Factors Influencing STEM Career Interests of Maldivian Secondary School Students

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HIGHLIGHTS

- Social Cognitive Career Theory applied to analyze STEM career interest among Maldivian lower secondary students.
- Girls showed low interest in math and engineering due to gendered role models.
- Self-efficacy and personal goals strongly predict STEM career aspirations.
- Urban students exhibit higher STEM interest, highlighting access and equity gaps.
- Findings inform gender-equitable STEM policies in small island developing states (SIDS).

ABSTRACT

Despite a growing national demand for professionals in Science, Technology, Engineering, and Mathematics (STEM), limited research has been conducted on STEM careers within the Maldivian context. This study addresses this gap by applying the Social Cognitive Career Theory (SCCT) to examine the factors influencing lower secondary school students' interest in STEM careers. Employing a convergent parallel mixed-methods approach, the study integrated findings from a STEM-Career Interest Survey administered to 257 Grade Seven and Grade Eight students in Malé City with insights from five focus group discussions involving thirty-one students. The results revealed that gender did not significantly influence students' interest in science; however, gender differences emerged in other STEM subjects. Girls reported reluctance to pursue careers in engineering and technology, citing a lack of female role models within their families, and concerns about entering male-dominated fields. While boys demonstrated the lowest interest in mathematics careers among the four STEM subjects, girls exhibited even lower interest in mathematics and engineering-related careers. These findings underscore the need to address sociocultural and economic barriers to promote gender equity in STEM. Educational interventions should aim to expand students' opportunities and capabilities in mathematics and engineering, thereby enhancing their engagement and confidence in these areas. The study offers valuable insights for educational institutions to develop targeted strategies that foster student motivation and aspiration towards STEM careers, contributing to the fulfilment of future workforce demands in this vital sector. Beyond addressing a critical knowledge gap in the Maldivian context, the study holds broader relevance for small island developing states and least deveoped countries. It supports initiatives aimed at raising awareness and providing structured guidance on STEM education and career pathways. Ultimately, these findings can inform policies and programmes designed to meet the global demand for STEM professionals while advancing educational equity and inclusion.

KEYWORDS

STEM career interest
Social Cognitive Career Theory
Secondary Education
Gender Disparities
Small Island Developing States

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INTRODUCTION

The Maldives is a low-lying archipelagic nation and a small island developing state (SIDS) with unique opportunities and challenges in Science, Technology, Engineering, and Mathematics (STEM). The vulnerability of its biodiversity-rich coral reef ecosystems to slight changes in ocean salinity and temperature, the impacts of coastal erosion due to global warming and overexploitation of coastal resources, and the effects of global pollution on air, water, and soil systems highlight the urgent need for public awareness and engagement in monitoring, advocating for, and protecting these fragile island and marine ecosystems. Global warming and extreme weather events—such as heatwaves, heavy rainfall, ocean surges, and flooding—further underscore the critical role of STEM education in safeguarding the reefs, islands, and communities from the escalating climate crisis. The COVID-19 pandemic and the 2004 tsunami exposed the vulnerability of island communities and the challenges associated with delivering public services across geographically dispersed and remote populations. Developing community STEM capabilities is therefore essential to foster an informed, responsive, and resilient nation, whilst meeting the demand for STEM professionals in the Maldives' fast-developing economy.

Inefficiencies in the provision of green energy services and high public health expenditure have been identified as key economic vulnerabilities related to the STEM sector in the Maldives (World Bank, 2024). Given the country's reliance on the service sector—particularly tourism—most secondary school graduates aspire to pursue higher education in this field. While robust STEM education can empower young people to diversify into a broader range of employment opportunities, including careers beyond traditional STEM pathways, only 20% of students demonstrate familiarity with higher education opportunities available within the country (Ministry of Higher Education, 2020).

Although the tourism sector employs a large number of expatriate workers, an equivalent number of foreign employees are also engaged in engineering and construction—indicating the presence of significant employment opportunities for Maldivian students willing to enter these fields. With improved internet connectivity, employment opportunities have become increasingly borderless, and globally, demand for computer science-related jobs continues to rise. This presents an opportunity for Maldivian youth to contribute to the global economy from their home islands. However, despite growing demand, student enrolment in secondary school science streams and interest in pursuing STEM-related careers have not increased sufficiently to meet the need for a STEM-educated workforce (Ministry of Higher Education, 2020b)

Despite the importance of STEM curriculum design and pedagogy in fostering critical thinking, creativity, and innovation being well recognised (World Bank, 2023), the Maldives faces substantial challenges. These include limited resources, a shortage of qualified STEM teachers, insufficient STEM programmes, and geographical barriers that hinder student exposure to enriching STEM experiences (UNDP Maldives, 2021; Zubair et al., 2020). Addressing these challenges and enhancing students' interest in STEM education and careers is critical for sustainable economic development, environmental protection, and public health. However, without tackling the motivational factors influencing student engagement in STEM education, and the career aspirations and perseverance of young STEM professionals, the full economic potential of STEM investment may remain unrealised (Aafal & Bakthavatchaalam, 2023).

