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Harjeet Kaur
GHG College of Education, Raikot, Ludhiana, Punjab, India

Corresponding Author:
Harjeet Kaur
GHG College of Education, Raikot, Ludhiana, Punjab, India

Factors influencing student interest in science: A peep into literature

Harjeet Kaur

Abstract
Student interest in science is pivotal for fostering future scientists and enhancing public scientific literacy. Despite the relevance of science in daily life, many students perceive it as disconnected from their future, leading to disengagement. This review explores factors influencing students' interest in science, emphasizing inquiry-based learning, real-world applications, and the role of family and social interactions. It highlights the importance of supportive educational environments, industry-school collaborations, and role models in science fields. By examining the literature on pedagogical approaches and external influences, this study aims to identify strategies to sustain and enhance student interest in science, ensuring a steady pipeline of scientifically literate individuals.

Keywords: Student interest, science education, inquiry-based learning, real-world applications, industry-school collaboration, pedagogical approaches, scientific literacy

Introduction
Experiences suggest that many students believe science has little relevance to their life, despite the fact that science is supposed to be influencing and changing our lives on a regular basis. Even when teachers try their best to share articles on current science and give real-world examples in the classroom, students still ask why and how this is important to learn.
Educators and governments around the world are concerned about the fall in senior science enrolment that has occurred in recent decades, given the widespread conviction that sciences abilities are crucial to economic success. Researching the turning point at which kids decide not to pursue science when given the opportunity in school is essential to preserving and expanding the pool of future scientists and raising public scientific literacy. When given regular opportunities to engage with the topic and are placed in a supportive setting, students are more likely to like science. Science is essential to modern society because it produces new information, technology, and answers to urgent global issues (Goodrum, Druhan, & Abbs, 2012; Tytler, 2007) [6,]. But in high school, a lot of students lose interest in science and start to believe it's pointless and boring (Goodrum, Hackling, & Rennie, 2001) [6]. Most students who are given the opportunity to select their final year courses opt out of science in favor of other disciplines from the vast array of possibilities during their final two years of education (Kennedy, Lyons, & Quinn, 2014; Lyons & Quinn, 2010, 2015) [8, 11]. Since the courses that teenagers choose to take have an impact on their future career routes, science education in the later years of school is essential to the flow of scientifically qualified individuals needed for our modern society (Thomson, 2005, Warton & Cooney 1997) [20, 23]. Senior science studies opens doors to future scientific jobs and the scientific workforce required for economic and social advances (DeBoer, 2000; Woods-McConney, Oliver, McConney, Schibeci, & Maor, 2014) [4, 24]. The purpose of this study is to investigate the elements that motivate students to continue their science studies.

Problem description
Students in my middle school science classrooms often tell me that the material doesn't really apply to them or their futures, so they take a detached approach to studying. At our school, units are inquiry-based and begin with a phenomenon. The lessons that follow are designed to help students answer a central, overarching question through lab research.

According to research on science education, inquiry-based science students are able to think beyond the box and build deeper understanding through the application of science to real-world circumstances. It depresses me when children think the knowledge, they are learning is meaningless, so it is important to show them how science is used in practical settings.

Literature Review

According to earlier research, using situational curiosity can be a good method to get students interested in the classroom (Palmer *et al*., 2017) [16]. Experts advise adjusting the curriculum and improving both formal and informal learning activities to give students engaging and personally meaningful experiences in the setting of school science and technology. Additionally, they have emphasized the significance of industry-school collaboration (Reinhold *et al*., 2018) [18]. The factors influencing students' decisions to continue with science in school or not have been the subject of much research (Ainley, Kos, & Nicholas, 2008; Henriksen, 2015; Lyons & Quinn, 2010, Regan & DeWitt, 2015) [11]. The choice to pursue science in school is frequently attributed to a number of factors, including students' involvement in prior science classes, their opinions of the subject's value, socioeconomic considerations, gender preferences for science courses, and the general decline in the popularity of science as a subject.

It is widely agreed that two essential strategies are providing teachers with instructional tools to utilize in school-industry cooperation activities and encouraging students to engage with role models in sciences fields. The instructors indicated the need for more support in applying background and career information, along with more opportunities to connect with potential business partners. Similarly, recent studies demonstrate the need for interventions that explicitly support students in developing their interest in science and in gaining more precise understanding about sciences careers (van den Hurk *et al*., 2019) [22].

