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Method of using sampling in teaching experimental sciences

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Abstract

On the use of sampling and qualitative case study approach; Brickhouse explored three science teachers' insights into the relationship between science and technology and the impact of such insights on classroom practice, and in 1990 tested a similar teacher relationship between understanding the nature of science and classroom practice. During the four months, a minimum of four hours of interviews and thirty-five hours of class observations (taped) were collected for each teacher. Additional data was also collected through tests, classroom exams, and training materials.

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Keywords: training materials, classroom practice, classroom exercises, sampling in teaching, curriculum constraints

1- Introduction

A more comprehensive study by Duchel and Wright in 1989 that included quantitative and qualitative techniques interviewed and observed 13 science teachers in a large urban area. Their results have convincingly shown that the nature and role of scientific theories are not the right components in the set of effects of effective educational decisions of teachers in which the nature of science is not considered as the result of perceived needs of students, auxiliary goals of the curriculum and answers.

In a 1987 study by Liderman and Zilid, which was equally coherent and included 18 high school biology teachers from nine schools. What is important is that the teachers in this study were affiliated with the New York State Department of Biology curriculum, one of the goals of which was to provide an adequate understanding of the nature of science. Applying rigorous disciplinary observations by quantitative and qualitative analysis was just one of the forty-four classroom changes identified (for example, at rest) that were specifically related to the teacher's concepts and perceptions of the nature of science.[1]

In the past, strong influence was used by institutional and educational constraints in the form of visual application as simple assumptions in early research on the nature of science. It is quite reasonable to expect that many factors (curriculum constraints, executive policies, student levels, procurement, etc.) are more influential than the teacher's understanding of science in the educational approach and classroom situation.[2]

2- Model

Complex issues surround the possibility of the teacher influencing the nature of science in classroom practice and solving it. There is research in this area that examines the direct impact of classroom practice and the situation of lack of influence. However, it is fair to say that there is a general consensus among teachers that there is a growing influence on curriculum constraints, executive policies, and teacher translation context training in the concept of classroom practice. The Importance of Student-Teacher Interaction in Conceptual Changes in Science Students' Insights A follow-up study was conducted on 18 high school biology teachers and 409 students. In this study, special attention has been paid to the nature of the interaction between teacher-student and the language used.[3]

What has been hypothesized is that perceptions of the nature of science are likely to be conceptually relevant to students through the use of teachers' language in the subjects they present. In general, when students use general language without competence or quality, students will also tend to adopt a realistic understanding of science. For example, talk about the structure of the atom without emphasizing that it is a model.

This perceptual insight of scientific knowledge as true; And Jude is independent of personal experience, and sometimes a number of scientific objects, such as atoms, new ions, and ions, have a similar ontological status to ordinary objects such as chairs and tables. Finally, when students are careful about using the right quality language correctly and accurately, students tend to understand instrumentalism. The instrumentalist understanding of the scientific benefit of scientific explanations emphasizes the role of ideas and the power to invent the development of scientific and experimental knowledge of the nature of science and the absolute use of structures and models and is in line with current insights into science.[4]

It is noteworthy that in a recent study by Liderman and Mali in 1990, the previous approach to assessing the perceptions of the nature of science as well as previous recommendations (based on research) to improve students' perceptions were considered. 69 students from grades 9 to 12, as a sample, are asked to complete four open-ended questions to assess the empirical and revised understanding of the nature of science. Questionnaires were distributed at the beginning of the academic year and after the exams at the end of the university year. After the students' answers, post-test and pre-test were categorized as absolute representation or experimental insights of a sample.

During the interview, students were asked to clarify the answers to their questionnaire and to provide information about the source of their beliefs and the causal factors of their beliefs for change. Although the answers to the questionnaires showed that the students had an absolute Anga view, while the interview showed that the students were quite clear about their beliefs that scientific knowledge is experimental. The findings are clearly inconsistent with the current knowledge of the majority of Koch students' view that scientific knowledge is an unchangeable fact. Many students are unable to identify the source of their beliefs due to factors that help to expand or change students' perceptions.[5]

Findings from Heron's discussion in which such perceptions are interconnected and conceptually learned. In addition, students have not seen laboratory activities or any scientific activities that are relevant to their scientific insights. The authors conclude that they consider it necessary to use interviews to assess students' understanding of the nature of science. Interestingly, Liedermann, who previously challenged the concept of sufficiency in the scientific literature, is the result of analyzing data reported in previous studies and data collected from 18 biology teachers and 409 high school students.

