A Study of Challenges in Socio-Scientific Towards Teaching

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ABSTRACT:

Socio-scientific Issues (SSI) are representations in social aspects of important social questions related to science. There were societal concerns, particularly moral, political, social and economic, although there were numerous scientific knowledge and investigative practises. In general, the scientific education community supports the promotion of scientific literacy, but there is a debate about what scientific literacy means. The term "scientific literacy" refers to science's context and its role in the changing world. This study promotes an understanding of scientific literacy that involves negotiating socio-scientific issues. It requires the ability to make socio-scientific decisions. Sociological and ethical implications are socio-scientific issues; therefore, the promotion of scientific literacy requires careful consideration of the moral and ethical implications of sociological issues. Therefore, SSI research and negotiation require science concepts and processes to be integrated into social constructs and practises.

KEYWORDS: Socio-scientific, political, social, economic, scientific education,

INTRODUCTION

Socio-scientific tasks ensure that people reflect on the impact of science in society and improve their decision-making and investigative skills. For this reason, it is necessary to encourage school children through science and technology lessons to be informed about the above-mentioned developments and to think about such matters and to engage in discussions in the classroom. For every student, scientific literacy is important. Most students are not going to become professional scientists. They need to be able to use scientific processes and habits to solve everyday problems and to face science-related issues and make informed decisions. Students must be able to consider and solve controversial science and social issues criteria. Students learn to be active and informed participants of society through socio-scientific issues. Students must learn strategies to prepare themselves for this rapidly changing world. The role of science educators is to show students how to think as socially concerned scientists. An effective scientific instruction helps build strong societies consisting of individuals who know their present and future. In science classrooms, socio scientific issues can be used for the following purposes:

❖ to provide rich contexts that support important scientific content exploration,

❖ To help students understand the connection between science and their lives, and

❖ To generate interest and motivation among students in science.

Socio-scientific education is an active approach to learning that places scientific content in a social context which provides motivation and the student's own learning skills. Many researchers today believe modern scientific literacy can be achieved through socio-scientific questions and advocate the fact that socio-scientific issues are essential ingredients for modern classrooms in science and technology. Therefore, it is necessary to inform, channel school children into learning, and to ensure that they discuss socio-scientific issues. Unless students are taught about it, students will ignore the influence of science and technology on social life. It is the responsibility of teachers to remove these constraints, help students to prepare for life and to guide them. Acquiring the desired results by applying socio-scientific questions to science and technology, generating an effective teaching-learning process, being able to reflect what has been learned in practise and being able to reflect the teaching process can only be achieved by determining a teacher's perception of their skills in using social education. Within this scope of study, it aims to explore the views of candidates in science and classroom teaching on socio-scientific issues and their skills in using socio-scientific questions in science and technology education. The socio-scientific topics offer a way to explore the nature of science, connect students and science literacy, the interdependence of the movement of science and society and democratic science. Students are complex in deciding socio-scientific issues and assessing inconsistent scientific information and in emphasizing personal experiences and values. "Curricula relating to social, tentative and empirical aspects of science, Sadler suggested, would be particularly useful for students as they deal with socio-scientific questions."

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REVIEW OF LITERATURE

Boujaoude, et al (2021) examined the world view on evolution of secondary professors and university professors in biology and highlighted the gender gap in science, technology, engineering, and mathematical science because of its impact on the digital society and its sustainable development goals, fourth and fifth, in pursuit of qualitative training and gender equality. According to recent studies, women are less involved than men in studies and are more likely to quit their occupations or take leave of absence. In this scenario, the participation of educational institutions is crucial to changing this trend. The University School of Engineering (ETSE-UV) initiated a pilot initiative to support and encourage the group's career. Based on this expertise in the field of women, families and teachers, the Girls Initiative was established. This thesis presents and motivates the main objectives and actions of the project to the current state of the art literature. The pilot programme contains preliminary findings, which show a significant statistical impact on the percentage of women studying for and motivating the later Girls initiative.

