to express descriptive categories with specific quotations from the written content that best reflect the participant's expressions (Åkerlind et al., 2005; Entwistle, 1997; Marton, 1986). In summary, citations that explain or support each descriptive category are essential in the creation/development of categories. By repetitive arrangement and continuous comparison of categories, the rate of change in categories would decrease, and the whole system of meanings and categories would be fixed (Marton, 1986).

3. Outcome Space

Descriptive categories revealed by the researcher, representing different ways of experiencing a phenomenon, form the outcome space as a logical and hierarchical schematic structure regarding inclusivity (Åkerlind, 2012, p. 116). Outcome space is diagramming conceptually homogeneous and heterogeneous descriptive categories through logical and hierarchical relationships (Walsh, 2000). Its hierarchical principle is based on the increasing complexity of experiencing the phenomenon under investigation and the logical inclusivity among the descriptive categories (Cope, 2004). What logical inclusiveness means here is based on the assumption that the ways of experiencing a phenomenon are logically related. Because we usually experience a phenomenon with one or more of its aspects, and what is experienced and expressed is internally related since it is directed towards "one" or "the same" phenomenon (Marton, 1981; 2000). The increasing inclusivity relationship between descriptive categories is determined by either the formal theories or the nature of the data set (Walsh, 2000). Therefore, the researcher must not identify the relationships between the descriptive categories until they are finalized (Ashworth & Lucas, 2000; Bowden, 2005). In addition, the researcher's view of the logical and hierarchical relationship between the categories is affected by the researcher's relationship with the researched phenomenon (experience process). If the development of descriptive categories and the identification of logical and hierarchical relationships co-occur, the researcher can distort the outcome space due to their own experience with the phenomenon (Bowden, 2005). Therefore, giving the outcome space is indispensable in phenomenographic studies (Cope, 2004). An example outcome space is shown in Table 2.

Table 2.
Example of Outcome Space

Level	*Descriptive Categories*
Level-1	DC-1*: Teaching is to convey knowledge to another in some way. DC-2**: Teaching is the flow of knowledge from the more to the lesser medium through enriched transmission paths.
Level-2	DC-3: Teaching is the process of transferring knowledge to one another. DC-4: Teaching is not just for teachers. Students can transfer knowledge to each other.
Level-3	DC-5: Only when the organism is active can individuals learn something from me.
Level-4	DC-6: Teaching is to provide progressively decreasing cognitive mentoring for an individual to construct a mental schema. DC-7: Teaching provides gradually decreasing cognitive mentoring service for an individual to construct a mental schema, expand an existing cognitive schema, or break down an existing but less useful or weakly explanatory schema in the face of nature or society phenomena and replace it with a more pragmatic one.
Level-5	DC-8: Teaching is to produce scientific knowledge; scientists learn when they produce scientific knowledge, so teaching is to organize, design or change the environment in or out of the classroom so that learners can produce their knowledge, collect data, analyze, interpret, and share what they produce with others.

*DC: Descriptive Category
**The authors hypothetically created the example in Table 2.

A sample outcome space is shown in Table 2, in which the investigated phenomenon is determined as "teaching." As seen in Table 2, an outcome space may contain more than one descriptive category at each hierarchical and structurally related level. As the descriptive categories increase, the higher categories contain more complex ways of experiencing the phenomenon and include sub-categories. According to this outcome space, for instance, Level-3 contains more diverse and qualitatively deep/complex dimensions of experience than Level-1 and Level-2. In the context of this outcome space, the focus of diversification may "logically" be "the number of individuals/parties involved in a teaching environment." As it can be seen, teachers who have an instructional activity experience at Level-1 can only include the "teacher (self)" in the teaching process. TK-3 and TK-4, included in Level-2, have a more complex instructional activities experience than Level-1, which characterizes a pure and single-individual (teacher only) experience and incorporates TK-1 and TK-2 points. To justify it, the only active entity in the instructional activity process at Level-2 is no longer the teacher: "Although the experience-concept couple is in the dimension of knowledge transfer (TK-3), learners can participate in the mentioned transfer process (TK-4)". The -concept pair implies that teachers experience a more profound "thing" about the teaching phenomenon. However, as can be seen, Level-3 includes a pattern of experience that is not included in Level-1 or Level-2 or includes and goes beyond them: the active and dynamic role of the organism in concept acquisition, which goes beyond mere knowledge and document transfer, it may reflect the teacher's teaching experience, which also highlights the mental role of the active individual in the classroom and expresses the creation of the concept. Existing theories may support this, such as behaviorist (knowledge transfer: classical and