This research aims to investigate the factors influencing secondary school students' interest in STEM careers in the Maldives, using the Social Cognitive Career Theory (SCCT) framework developed by Lent, Brown, and Hackett (1994). The study explores behavioural variables such as self-efficacy, social support, and goal-setting, alongside contextual factors including gender, culture, and socioeconomic status, all of which shape students' career-relevant learning experiences. In doing so, the study seeks to inform educational strategies and policy initiatives that will better equip Maldivian students for STEM education and related career pathways (Koh, Tindall, & Faisal, 2021; Mau & Li, 2018; Murcia, Pepper, & Williams, 2020). Additionally, the study contributes to the broader discourse on advancing STEM education in island nations facing comparable challenges.

Ultimately, this research aims to inform practical interventions such as targeted career counselling, curriculum reform, and initiatives to reduce gender disparities. These efforts are intended to better prepare Maldivian students to meet the demands of an evolving workforce and support national objectives for promoting STEM education.

LITERATURE REVIEW

Research on students' STEM career interests and choices—such as that by Grimmon et al. (2020), Murcia et al. (2020), and Sidiq et al. (2022)—offers nuanced insights into the complex interplay between individual aspirations, societal expectations, and educational influences, including curriculum design and pedagogical strategies. In the Maldivian context, data indicate that social media exerts the greatest influence on students' career choices,

followed by family and friends, particularly within island communities (Ministry of Higher Education, 2020a, 2020b). Similarly, a UNDP Maldives initiative aimed at encouraging girls to enter STEM fields revealed limited awareness of STEM careers among female students. Interventions such as coding workshops and exposure to female role models were implemented to address this gap (Koh, Tindall, & Faisal, 2021). However, these external initiatives were not sustained at the school level after project completion. Student interest in pursuing careers in Information and Communication Technology (ICT) remains notably low, reflecting weaknesses in ICT education and the lack of effective career guidance at the secondary school level (Ministry of Higher Education, 2020b).

Gender disparities in subject selection for higher education are also prominent in the Maldives. Boys tend to make subject choices based on personal interests and passion, often receiving encouragement to pursue careers in technology and engineering. In contrast, girls are more likely to follow familial advice and base decisions on the availability of courses either on their home island or nearby communities (Shafina, 2020; Aafal & Bakthavatchaalam, 2023).

Both boys and girls consider the likelihood of achieving high grades in the General Certificate of Secondary Education (GCSE) examinations when selecting their academic stream (Mohamed & Waheed, 2011; Shafina, 2020). For students from low-income backgrounds, achieving top marks in selected International General Certificate of Secondary Education (IGCSE) subjects is a pathway to securing government-funded scholarships for overseas study. Consequently, these students may avoid STEM subjects, as the perceived difficulty and associated costs—such as the need for private tuition—make it more feasible to obtain top grades in business-related subjects.

Cultural expectations regarding traditional gender roles further limit girls' engagement in STEM. The absence of female role models in STEM careers, coupled with gender stereotyping in both school and community settings, contributes to this disparity. Moreover, the limited availability of educational resources for girls, and societal expectations that women remain close to home, discourage girls from selecting science subjects or pursuing careers that require travel and time away from their communities (Aafal & Bakthavatchaalam, 2023).

SOCIAL COGNITIVE CAREER THEORY

The Social Cognitive Career Theory (SCCT), grounded in Bandura's triadic reciprocal model of causality and Krumboltz's learning theory, provides a comprehensive framework for understanding career decision-making through the interplay of cognitive, behavioural, and contextual factors (Hackett & Betz, 1981; Lent, Brown, & Hackett, 1994; Lent & Brown, 2013). The theory is widely employed in research exploring factors that influence students' career interests, underscoring its acceptance and applicability in examining career development processes (Bandura et al., 2001; Lent et al., 1994). However, despite its broad utilisation, SCCT-based studies have often overlooked geographically isolated or culturally homogeneous contexts such as the Maldives. In such settings, distinctive factors—such as limited visibility of STEM careers and geographic dispersion—may significantly influence students' career interests and aspirations.

Self-Efficacy

Self-efficacy refers to an individual's belief in their ability to effectively manage and succeed in various life situations. Informed by sources such as personal accomplishments, vicarious experiences, social persuasion, and emotional states, self-efficacy plays a pivotal role in shaping career-related behaviours and decisions (Bandura, 1994; Bandura et al., 2001). Within the SCCT framework, high levels of self-efficacy in STEM subjects can enhance students' confidence and strengthen their interest in pursuing STEM careers. Numerous studies have underscored the influence of self-efficacy on occupational interests, highlighting its central role in shaping career aspirations (Murcia et al., 2020). However, there remains limited understanding of how self-efficacy is cultivated among students in resource-constrained settings, such as remote islands in the Maldives, where access to STEM role models and educational resources is often limited.