R. Vilanova et al (2021) said his thesis offers web-based software to teach engineering help to students without data scientists. The objective of this application is to analyse the pupils' performance in terms of visible results and studies. It uses only the elements that the university authorities routinely collect from students, graduates and disciplines. The web-based tool provides access to results from a number of analyses. Clustering and viewing student data in a small way helps an analyst find trends. The coordinated representation of aggregated students in histograms, which are automatically updated in individual filters defined interactively by an analyst, is to help confirm assumptions about students in a collection. To understand the degree of dependence of student behaviour, classification is used for students who have previously completed three levels using exploratory factors and early data. Analyzing the impact on the probability of graduation of the student's explaining variables could lead to a better understanding of the cause of the drop-out. A preliminary analysis of data from the engineering students of the universities involved in the project defined the final implementation of the Web-based app. In case of a greater accuracy, preliminary findings for classification and drop were acceptable. The usefulness of the device is investigated in relation to the stated goals and shows its potential to promote early student profiling. The evidence from engineering degrees of EU higher education institutions shows the potential of a high-school management instrument to verify its application in real-life situations.

M. M. A. Almaya; M. M. A. Al-Rahmi et al. (2021) aims to alleviate the dividing gap between the literature on social networking applications (SNAs) and its implications for student happiness and performance on sustainable education and task technology (TTF). While studies have examined the use of SNAs in multiple contexts, TTF and the compatibility of mediating variables in education sustainable development have not been investigated in accordance with the TAM model and constructivism theory. This study included a total of students and researchers from the public university. We examined students' impression with the structural equation modelling (SEM) technique (SNAs). Based on the results, the (SNAs) use of cooperation and commitment in higher education for sustainable development, as well as TTF and TTF, significantly affected the student's learning performance to assess the sustainability of education. Finally, the role of TTF and compatibility have a positive impact on sustainable development performance in education, as well as mediating collaboration and commitment partnerships such as sustainable higher education, student satisfaction with the use (SNAs) and performance in education sustainability. Their impact on higher education institutions should therefore be supported in the processes of learning.

(Tomas, Ritchie, & Tones; Zeidler et al., (2021), suggested by Hofstein et al. Students do not find science relevant to their everyday lives, as school science does not address the usefulness of science in their everyday lives. Feinstein stated that science in schools is not in line with the everyday life of students. As a result, students gradually stop being involved in science and become disillusioned with science and do not choose it for their future lives.

CHARACTERIZATION OF EXPRESSIONS

Socio-Scientific Issues (SSI): SSI is defined as unending, often controversial dilemmas that are not used to resolve such issues through definitive answers and informal processes of reasoning. Scientific and Social Reasoning (SSR): It is defined as practical aspects of SSI negotiation and resolution. It includes an understanding and ability, such as an awareness of the complex nature of SSI and the analysis of SSI from multiple perspectives. Preservation Science teacher is a key element in promoting the nature of science for students and developing ethical skills to confront new knowledge or science products with social involvement. Preservatory science teachers need to develop their own conception of socio-scientific teaching, which helps their students to meet real science. As responsibility, they must ensure that students discuss explicitly how the characteristics of the science relate to the characteristics of science study. Preservation teachers will have to think about how this knowledge can be used to teach science. The aim of this study is to develop conservation teachers who promote the introduction in the classroom of socio-scientific issues.

FIGURE 1: EXPRESSIONS OF SOCIO SCIENTIFIC ISSUES

A conception of how science and social issues can be incorporated into classrooms is employed and describes the historical development of the structure and groups in two visions of the different perspectives on scientific literacy. Vision I: Scientific literacy includes a strictly scientific understanding of scientific processes, practises and basic principles. On the other hand, Vision II takes other contexts into account — real-life situations of a scientific nature but influenced by others, such as social, political and ethical issues. This view focuses on decision-making and the negotiation of scientific questions for all citizens, not just scientists. Scientific literacy in Vision II complies with the Science standards of the next generation, in particular in scientific practises such as data analysis and interpretation, the use of evidence to participate in argumentation, and the collection, assessment and communication of information. Socio-scientific (SSI) issues, open-ended social issues with substantive science-based links (e.g., climate change, gene therapy, nuclear energy), constitute the kind of situations many people are challenged to practise scientific literacy.