operant conditioning) and constructivist (cognitive processing, social learning, activity theory, etc.) teaching theories. Therefore, the hierarchical positioning of Level-3 higher than Level-1 and Level-2 can also be logically verified, which is the primary mechanism for creating the outcome space. It should also be noted that the number of logical-hierarchical levels is variable in the presence of more than one descriptive category at any level in an outcome space. However, the basic principle in abstracting the descriptive categories and determining the number of levels in the outcome space is that the researcher behaves very "parsimonious." What is meant here is that the researcher represents the outcome space with as few categories as possible (Marton & Booth, 1997).

Validity

Validity refers to the extent to which a study investigates the intended phenomenon or the degree to which research findings reflect what was researched (Åkerlind, 2012). Therefore, phenomenographic studies' validity covers the research findings and the entire research process (Collier-Reed et al., 2009). Especially for phenomenographic research, criteria such as the following should be centralized as validity strategies:

- Researchers should be able to grasp all aspects of participant verbal externalizations about the explored phenomenon,
- The researcher should be open to all possible meaning positions,
- The researcher should know and operate strategies to bracket their assumptions,
- The researcher should purposefully select participants,
- The researcher should describe the context of the interaction,
- Researchers should ensure that a process suitable for phenomenographic research is followed in data analysis processes concerning the structure and content of the interview (Ashworth & Lucas, 2000; Collier-Reed et al., 2009; Cope, 2004).

Commonly, two types of validity can be mentioned in phenomenographic studies: communicative and pragmatic (Åkerlind, 2012; Kvale, 1996). Communicative validity checks the internal consistency of the general meaning categories abstracted from the participants' discourses in phenomenographic research through dialoguing. This process is carried out through the continuous social negotiation of the abstracted meanings by the members who carry out the research or who can "inform" the research (Kvale, 1996). Åkerlind (2012) draws attention to the fact that the researcher can convincingly discuss any interpretation put forward in the communicative validity strategy. A phenomenographic study can also be validated if researchers with similar research interests justify proposed interpretations (Collier-Reed et al., 2009). The prevalence of research conferences, seminars, and peer-reviewed journals also ensures this validity check and legitimizes research results (Åkerlind, 2012). For example, Hajar (2021) published his article titled "Theoretical Foundations of Phenomenography: A Critical Review" in "Higher Education Research & Development," and Åkerlind (2022) published her article "Critique of the article, 'Theoretical Foundations of Phenomenography: a critical review" in the same journal and criticized the

"misconceptions" about phenomenographic research in the article presented by Hajar (2022).

Pragmatic validity, conversely, is about the emancipatory scaffolding of the outputs of a phenomenographic study into public actions and precautions (Kvale, 1996). In this context, the main issue is to clarify all possible praxis (action) (McKerrow, 1989) that brings liberation through FP (Hart, 1990). Moreover, the results obtained from the research are related not only to the participant group but also to society outside the participant group (Collier-Reed et al., 2009). Therefore, the practical use of the results obtained from the phenomenographic research, providing insight into the actions to be taken after the research, makes the results pragmatically valid (Sandberg, 2005; Entwistle, 1997). Furthermore, the results obtained in a phenomenographic study can be shared with the study participants to check the validity of the results. The aim of this control, mainly conducted through focus group discussions, is to confirm whether the descriptive categories formed due to the phenomenographic analysis reflect their point of view (Bowden, 2005, p. 30).

