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Research article

Decline in enrollment in science and technology education: From the perspectives of Mauritian educators

Hemraj Ramsurrun*, Roushdat Elaheebocus and Aatish Chiniah

Department of Digital Technologies, University of Mauritius, Mauritius;
hemraj.ramsurrun1@umail.uom.ac.mu; r.elaheebocus@uom.ac.mu; a.chiniah@uom.ac.mu

*** Correspondence:** Email: hemraj.ramsurrun1@umail.uom.ac.mu; Tel: +230 59204145.

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Abstract: The decline in participation in science and technology education is widely recognized as a growing global phenomenon. Literature, however, has a dearth of insights from Small Island Developing States. Moreover, educators are essential in bridging the theory-practice gap in science and technology education, but the perspectives of educators have been less considered. We used a mixed methodology approach to explore the perceptions of educators on the decline in enrollment in science and technology education in the Republic of Mauritius. A total of 129 educators responded to a survey to identify possible factors influencing the decline and potential measures to arrest this decline. A lack of career knowledge, perceptions of low job prospects, and low salary expectations are considered the major influencing factors of the decline. Advice and recounting experiences from peers were also found to significantly influence subject choice among students. Educators advocate for enhancing the teaching and learning of students as possible strategies amongst others to boost participation in science and technology education.

Keywords: enrollment decline, gross enrollment ratio, factors of decline, science and technology education, teaching and learning, STEM

1. Introduction

The role of science and technology is indispensable in today's world. The immensely complex natural world that surrounds us and the vast array of technological devices affecting our society

illustrate infinite scientific and technological concepts. Education in science and technology undoubtedly contributes to pursuing societal concerns and the advancement of people's lives. Studying science and technology promotes creativity, problem-solving, decision making, and innovativeness, skills that are required to succeed in the 21st century. To this end, a critical mass of scientists and technologists is crucial for the benefit of our society.

However, science education has been experiencing a significant and persistent issue for decades which is the decline in the number of teenage students choosing to study the triple sciences - physics, chemistry, and biology. Educators and policymakers worldwide are alarmed by the declining science subject enrollments. In a report published in the "*ASPIRES: Young People's Science and Career Aspirations Project in 2013*", it was stated that many students between the ages of 10 and 14 years were not inclined to choose a career in science. Until recently, studies related to enrollment in science education continue to make similar statements [1–4]. Kennedy et al. [5] state that the declining trends in enrollment in science education reported in Australia are to various extents similar in several countries across the globe thus suggesting that the causes of the changes may go beyond national and cultural borders. Mauritius is not an exception.

Understanding the factors contributing to low enrollment of students in science and technology programs is a complex and multifaceted issue [6]. The root causes behind waning student interest in science and technology need to be understood, and fundamental causes identified [7]. We aim to explore possible causal factors of the decline and potential measures to reverse the declining participation in science and technology education by gathering insights from science and technology educators in Mauritian schools. Politis et al. [8] has stressed that educators' views are important to study because educators are judged to have a wealth of experience in relation to the factors influencing subject choice, as well as considerable insights into the mindset of modern students. These educators play a crucial role in this discussion, as students' decisions to pursue science and technology are made at the school level, highlighting the significant role of educators in this process.

2. Background and related works

There has been considerable research conducted on the factors influencing students' choices to continue with science at school or not [7,9–12]. Several possible causal factors emerged. Educational and career aspiration is often seen as one of the major factors of interest in pursuing Science, Technology, Engineering and Mathematics (STEM) career pathways. The decline in enrollment in science subjects in Australia was analyzed by Lyons and Quinn [10], in a large-scale national study to understand the influences on Year 10 students on choosing science subjects in Year 11 from the perspectives of students and teachers. The wide range of subject choices available appeared to be the main factor in the decline. Other contributing factors identified were the difficulty in students in portraying themselves as scientists, the reduced utility value of science subjects with respect to their difficulty level and the failure in school science in engaging a wider range of students.

Wahab et al. [3] opinions on shrinking enrollment in science education in Bangladesh were collected from the teaching community and revealed that reduced scope of employment, scarcity of efficient science teachers, inadequate supply of science equipment, and above all, no 'priority of science' over arts and business studies have been the main causes of shrinking enrollment science students. The head teachers considered science contents as overloaded that there was no better scope of jobs for the science graduates, and inadequacy of qualified science teachers caused the shrinkage in

science enrollment the most. students' decision to pursue a degree in the sciences is influenced by personal, social, and institutional factors. Khan et al. [13] mention that individual-level factors deterring students from enrolling in science programs include poor academic performance and a lack of interest in science education. These barriers to interest in science education are influenced by socio-demographic factors, including gender, race, and socio-economic status [14].