Outcome Expectations

Outcome expectations—defined as beliefs about the likely consequences of specific behaviours—play a critical role in career decision-making. Studies grounded in the SCCT have highlighted the strong predictive value of both self-efficacy and outcome expectations in shaping career interests (Baglama & Uzunboylu, 2017). Positive outcome expectations, when combined with high self-efficacy, can significantly enhance students' interest in particular subjects or career pathways. In contrast, negative outcome expectations—often shaped by factors such as socioeconomic status and gender—may discourage students from pursuing STEM careers, even in cases where they have previously demonstrated success (Shoffner et al., 2015). In the Maldivian context, limited awareness of local STEM career opportunities may contribute to

negative outcome expectations among students, thereby diminishing their interest in STEM fields. Addressing these barriers through targeted interventions, such as increasing visibility of both local and global STEM career pathways, is essential to fostering more informed and positive career outlooks among students.

Contextual Factors

Contextual factors refer to external elements that influence individuals' career choices and developmental pathways. Within the framework of SCCT, such factors—including cultural norms, family background, and access to educational opportunities—play a pivotal role in shaping learning experiences and career trajectories (Lent et al., 1994). Media influences also function as powerful channels for disseminating STEM-related information, significantly affecting students' interests and career aspirations (Venville et al., 2013). In the Maldivian context, geographic dispersion and limited exposure to diverse career options further underscore the importance of contextual factors in influencing students' STEM interests. Students residing on remote islands often lack access to STEM career fairs, extracurricular activities, and professional mentorship. These limitations necessitate targeted policy interventions to bridge the gap and create equitable access to STEM-related opportunities. Such measures are essential in shaping students' beliefs and expanding their awareness of possible career choices.

Personal Goals and Inputs

Personal goals and inputs serve as essential elements in shaping individuals' career pathways by providing direction and a foundational framework for decision-making. In alignment with SCCT, personal goals represent individuals' aspirations and values, guiding their motivation, persistence, and engagement in career-related activities (Lent et al., 2006; Hulleman & Harackiewicz, 2009). Personal inputs—such as interests, values, and skills—further inform individuals' self-assessments and influence the choices they make regarding potential career paths. Although subject to some critique, personal inputs remain integral to understanding career development and informing interventions and educational programmes designed to enhance individuals' career success and satisfaction (Hackett et al., 1992; Lent et al., 2013).

CONCEPTUAL FRAMEWORK

The SCCT framework is a comprehensive model that emphasises the dynamic interaction between cognitive variables (self-efficacy and outcome expectations), personal inputs, and contextual factors in shaping career choices. It posits that learning experiences influence self-efficacy and outcome expectations, which in turn affect individuals' career interests and decisions (Lent et al., 2000). The model also incorporates environmental influences, including support and barriers arising from familial, financial, and educational contexts. However, its application in small, geographically dispersed nations such as the Maldives remains limited, underscoring the need for research that investigates how SCCT can be adapted to suit such unique settings. In this study, the SCCT choice model was employed to examine secondary school students' STEM career interests, focusing on six independent variables: self-efficacy, outcome expectations, contextual factors, interest in STEM subjects, personal inputs, and personal interest. The dependent variable was students' STEM career interest. Through the examination of these factors, the study aimed to offer a comprehensive understanding of the determinants influencing STEM career interest among secondary students. This research contributes to the advancement of SCCT by exploring its applicability within the distinctive context of the Maldivian education system, thereby addressing a critical gap in the existing literature.

RESEARCH DESIGN

A mixed-methods research approach was employed in this study, combining the STEM Career Interest Survey (STEM-CIS) with small focus group discussions. Data were collected between September and December 2023 from seven schools located in Malé and Hulhumalé. The STEM-CIS consists of 44 items, divided into four subscales—Science, Technology, Mathematics, and Engineering—with each subscale comprising 11 items. Students responded using a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). Although no major cultural or contextual modifications were made to align the STEM-CIS with the Maldivian education system, the instrument was pilot tested with a small group of Maldivian students. Feedback obtained on the clarity and relevance of items led to minor wording adjustments, particularly to incorporate local terminology and educational norms. These adaptations ensured that the instrument was appropriately contextualised while maintaining its original structure and psychometric integrity. The survey was found to retain its reliability and validity within the Maldivian context.

Focus Group Discussions

Five focus group discussions were conducted, each comprising four to seven students of mixed gender and

grade levels (Grades 7 and 8) from the same school. This structure facilitated open dialogue and deeper exploration of the factors influencing students' interest in STEM careers. Participants were selected through convenience sampling from among those who had completed the survey. Teachers nominated students based on their demonstrated interest in the topic, active involvement in extracurricular activities, and availability of parental consent.

Validity

The internal consistency of the STEM-CIS was assessed using Cronbach's alpha. The overall Cronbach's alpha coefficient for the six constructs measured in the study was 0.899, indicating a high level of reliability, as values above 0.70 are generally considered acceptable (Gliem & Gliem, 2003). When examined individually, the coefficients for the subscales were: self-efficacy (0.747), outcome expectations (0.740), personal goals (0.777), interest in STEM subjects (0.816), contextual support (0.572), and personal inputs (0.658). While most subscales demonstrated acceptable reliability, contextual support and personal inputs fell below the conventional threshold. Nevertheless, these constructs were retained due to their conceptual relevance to the research aims, despite indicating areas for potential refinement in future applications. The item-total correlations for all constructs remained above the minimum acceptable threshold of 0.30, supporting the reliability of the individual item constructions (Gliem & Gliem, 2003). Although the removal of certain items from the contextual support and personal input subscales would have improved their respective Cronbach's alpha values, these items were retained due to their conceptual importance and relevance to the research focus.