The use of these issues in formal science education therefore provides an ideal approach for promoting scientific literacy vision II. By providing SSI as a background for students to study science, students can become aware of the interaction between social, political and scientific perspectives, learning important scientific content and practises such as argumentation, argumentation and decision-making. The book, Socio-Science Issues in the Classroom: teaching, learning and research, features examples of classroom SSI research, especially focused on the nature of SSI interventions and their implications for SSI teaching and learning. The nine studies included various types of SSIs (including climatic change, environmental issues and biology determinism), the duration of the intervention (from short units to long projects) and analytical approaches to research (including pre/post-tests, case studies, mixed projects) in the study in the study. These studies together represent a broad range of SSI-based instructions in K-16 settings. By examining the instruction and research findings that have arisen in these empirically based studies, we have developed an SSI-based instruction framework. This framework identifies key characteristics of SSI teaching and learning. The framework that we are promoting is not a fixed model with a simple list of procedures to follow. It offers flexible guidelines for practitioners, curriculum designers, administrators and researchers to conceptualize the fundamental components and complexities of successful SSI education and learning. This article aims to present and describe this SSI instructional framework and discuss important considerations with a view to implementing the SSI-based instruction. We present the framework, the features required and the subcomponents of each feature in the following section. The key and recommended components of the framework are described in Figure 1 and throughout the paper literature supporting the use of these components is cited.

EDUCATIONAL SYSTEM PROVIDED TO STUDENTS

For example, technological tools can help students connect evidence to claims while they are working towards more advanced forms of argument. Scaffolds can also be structured activities that support the student's analysis of several perspectives while working to identify their own positions on a controversial issue. These are just two of the much information on the matter. The other element is the use of technology to support learning for students.

Technology can be used in various ways to improve SSI-based education and can be a powerful tool for accessing relevant social issues. In addition, technology can be used for networking in different locations with either other students or experts. Students and teachers can naturally use technology to access a wide variety of media. All learners need the opportunity to engage in activities to promote one or more of the best practises in the field of reasoning, argument, decision making, and position taking to undergo effective SSI-based instruction. For example, students can be assigned to groups that view climate change differently when learners learn about climate change. Students could then investigate evidence that supports their perspective and present it to the other group. Students could use evidence to support their claims and offer refutation against the evidence presented by the opponent group to engage in arguments.

After evidence for both sides has been submitted, students should be able to choose the side based on the arguments. When students conduct research and hear arguments against each other, they are also learning scientific content (second essential learner experience). Students may be subject to the carbon cycle, water cycle or greenhouse effect in the case of climate change. To help them develop their arguments, students can investigate individually or analyse existing data sources (third essential learner experience). For example, students can collect their own data from greenhouse models or they can use publicly available databases to analyse atmospheric data accessible databases.

FIGURE 2: EDUCATIONAL SYSTEM PROVIDED TO STUDENTS

The final learner experience involves negotiating the SSI's social dimensions. In the case of climate change, the economic and political aspects of issues and policies to address this problem can be examined by students. The objective is not necessarily to bring together all students to be experts in economics and politics, but to help students understand the economic and political contexts that shape the question significantly and interact with science (or interpretation of science). Further learning experience is also recommended in the SSI framework. As with the first core aspect (design elements), we distinguish between the four necessary experiences (described above) and experiences that are recommended but not absolutely necessary. · Tackling the ethical dimensions of the problem. Considering the nature of science (NOS) themes related to the subject. Appropriate learning experience is the understanding of the ethical dimension and the NOS themes associated with SSI, because both aspects may not be present for all SSI-based training. In addition, when discussing an ethical issue, tensions could arise. However, it may be appropriate to discuss the ethical and NOS elements of the problem in the case of climate change. For instance, students can discuss the extent to which people have a moral obligation to care for the world in exploring climate change. In conducting research on climate change, the subjectivity and tentativity of science along with sociocultural impacts on science are inevitably confronted by researchers. This could provide educators with ideal opportunities to encourage students to think about NOS subjects.