Reliability

In qualitative research, reliability refers to the stability or consistency between the reactions of more than one qualitative coder (Creswell, 2007). Åkerlind (2012) mentions two types of reliability checks: intercoder reliability and dialogic reliability, which involve several researchers balancing or evaluating the impact of a single researcher's perspective on the data. Inter-coder reliability involves coding all or a part of the data by different researchers and comparing the coding preferences (Miles & Huberman, 1994). Dialogical reliability, conversely, aims to gain consensus by mutually reviewing the data with the interpretation developed by more than one researcher (Åkerlind, 2012). In addition, Kvale (1996) draws attention to contributing to the reliability of the research by ensuring that the researcher is not intrusive during the interview process and that the documentation is consistent in the transcription of the interviews -when conducted by more than one researcher- and that there is an agreement between the coders in the analysis of the data. With a similar approach, descriptive categories developed by a single researcher will be less reliable than those developed by a group of researchers. Therefore, it is essential to establish group discussion processes in which researchers can encounter other perspectives, control their subjectivity towards the data, and lead or force team members to think differently in the development, modification, and arrangement of categories (Åkerlind et al., 2005; Bowden, 2000b; Trigwell, 2000; Walsh, 2000).

In phenomenographic studies, intercoder reliability is a reproducibility strategy that involves researchers categorizing the comprehension patterns in the interview transcripts according to the descriptive categories developed by the principal researcher. The percentage of agreement between the coders is calculated by comparing the classifications of the primary researcher and the other coder researcher (Sandberg, 1997). However, intercoder reliability is controversial in qualitative research (Morse,

1997) and phenomenographic research (Sandberg, 1997). In phenomenographic studies, the participant's statements about their experiences may include more than one aspect related to that phenomenon. These can be hierarchical aspects in themselves, which can be more comprehensive than each other. However, since the external coder does not have as much control over the data as the principal researcher, the coder may not notice this distinction and may classify the participant concepts differently (Sandberg, 1997).

Another alternative for reliability checks is to explain all the steps in detail, as used in other qualitative research approaches, and to elaborate the whole process for the external reader (Guba, 1981; Kvale, 1996). It is also essential for researchers to take a high-quality audio recording, including detailed field notes, and transcribe participant interruptions in the interview process (Creswell, 2007). Sandberg (1997) developed the concept of interpretative awareness as an alternative to intercoder reliability. Intercoder reliability may also imply ignoring the intentional relationship that researchers establish with the participant's understanding of the phenomenon. Therefore, interpretive awareness contributes to researchers' acceptance of their subjectivity throughout the research process and maintaining their position as researchers per the phenomenographic research principles (Sandberg, 1997; 2005).

Conclusion and Recommendations

This research presents the central characteristic components of FP's philosophy, theoretical framework, and methodology to an external reader. This study aims to pave the way for the research in which FP is centralized to be understood and developed theoretically and practically, and used in different disciplines nationally. As mentioned, three essential components ("experience," "expressing experiences with conceptions," and "conceptual diversity") characterize FP, and these shape phenomenographic thinking and knowing. In other words, since the primary function of FP as a knowing instrument is shaped around these three components, a phenomenographic study includes the following three stages: (i) determining the ways of experiencing as an analytical process, (ii) developing descriptive categories as a holistic process, (iii) illustrating a structural-hierarchical-overarching diagram (output space) containing collective human cognition. In the final analysis, FP lends researchers a set of ways of thinking to understand the depth of experiential-conceptual expressions of relationships with the experienced world through systematic, data-driven, and reasoning ways. FP as a research approach is a kind of conceptual "literature review" of "collective human cognition," It can allow for knowing the gaps or shallows, if not the depths, in the literature.