A concurrent triangulation design was employed in this study, whereby quantitative and qualitative data were collected and analysed simultaneously and integrated during interpretation to enhance the robustness of the findings. Specifically, qualitative data were used to contextualise and explain patterns identified in the quantitative results, thereby offering a more nuanced understanding of students' STEM career interests. This approach aligns with Creswell's (2013) recommendations for achieving well-validated results. Moreover, data triangulation across multiple participant settings—including students from different schools—further enhanced the reliability of the study (Zohrabi, 2013).

Data analysis

Quantitative data from the STEM-CIS survey were analysed using IBM SPSS Version 25. The analysis included descriptive statistics, correlation analysis, and multiple regression to examine STEM career interest and its influencing factors. Demographic variables were analysed using chi-square tests and the Mann–Whitney U test (Zohrabi, 2013). The reliability of the quantitative data was assessed using Cronbach's alpha (Gliem & Gliem, 2003), while Spearman's rank correlation was used to examine associations between variables (Pallant, 2020). The analysis was guided by the study's objectives, which included: investigating the level of STEM career interest among secondary school students; exploring key influencing factors; examining associations with demographic variables; and identifying gender differences. The Kruskal–Wallis test was applied to compare factors influencing career interest across gender groups, thereby offering comprehensive insights into the determinants of STEM career interest among Maldivian secondary school students. For the qualitative component, validity was ensured through rapport-building during focus group discussions, member checking with participants, and an external audit process (Creswell, 2013).

Ethical Considerations

The study adhered to established ethical guidelines, with particular attention to participant privacy, anonymity, and confidentiality. Approval to conduct the research was obtained from the Ministry of Education in early January 2023. No personal data were collected from participants. Online parental consent was obtained for student participation, while verbal consent was acquired from the students themselves for both the survey and focus group discussions. All consent documentation was securely stored.

FINDINGS

The normality test, conducted using the Shapiro-Wilk test, revealed significant results for the variables. The obtained p-values were .000 for science, .006 for technology, .008 for engineering, and .014 for mathematics, all indicating deviations from normal distribution, as they fell below the chosen significance level of 0.05. This suggested that caution should be exercised when relying on normality assumptions in subsequent statistical analyses.

DESCRIPTIVE AND INFERENTIAL ANALYSIS

Demographic Analysis

Of the 268 students who completed the survey, 55%

were girls and 45% were boys. The majority of respondents (62%) had lived in the Greater Malé City area for over 11 years, while 4% had resided there for less than one year. Most students reported family sizes ranging from five to seven members, with some from larger households. This demographic variable was considered relevant because, in the Maldivian context, students' exposure to STEM careers may be influenced by the professional engagement of extended family members in STEM-related occupations.

STEM Career Interest by Gender and by School Subject Studied

Table 1: Career interest in STEM Subjects

Report

Gender		Science	Math	Technology	Engineering
Male	Mean	3.7536	3.559	3.9482	3.5875
	N	121	121	121	121
	Std. Deviation	.75116	.75100	.61990	.87095
	Range	2.82	3.82	2.73	3.64
	Std. Error of Mean	.06829	.06827	.05635	.07918
	Variance	.564	.564	.384	.759
	Kurtosis	-.985	.913	-.555	-.424
	Std. Error of Kurtosis	.437	.437	.437	.437
	Skewness	-.278	-.675	-.166	-.277
	Std. Error of Skewness	.220	.220	.220	.220
Female	Mean	3.7112	3.243	3.6116	2.8231
	N	147	147	147	147
	Std. Deviation	.7788	.8128	.6255	.7876
	Range	3.27	3.55	3.36	3.91
	Std. Error of Mean	.06424	.06704	.05159	.06496
	Variance	.607	.661	.391	.620
	Kurtosis	-.073	-.605	-.544	-.161
	Std. Error of Kurtosis	.397	.397	.397	.397
	Skewness	-.623	.004	-.478	.232
	Std. Error of Skewness	.200	.200	.200	.200
Total	Mean	3.7303	3.3857	3.7636	3.1682
	N	268	268	268	268
	Std. Deviation	.76532	.79971	.64403	.90848
	Range	3.27	3.82	3.45	4.00
	Std. Error of Mean	.04675	.04885	.03934	.05549
	Variance	.586	.640	.415	.825
	Kurtosis	-.438	-.264	.176	-.569
	Std. Error of Kurtosis	.297	.297	.297	.297
	Skewness	-.477	-.290	-.308	.920
	Std. Error of Skewness	.149	.149	.149	.149

Analysis of STEM career interest by gender and subject area revealed notable differences. Among boys, the highest level of interest was in technology-related careers, followed by science, with mathematics receiving the lowest interest. Girls showed the greatest interest in science careers, followed by technology, with the lowest interest in engineering. Notably, girls' interest in mathematics careers was even lower than that of boys. These findings suggest the need for improvements in the quality of mathematics instruction and curriculum design, to better illustrate the practical application of mathematics in various careers. Furthermore, the low interest in engineering among both genders may be attributed to a lack of exposure to engineering as a school subject or career pathway. This highlights the importance of targeted interventions to increase students' awareness of and engagement with engineering-related opportunities.

