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Student's perception and interest in physics, causes and intervention: A case Study of Bonny Island, Rivers State, Nigeria

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Abstract

This study examined student's perception and interest in Physics, the causes of declining interest, and possible interventions in Bonny Island. A descriptive survey research design was adopted for the study. Data were collected using a structured questionnaire administered to 108 senior secondary school students and 57 Physics and science teachers selected from both public and private secondary schools in Bonny Island. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). The findings revealed mixed perceptions of Physics among students. While a majority of the respondents (64.8%) perceived Physics as very useful to everyday life and societal development, a significant proportion (40.7%) regarded the subject as difficult to understand. These perceptions were found to influence students' interest and willingness to study Physics at the senior secondary school level. Further results indicated that inadequate laboratory equipment was the major factor contributing to the declining interest in Physics, as reported by 44.4% of the respondents. Other contributing factors include students' poor background in Mathematics, which affects their understanding of fundamental Physics concepts. To address the identified challenges, the study recommended several intervention strategies, including increased hands-on laboratory activities, after-school remedial Physics classes, career seminars facilitated by practicing physicists and engineers, and regular teacher training to improve instructional methods. The study concludes that improving learning resources and adopting learner-centered teaching approaches are essential for enhancing students interest and participation in Physics in secondary schools in Bonny Island.

Keywords: Bonny Island; Survey; Questionnaire; Innovative; SPSS; Laboratory

1. Introduction

Physics as we know is one of the fundamental science subjects and a foundational science for technological progress, engineering innovation, and scientific research. Physics provides the basic understanding to natural phenomena and supports key fields such as engineering, medicine, telecoms, energy and environmental sciences. As a result, Physics is central to science education curriculums around the world, including Nigeria. Yet students' understandings and interest in Physics remain a major concern of educators, researchers, and policy-makers, particularly in developing countries (Adeyemo, 2010; Orji, 2014).

In Nigeria, Physics is a compulsory subject for students who intend to pursue science-based courses at the tertiary level. But, statistics from secondary school enrollment records and testing performance indicate that students' interest and achievement in Physics have decreased dramatically, especially relative to other sciences such as Biology and Chemistry (WAEC, 2021). This trend has also been attributed to a negative view of Physics as complicated, abstract, and

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mathematically demanding subject. These perceptions often result to low enrollment, poor performance and even the rejection of Physics-related careers (Bamidele and Oloyede, 2013).

Students' perception is very crucial in their interest, motivation, and learning. Perception refers to students' beliefs, attitudes, and feelings about a subject which are influenced by their personal experience, instruction, curriculum design, and socio-cultural factors (Bandura, 1997). Once student sees Physics as irrelevant to their lives, they lose interest. Conversely, positive perception increases engagement, curiosity, and sustained interest in learning Physics (Osborne, Simon and Collins, 2003).

Interest, by contrast, is a psychological state where attention is drawn to the subject, increase mental abilities and positive emotional connection with the subject (Hidi and Renninger, 2006). Student interest in Physics is essential to successful learning because it encourages active participation, persistence in solving problems, and commitment to their studies over time. Unfortunately, most Nigerian students lack interest in Physics, and this leads to an apathy in the classroom, failure to do tasks related to Physics, and poor academic performance (Erinosho, 2013).

Several reasons have been identified why students have had a negative perception and low interest in Physics. These include teacher-related factors such as lack of practical activity, overdependence on lecture-based method, lack of instructional tools, (Okoronka and Wada, 2014). Student related factors include poor mathematics background, fear of failure, and lack of self-believe. Furthermore, curriculum problems such as over-complexity of content, abstract concepts, and limited linkage to real-world applications further discourage students (Ogunleye, 2002).

Our learning environment also has a significant impact on the student's understanding and interest in Physics. Many Nigerian schools lack well-equipped laboratories, modern teaching methods, and supportive learning environments. This makes it difficult for teachers to show abstract concepts in the form of experiments and practical practice, further extending the view of Physics as theoretical and difficult (Aina, 2013). More social factors, such as parental influence, peer pressure, and society stereotypes that portray Physics as a skillful subject for a gifted student also contribute to a lack of interest in the whole curriculum, especially in the case of females (Kola, 2012).