In Mauritius, the number of students opting for science subjects, particularly biology, beyond the compulsory school level has been decreasing substantially in recent decades [4]. Studies on STEM education in Mauritius have focussed more on gender considerations. Naugah [15] identified the factors that influenced girls to study science beyond the compulsory level in Mauritius. These ranged from their experience of school science, which incorporated pedagogy and curriculum, the behavior of teachers and other pupils, their preferred learning style, the relevance of the science topics they were taught, and socio-cultural factors. Naugah and Watts [16] investigated the approaches to teaching science in classrooms in Mauritius, with particular emphasis on the preferences of girls as they learned science. A lack of opportunity for collaborative or activity-based learning were found to be responsible for alienating the girls from science. Gender gaps in STEM enrollment and in the professional aspirations of students were assessed by Madhou et al. [17] both at secondary and tertiary levels. Enrollment for girls at the O and A levels were very low in subjects like Physics, Computer Studies, and Design and Technology. Similar observations were recorded at higher education levels in Engineering and Information Technology. They also found that the gender gap in STEM doctoral studies was considerable.

Recent studies in Mauritius have analyzed, to some extent, the participation and performance of students in STEM subjects as well as assessed the role of educators and policymakers in the present education system. Maulloo and Naugah [18] conducted a case study of the post-16 STEM curriculum in Mauritius. STEM subject enrollment in Grades 10 and 12, analyzed for the period 2007 to 2016, showed a decline in the intake of STEM subjects, and according to this study, the low intake of STEM subjects may have been due to the wide variety of subject choices offered to students. Naugah et al. [19] found that parents overall felt that they did not influence their children in the choice of subjects or eventual careers, though they held science in high esteem. Rumjaun et al. [4] analyzed how policies in the last two decades responded to the decline in the number of students opting for biology at the post-compulsory education level in Mauritius, drawing on 25 biology education policy documents and focus groups with students, educational officials, and parents. They argued that policy actions lacked coherence and that a policy framework to address the issue was absent. They also argued that policy actions were too state-centered and deployed using a top-down approach rather than by simply implementing at the school level.

This study contributes to the broad literature on participation in science and technology education by providing scarce insights from educators and potential solutions that address the declining trends being faced. While researchers have identified numerous factors contributing to the decline, these findings cannot be generalized to small island developing states like Mauritius, where unique economic and social contexts differ significantly from those of developed nations upon which most existing research studies focused on.

3. Methods

A mixed methodology approach was used for the purpose of this study involving the collection and analysis of both quantitative and qualitative data. The study is divided into two parts:

(i) A: Quantitative analysis of enrollment data in science and technology education

The Gross Enrollment Ratio (GER) and Gross Tertiary Enrollment Ratio (GTER), as defined by UNESCO, were used to analyze participation in science and technology education in Mauritius at the secondary and tertiary levels, respectively.

GER = (Enrollment in Specific Education/school-age population) x 100

GTER = (Enrollment in Tertiary Education/population aged 20-24 years*) x 100

* - *The five-year age group after official secondary school, taken in our case as 20 to 24 years*

Data, for the period of 2012 to 2022, have been examined to conduct an:

- Analysis of enrollment in science and technology subjects (Biology, Chemistry, Computer Science and Physics) in Mauritius at secondary level (Grade 11 and 13)
- Analysis of enrollment in science and technology programs in Mauritius at the tertiary or higher education level.

(ii) B: Educators' survey on decline in participation in science and technology education at the secondary level

A structured questionnaire, adapted from [10], was used as the research instrument, which contained three sections. Section 1 consisted of 17 hypothetical statements on possible causes of declines, while section 2 contained items to obtain educators' perception on the level of influence of older students and/or siblings, friends/peers, science educators, parents/relatives, and career advisors on students' decision of choosing science subjects, using a five-point Likert scale 1 (Not at all influential) to 5 (Extremely influential). In section 3, educators were invited to suggest potential strategies or measures to arrest the decline and boost enrollment. Responses from sections 1 and 2 were quantitatively analyzed using descriptive statistics and a thematic analysis was conducted with the open-ended responses. Ethical clearance was obtained from the University of Mauritius prior to conducting any survey.