Gender Differences in STEM Subject Interest

The Mann–Whitney U test was conducted to compare levels of interest in the four STEM subjects across gender categories. The significance level for science was 0.768, indicating no statistically significant difference in the distribution of science interest scores between boys and girls. In contrast, the significance levels for mathematics ($p = 0.001$), technology ($p = 0.000$), and engineering ($p = 0.000$) revealed statistically significant differences in the distribution of interest scores between genders. These findings suggest that gender plays a significant role in shaping students' interest in mathematics, technology, and engineering, but not in science.

The Kruskal–Wallis test was also conducted to determine whether there were differences in subject interest across gender groups. The results showed a p-value of 0.001 for mathematics, and 0.000 for both technology and engineering, indicating significant differences in the median interest scores for these subjects across gender groups. Conversely, the p-value for science was 0.768, again suggesting no significant difference between boys and girls in science interest. These findings corroborate the results of the Mann–Whitney U test, offering further support for the presence of gender-based differences in subject-specific interest, particularly in mathematics, technology, and engineering.

Spearman Correlation Test

A Spearman correlation analysis was conducted to examine the relationship between students' STEM career interest and their interest in individual STEM subjects.

Table 2: Nonparametric Correlation between STEM Career Interest and STEM Subject Interest

Correlation

			StemCI	Science	Math	Technology	Engineering
Spearman's rho	StemCI	Correlation Coefficient	1.000	.714**	.741**	.700**	.759**
		Sig. (2-tailed)	.	0.000	0.000	0.000	0.000
		N	268	268	268	268	268
	Science	Correlation Coefficient	.714**	1.000	.410**	.389**	.329**
		Sig. (2-tailed)	0.000	.	0.000	0.000	0.000
		N	268	268	268	268	268
	Math	Correlation Coefficient	.741**	.410**	1.000	.361**	.418**
		Sig. (2-tailed)	0.000	0.000	.	0.000	0.000
		N	268	268	268	268	268
	Technology	Correlation Coefficient	.700**	.389**	.361**	1.000	.447**
		Sig. (2-tailed)	0.000	0.000	0.000	.	0.000
		N	268	268	268	268	268
	Engineering	Correlation Coefficient	.759**	.329**	.418**	.447**	1.000
		Sig. (2-tailed)	0.000	0.000	0.000	0.000	.
		N	268	268	268	268	268

* Correlation is significant at the **0.01 level (2-tailed)**.

The Spearman rank correlation results (as shown in Table 2) indicate the relationship between students' STEM career interest and their interest in individual STEM subjects. A strong positive correlation was observed for

science (r = .714), mathematics (r = .714), technology (r = .700), and engineering (r = .759). These coefficients suggest that as students' interest in STEM careers increases, their interest in the respective STEM subjects also rises. This finding implies that fostering interest in STEM careers may enhance students' engagement with STEM subjects. The strength of the correlations further underscores the interdependence between subject-specific interest and career aspirations in STEM.

FACTORS INFLUENCING SECONDARY SCHOOL STUDENTS STEM CAREER INTEREST

This section presents an analysis of how six key factors influenced students' STEM career interest. The factors examined were: personal goals, interest in STEM subjects, contextual support, outcome expectations, personal inputs, and self-efficacy. As the dataset was not normally distributed, the Spearman rank correlation was used to assess these relationships.

To ensure the validity of the statistical inferences, several assumptions were examined: linearity, independence of errors, absence of multicollinearity, and normality of residuals (Zohrabi, 2013; Neuman, 2013).

a. Multicollinearity

The data presented in Table 4 indicate a high degree of multicollinearity between the independent variables and the dependent variable (STEM career interest). The highest correlation was observed between personal goals and STEM career interest (r = .896), while the lowest was between contextual support and STEM career interest (r = .710). According to Pallant (2016), while a moderate correlation (above .30) between independent and dependent variables is desirable, excessively high correlations (above .70 or .80) may raise concerns about multicollinearity, potentially undermining the reliability of the regression analysis.

To further assess the presence of multicollinearity, a collinearity diagnostic was conducted. This test is designed to detect multicollinearity issues that may not be readily apparent through the correlation matrix alone, providing a more robust evaluation of inter-variable relationships.