In the context of Bonny Island, Rivers State, these challenges are particularly significant. Bonny Island is an important industrial and economic center because of oil and gas industry which rely on Physics knowledge and skills. Ironically, even in such an industrial context, there is some evidence that on the Island many secondary school students are not particularly interested in Physics. This paradox may be influenced by factors such as limited exposure to practical Physics applications and poor collaboration between schools and industry. Due to these challenges, there is need for effective strategies to improve students' understanding and interest in Physics.

2. Material and Methods

2.1. Objective of the Study

The aim of this study is to investigate students perception and interest in Physics, the causes of weak interest, and possible intervention strategies for improving Physics learning in secondary schools in Bonny Island, Rivers State, Nigeria. The specific objectives of this study are to

- Examine the factors contributing to the declining interest in Physics studies among secondary school students in Bonny Island
- Examine how students perceive Physics as a subject and how it influences their subject choice
- Examine the impact of decline interest in physics across three domains (Innovation, Research, and economic development)
- Make recommendation on how to reactivate interest in Physics in Bonny Island.

2.2. The Study Area

Bonny Island is located in the southern region of Rivers State, Nigeria, within the Niger Delta. It spans along Atlantic Ocean and is separated from the mainland by a series of rivers and creeks. Bonny is a strategically important economic area, rich in natural resources, and unique environmental setting. The Island lies on the Lat. 4° 27N and Long 7° 10E with an estimated population of 270,000, and is known for its strategic economic importance, rich natural resources, and unique environmental setting. Bonny is one of the oldest settlements on the coast of Nigeria and has a long history of trade and commerce that began in the pre-colonial period (Alagoa 2005).

Geographically, Bonny Island is characterized by a low-lying coastal terrain and mangrove swamps. It is believed that movement to and from the island is by boat and this makes it problematic for administrators of the school, teachers, and students (Nwankwo and Ifeadi, 1988).

Bonny Island is a socio-economically significant and significant in terms of national significance because it is connected to the activity of the Nigeria Liquefied Natural Gas (NLNG) Limited as well as other oil and gas related activities. It is also home to a number of major oil and gas companies, making it one of Nigeria's key industrial centers. These activities have helped to create jobs and enhanced infrastructure in the local economy, as well as attracting a broad range of ethnic, cultural, and educational backgrounds (NLNG, 2021; Ibaba, 2010).

In terms of education, Bonny Island has several public and private primary and secondary schools that are under the administration of the Rivers State Ministry of Education. Although they are situated within an industrially advanced setting, many schools still face challenges including inadequate Physics laboratories, limited instructional resources, large class sizes and insufficient science teachers. These constraints may negatively impact effective teaching and learning in Physics, influencing students' understandings and interest in the subject (Aina and Akintunde, 2013).

Figure 1 Map of Bonny Island (Google Map)

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2.3. Data Acquisition and Processing

Descriptive survey research design was adopted in this study to examining students' understandings and interest in Physics, the causes of these perceptions, and possible intervention strategies. This method was chosen because it allows a more systematic and accurate collection of data from a larger sample of respondents. A total of 108 senior secondary school students and 57 Physics and science teachers were selected from both public and private secondary school in Bonny Island. The inclusion of both the students and teachers is to have a balance view of the concerns for students' interest and perception in Physics, and the instructional and institutional factors that may have influenced it.

A random sampling method was utilized in this survey. This is to ensure a fair representation of the government and private secondary schools as well as to reduce sampling bias and to enhance the generalizability of the findings in the case of Bonny Island. Some of the schools are Bonny National Grammar School, Government Girls' Secondary School, Destiny Academy, Kalviv Secondary School, among others.

In this study, structured questionnaire which is the primary instrument for data collection was designed for students and teachers. The questionnaires were designed in both open ended and Likert-scale to collect information on students' perceptions and interest in Physics, their attitudes to the subject, teaching methods, instructional resources availability, and possible intervention strategies for improving student understanding of Physics.

The questionnaires were administered to respondents directly through their teachers and ample time was given for responses to ensure accuracy. The collected data was coded and analyzed using computer application; Statistical Package for the Social Sciences (SPSS). Descriptive statistical tools such as frequencies and percentages were used to interpret the responses and present the findings in an understandable way.