The number of studies based on FP in the national context is increasing daily. For example, in an academic search to be carried out in a national context, more than fifty studies can be found in which the word "phenomenography" is used as a research approach in the title, abstract, or keywords. In this context, it could be argued that this

study's timing and arguments are essential in informing the methodological content and developing methodological thinking.

This research makes some methodological suggestions. First of all, in a systematic review by Chan et al. (2021), for example, the authors justified the principle that research articles make mandatory citations to studies on "teacher awareness in mathematics education" or show them as essential references as a selection criterion. The main reasoning of Chan et al. (2021) in this context was as follows: if education researchers in fields other than mathematics education (e.g., science education, classroom teaching) conduct studies on the phenomenon of "teacher awareness," they have to refer to the cumulative scientific knowledge created by mathematics teachers because the starting point of the related phenomenon is mathematics education. Mathematics teachers who made the first "teacher awareness" studies formed the tenets of how this concept should be studied in classroom instructional activities. The same is true for researchers who will adopt FP. As mentioned, the sole purpose of this study is not to introduce FP as a methodology of knowing but to bring together the primary or master researchers of this tenet with external readers. In this context, as mentioned, master methodologists or qualitative researchers who have made significant contributions to FP are indicated by (*) in the "References" section below. Therefore, in determining the purpose of phenomenographic research or data collection, analysis, interpretation, and reporting, future researchers should often refer to the primary references indicated with (*) and adopt the thinking styles presented in their content. In this context, according to the interpretative paradigm or worldview, which is the basic paradigm of qualitative researchers, it is indispensable for future researchers to know the basic and expert authors who built the FP paradigm to analyze and interpret their essential claims and arguments, and to establish (written) dialogues with them in research articles.

In addition, as evident from this systematic review and description, the authors have often sought to clarify a qualitative distinction between phenomenographic research and FP. FP essentially depicts phenomenographic thinking and is a more general concept than phenomenographic research. Also, as demonstrated in the key conceptual, theoretical, and methodological arguments above, adopting FP or phenomenographic thinking is a prerequisite for carrying out phenomenographic research. Therefore, in phenomenographic research, the researcher is labeled "phenomenographer." On the other hand, the phenomenographer constantly carries out phenomenographic studies and owes this mainly to one's adoption of FP or internalization of phenomenographic thinking. Therefore, future researchers who will carry out and report phenomenographic research in the best way will be the ones who will operate "phenomenographic thinking" in the actions of knowing, understanding, explaining, and making sense of things in all areas of their lives.

References

*Åkerlind, G. S. (2003). Growing and developing as a university teacher-variation in meaning. *Studies in Higher Education*, *28*, 375-390. https://doi.org/10.1080/0307507032000122242

*Åkerlind, G. S. (2005a). Learning about phenomenography: Interviewing, data analysis and the qualitative research paradigm. In J. Bowden & P. Green (Eds.), *Doing developmental phenomenography* (pp. 63–73). Melbourne: RMIT University Press.

*Åkerlind, G. S. (2005b). Phenomenographic methods: A case illustration. In J. Bowden & P. Green (Eds.), *Doing developmental phenomenography* (pp. 63–73). Melbourne: RMIT University Press.

Åkerlind, G. S. (2008). A phenomenographic approach to developing academics' understanding of the nature of teaching and learning. *Teaching in Higher Education, 13*(6), 633-644. https://doi.org/10.1080/13562510802452350

*Åkerlind, G. S. (2012). Variation and commonality in phenomenographic research methods. *Higher Education Research & Development, 31*(1), 115-127.

*Åkerlind, G. S. (2018). What future for phenomenographic research? On continuity and development in the phenomenography and variation theory research tradition. *Scandinavian Journal of Educational Research, 62*(6), 949-958. https://doi.org/10.1080/00313831.2017.1324899

*Åkerlind, Bowden & Green (2005). Learning to do Phenomenography: A reflective discussion. In J. Bowden & P. Green (Eds.), *Doing phenomenography* (pp. 74-100). Melbourne: RMIT University Press.