Table 3: Correlation analysis of influencing factors, and student STEM career interest

		StemCI	SelfEfficacy	PersonalGoal	OutcomeExpectation	InterestInStemSubject	Contextual Support	PersonalInp
Pearson Correlation	StemCI	1.000	.835	.896	.831	.885	.710	.7
	SelfEfficacy	.835	1.000	.751	.605	.670	.492	.5
	PersonalGoal	.896	.751	1.000	.758	.816	.467	.5
	OutcomeExpectation	.831	.605	.758	1.000	.716	.460	.5
	InterestInStemSubject	.885	.670	.816	.716	1.000	.495	.6
	ContextualSupport	.710	.492	.467	.460	.495	1.000	.5
	PersonalInput	.729	.553	.556	.514	.613	.507	1.0
Sig (1-tailed)	StemCI	.	.000	.000	.000	.000	.000	.0
	SelfEfficacy	.000	.	.000	.000	.000	.000	.0
	PersonalGoal	.000	.000	.	.000	.000	.000	.0
	OutcomeExpectation	.000	.000	.000	.	.000	.000	.0
	InterestInStemSubject	.000	.000	.000	.000	.	.000	.0
	ContextualSupport	.000	.000	.000	.000	.000	.	.0
	PersonalInput	.000	.000	.000	.000	.000	.000	
N	StemCI	268	268	268	268	268	268	2
	SelfEfficacy	268	268	268	268	268	268	2
	PersonalGoal	268	268	268	268	268	268	2
	OutcomeExpectation	268	268	268	268	268	268	2
	InterestInStemSubject	268	268	268	268	268	268	2
	ContextualSupport	268	268	268	268	268	268	2
	PersonalInput	268	268	268	268	268	268	2

Table 4: Collinearity diagnostic of factors influencing STEM career and STEM career interest

Coefficients[a]

Mode		Unstandardized Coefficients		Standard Coefficients			95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.331E-15	.000		.000	1.000	.000	.000					
	SelfEfficacy	.182	.000	.210	88974836.5	.000	.182	.182	.835	1.000	.132	.396	2.52
	PersonalGoal	.182	.000	.222	70486620.2	.000	.182	.182	.896	1.000	.105	.223	4.49
	OutcomeExpectation	.182	.000	.202	84874874.8	.000	.182	.182	.831	1.000	.126	.389	2.57
	InterestInStemSubject	.182	.000	.223	79435209.0	.000	.182	.182	.885	1.000	.118	.280	3.57
	ContextualSupport	.182	.000	.233	127241716	.000	.182	.182	.710	1.000	.189	.656	1.52
	PersonalInput	.091	.000	.130	64901295.2	.000	.091	.091	.729	1.000	.096	.549	1.82

a. Dependent Variable: StemCI

b. Spearman Rank

This diagnostic test was conducted to further analyse the relationship between STEM career interest and the identified influencing factors, ensuring the robustness of the regression model by checking for potential multicollinearity among the independent variables.

Table 5: Relationship between stem career interest and influencing factors

Correlation

			StemCI	Personal Goal	InterestInStemSubject	ContextualSupport	Outcome Expectation	PersonalInput	SelfEfficacy
Spearman's rho	StemCI	Correlation Coefficient	1.000	.894**	.872**	.721**	.798**	.741**	.813**
		Sig. (2-tailed)	.	0.000	0.000	0.000	0.000	0.000	0.000
		N	268	268	268	268	268	268	268
	PersonalGoal	Correlation Coefficient	.894**	1.000	.811**	.493**	.732**	.576**	.724**
		Sig. (2-tailed)	0.000	.	0.000	0.000	0.000	0.000	0.000
		N	268	268	268	268	268	268	268
	InterestInStemSubject	Correlation Coefficient	.872**	.811**	1.000	.504**	.676**	.624**	.640**
		Sig. (2-tailed)	0.000	0.000	.	0.000	0.000	0.000	0.000
		N	268	268	268	268	268	268	268
	ContextualSupport	Correlation Coefficient	.721**	.493**	.504**	1.000	.464**	.499**	.489**
		Sig. (2-tailed)	0.000	0.000	0.000	.	0.000	0.000	0.000
		N	268	268	268	268	268	268	268
	OutcomeExpectation	Correlation Coefficient	.798**	.732**	.676**	.464**	1.000	.522**	.576**
		Sig. (2-tailed)	0.000	0.000	0.000	0.000	.	0.000	0.000
		N	268	268	268	268	268	268	268
	PersonalInput	Correlation Coefficient	.741**	.576**	.624**	.499**	.522**	1.000	.559**
		Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	.	0.000
		N	268	268	268	268	268	268	268
	SelfEfficacy	Correlation Coefficient	.813**	.724**	.640**	.489**	.576**	.559**	1.000
		Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	.
		N	268	268	268	268	268	268	268

. Correlation is significant at the **0.01 level (2-tailed).

As shown in Table 5, all six factors demonstrated positive correlations with STEM career interest. Contextual support ranked the lowest, while personal goals exhibited the strongest association. The correlation coefficient between STEM career interest and personal goals was 0.894, indicating a very strong positive relationship. Similarly, a strong positive correlation was observed between STEM career interest and interest in STEM subjects (r = 0.872), suggesting that increased subject interest is associated with heightened interest in STEM careers.

A correlation coefficient of 0.813 was recorded between STEM career interest and self-efficacy, further highlighting a strong positive relationship. This finding implies that students with greater confidence in their abilities to perform STEM-related tasks are more likely to express strong interest in pursuing STEM careers. The correlation between STEM career interest and contextual support was 0.721, reflecting a moderate positive

correlation. This suggests that students who perceive greater levels of support from their environment—such as families, communities, and schools—are more likely to develop an interest in STEM careers.