4. Results

The results of parts A and B are presented below:

4.1. A: Quantitative analysis of enrollment data in science and technology education

Enrollment in Science and Technology education is analysed at secondary and tertiary/higher education levels.

4.1.1. Secondary level (Grade 11 and 13)

The trend in percentage enrollment for the subjects of Biology, Chemistry, Computer Science and Physics at secondary level (based on number of students examined at Grade 11 and Grade 13) for the period of 2013 to 2022 is shown in Figure 1.

It is observed that:

- The triple science subjects suffer a visible decline in enrollment with Biology being affected the most. Biology significantly drops from a low GER of 4.3% to 2.9 %. Similarly, Chemistry drops from 7.4% to 4.9%. Physics declines from 7.7% to 6%.
- However, a positive increase in enrollment for Computer Science is noted from 6.5% to 8.5%.

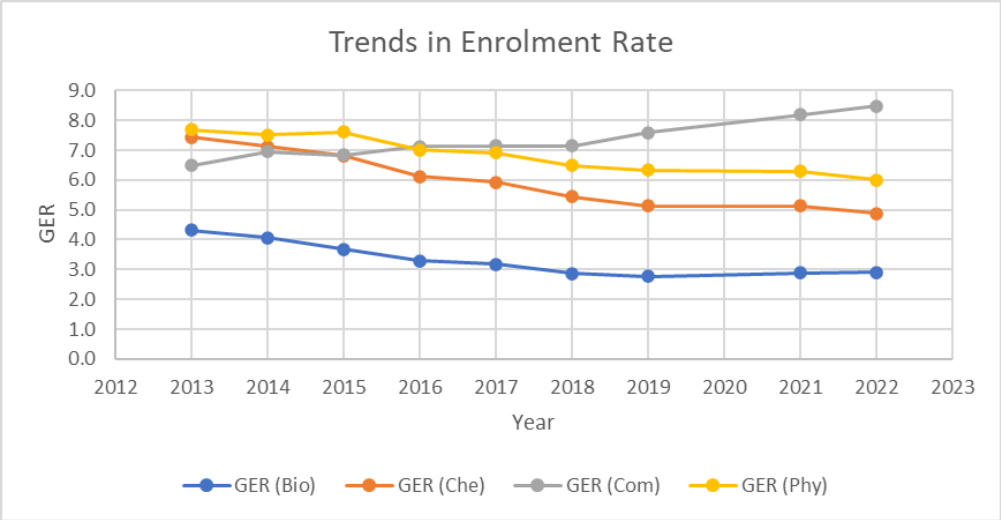

Figure 1. Enrollment pattern at the secondary level, Source: Mauritius Examination Syndicate, https://mes.govmu.org.

4.1.2. Tertiary/higher education

An analysis of the figures, as revealed by the Higher Education Commission in its annual "Participation in Tertiary Education" report for the years 2011 to 2022 [20], is shown in Figure 2. Here, we consider percentage enrollment, percentage admissions and the GTER for science and technology related programs. It was found that percentage enrollment has decreased from 29.7% to 25.9 %. Similarly for new admissions, a decrease is noted from 27.2% to 23.9%. The GTER has decreased from 14.7% to 13.1% in a span of 12 years.

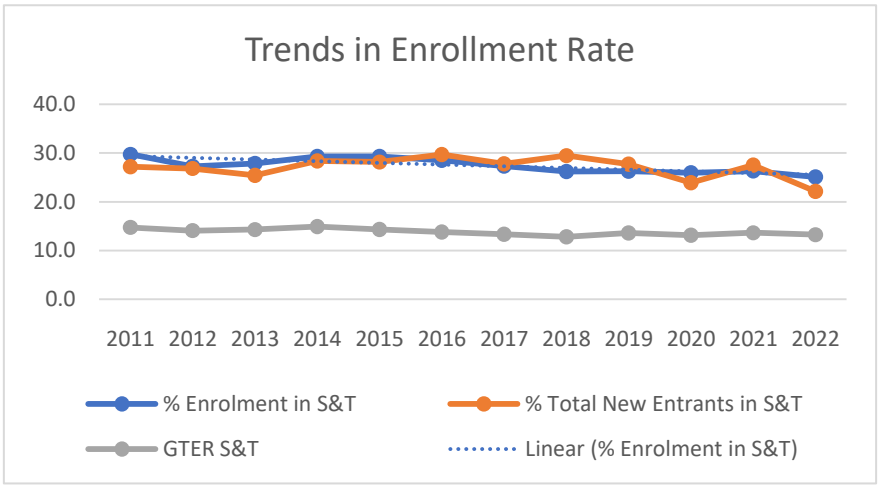

Figure 2. Enrollment pattern for science and technology programs in higher education, Source: Higher Education Commission, Mauritius, https://www.hec.mu.