*Ashworth, P., & Lucas, U. (2000). Achieving empathy and engagement: A practical approach to the design, conduct and reporting of phenomenographic research. *Studies in Higher Education, 25*(3), 295-308. https://doi.org/10.1080/713696153

*Barattucci, M., & Bocciolesi, E. (2018). Phenomenography in the student learning perspective: A review of studies in academic contexts. *Encyclopaideia, 22*(50), 21-34. https://doi.org/10.6092/issn.1825-8670/7900

Barnard, A., McCosker, H., & Gerber, R. (1999). Phenomenography: a qualitative research approach for exploring understanding in health care. *Qualitative Health Research, 9*(2), 212-226. https://doi.org/10.1177/104973299129121794

*Bowden, J. A. (2000a). The nature of phenomenographic research. In J. Bowden & E. Wlash (Eds.), *Phenomenography* (pp. 1–18). Melbourne: RMIT University Press.

*Bowden, J. A. (2000b). Experience of phenomenographic research:A personal account. In J. Bowden & E. Wlash (Eds.), *Phenomenography* (pp. 47–61). Melbourne: RMIT University Press.

*Bowden, J. A. (2005). Reflections on the phenomenographic team research process. In J. Bowden & P. Green (Eds.), *Doing phenomenography*. Melbourne: RMIT University Press.

*Bowden, J. A., & Walsh, E. (Eds.). (2000). *Phenomenography*. RMIT University Press.

Chan, Z. C., Fung, Y. L., & Chien, W. T. (2013). Bracketing in phenomenology: Only undertaken in the data collection and analysis process. *The Qualitative Report, 18*(30), 1-9.

Chan, K. K. H., Xu, L., Cooper, R., Berry, A., & van Driel, J. H. (2021). Teacher noticing in science education: do you see what I see?. *Studies in Science Education, 57*(1), 1-44. https://doi.org/10.1080/03057267.2020.1755803

*Collier-Reed, B. I., Ingerman, Å., & Berglund, A. (2009). Reflections on trustworthiness in phenomenographic research: Recognising purpose, context and change in the process

of research. *Education as Change, 13*(2), 339-355. https://doi.org/10.1080/16823200903234901

*Cope, C. (2004). Ensuring validity and reliability in phenomenographic research using the analytical framework of a structure of awareness. *Qualitative Research Journal, 4*(2), 5-18.

*Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: Sage.

*Entwistle, N. (1997). Introduction: Phenomenography in higher education. *Higher Education Research & Development, 16*(2), 127-134. https://doi.org/10.1080/0729436970160202

*Feldon, D. F., & Tofel-Grehl, C. (2018). Phenomenography as a foundation for mixed models research. *American Behavioral Scientist, 62*(7), 887-899. https://doi.org/10.1177/0002764218772640

Giorgi, A. (2008). Difficulties encountered in the application of the phenomenological method in the social sciences. *Indo-Pacific Journal of Phenomenology, 8*(1), 1-9. https://doi.org/10.1080/20797222.2008.11433956

*Green, P. (2005). A rigorous journey into phenomenography: From a naturalistic inquirer viewpoint. In J. Bowden & P. Green (Eds.), *Doing phenomenography*. Melbourne: RMIT University Press.

*Green, P., & Bowden, J. A. (2009). Principles of developmental phenomenography. *Malaysian Journal of Qualitative Research, 2*(2), 55-74.

Guba, E. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology Journal*, 29, 75–91.

*Hajar, A. (2021). Theoretical foundations of phenomenography: a critical review. *Higher Education Research & Development, 40*(7), 1421-1436. https://doi.org/10.1080/07294360.2020.1833844

Hançerlioglu, O. (1993). *Felsefe Sözlüğü*. Remzi Kitabevi.

