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IN A CLASSROOM CONTEXT, STUDENTS WHO ARE GIVEN CONCISE EXPLANATIONS ARE MORE LIKELY TO COMPREHEND THE MATERIAL

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Abstract

Giving students concise explanations is essential in the classroom to ensure they understand the material. When it comes to generalizing, students' logical thinking is strengthened and provides guidance through inductive judgment. Regarding explanations, Leinhardt distinguished between disciplinary and instructional forms of teaching. He argues that instructional explanations aim to make concepts, procedures, events, ideas, and classes of problems clearer in order to assist students in comprehending, learning, and applying information in a flexible manner.

Keywords: inductive judgement, generalising, to distinguish, interrelated nature, to collaborate.

Introduction

Explanation is the simplest type of instruction. "A tool that is used by a speaker for understanding or 'giving a sense' to the object of communication, of a debate, or a discussion" is how explanation is defined. An explanation's function is to clarify the meaning of an item (method, term, assignment) while officially preserving the appropriate distance between the study's or action's focal point and its instruments. Both the teacher and the students use explanation as a tool in the teaching and learning process. Its intention is to make understanding visible [1-3].

The main part

Historically, explanation has been a part of monological teaching approaches, in which pupils get information from the teacher along with other instructional strategies like narration, description, or lectures. Skalkova says that in practice, individual forms of explanation often percolate. In this perspective, explanation is

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seen as the task fulfilled by the teacher with students passively receiving what is presented. Collecting feedback on students' perceptions of whether explanations are clearly identified whether student's feel particular teaching assisted them in understanding the subject matter. Without student understanding, no explanation can be said to be clear. We see explanation in a much broader sense: Communication in school is a mutual interchange of information among teachers and students, students and students during the educational process, i.e. students have an active role in the whole process.Using explanation in a mathematics classroom is a normal procedure, but its roles and forms vary. Predominantly explanation is seen as a tool for describing relevant phenomena, developing students' logical thinking, and guiding students by inductive judgement to generalising. It leads to clarifying interrelations, demonstrating, and justifying [4-7].

Although explanation is not often explicitly studied in literature, it is present in the background of most papers dealing with communication and reasoning. "Good teaching is good explanation". This quotation reflects the belief that the capacity to explain is critically important in teaching. According to Behr, the art of explaining - the ability to provide understanding to others - is the central activity of teaching.

Therefore, to achieve the goal of teaching, the teacher must adopt effective teaching methods that can lead to learners understanding the subject being taught. Being the most commonly used teaching method, explanation integrates well in all methods of instruction, such as discussions, seminars, practical lessons and tutorials [8-14]. Therefore, if used properly, this teaching method can develop logical operations: induction, deduction, comparison, analysis, synthesis and analogy. The main objective of explanation in teaching is to enable the learners to take intelligent interest in the lesson, to grasp the purpose of what is being done, and to develop their own insight and understanding of how to do it. In addition, and with specific reference to technology education, explanation is used in classroom teaching to provide students with an understanding of the complex and interrelated nature of technology, which is technical, procedural, conceptual and social. This involves the ability by the teacher to use explanation effectively in order to communicate information to students. From the standpoint of technology education, explanation in teaching is an intentional activity, which represents the discovery of truth, which is based on concrete deductive arguments. Explanation as it pertains to teaching can be considered as an attempt to provide understanding of a problem to others [15-17].