3. Result and Discussion

The result of the investigations on Students Perception and Interest in Physics, Causes and Intervention is presented below in the form of tables, figures and charts.

Table 1 Perception of Physics as a Subject and how it influences subject choice

Perception of Physics	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Physics is Useful for daily life	-	-	12 (11.1%)	26 (24.1%)	70 (64.8%)
Physics is difficult to understand	-	3 (2.8%)	35 (32.4%)	44 (40.7%)	26 (24.1%)
Physics is taught in a clear way in my school	3 (2.8%)	3 (2.8%)	11 (10.2%)	35 (32.4%)	56 (51.9%)
Practical/lab activities help me understand physics better	-	6 (5.6%)	11 (10.2%)	22 (20.4%)	69 (63.9%)
Physics requires strong mathematics and that makes it hard.	3 (2.8%)	27 (25%)	50 (46.3%)	20 (18.5%)	8 (7.4%)
TOTAL	108 Respondents				

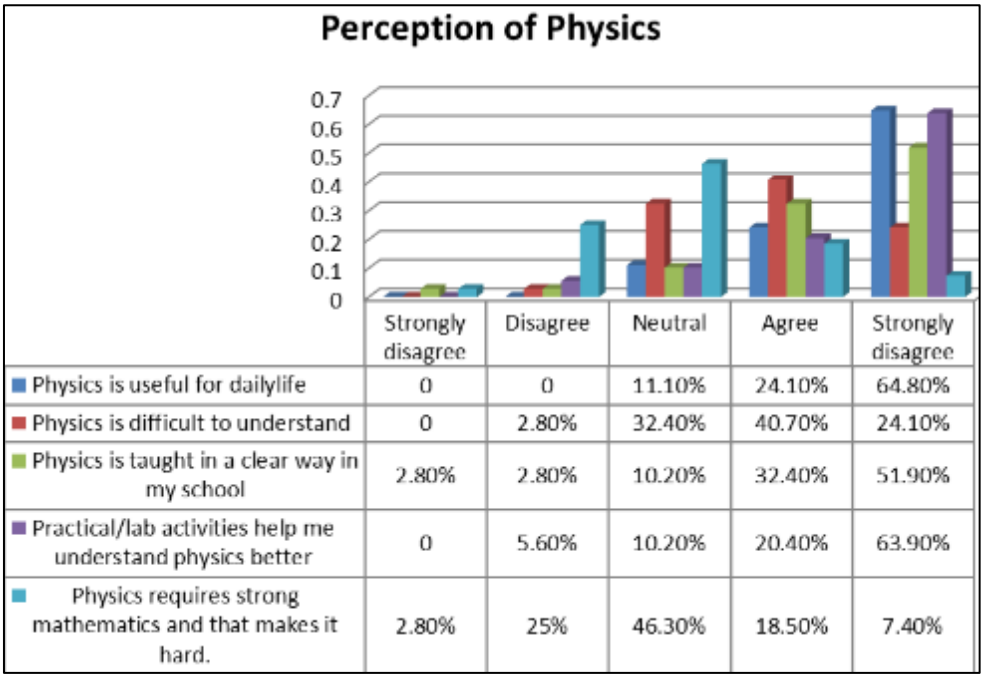

Figure 2 Perception of Physics as a Subject and how it influences subject choice

The result on students perception of Physics and its influence on subject choice among secondary school students in Bonny Island were categorized into five key perceptions. The findings show that a majority of respondents view Physics positively, with 70 out of 108 students (64.8%) strongly agreeing that Physics is useful in daily life.

However, a substantial proportion of students perceive Physics as difficult to understand, with 44 respondents (40.7%) agreeing with this view. In terms of instructional clarity, 56 respondents indicated that Physics is taught clearly in their schools, suggesting a generally positive teaching approach.

Furthermore, 69 respondents (63.9%) reported better understanding of Physics when more practical activities are incorporated into lessons, highlighting the importance of hands-on learning. In contrast, perceptions of Physics being difficult due to its mathematical content were mixed, with 50 respondents expressing a neutral position.

