The Case Study Method

From the very beginning of my teaching career, it bothered me deeply when my students failed to understand what I was explaining. I quickly concluded that if only one-tenth of the children in front of me fully understood and could apply a newly taught concept or principle, half had only a vague grasp of it, and four-tenths simply sat there staring blankly at me, then something was seriously flawed in the process of knowledge transfer. I found it impossible to believe that such a high proportion of children in a single group could genuinely have weak abilities.

My solution was to call one of the blank-staring children to the board to solve a problem. At first, the child I chose would try to refuse, insisting he didn't understand it at all. I would reassure him that this was no problem—I would help him—but that he had to be the one to start working on the solution. Almost without exception, the children's concerns proved justified: they truly did not understand the concept, because they were applying it incorrectly. At the same time, the nature of the error clearly revealed what they had misunderstood, which allowed me to offer targeted help. But the benefit was never limited to that one child. The nature of the misunderstanding also gave me insight into the child's way of thinking, enabling me to offer general advice on how similar misunderstandings could be avoided. In these situations, it was always evident that I wasn't simply solving one child's problem; every child in the class who was struggling with the same point of confusion came to understand the concept as well.

Contrary to the common view—that a teacher usually interprets a child's incorrect application of knowledge as a sign that the child is simply "dumb" and therefore makes mistakes—I believed that no child says foolish things on purpose. Children identify with their own flawed reasoning and genuinely believe that the solution they present is correct. Because I truly believed that the child understood the concept exactly as he was applying it, I was able to give him real help in identifying what he needed to change in his thinking in order to align it with the correct mathematical concept.

A clear pattern emerged from the nature and depth of these errors. Because the children trusted me, they allowed me deep insight into their thinking. Without my ever consciously seeking it, case study became the natural foundation for my observations and for exploring the correlations I discovered.

(Mária Majoros: *The Native Language as a Cognitive Model Limiting Mathematical Understanding*; Mária Majoros: *The Thought Processes Behind Typical Mathematical Errors*; Mária Majoros: *Should We Teach or Fail Them?*; Mária Majoros: *The Miracle of Human Thought: The Left-Handed Child*)

In teaching mathematics, our task is to recognize and correctly interpret the full range of approaches and solutions students bring to a problem. In this context, an incorrect approach is itself a form of interpretation—differing only in that its starting point is wrong—but it remains one possible path among others. Since some of my students were left-handed, understanding their particular way of thinking was, in their case too, the foundation of successful teaching.

The distinctiveness of left-handed children's thinking should not be taken to mean that the solution paths they favor cannot also occur in right-handed children. At the same time, left-handed children do typically and strikingly gravitate toward certain solution paths. It was entirely clear to me that here, too, I would base my conclusions on case studies.

In the fields of psychology and social sciences, such as education, case studies are a reliable approach to formulating hypotheses. They can reveal unexpected patterns or behaviors, prompting new hypotheses that can be tested in future research, and thereby playing a basic role in exploratory insights. Researchers are able to see how different psychological factors interact, which helps them identify possible variables for additional research.

Especially in fields without strong theoretical frameworks, case studies excel at developing and refining new theories through in-depth examination of individual cases.

By using case studies, multifactor analysis can be used to look into how biological, psychological, and social factors interact with each other in complex ways, which helps us understand theories better. Additionally, they draw attention to the diversity of human behavior and the possibility that people do not all fit neatly into preexisting theoretical frameworks.

One of the most significant benefits of case study analysis is its comprehensive perspective. They support theories that take into consideration the complexity of human experiences and advocate for a comprehensive approach to psychological problems. Case studies are basically very important to the development of psychological theories because they connect abstract ideas with real-life applications. They support a dynamic process of developing, testing, and improving theories, which is very important for the field's progress.

Case studies are advantageous for investigating novel or intricate phenomena in which there is inadequate prior research.

The sole feasible and effective research method for the study, description, and proper interpretation of left-handedness was case studies. Both the responses associated with a particular situation and the observable behavioral patterns associated with left-handedness do not fit the definition of measurable phenomena.

My observations on left-handedness are based on case studies that were conducted in school settings or during my private tutoring work. It is crucial to stress that, even when observations were made in a classroom, the children's explanations of their thought processes regarding a given issue were unaffected by outside factors. In the courses I instructed, it was an essential expectation that all students would be able to freely express their perspective on a particular issue. I explicitly communicated to the students that their errors were beneficial in assisting me, as a teacher, in comprehending their misinterpretations. Therefore, I was able to observe the cognitive processes of left-handed children during classroom activities.

I worked one-on-one with a child in private tutoring sessions. Adjacent to me, the children were situated in cozy armchairs. I could see right into their notebooks, where they recorded their answers. I also stipulated to my private students that they were permitted to think independently and make errors, as this enables me to gain a more comprehensive understanding of their thought processes.

The fact that the participants in the cases that underlie the observations had never met one another, differed in age and social background, and yet exhibited the same orientation characteristics and mental responses is of considerable importance from the perspective of generalization. Lefthandedness was the sole shared characteristic among these individuals.

These common traits served as the foundation for characterizing and analyzing left-handedness as a phenomenon as well as for looking for suitable explanations.

If there is any physiological explanation for these phenomena, it is the responsibility of brain research to offer it.

It was my intention to systematically organize and describe as many observable phenomena as possible in order to provide parents and teachers with the necessary information to better understand left-handed children. This would alleviate the discrimination that these children face in their daily lives at home and school.