These findings highlight the importance of the assistance given to teachers in carrying out collaborative school-industry projects.

Scientists, who study science education, have spent the last 20 years examining why students' interest in the topic declines from elementary school through high school graduation and beyond. Bennett *et al*. (2013) [1]; Lykkegaard & Ulriksen (2019) [10]. Reinhold *et al*. (2018) [18] investigated the reasons behind the low number of sciences graduates in their scientific investigation. The researchers presented evidence that school-related factors play a significant role in predicting students' interest in science fields and their aspirations for their careers. They focused on the ways that secondary education influenced students' interest in sciences-related occupations. Twenty-eight US-based studies were reviewed. Regarding opportunities for career exploration, Kudenko *et al*. (2017) [9] examined existing initiatives aimed at persuading students to choose careers in science disciplines. Quantitative and qualitative data on 79 school-industry programs across 14 EU member states and EU partner countries were collected. The findings demonstrated that the majority of these initiatives were one-time affairs or short-term projects with minimal support from corporate representatives and discussions regarding sciences careers. Teachers say that the majority of students were unable to draw the connection between science courses taken in the classroom and real-world applications, and only a small percentage of students had a firm understanding of sciences careers.

The findings indicated that in the absence of organized career exploration support from advisers and specific information about professional paths, students were prompted to "go for breadth," choosing a variety of subjects from the humanities, arts, and sciences to keep their options open. Additionally, the findings showed that sciences education that places an emphasis on real-world applications, presents science topics that are applicable to everyday life, connects students with practicing scientists, and incorporates extracurricular sciences activities is more likely to strengthen students' sciences orientation.

The longitudinal study by Blustein *et al*. (2013) [2], which aimed to persuade high school students to consider sciences jobs as viable options, produced findings similar to these. The kids participated in two weeks of summer sciences/career development program; during the next eighteen months, they were interviewed twice. It was shown that the summer program improved students' science comprehension, topic knowledge, and desire to work in sciences fields.

Pedagogies of Science in the Classroom

The students may confront their own misconceptions since their scientific knowledge is founded on knowledge received via the scientific method and they find answers through independent material research. It is the teacher's responsibility to assist this discovery through inquiry-based learning. Conceptual change models operate under the assumption that students enter the classroom with preconceived conceptions about science and that they must investigate and rationalize opposing examples in order to embrace the perspectives of modern science (Cakir, 2008) [3]. The term "inquiry," which is frequently used in science-based education, originates from the learning paradigm known as constructivism (Minner, Levy, & Century, 2009) [13]. The teacher facilitates learning under the student-centered paradigm, which prioritizes inquiry over rote memorization. According to Taraban *et al*. (2006), the objective of this strategy is to foster critical thinking and problem-solving abilities in students by including them in hands-on activities that involve experimentation, data analysis, and explanation of findings. Instead of emphasizing discrete facts, questions or concerns are put forth initially and used as the foundation for subsequent research. At its foundation, constructivism is an educational philosophy that emphasizes identifying existing previous knowledge and applying it to inform conceptual change (Cakir, 2008) [3]. Because misconceptions are often the result of students' experiences and impressions of the world, which foster a deep intellectual and emotional attachment, this can be extremely challenging (Posner, Strike, Hewson, & Gertzog, 1982) [17]. The conventional approach is called the teacher-centered instructional paradigm, and it proposes that the instructor is the only one who disseminates knowledge in the classroom. This style emphasizes memorizing of vocabulary and facts taught through lectures, with assessments usually centered on the ability to repeat the material. When learning is centered on content mastery and treats science as a static body of information built on defined techniques, little to no critical thinking and problem-solving skills are developed.

Cakir (2008) [3] argues that teachers have to become familiar with their students' views and then apply a strategy to change them. Vital to this is a classroom environment where students are able to suggest ideas without fear of be criticized for wrong answers. O'Loughlin (1992) [14] defines it as teachers who emphasize connections between concepts and experimental evidence and not just reciting facts. An idea that corresponds to two distinct approaches to instruction: Teacher-centered instruction vs student-centered instruction.