Table 2 Factors Contributing to the Declining Interest in Physics Studies among Secondary School Students

Perceived Causes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Lack of Laboratory equipment	4 (3.7%)	12 (11.1%)	9 (8.4%)	35 (32.4%)	48 (44.4%)
Lack of practical example	13 (12%)	25 (23.1%)	25 (23.1%)	28 (25.9%)	17 (15.7%)
Poor background in Mathematics	12 (11.1%)	17 (15.7%)	15 (13.9%)	22 (20.4%)	42 (38.9%)
Parent/peer discouragement	37 (34.3%)	25 (23.1%)	29 (26.9%)	8 (7.4%)	9 (8.3%)
TOTAL	108 Respondents				

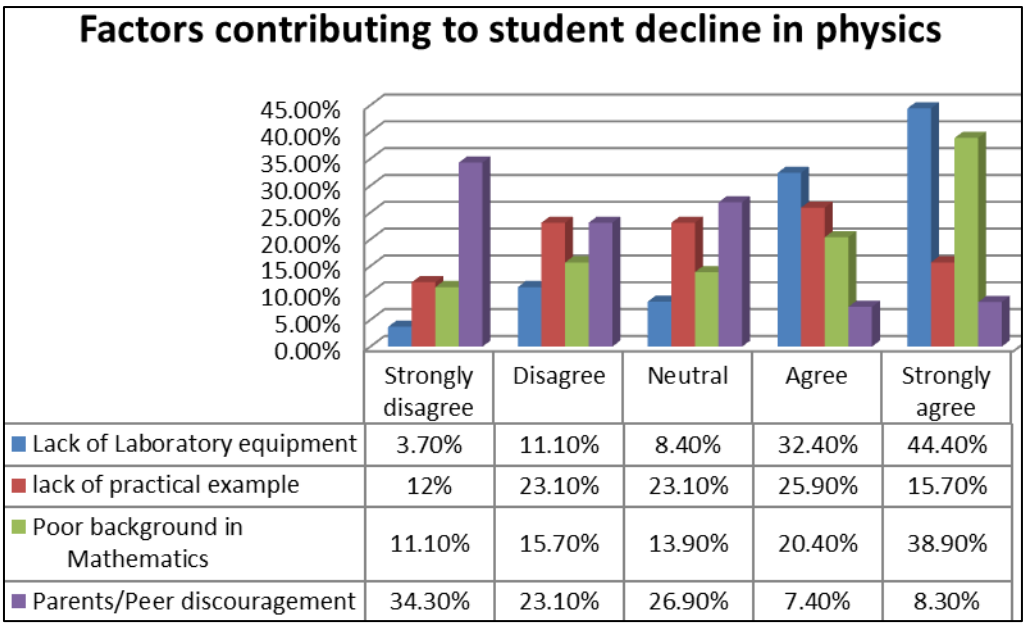

Figure 3 Factors Contributing to the Declining Interest in Physics

The results indicate that declining interest in Physics among secondary school students in Bonny Island is influenced by several instructional and academic factors. Lack of laboratory equipment emerged as the most significant factor, with 48 respondents amounting to 44.4% of respondents strongly agreeing that inadequate facilities reduce students' interest. Poor background in Mathematics was also identified as a major contributor, as 38.9% of respondents strongly agreed that weak mathematical foundations hinder effective learning of Physics.

The lack of practical examples showed a moderate influence, with the highest proportion of respondents (25.9%) agreeing that insufficient practical demonstrations affect their interest. In contrast, parent and peer discouragement was perceived as the least influential factor, as 34.3% of respondents strongly disagreed that social influences contribute to declining interest in Physics.

Table 3 A Cross-Tabulation Analysis of the Impact of Decline Interest in Physics across Three Domains

Impact	Count and % within domain	Innovation	Research	Economic Development	Total
Reduced Technological advancement	Count	24	0	18	42
	% within Domain	34.8%	0.0%	33.3%	24.6%
Decline in Research capacity	Count	0	45	0	45
	% within Domain	0.0%	93.8%	0.0%	26.3%
Decrease in STEM- skilled workforce	Count	9	0	12	21
	% within Domain	13.0%	0.0%	22.2%	12.3%
Slower energy/Health sector growth	Count	21	0	9	30
	% within Domain	30.4%	0.0%	16.7%	17.5%
Increase reliance on foreign expertise	Count	15	3	15	33
	% within Domain	21.7%	6.3%	27.8%	19.3%
TOTAL	Count	69	48	54	171
	% within domain	100.0%	100.0%	100.0%	100%