4.2. B: Educators' survey on the decline in participation in science and technology education at the secondary level

The population of science and technology educators was estimated at 3,176. The sample size was estimated at 132 (confidence interval: 95%, margin of error: 7%). 129 responses (success rate: 57%) were received and analyzed using descriptive statistics and thematic analysis. A total of 53.5% of the respondents were female and 46.5 % were male. A total 51.9% of respondents were from Private Grant Aided schools, whereas 45.7% were from State Owned secondary schools. The remaining 2.4% were from Private Fee-Paying schools. 61% of respondent educators came from single-sex schools, and the remaining were from co-educational schools. Table 1 provides the distribution of educators in terms of years of experience.

Table 1. Percentage distribution of educators' years of experience.

Less than 5 years	14.7%
6-10 years	20.2%
11-15 years	27.1%
16 years and above	38%

4.2.1. Educators' perceptions on the possible causes of decline

The internal consistency, Cronbach's alpha, of the set of items was 0.73, which indicates good reliability. Table 2 shows the mean score and standard deviation for each statement.

Mean is the average score of the respondents for each item. A mean of 3.5 and above indicates a strong influence. The standard deviation shows the dispersion of the scores obtained around the mean. The following observations are made:

(i) The Professional Context: Lack of Career Knowledge, Perceptions of Low Job Prospects, and low salary expectations.

A total of 76.7% of educators perceived *a lack of career knowledge about the wide range of careers* (item 12; mean score: 4.05) and *perceptions of low job demands in the SET field* (item 13; mean score: 4.07) as being very or extremely influential on the decline. Moreover, 60% of the respondents consider that the *perception among students that STEM careers are low remunerating*, (item 11; mean score 3.68) is very or extremely influential on the decline.

(ii) A Lack of Effort from Science Organisations and Universities

74.4 % of educators were found to perceive that a *lack of effort from science organizations and universities in encouraging students to choose science programs,* (item 17; mean score: 4.00) is very or extremely influential on the decline.

(iii) Influence of Parents

60.5% of the respondents were found to perceive that a *decline in the number of parents who encourage their children to take science* is very or extremely influential on the decline. (Item 15, mean score: 3.69)

(iv) Secondary School Curriculum

More than 50% of the educators consider that *Students' negative experiences of lower secondary science classes* (Item 6; mean score: 3.61) and *a decline in the amount of practical and experimental*

work undertaken in junior science classes (Item 9; mean score: 3.81) are contributing considerably to the decline. A high tendency among students to choose subjects that are less academically demanding (item 3, mean score: 3.86) is noted by 64.4% of educators who find this situation as being very or extremely influential on the decline. Regarding item 2 (mean score: 3.55), *the requirement of 5 credits is perceived as difficult to achieve with science subjects*, more than 50% of the respondents consider this factor as being very or extremely influential. A similar observation is noted for items 5; *a greater reluctance among today's students to persevere with repetitive or rigorous tasks such as required in experimental work*, a mean score 3.49 and item 7, *a decline in the quality of teaching in junior science classes*, mean score 3.5. However, *the wide range of subjects available*, item 1 (mean score 3.36), and *a decline in the quality of teaching in junior science classes*, (item 8, mean score 3.1) are perceived to be moderately influential on the decline.

Table 2. Mean and Standard Deviation for each of the statements.