In summary, this study claims that much of the attention is in the numerical state obtained by students and teachers with a variety of tools used to assess understanding of the nature of science, by constructing an index of beliefs represented by numbers. Is in contradiction. According to Leaderman's example, all teachers have beliefs that are far more acceptable than (which is consistent with today's science insights) students' insights.[6]

This study, like previous studies, included quantitative evaluation in contrast to interviews. Recently, Gallagher (1991) reported on a series of studies on the beliefs of secondary school teachers in full-time and part-time teaching about the philosophy of science and how beliefs influence classroom practice. The dominant role is played by the textbook. A first analysis of science textbooks provides data on how they are treated by secondary students and generally concludes that textbooks pay less attention to history and the spread of scientific ideas, conflict. Among intellectuals, it is characteristic of the history of science and the application of science in the daily lives of students.

Based on textbook recognition for 2 years and 27 high school teachers from five schools in two different areas were tested in an ethnographic study. The data was collected through the supervision of over 1000 science classes and countless formal and informal interviews and conversations with teachers. Twenty-five teachers have a confused view of the nature of science, and their real lessons have never been devoted to talking about the nature of science. The author considers the emphasis of teachers in the classroom on scientific facts due to the lack of education in the fields of history, philosophy or sociology of science. This claim is corroborated by interview data.[7]

Galmer was careful to confirm the subjects of this research by those with at least ten years of teaching experience. Two teachers had extensive experience in the physics project who were clearly incapable of articulating a basic understanding of science as a way of knowing. In summary, the results of the study indicate two major shortcomings in the field of full-time teachers. A: The need to present more about the nature of science B: The need for more experience for how to teach the nature of science. The recent deficiency was discussed by Liderman and Zild (1987)

3- How to use the model

The reviews of the research presented were not necessarily comprehensive, but were an attempt to at least represent the sampling of early experimental literature (quantitative and qualitative) related to teachers 'and students' understanding of the nature of science. Overall, this general area of research includes several specific lines of research that emerged logically and linearly. Although the belief in the importance of students 'understanding of the nature of science began in the 20th century, the assessment of students' understanding did not begin until 1954.

The initial assessment showed that students did not have a sufficient understanding of the nature of science and concluded that science teachers did not make efforts to teach the nature of science. The second line of research focuses on curriculum development, and this assessment was initiated by Gypsy and Coliffer. The result is a two-pronged move in which the same curriculum was effective for one teacher with a specific group of students but not for another teacher with a different group of students. The bottom line was that private science teachers make a difference. It was predictable that the outcome of the research line would focus on teacher evaluation.[8]

What is worrying is that there is no attempt to focus on the behaviors and variables of other tutoring classrooms. Teachers' assessment of understanding has shown that they do not have the desired level of understanding. Because teachers cannot expect to teach purposefully what they do not understand, many researchers focus on developing and evaluating techniques designed to improve teachers' understanding, which is unfortunately the result of such ambiguous efforts and specific variables to enhance understanding of nature. Science remains unknown.

In the research line stated by two conceptual assumptions, the teacher's understanding of the nature of science depends on the student's perceptions, and teachers' behaviors and decisions