Hart, M. (1990). Critical theory and beyond: Further perspectives on emancipatory education. *Adult Education Quarterly, 40*(3), 125-138. https://doi.org/10.1177/0001848190040003001

*Hasselgren, B., & Beach, D. (1997). Phenomenography: A good-for-nothing brother of phenomenology? Outline of an analysis. *Higher Education Research & Development, 16*(2), 191–202. https://doi.org/10.1080/0729436970160206

Josephs, I. E. (1998) Do you know Ragnar Rommetveit? On dialogue and silence, poetry and pedantry, and cleverness and wisdom in psychology (an interview with Ragnar Rommetveit), *Culture and Psychology, 4*(2), 189–212. https://doi.org/10.1177/1354067X9800400203

Kozulin, A. (1990). *Vygotsky's psychology: A biography of ideas*. New York: Harvester Wheatsheaf.

*Kvale, S. (1996). *Interviews: An introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage.

Lamb, P., Sandberg, J., & Liesch, P. (2011). Small firm internationalisation unveiled through phenomenography. *Journal of International Business Studies, 54*(2), 1–22.

Larsson, J., & Holmström, I. (2007). Phenomenographic or phenomenological analysis: Does it matter? Examples from a study on anaesthesiologists' work. *International Journal of Qualitative Studies on Health and Well-being*, *2*(1), 55-64. https://doi.org/10.1080/17482620601068105

Limnatis, N. G. (Ed.). (2010). *The dimensions of Hegel's dialectic*. Bloomsbury Publishing.

*Marton, F. (1986). Phenomenography: A research approach to investigating different understandings of reality. *Journal of Thought, 21*(3), 28-49.

*Marton, F. (1981). Phenomenography – describing conceptions of the world around us. *Instructional Science, 10*(2), 177–200.

*Marton, F. (1994). Phenomenography. *The International Encyclopedia of Education, 8*(2), 4424-4429.

*Marton, F. (1995). On non-verbal learning 1. Level of processing and level of outcome. *Scandinavian Journal of Psychology*, 16, 273-279. https://doi.org/10.1111/j.1467-9450.1975.tb00193.x

*Marton, F. (2000). The structure of awareness. In J. Bowden & E. Wlash (Eds.), *Phenomenography* (pp. 102-116). Melbourne: RMIT University Press.

*Marton, F., & Booth, S. (1997). *Learning and awareness*. Hillsdale, N. J.: Lawrence Erlbaum.

Marton, F., Dall'alba, G., & Beaty, E. (1993). Conceptions of learning. *International Journal of Educational Research, 19*(3), 277-300.

*Marton, F., & Säljö, R. (1976). On qualitative differences in learning. 1- outcome and process. *British Journal of Educational Psychology, 46*(1), 4–11. https://doi.org/10.1111/j.2044-8279.1976.tb02980.x

McCarthy, T. A. (1984). Reflections on rationalization in the theory of communicative action. *Praxis International, 4*(2), 177-191.

McKerrow, R. E. (1989). Critical rhetoric: Theory and praxis. *Communications Monographs, 56*(2), 91-111. https://doi.org/10.1080/03637758909390253

Morse, J. M. (1997). " Perfectly healthy, but dead": the myth of inter-rater reliability. Qualitative Health Research, 7(4), 445-447.

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods, 1*(2), 13-22. https://doi.org/10.1177/160940690200100202

*Orgill M. (2012) Phenomenography. In Seel N.M. (Eds.) Encyclopedia of the Sciences of Learning. Springer, Boston, MA. https://doi.org/10.1007/978-1-4419-1428-6_271

Özen, V. O. (2020). The Ambiguity in Schopenhauer's Doctrine of the Thing-in-Itself. *The Review of Metaphysics, 74*(2), 251-288.

Pellegrino, J. W., & Glaser, R. (2021). Components of inductive reasoning. In *Aptitude, learning, and instruction* (pp. 177-218). Routledge.

*Pherali, T. (2011). *Phenomenography as a research strategy: Researching environmental conceptions*. Lambert Academic Publishing.