Statements	Mean	Std. Deviation
The wide range of subject choices available	3.36	0.917
The requirement of 5 credits perceived as difficult to achieve with science subjects	3.55	1.023
A tendency among students to choose subjects seen as to be less academically demanding	**3.86**	1.021
A tendency to choose subjects perceived as more interesting/engaging than science	3.12	1.159
A greater reluctance among today's students to persevere with repetitive or rigorous tasks, such as required in experimental work	3.49	1.032
Students' negative experiences of lower secondary science classes	3.61	1.188
The junior secondary science syllabus or curriculum	3.50	1.032
A decline in the quality of teaching in junior science classes	3.10	1.158
A decline in the amount of practical and experimental work undertaken in junior science classes	**3.81**	1.112
An increase in the standard of university entrance requirements/prerequisites for Science and Technology programmes in Mauritius	3.33	1.041
Students' perceptions that STEM careers are not sufficiently well paid.	3.68	1.132
Students' lack of knowledge about the wide range of STEM careers	**4.05**	.878
A perception among students that there is a low demand for Science Engineering and Technology jobs	**4.07**	.978
Students' perceptions that science can have a negative impact on society	1.85	1.039
A decline in the number of parents who encourage their children to take science	3.67	1.069
The way the mass media depicts science or scientists.	2.94	1.223
A lack of effort from science organisations and university faculties to encourage students to choose senior science courses	**4.00**	.893

Items 3, 9, 12, 13 and 17 scored the highest mean. These items have been each considered for a bivariate analysis with gender and number of years of experience. Used for this purpose, the Spearman's rank correlation coefficient is a nonparametric (distribution-free) rank statistic proposed as a measure of the strength of the association between two variables. It is a measure of a monotone association that is used when the distribution of data makes Pearson's correlation coefficient undesirable or misleading [21]. The values are given in Table 3.

Table 3. Spearman Correlation values, source: Author.

Item	3	9	12	13	17
Gender					
Spearman Value	-0.12	-0.19	-0.06	-0.07	-0.12
Years of Experience					
Spearman Value	-0.04	-0.19	-0.13	-0.06	-0.22

The Spearman Correlation values for Gender and each of the 5 items range between -0.06 and -0.19. Therefore, the disparity in responses based on gender is considered negligible. Exceptionally, for item 9, male responders consider that the *decline in the amount of practical and experimental work undertaken in junior science classes* is less influential. Similarly, the Spearman Correlation values for Years of Experience and each of the 5 items range between -0.04 and -0.21. The disparity in responses based on years of experience is considered negligible. However, for items 9 and 17, experienced educators consider that a *decline in the amount of practical and experimental work undertaken in junior science classes* and *a lack of effort from universities/science organizations*, are less influential on the decline.

4.2.2. Influence on students' decisions in choosing science subjects

The mean score and standard deviation of perceived influence on students' decision in choosing science subjects are shown in Table 4.

Table 4. Mean and Standard Distribution for influence on students' decision on choosing science.

	Mean	Std. Deviation
Career Advisors in School	3.33	1.232
Parents and Other Adult Relatives	3.83	0.936
Advice from their science teachers	3.90	0.900
Advice from friends and peers in their year level	4.25	0.761
Advice from older students or siblings	3.93	0.905

Advice from friends/peers at the same level is perceived to be most influential (Mean Score: 4.25). *Advice from Educators, older students/siblings, and parents* is also found to have a high influence (Mean Score: 3.93, 3.91, and 3.83, respectively). *Advice from career advisors in school* is perceived to be the least influential by the respondents. 41% considered advice from friends/peers at the same level as "extremely influential". 34% of the educators perceive career advisors at school to be "moderately influential. The Spearman values for items 1 to 5 with gender and number of years of experience is found in Table 5.

Table 5. Bivariate analysis for items 1,2,3,4, and 5, source: Authors.

Item	1	2	3	4	5
Gender					
Spearman Value	-0.05	-0.11	-0.03	-0.18	-0.13
Years of Experience					
Spearman Value	-0.14	-0.06	-0.08	-0.03	-0.05

The Spearman Correlation values for Gender and each of the 5 items range between -0.03 and -0.18. Therefore, the disparity in responses based on gender is considered negligible. However, for item 4 - *Advice from parents/relatives*, male responders argue that it has limited influence on students' science choices.

Similarly, the Spearman Correlation values for Years of Experience and each of the 5 items range between -0.03 and -0.14. Therefore, the disparity in responses based on gender is considered negligible. However, for item 1 - *Advice from older siblings*, experienced educators argue that it has limited influence on students' science choices.

4.2.3. Potential measures to increase enrollment in science and technology education

The thematic analysis resulted in the following desired potential measures:

- *Improve the teaching of science and enhance the learning experience of students***.**

Most of the educators suggested increasing hands-on, inquiry-based science activities both in and out-of-classroom learning settings. The syllabus, deemed bulky and rigorous, should be alleviated. The teacher-student ratio and assessment methods be reviewed.