One of the main attributes of teachers is their familiarity with the content of science and social issues of the SSI they organize education. Teachers need to understand the underlying content knowledge in order to teach science in the context of an issue. For example, teachers should understand the scientific concepts of solar radiation and the greenhouse effect in order to teach an SSI-based lesson on tropical deforestation. However, successful SSI training also depends on teacher awareness of social considerations. The economic impact of removing or not removing forests must be understood in order to help students reach decisions regarding deforestation. While we require a level of scientific content expertise, we do not suggest comparable expertise with all social aspects of a given SSI.

It is important for teachers to be aware of potential political, economic or ethical challenges, but it is unworkable to obtain the same level of expertise in the social dimensions of problems, in order to successfully implement SSI-based instruction. Because SSI often involves cutting-edge science and always includes elements of uncertainty, SSI-based education requires that teachers learn with their students (second essential teacher attribute). The teacher should know and be aware of the problem to help students learn to learn new information and understanding, but teachers should not be expected to know all about the problem. Teachers certainly contribute to ideas and knowledge that have been built in the classroom (as do students), but successful teachers of SSI are not the sole authority in the classroom. SSI-based instruction is built around open problem inherently, so it is difficult to predict exactly what instructions SSI-related classroom discourse will take. This necessarily makes classrooms with SSI more uncertain than classrooms.

SOCIO SCIENTIFIC DOMAIN AND CURRICULAM

Moreover, due to the controversies in many of these issues, many reforms to science curricula have avoided such explicit attention to these issues; this has led "invariably to academic abstraction and contextualization of the science content found in the culture of conventional school science." Thus, "teachers deal only with socio-scientific fields in limited contexts, such as genetics, personal health or environmental issues." Therefore, SSI teaching must be explicitly considered in context, including ethical, societal, religious and other aspects, to address more effectively the humanistic dimensions of science in many SSIs. Many authors and researchers have therefore emphasized that all curriculum reforms that take SSI into account should explore teachers' views, such as their ethical, cultural, social and teaching value. Based on this assumption, science teachers are a significant factor in transforming and implementing SSI reforms into real and genuine practises. No real curriculum reforms designed around SSI would succeed without real investigation of their perspectives and teaching strategies on these issues.

In this regard, many research studies have reported among science teachers different views and teaching practises of SSI. These and other studies have shown various directions that illustrate the views and teaching practises of different teachers on these issues. However, the study focuses on some main aspects including an overall understanding of the views of Saudi science teachers and the factors that influence such views. This study also examined views of Saudi science teachers on certain issues reported in the literature and by certain teachers. In addition, some of the teaching strategies used by science teachers are discussed when teaching these issues. The views of SSI science teachers are diverse and contain various interpretations and directions. This study focused more on the reasons behind the views of SSI science teachers. For example, different studies from various settings have revealed different views on these questions and the reasons behind such views. This study therefore reviews some studies which provided reasons for the views of SSI science teachers and teaching strategies in different contexts. These studies and others are discussed in detail to show how the views and teaching of many SSIs influence science teachers.

CONCLUSION

Views of SSI inclusion were not a preferred perspective indicator. An impressive 78% of teachers were willing to add these topics when they were joined by opposing sides but just fewer than half (38.7%) showed a preference for the scientific point of view. A majority (50.5%) was willing to include evolution, but the preferred view was divided fairly evenly between those who supported the evolution of science and those who preferred to include alternative perspectives. Stem cell research showed similar results, with 58,6% willing to include both sides, and 38,7% willing to look equally at embryo rights and benefits. Climate change was supported most impressively with 78.3% ready to address the issue, and 55.7% preferred to take a view on climate change. The overall results are summarised. Demographic information was not a sign that SSI was ready to be included in the curriculum but rather an indication of the preferred perspective. There has been a relationship between political ideology and SSI inclusion in the school curriculum, whereby conservatives are less likely to support inclusion of climate change in the curriculum. Although all the other groups were prepared to include SSI in the curriculum, the rural groups, the evangelists, the weekly church participants, republicans and the conservatives all held below views. For evangelicals and rural people, these differences were not significant when views of climate change were isolated. In several cases, the views expressed by the above groups revealed a preference for the inclusion of alternative perspectives.

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