In the educational setting, providing clear explanations to students is crucial to helping them grasp the material. Students' logical thinking is developed, and it offers direction through inductive judgment when it comes to generalizing. Leinhardt made a distinction between the instructional and disciplinary forms of teaching when it came to explanations. In order to support students in understanding, learning, and applying information in a flexible manner, he claims that instructional explanations seek to clarify concepts, methods, events, ideas, and classes of problems. Disciplinary explanations attempt to explain what is considered evidence, what is assumed, and what the discipline's objective is. They are based on a core set of conventions within each specific field. They give fresh information credibility, reframe old knowledge, and confront and criticize preexisting knowledge. From a learning perspective, explanation holds a special place as one of the core critical thinking skills. Good critical thinkers, according to Facione, are those who can explain what they think and how they arrived at that judgment. The Delphi Study expert panel, cited by Facione, defined explanation as being able "to state the results of one's reasoning; to justify that reasoning in terms of the evidential, conceptual, methodological, criteriological, and contextual considerations upon which one's results were based; and to present one's reasoning in the form of cogent arguments". Explanation that works is one that is "sticky" (people remember it, think about it, and can repeat it, often even days or weeks later), is easily communicated (people can explain it to each other), and guides thinking in new and better directions (it leads to new kinds of reasoning, which are not only more constructive and accurate but more engaging) [18-20].

Howard Gardner identified a wide range of modalities in his Multiple Intelligences theories. The Myers-Briggs Type Indicator and Keirsey Temperament Sorter, based on the works of Jung, focus on understanding how people's personality affects the way they interact personally, and how this affects the way individuals respond to each other within the learning environment.

Demonstrating - Demonstrating, which is also called the coaching style or the Lecture-cum-Demonstration method, is the process of teaching through examples or experiments. The framework mixes the instructional strategies of information imparting and showing how. For example, a science teacher may teach an idea by performing an experiment for students. A demonstration may be used to prove a fact through a combination of visual evidence and associated reasoning.

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Demonstrations are similar to written storytelling and examples in that they allow students to personally relate to the presented information. Memorization of a list of facts is a detached and impersonal experience, whereas the same information, conveyed through demonstration, becomes personally relatable. Demonstrations help to raise student interest and reinforce memory retention because they provide connections between facts and real-world applications of those facts. Lectures, on the other hand, are often geared more towards factual presentation than connective learning.

One of the advantages of the demonstration method involves the capability to include different formats and instruction materials to make the learning process engaging. This leads to the activation of several of the learners' senses, creating more opportunities for learning. The approach is also beneficial on the part of the teacher because it is adaptable to both group and individual teaching. While demonstration teaching, however, can be effective in teaching Math, Science, and Art, it can prove ineffective in a classroom setting that calls for the accommodation of the learners' individual needs.

Collaborating - Collaboration allows student to actively participate in the learning process by talking with each other and listening to others opinions. Collaboration establishes a personal connection between students and the topic of study and it helps students think in a less personally biased way. Group projects and discussions are examples of this teaching method. Teachers may employ collaboration to assess student's abilities to work as a team, leadership skills, or presentation abilities.

Collaborative discussions can take a variety of forms, such as fishbowl discussions. It is important for teachers to provide students with instruction on how to collaborate. This includes teaching them rules to conversation, such as listening, and how to use argumentation versus arguing. After some preparation and with clearly defined roles, a discussion may constitute most of a lesson, with the teacher only giving short feedback at the end or in the following lesson.

Some examples of collaborative learning tips and strategies for teachers are; to build trust, establish group interactions, keeps in mind the critics, include different types of learning, use real-world problems, consider assessment, create a pre-test, and post-test, use different strategies, help students use inquiry and use technology for easier learning.

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Class discussions can enhance student understanding, add context to academic content, broaden student perspectives, highlight opposing viewpoints, reinforce knowledge, build confidence, and support community in learning. The opportunities for meaningful and engaging in-class discussion may vary widely, depending on the subject matter and format of the course. Motivations for holding planned classroom discussion, however, remain consistent. An effective classroom discussion can be achieved by probing more questions among the students, paraphrasing the information received, using questions to develop critical thinking with questions like "Can we take this one step further?;" "What solutions do you think might solve this problem?;" "How does this relate to what we have learned about..?;" "What are the differences between ... ?;" "How does this relate to your own experience?;" "What do you think causes .... ?;" "What are the implications of .... ?"