- *Vulgarise the promotion of science careers and job prospects.*

Educators consider that increasing effort in promoting science careers and job prospects would be a strong strategy towards encouraging students to enrol for science subjects, supported by the involvement of parents in career guidance activities.

- *Bridge the gap between science theory and real-life applications of science and technology.*

Educators perceive that highlighting the practical aspects of science in real-life situations would motivate students to embrace science. Creating platforms for students to interact with scientists from industry and community has also been recommended.

- *Use of technology.*

Respondents have supported the deployment of digital technologies to improve the teaching and learning process. Digital tools are considered effective in demystifying scientific concepts.

- *Professional Development of Educators.*

Some respondents think educators lack enthusiasm and motivation when teaching science subjects. Thus, educators need continuous professional development.

- *Other proposed strategies.*

A review of policy measures and improving accessibility to science by addressing issues related to language barriers, facilities, financial implications, and logistics.

5. Discussion

The enrollment data in the first part of this study provide a detailed analysis of the trends in science and technology education at secondary education levels and extends to the tertiary level, where participation in science and technology programs has decreased. The patterns observed in the GER reveal significant declines in traditional science subjects [18] and suggest that the "triple science" subjects are becoming less attractive to students at the secondary level. These findings consolidate the global nature of this phenomenon [7]. In contrast, computer science enrollment showed a positive trend which reflects a growing interest in technology-related fields, likely driven by the increasing relevance of computer science in today's digital economy. The declining trend in GTER for science and technology programs is indicative of a reduced interest of youth in embracing a career related to STEM. Possible reasons could be that prospective students do not have sufficient information concerning possible STEM career paths [22]. However, there may be cross national differences in factors influencing enrollment decline in STEM programs. According to Langen and Dekkers [23], central to the explanations are the accessibility of the STEM pathway, the balance between broad interdisciplinary studies and early specialization, labor market dynamics, social customs, and government policies.

5.1. Possible impact of COVID-19 pandemic

According to UNESCO [24], more than 87% of the world student population has been affected by disruptions in their education due to the COVID-19 pandemic, causing severe challenges, especially in developing countries [25]. Mauritius, as a small island developing state, is not an exception [26,27]. Understanding a possible impact of COVID-19 would require a detailed examination of the data related to science and technology education for the years 2020, 2021, and 2022 to specifically focus on the possible impact of the pandemic on the enrollment rates, which is beyond the scope of the study. However, arguably, the disruptions caused during the pandemic may have contributed to the decrease in GER and GTER observed during this period. Students' performances in the science subjects at secondary level were expected to fall due to the pandemic impacting adversely on participation in science education in Nigeria [28] and Zambia [29]. Factors such as economic difficulties, interruptions to academic progression, and challenges associated with online learning may have played a role in influencing tertiary enrollment in STEM programs [30–32]. Understanding the decline becomes, therefore, imperative. The factors driving it, however, may vary across different countries. The declines also suggest that effective strategies are required to reinvigorate participation in science and technology education.

5.2. Influencing factors of the decline in Mauritius

From our survey, educators perceived that the influencing factors of the decline in the Republic of Mauritius, mainly revolve around (i) *the Professional Context: Lack of Career Knowledge, Perceptions of Low Job Prospects and Low Salary Expectations; (ii) the inadequate measures undertaken by organizations and universities, (iii) the influence of parents (not to choose science) and (iv) the secondary science school curriculum (lack of practical experiences for students, an academically demanding science program etc*). The results of part A, the decline in enrollment in science and technology programs, reflect the perceptions uncovered in part B. First, it appears that

students' choice of subjects is heavily influenced by their perception of poor career prospects, limited future opportunities, and low salaries in science-related fields, creating a negative feedback loop where low enrollment reinforces the belief that science subjects are not viable career paths. Moreover, without strong encouragement and clear pathways for students to see the relevance and benefits of pursuing STEM fields at the university level, fewer students may be motivated to continue their education in these areas. Further, the demanding nature of the science curriculum, as indicated by educators, and a lack of hands-on learning cause students to likely feed into each other, which may alienate students early on, contributing to lower enrollment in upper secondary and tertiary levels. The rise in computer science enrollment could reflect students opting for a subject that is perceived as both less challenging and more relevant to future careers. While parental discouragement further reinforces the decision to avoid traditional sciences, students may be swayed by peers to choose subjects perceived as easier and less demanding.