Popper, K. R. (1972). *Objective knowledge: An evolutionary approach*. Oxford, UK: Clarendon Press.

Popper, K. R. (1978). *Three worlds. In The Tanner lectures on human values* (pp. 143–167). Salt Lake City, UT: University of Utah.

*Richardson, J. T. (1999). The concepts and methods of phenomenographic research. *Review of Educational Research, 69*(1), 53-82. https://doi.org/10.3102/00346543069001053

*Sandbergh, J. (1997). Are phenomenographic results reliable?. *Higher Education Research & Development, 16*(2), 203-212. https://doi.org/10.1080/0729436970160207

*Säljö, R. (1997). Talk as data and practice—a critical look at phenomenographic inquiry and the appeal to experience. *Higher Education Research & Development, 16*(2), 173-190. https://doi.org/10.1080/0729436970160205

Sjöström, B., & Dahlgren, L. O. (2002). Applying phenomenography in nursing research. *Journal of Advanced Nursing, 40*(3), 339-345. https://doi.org/10.1046/j.1365-2648.2002.02375.x

*Souleles, N. (2012). Phenomenography and e-learning in art and design. Proceedings of the 8th International Conference on Networked Learning (pp. 466–473).

*Stolz, S. A. (2020). Phenomenology and phenomenography in educational research: A critique. *Educational Philosophy and Theory, 52*(10), 1077-1096. https://doi.org/10.1080/00131857.2020.1724088

*Svensson, L. (1997). Theoretical foundations of phenomenography. *Higher Education Research & Development, 16*(2), 159–171. https://doi.org/10.1080/0729436970160204

*Trigwell, K. (2000). A phenomenograpic interview on phenomenography. In J. Bowden & E. Wlash (Eds.), *Phenomenography* (pp. 62–82). Melbourne: RMIT University Press.

Tufford, L., & Newman, P. (2012). Bracketing in Qualitative Research. *Qualitative Social Work, 11*(1), 80–96. https://doi.org/10.1177/1473325010368316

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological process.* Cambridge, MA: Harvard University Press.

Vygotsky, L.S. (1987). Thinking and speech. In R. W. Rieber & A. S. Carton (Eds.), *The collected works of L.S. Vygotsky* (pp. 39–285). New York: Plenum Press.

*Walsh, E. (2000). Phenomenographic analysis of interview transcripts. In J. Bowden & E. Wlash (Eds.), *Phenomenography* (pp. 19-33). Melbourne: RMIT University Press.

Wegerif, R. (2008). Dialogic or dialectic? The significance of ontological assumptions in research on educational dialogue. *British Educational Research Journal, 34*(3), 347-361. https://doi.org/10.1080/01411920701532228

Wells, G. (2008). Learning to use scientifi c concepts. *Cultural Studies of Science Education*, 3, 329–350.

Wells, R., Barker, S., Boydell, K., Buus, N., Rhodes, P., & River, J. (2021). Dialogical inquiry: Multivocality and the interpretation of text. *Qualitative Research, 21*(4), 498-514. https://doi.org/10.1177/1468794120934409

Authors

Dr. Yılmaz SOYSAL is a faculty member at Istanbul Aydın University, Faculty of Education, Classroom Education Program. His main areas of study are classroom discourse, classroom questioning, and teachers' professional development.

Research Assistant Vildan SARUHAN works as a researcher at Istanbul Aydın University, Faculty of Education, Department of Guidance and Psychological Counseling.

Contact

Yilmaz SOYSAL,

Istanbul Aydin University, Faculty of Education, Classroom Teaching, Küçükçekmece / İstanbul

E-posta: yilmazsoysal@aydin.edu.tr

Vildan SARUHAN,

Istanbul Aydin University, Faculty of Education, Department of Guidance and Psychological Counseling, Küçükçekmece / İstanbul

E-posta: vildansaruhan@aydin.edu.tr