It is clear from "the impact of teaching strategies on learning strategies in first-year higher education cannot be overlooked nor over interpreted, due to the importance of students' personality and academic motivation which also partly explain why students learn the way they do" that Donche agrees with the previous points made in the above headings but he also believes that student's personalities contribute to their learning style. The way a student interprets and executes the instruction given by a teacher allows them to learn in a more effective and personal way. This interactive instruction is designed for the students to share their thoughts about a wide range of subjects.

Class discussions have also proven to be an effective method of bullying prevention and intervention when teachers discuss the issue of bullying and its negative consequences with the entire class. These discussions have shown to increase the number of students who would help other students when they are victimized.

The subject of the social and methodological analysis in this project was the emerging and the development of the theory of mechanisms as a classical scientific and engineering discipline, on the one hand. On the other hand, the emerging and the development of radar science and technology as a special discipline of scientific engineering (as distinct from the engineering industry) was the subject of social and methodological analysis. Radar theory is discussed not as much as a specific engineering science but as a model of development of an engineering discipline. On the one hand, it is an object of systems study; on the other hand, it has given an impetus in modern science and engineering to the development of methodological principles for the systems approach. This is not only about adding new details to the stories of this particular sphere of science and technology but rather about using this example as a case study to uncover the social and methodological structures connected to the origination of new sciences and technologies. This approach was propagated by the philosophers of science in the middle of the 20th century. For this reason, it was possible to apply in this project the results of the social and methodological analysis done by scientific engineering disciplines, results which were elaborated for the investigation of radar science and technology, and for the philosophical analysis of another modern science, namely of nanotechnology.

The scientific technological disciplines already have founded or are founding at present disciplinary organizations and, meanwhile, they have a stable position in science. In addition, as shown in the project, by the second half of the 20th century, a majority of the scientific technological disciplines had begun their own theoretical studies that have received the status of a technical theory, by now. Today, there is more interconnectedness between science and technology (also in the basic research spheres) within the scientific community. We already say "techno science". In the modern scientific landscape, we can find increasingly a special type of scientific discipline – the scientific technological discipline.

These new scientific technological disciplines are unique in that they emerge at the interface between scientific and engineering activities, and are supposed to ensure the effective interaction of both of these fields. We already speak of "techno science". Three main levels of the theoretical (ontological) schema within a nano scientific theory can be discerned: namely, mathematically-oriented functional schemes, "flow" schemes reflecting natural processes occurring in the system investigated or constructed, and structural schemes representing its structural parameters and engineering analysis, i.e., the system's structure. In nano techno science different models (equivalent circuits with standard electronic components) of electric circuit theory are used for the analysis and synthesis of nano circuits, and a special nano circuit theory is elaborated. The implementation of technological theory is carried out by using the iteration method. First, a special engineering problem is formulated. Then it is represented as a structural diagram of the technical system. To calculate and to model this process mathematically, a functional diagram is drawn up. Consequently, the engineering problem is reformulated into a scientific one, and then into a mathematical problem that is solved by the deductive method. This path from the bottom to the top represents the analysis of models. The opposite direction – the synthesis of models – makes it possible to synthesize the ideal model of a new technical system from idealized structural elements according to the appropriate rules of deductive transformation, to calculate basic parameters of the technical system, and to simulate its function.

Conclusions

Today, it is impossible to separate knowledge production not only from knowledge application but also from ethical reflection. That is why in this project problems related to technological catastrophes are analyzed: Hereinafter, an example for nuclear reactor accidents follows. After the Chernobyl catastrophe the scientific worldview has changed. The related problems are the problems of the whole world community. This incident has changed significantly the way how the safety of nuclear power engineering and the responsibility for that safety borne by scientists, engineers, and politicians, are discussed. No reference to the public, economic, or technological expedience or to higher scientific interests can justify the moral and material damage that can be done to human beings and to the environment. The immensely intensified potential impacts of technology will require an entirely new ethical orientation not only regarding behavior rules but also with regard to responsibility and provision as well as to providence and caring for the future.

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