Unlike the findings of this study, Maulloo and Naugah [18] found that the *wide range of subject choices available* could explain the decline in enrollment in science subjects in Mauritius. In our study, this factor was perceived as a moderate influencer on the decline (mean: 3.36). Moreover, educators have clearly perceived that *a decline in the number of parents who encourage their children to take science* impacted on the decline (Mean: 3.67). In contrast to our findings, Lyons and Quinn [10] argue that teachers consider that the influence on enrollment declines resides principally with students rather than with the professional context, science curriculum, or parents. The major influences according to Lyons and Quinn [10] were found to be (i) *students' preferences for less academically demanding courses*, (ii) *students' reluctance to undertake courses requiring perseverance with rigorous tasks*, and (iii) *increasing students choosing subjects seen as more engaging and interesting than science.* We also found that a*dvice from friends/peers at the same level* has clearly emerged as having the most influence on students' decision on choosing science subjects, although educators also felt that *advice from educators, older students/siblings, and parents* has a high influence. In their study, Lyons and Quinn [10] had a similar outcome, except that the teachers felt that *advice from educators* had a lower influence.

Lyons and Quinn [33] have shown that such declines and the dynamics of subject choice in secondary education are related to policy and structural changes, while Kenedy et al. [5] proposed that a wide range of curriculum offerings, students' self-perception of ability and perceptions of subject difficulty and usefulness, are the most likely cause of the decline in participation in Australia. Adolphus [34] investigated the low popularity of physics among secondary school students in Nigeria and found that effective teaching and learning influences the intake of the subject. Palmer et al. [7] found that there are both intrinsic and extrinsic factors, and the most important ones in both choosing and rejecting science subjects among students are enjoyment, interest, and ability in the subject and its perceived importance related to career plans. Other factors cited in Palmer et al. [7] include students' engagement in previous school science, their perceptions of the usefulness of science, socioeconomic factors, gender preferences for some science subjects, and the decreased relative popularity of science as a subject generally

5.3. Comparison with global trends

From a broader perspective, many of the underlying influencing factors are shared across different countries. Studies in Australia [5,10,35] and Bangladesh [3] similarly report that students opt for subjects they perceive as less demanding. In Pakistan [13], the education system surrounding the teaching and learning of science was highlighted as causing the decline. These dynamics resonate

with findings from Mauritius, where educators reported that the rigid and demanding nature of the science curriculum discourages students from choosing STEM subjects, as well as the influence of parents and peers [36]. The perception that STEM subjects are difficult, coupled with the lack of engaging and practical learning experiences, suggests that innovative pedagogical approaches are necessary to reverse the trend. While career concerns are a common issue globally, the degree to which they influence subject choices in Mauritius is particularly pronounced where uncertainty about job prospects in Mauritius has a stronger impact. This appears to be a peculiarity, which may be reflective of the country's smaller, developing economy where job opportunities in STEM may be more limited, making the perceived risk of pursuing these fields greater. The lack of effort taken by organizations and universities can also be considered a feature unique to the decline phenomenon in Mauritius, indicating that a review of our policy measures is required**.**

5.4. Potential strategies for improvement

The results from Parts A and B highlight the interconnected nature of the factors influencing the decline in science and technology enrollment in Mauritius. The professional context, inadequate institutional support, social influencers (parents and peers), and challenging science and technology all work together to perpetuate declining enrollment rates at both secondary and tertiary levels. To reverse this trend, a multifaceted approach is needed, addressing these key areas simultaneously to make science and technology subjects more appealing and accessible to students.

First and foremost, educators expressed the need for a reform in science and technology education, emphasizing a modern constructivist approach that provides more opportunities for hands-on experiences both inside and outside the classroom. Traditional pedagogical practices and curricular approaches, particularly lecture-based teaching, can drive previously eager students out of STEM. This is in line with Semali and Mehta [37]. A shift from memorization and tradition to active, inquiry-based science teaching for better knowledge translation is required. Christidou [38] found that school science is often academic, presented in a decontextualized way, and does not relate to everyday life. Good teaching of science would involve motivated educators willing to run organized and stimulating science lessons relating to everyday life contexts. Educators' professional development opportunities are required for enough educators to increase their interest and competence in STEM fields [39].

There is a necessity for promoting and popularising science careers and job prospects rather than directing our students to a career choice based on their academic achievement. Educators suggest connecting students with industry and community scientists to emphasize real-life applications and boost science motivation. There is a dire need to develop and strengthen collaborative mechanisms between educational authorities and informal education institutions in Mauritius [4]. The existence of a lack of effort by universities and science organisations has been clearly pointed out by the educators in this study.