Influence of Family and relatives

The number of references students made to their family members revealed the subtheme of family as a source of motivation and inspiration. In surveys and interviews, students said that their families support them in becoming science experts. First, a great deal of students stated that their parents had inspired or had an influence on their decision to pursue science-related activities. If a parent is a scientist, it might encourage the student to pursue science as a career. Some students contend that their science majors were imposed upon them. Older siblings act as role models for their younger siblings and frequently inspire them to pursue scientific endeavors.

Grandparents

Furthermore, grandparents influence their grandchildren's decisions by using the sciences to inspire them.

The students' references to their friends as a significant influence on their engagement, enthusiasm, and drive for a career in science give rise to the subtheme of friends. Friendship encouraged participation in activities and served as an inspiration.

Research Projects

Students love working on science projects related to solitary activities, like Science Olympiad, with friends and peers.

Impact of Social Interactions

As said before, inquiry-based scientific education encourages students to work like scientists by giving them practical assignments and encouraging them to collect data. Scientists in the scientific community participate in significant social contacts in addition to publishing research, conversing, exchanging data, and defending study conclusions (Ellwood & Abrams, 2017) [5]. Inquiry-based science classrooms typically involve group collaboration, with discussions taking place as students do experiments, evaluate data, and prepare lab presentations. Research indicates that social ties with peers can impact students' motivation and engagement with science, which can impact their particular interests (Yang, 2016; Ellwood & Abrams, 2017) [5, 25].

Influence of Student's own though process

Since students are becoming disinterested in scientific lectures, many student-centered techniques have been utilized to spark their interest in the subject matter, such as using themes that are relevant to them, inquiry-based learning, and discussion-based learning. However, these approaches' efficacy was usually evaluated in small-scale research, thus there isn't enough large-scale evidence to back up student-centered approaches in routine practice. The results imply that inquiry-based teaching strategies can affect students' perceptions of science. Guzey, Moore, Harwell, and Moreno (2016) [7] investigated how students' attitudes and learning were impacted by engineering design-based science. According to the students who were interviewed, real-world application is the capacity to imbue the examples they met in the course with personal meaning. They also indicated that the science problems that most interested them were those that had a personal connection.

Influence of sciences as a career

Inquiry-based science teaching for middle school students may inspire them to pursue jobs in the sciences, as per a study by Gibson and Chase (2002). According to the results, children who attended the camps demonstrated a higher interest. The studies demonstrate the great potential that inquiry-based science education has for students' interest in the sciences as a possible career route. According to Tofel-Grehl *et al*. (2017) [21], a key factor in determining students' perseverance in their studies is their level of interest. Interest is a significant predictor of major choice in addition to influencing academic achievement.

Students' Interest Towards Science

A common theme in the literature is the seeming disparity between students' perceptions of science in general and classroom science in particular (Osborne, Simon & Collins, 2003) [15]. In a 1993 study, Ebenezer and Zoller found that, among 1564 students in Grade 10, 72% believed science was useful and 73% believed scientific education was essential, yet 40% thought science lectures were boring. The report highlights this disparity. Relevance is an important factor in increasing students' interest in science, according to Osborne, Simon, and Collins (2003) [15].

Summary

This review of the literature shows how a variety of factors influence how science is perceived by students. A particular emphasis was placed on science pedagogies in the classroom and their impact on students' attitudes toward science, as well as other factors that influence science interest. Inquiry-based science increases students' views about science, willingness to pursue sciences as a career, and social connections, all of which contribute to improved motivation and engagement with science, according to research from the former. Research suggests that students find relevance to be important when it comes to the factors influencing their interest in science, and that their interest in studying science increases when they feel a connection to the topic matter. By investigating how the learning structure/approach affects students' connections to information and what, if anything, the students continuously look at ways to enhance students' interest and, subsequently, achievement in science.

Conclusion

This review underscores the multifaceted factors influencing student interest in science, highlighting the critical role of inquiry-based learning and real-world applications in engaging students. Supportive educational environments, strong family and social influences, and effective industry-school collaborations are essential in fostering a sustained interest in science. By integrating these elements, educators can enhance students' perception of science as relevant and exciting, ultimately contributing to a scientifically literate society and a robust pipeline of future scientists.

Implementing these strategies is crucial for addressing the decline in science enrollment and ensuring economic and social advancements through scientific innovation

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