are particularly influenced by their perceptions of the nature of science. Identifying these assumptions and the results of general research on teaching depends on re-focusing researchers' attention on testing these assumptions and trying to infer classroom variables related to changes in student perceptions.[9]
Interestingly, Trent (1965) made such a recommendation 20 years ago. As a result of this research, it has been shown that important variables that affect students' beliefs about the nature of science include special educational behaviors, activities, and Decisions are made in the context of a lesson. This shows that my constant emphasis on high-level thinking, problem-solving, research-based learning, and a high level of repetitive jumping in a risk-free supportive environment is at least related to desirable changes in students' perceptions. This debate is still surrounded by topics such as the following: Is teacher understanding directly related to development, or is it related to the display of these variables or another aspect of classroom practice? It seems clear that the concern of science educators should extend well beyond teachers' understanding of the nature of science. Like people who translate these understandings into classroom exercises and are actually mediators of a complex set of situational variables. What is very important is that having valid perceptions of science is not necessarily the result of demonstrating those teaching approaches that aim to improve students' understanding.
As a result of the lines of research reviewed, science teachers appear in the form of a balanced approach to the existing problem. That is, we are still concerned about students' perceptions, teachers' perceptions, and classroom variables related to changes in students' perceptions. This indicates that each of these lines of research is a larger piece of a puzzle. This shows that this obvious identification of what teachers can not teach they have not been able to understand and in fact does not have the desired knowledge to ensure an effective relationship with students. In addition, our interest in students' perceptions is in the context of structural epistemology. In this approach, what is unavoidable is related to special classroom activities and educational upgrades.[10]
In the early years of 1950-1983, research in this area was characterized by the relevant relative research lines. These research lines were parallel. But it has emerged in the form of little communication or the construction of ideas through a variety of research issues, and instead, researchers work on almost the entire puzzle rather than focusing on the piece. As a field of research on students and the perceptions of science teachers, it was often disordered, as opposed to being cohesive and progressive.
Without awareness, the future may not be as fruitful as it appears. With the growing acceptance of qualitative research methods, there is less reason to rely on pencil and paper evaluations (at least in the convergent species) of teachers 'and students' perceptions. The recent publication of qualitative techniques in research on the nature of science allows the researcher to disregard the problems posed by limiting answers in the form of a set of combinations and deductive points of view. As a result of recent research, it also allows us to identify the greater diversity and complexity of students' perceptions. In addition, convincing evidence of reliance traps is entirely present in the recent convergent evaluation approach. It also does not contradict the results of previous quantitative approaches and provides in-depth and valid assessments of teachers 'and students' perceptions, as well as providing more contextual insight into the educational sequence of mediators of individual perceptions. For example, the importance of teacher education intentions and students' perceptions of classroom characteristics in exploring the nature of science has not been explicitly considered. It is not enough to simply observe the results and the teachers without the tendencies and intentions of the teacher and the reason for the educational decisions.[9,10]

4- Conclusion

Throughout the history of science about teachers 'and students' perceptions of the nature of science, teachers are first criticized and then students are criticized for their insignificance of insufficient perceptions. For example, both groups have been blamed for not understanding that scientific knowledge is necessarily experimental. Optimal perceptions of science are generally inferred from national organizations. However, a very hasty review of the conceptualization of science varies among different disciplines. For example, how does a biologist construct a causal relationship, and also how does he see the science of teleology, which is particularly different from the vision of a physicist. In addition, when one looks at the differences between Popper, Cohen, Lakatos, Fernid, Laudan, and Kasir, it becomes clear that an exceptional phenomenon of the nature of science has not been proposed, and that the nature of experimental science is nothing more than scientific knowledge itself. . Some may argue that the mere existence of competing approaches is not evidence of experimentation. Certainly the nature of science has a development-oriented approach that obviously each of the mentioned writers has benefited from a little of the explained work.

However, this situation does not differ from the influence of Darwin's work and the theory of natural selection on the emergence of point equilibrium theory. The theory of evolution has changed as our view of the nature of science has changed and will change. For more information and documentation on how the nature of science changes, refer the reader to House (1991). The critical point is that we should not make the same mistake of criticizing our teachers and students. Let us not try to impose a particular view of science on students and teachers, even though it is very conscious and unchangeable. Finally, the influence of Schulman (1986) on the knowledge of educational content is very specific and extensive. For the science teacher, teacher knowledge is one of the syntactic aspects that is highly emphasized as part of building an understanding of the concept of the nature of science. Criticism of the teacher knowledge model, which includes knowledge of educational content, implies that the main subject of knowledge directly affects the teacher's educational approach. This assumption seems very familiar and is not entirely accepted. As mentioned earlier, there is general agreement among researchers about the impact of science on teacher perceptions of classroom exercises through a complex set of mediating factors.

Let me not ignore three decades of research, and research on teachers 'and students' perceptions of the nature of science can and should inform research on educational content knowledge. In particular, research on teachers' perceptions indicates that teachers as a group have a wide variety of perceptions of different levels of logical stability and complexity. An additional factor dealing with a person's translation of the concept of the nature of science in classroom practice is probably the relative complexity of the concept. Does a very simple understanding of the nature of science or very simple knowledge structures easily affect education? This question is related to researchers in the field of nature science as well as researchers of educational content knowledge. This should be considered in future research in both areas of research. Let us not focus solely on one educational variable or teacher trait in an effort to improve science education. We have learned about the shortcomings of such an approach from the production of effective education research. Unfortunately or fortunately, the complexity of a person's understanding of the nature of science is yet another factor related to the known specific variables of the class.

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