Information, communication, and educational technologies nowadays exist in great range. Educators have advocated for the adoption of digital tools, which have the potential for a significant positive impact on student learning outcomes and attitudes toward the taught subject [40]. The deployment of information, communication, and digital tools in science education impacts positively on the scientific literacy level of the students [41]. However, there is a need to understand how to deploy these tools to enhance and improve students' interest, motivation, and learning in science.

According to Palmer et al. [7], studies have shown that enhancing students' enjoyment, interest, and perceptions of their ability in science may encourage more students to study science at school. Successful adoption of digital educational technologies appears to rest on the deployment of strategies for the integration of these technologies in the teaching and learning process. Based on the findings, the following recommendations are made:

- To rethink science education in Mauritius, especially at the lower secondary level, to adopt context-based approaches and strategies to make it more interesting, practical, and personally relevant.
- To develop collaborative actions between formal and informal science education institutions and implement strategies that boost students' interest, perceptions, and attitudes toward science.
- To undertake more research initiatives to examine the various aspects of subject choice by students in Mauritius as regards science education.
- To design and implement a holistic STEM career program to generate interest and awareness among students, parents, and educators about the exciting possibilities in this field.
- To design and implement continuous professional development programs for science and technology educators to be sufficiently competent with pedagogical materials and methods.

To provide access to cutting-edge digital tools and resources, allowing students to engage in hands-on STEM experiences from home and out-of-classroom. This approach can support in maintaining positive learning outcomes.

6. Conclusions

This study has provided a better understanding of the decline in enrollment in science and technology education in Mauritius based on the perception of secondary science and technology educators on the possible causes. The professional context was considered as among the most influential factors in this decline. Illuminating key elements of attractive careers in science and technology fields may promote interest in science and technology amongst Mauritian students. To reverse this trend, rethinking the delivery of science education - with the aim of enhancing the teaching and learning experience of science is crucial. The meaningful insights into the phenomenon of decline in science and technology education in Mauritius could potentially be relevant to other small island developing states with similar contexts. Although there are similarities between existing published research on the decline in enrollment in science and technology education, not all findings can be generalized to countries having varied socio-economic contexts and cultural backgrounds. This highlights the importance of understanding, on a case-to-case basis, the motivation behind students' choice to opt for or intentionally 'stay away' from science and technology subjects. The role of all stakeholders, from policymakers to organizations, from educators to students, from technology developers to adopters, from society to parents, appear to be forming part of the current situation.

7. Future research

Despite these indications and perceptions from stakeholders, more research on the root causes of interest decline among students in STEM needs to be undertaken. This could help in the development of enhanced and targeted interventions for tackling this issue. As part of a strategy to rethink science

education, the adoption of digitally enhanced out-of-classroom learning of science activities could be explored as a potential intervention for the development of scientific literacy and to further motivate students to engage with the field of science. There is a need to systematically gather evidence on the potential benefits and efficacy of the deployment of digital tools in out-of-classroom learning of science set-ups.

Authors' contribution

Hemraj Ramsurrun: Resources, Data curation, Formal analysis, Writing – original draft; Roushdat Elaheebocus and Aatish Chiniah: Supervision, Writing – review & editing. All authors contributed to the study conception and design. All authors have approved the final version of the manuscript for publication.

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Conflict of interest

The authors declare no financial or non-financial interests.

Ethics declaration

The Research Ethics Committee of the University of Mauritius has reviewed and granted ethical clearance for this research.

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Author's biography

Hemraj Ramsurrun is currently a research student in the Faculty of Information, Communication and Digital Technologies at the University of Mauritius. His interests include digital tools and technologies and informal STEM education.

Roushdat Elaheebocus is a Senior Lecturer in the Faculty of Information, Communication, and Digital Technologies at the University of Mauritius. He holds a PhD in Computer Science, and his research spans digital technologies, exergaming, and the Internet of Things (IoT). He is particularly

interested in how these technologies can be applied in various fields, including education, health, and social computing, to foster innovation and improve user engagement.

Aatish Chiniah is an Associate Professor in the Faculty of Information, Communication and Digital Technologies, University of Mauritius. He completed his PhD in the area of Cloud Storage. His area of research includes Networking, Mobile and Cloud Computing as well as Technology Adoption.

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