The correlation coefficient between STEM career interest and outcome expectations was 0.798, indicating a strong positive relationship. This suggests that students who anticipate positive outcomes from pursuing STEM careers are more likely to express interest in such fields. Finally, the correlation between STEM career interest and personal inputs was 0.741, also reflecting a moderate positive relationship. This indicates that students who view themselves as actively involved in STEM-related decisions or activities are more likely to pursue STEM career paths.

The comparatively lower correlation between contextual support and STEM career interest may reflect the limited support students receive from families, schools, and the wider community in cultivating career interest. This includes limited exposure to STEM role models, a lack of field visits to STEM-related faculties, institutions, or workplaces, and insufficient participation in STEM fairs or outreach programmes—factors that could otherwise enhance students' career awareness and motivation.

Comparative Analysis of How the Career Interest of Male and Female Students was Influenced by the Six Factors Investigated

The Kruskal–Wallis test was conducted to determine whether there were statistically significant differences across gender groups in relation to the six factors influencing STEM career interest. The p-values were as follows: self-efficacy (.000), personal goals (.000), interest in STEM subjects (.000), personal input (.000), and outcome expectations (.001). These results indicate significant differences in the median scores for five of the six factors across gender groups. Given the extremely low p-values, it is unlikely that these results occurred by chance, suggesting that gender significantly influences these factors. It can therefore be inferred that gender-related differences contribute meaningfully to variation in students' career-related beliefs, motivations, and aspirations.

In contrast, the p-value for contextual support was 0.23, indicating no significant difference in median scores between male and female students for this factor. This suggests that the perceived level of contextual support—whether from family, school, or community—is similarly limited for both boys and girls, underscoring a broader issue of insufficient environmental support for STEM engagement among all students.

QUALITATIVE INSIGHTS

The qualitative data analysis explored six key constructs derived from Lent et al.'s Social Cognitive Career Theory (SCCT) to gain deeper insights into students' perceptions and experiences relating to STEM career interest.

Self-efficacy beliefs emerged as a prominent theme. Many students expressed positive attitudes towards STEM subjects—particularly science—citing ease of understanding and alignment with future career aspirations as motivating factors. Although less common, some students reported negative beliefs about their abilities in STEM, often related to the perceived difficulty of these subjects, which in turn influenced their consideration of STEM-related career paths.

Personal goals were identified as central guiding principles in students' career planning. Marine biology, for example, emerged as a popular aspiration, particularly among female participants, reflecting both personal interests and alignment with environmental and cultural contexts.

Outcome expectations were primarily framed around financial security and personal fulfilment. Students frequently mentioned career prospects, earning potential, and alignment with personal interests as significant factors shaping their aspirations.

Interest in STEM subjects was largely driven by individual preferences and perceived ease of learning, underscoring intrinsic motivation as a key influence. Meanwhile, contextual support encompassed a range of external influences, including family dynamics, teacher encouragement, media exposure, and the availability of career guidance. These diverse influences contributed to students' evolving career trajectories and interests.

The analysis also revealed notable **gender differences** in STEM career interests. Girls tended to demonstrate higher self-efficacy beliefs in science, while boys exhibited stronger self-efficacy in engineering and computing—patterns consistent with findings from prior studies (Wang, Ye, & Degol, 2017). These differences in perceived ability likely contribute to the gender-based variations observed in STEM career aspirations. For instance, girls commonly expressed interest in marine biology, whereas boys showed a marked preference for engineering and computing, reflecting broader societal norms and expectations. Additionally, girls articulated concerns about discomfort in male-dominated STEM fields, suggesting that societal pressures and outcome expectations influence their career considerations. Boys' preferences, on the other hand, appeared more strongly aligned with traditionally masculine domains within

STEM. Despite these gendered trends, both boys and girls shared similar views regarding contextual factors, particularly emphasising the importance of parental involvement and internet-based information in shaping their career interests.

Overall, the qualitative findings highlighted students' perceptions of the cognitive demands and intellectual stimulation offered by STEM subjects in contrast to non-STEM disciplines. These perceptions influence both subject preferences and long-term career aspirations. As such, educators and policymakers must promote inclusivity and ensure equal access to STEM opportunities, particularly by addressing gender disparities. Understanding students' preferences—such as girls' interest in non-traditional STEM fields like marine biology and boys' inclination towards engineering—can inform the development of more targeted, equitable, and effective STEM engagement strategies.

DISCUSSION

STEM subject interest was found to significantly correlate with STEM career interest, underscoring the importance of subject preference in career decision-making. To build on this relationship, schools should encourage early exploration of STEM subjects by offering extracurricular activities that integrate artistic, creative, and unconventional approaches—such as combining art with mathematics and science (Arias-Alfonso & Franco, 2021). Initiatives such as coding clubs, engineering challenges, and interdisciplinary projects—such as linking Dhivehi literacy with science—can foster engagement and broaden understanding of STEM applications. Field visits to STEM workplaces, guest lectures by professionals, and exposure to visual media and online resources can make such activities accessible to students across the archipelago, including those in remote areas.

Although gender disparities were evident in interest-related factors, both boys and girls expressed a strong interest in science subjects. However, boys demonstrated greater interest in technology and engineering careers. To address this imbalance, targeted STEM outreach campaigns should be developed that promote diverse career opportunities across all STEM fields. These campaigns should be gender-responsive and tailored to engage both male and female students, helping to balance interest and participation in under-represented STEM areas.