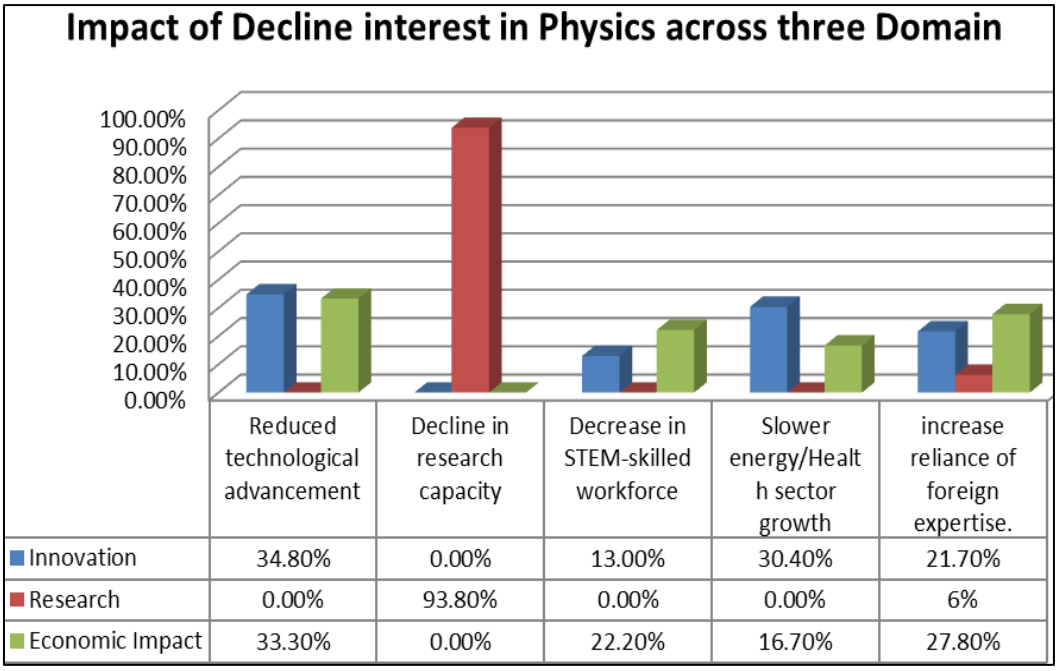

Figure 4 Impact of Decline Interest in Physics across Three Domains

A Cross-tabulation analysis was carried out across three Domains- Innovation, Research, and Economic development. The result of the analysis (Table 3) as responded by 57 Physics and science teachers selected from both public and private secondary school in Bonny Island Shows that the most frequent impact on "Innovation" is reduced technological advancement with 24 (34.8%) responses. Dominance concern for "Research" is Decline in Research capacity with 45 (93.8%) responses, while on the impact on "Economic Development", Reduced Technological Advancement recorded the highest frequency with 18(33.3%) responses, followed by Increase Reliance on Foreign Expertise (27.8%), and 22.2% for Decrease in STEM-Skilled Workforce.

Table 4 Teachers recommendation on ways to reactivating interest in Physics

Recommendation	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
More hands-on laboratory session	-	-	2 (3.5%)	19 (33.3%)	36 (63.2%)
After school remedial physics class	-	-	8 (14%)	49 (86%)	-
Career seminar by Physicist/Engineers	-	-	2 (3.5%)	25 (43.9)	30 (52.6%)
Teaching training to activate teaching training	-	-	2 (3.5%)	14 (24.6%)	41 (71.9%)
TOTAL	57 Respondents				

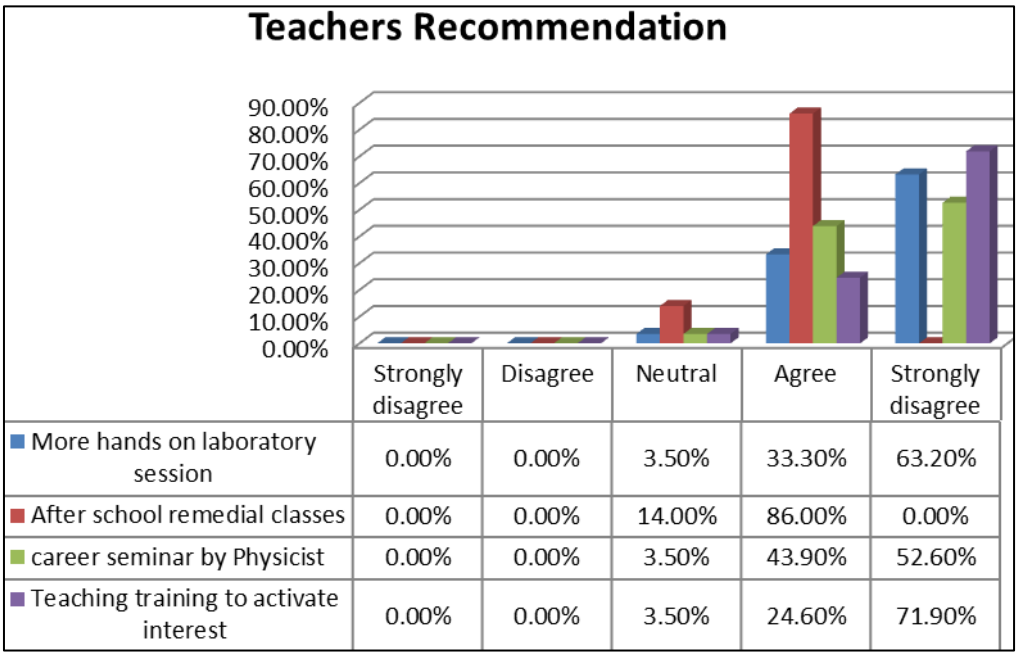

Figure 5 Teacher's recommendation on ways to reactivating interest in Physics

The result on teachers recommendations for reactivating interest in Physics among secondary school students in Bonny Island were grouped into four key strategies. The findings show strong support for after-school remedial Physics classes with 49 teachers (86%) endorsement.

More hands-on laboratory sessions were strongly supported; with 36 out of 57 teachers (63.2%) strongly agreeing that increased practical exposure would enhance students' interest. Career seminars led by practicing physicists or engineers were also recommended by 30 respondents (52.6%), highlighting the importance of career awareness.

Lastly, frequent teachers training and professional development was identified as a long-term solution, with 41 teachers strongly agreeing that improved teaching capacity would help sustain students' interest in Physics.

4. Conclusion and Recommendation

This study investigated students perception and interest in Physics in Bonny Island, the causes of declining interest, and possible interventions. A total of 108 students and 57 Physics and science teachers were randomly selected from private and public secondary school in Bonny Island. Each questionnaire was divided into four categories: perception of Physics and how it influenced subject choice, factors that contributed to declining interest, effects of declining interest in

Physics, and recommendations to reactivating student interest. This report provides important insight into the current state of Physics education in Bonny Island and key issues that need immediate attention.

The results indicates that majority of respondents (64%) believed that Physics is "unique" for everyday lives and human development. This positive perception reflects the students' understanding of the relevance of Physics to technology, engineering, medicine, and other applied interests. But, despite this awareness many students (40.7%) found Physics to be hard to understand. Such a feeling of difficulty may discourage students from concentrating on Physics as a subject and may contribute to the observed decrease in enrolment and continued interest.

Findings of the factors contributing to decreased interest in Physics further underscore systemic and instructional challenges. The most critical problem was lack of adequate laboratory equipment, identified by 44.4% respondents as the leading cause. Physics is practical and experimental; therefore, lack of adequate laboratory equipment prevents students from translating theoretical concepts into observable phenomena. This not only limits understanding but also decreases student interest and passion for the subject. Another contributing factor is students' poor background in Mathematics, which reinforced the link between Physics and mathematics knowledge.

The decline in students' interest in Physics has serious implication to science and technology, especially in an economically important community like Bonny Island, where industrial and energy related activities are central. A further reduction in Physics attendance would result in fewer students entering science and technology related industries.

To address these challenges, the study recommends several practical and achievable interventions. These include more laboratory practice for experiential learning, after school remedial Physics classes for struggling students; career seminars by physicists and engineers to introduce students to real-world applications and career paths; and regular teacher training to improve instructional effectiveness and skills. Together these recommendations point to the need for a more engaging, supportive and resourceful environment for learning.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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