The study also found that the length of residence in the Greater Malé Region significantly influenced students' interest in STEM careers. Students who had lived in the capital for over a year reported higher levels of STEM interest compared to recent residents. This suggests that Malé provides more extensive exposure to STEM-related opportunities, highlighting urban–rural disparities in access to STEM education and career resources. This finding aligns with previous research indicating that girls from higher socio-economic backgrounds and urban areas often have better access to and performance in STEM education compared to peers from rural or lower socio-economic backgrounds. Addressing this disparity requires affirmative policy interventions that expand access to STEM programmes and resources in under-represented rural areas, including through school-based outreach and national equity initiatives.

Self-efficacy beliefs also emerged as a significant factor associated with STEM career interest. Students with stronger self-efficacy reported greater interest in STEM careers, a relationship further supported by qualitative data in which students linked their confidence in science to future career aspirations. This finding is consistent with earlier research (Murcia et al., 2020) and highlights the importance of strengthening students' confidence in their STEM capabilities. Interventions such as STEM workshops, exposure to role models, and hands-on learning experiences can be instrumental in enhancing self-efficacy. Given the observed gender gap—where girls demonstrated higher confidence in science and boys in engineering and computing—interventions should aim to bolster girls' confidence across all STEM subjects, and encourage boys in areas such as mathematics and engineering, to narrow gender-based disparities.

Students also demonstrated a clear inclination towards careers aligned with their personal interests rather than those driven solely by financial outcomes. This highlights the importance of career guidance programmes that not only present financial prospects but also prioritise personal satisfaction, intrinsic motivation, and alignment with individual passions and talents.

Personal inputs, such as parental influence and individual preferences, were particularly influential—especially among girls. Many female participants reported career interests that were shaped by parental guidance. Mentorship programmes for girls, particularly those lacking family backgrounds in STEM, could help cultivate broader career interests, especially in traditionally under-represented fields such as mathematics and engineering.

Although contextual support showed the lowest correlation with STEM career interest, it was still statistically significant. Internet-based resources emerged as particularly influential. This highlights the potential of digital platforms in delivering accessible, engaging STEM content and career guidance. Schools and communities could partner with online STEM initiatives to enhance outreach and accessibility, ensuring all students—regardless of geographic location—can access quality

STEM education and guidance.

CONCLUSION

This study underscores the importance of accounting for a range of factors—such as socio-economic background and geographical location—when promoting STEM career awareness among secondary school students. Although gender disparities were evident, all career interest factors demonstrated significant relationships with STEM career interest, highlighting their collective influence. By addressing systemic barriers such as geographic isolation and gender-based inequities, alongside individual-level influences like self-efficacy and personal inputs, educators and policymakers can design more inclusive and effective interventions.

The findings also highlight the necessity of exploring both the individual and combined effects of factors influencing STEM career interest, in order to develop nuanced and targeted approaches. The role of media—particularly the internet—was reaffirmed as a powerful influence on students' career aspirations, aligning with previous research. Moving forward, focused efforts are needed to address both systemic and individual-level obstacles. This includes improving the curriculum to foster students' interest in STEM careers, actively involving parents in guiding children's understanding of STEM opportunities, and equipping teachers with the skills to deliver effective career guidance. Greater emphasis should be placed on exposing students in lower secondary grades (Grades Seven and Eight and younger) to STEM pathways, particularly through integrative approaches that combine art, engineering, and mathematics.

IMPLICATIONS

The findings of this study have important implications for a range of stakeholders, including policymakers, educators, parents, and students. A deeper understanding of the factors that shape STEM career interest can inform curriculum development, targeted interventions, and the design of effective career guidance programmes. For instance, integrating STEM career education into middle school curricula can cultivate early awareness of STEM-related opportunities and pathways.

Educational agencies can use these insights to motivate students and increase participation in STEM activities, contributing to the development of a skilled future workforce capable of advancing innovation and addressing national priorities in science and technology. Teacher training programmes should incorporate modules on STEM career guidance, equipping educators with the tools and strategies to nurture student interest. Furthermore, digital platforms and internet resources should be leveraged to provide accessible career information—particularly valuable for students in geographically dispersed communities.

In addition, career guidance services should be embedded as a mandatory component within schools, supported by organised visits to workplaces and higher education institutions that offer STEM programmes. These efforts can broaden students' perspectives and inspire informed career choices.

To ensure more aligned and effective outcomes, it is essential for the Ministry of Higher Education to prioritise updated research on students' career interests, as well as national skills training and labour market assessments. Such data will provide a robust foundation for developing education and workforce policies that respond to both national and global STEM demands.

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This study was conducted in accordance with the ethical guidelines outlined in the Villa College Research Policy and the Ministry of Education regulations for research involving human participants. Ethical approval was granted by the relevant authorities in January 2023.

DATA AVAILABILITY STATEMENT

The data presented in this study are available on request from the corresponding author due to privacy and institutional restrictions.

DISCLOSURE STATEMENT

The authors declare no conflict of interest.

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