

FACTOR INFLUENCING MALAYSIAN FEMALE UNDERGRADUATES' INTERESTS TO PURSUE CAREERS IN STEM-RELATED FIELDS

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ABSTRACT

Female students' experiences are unique since they are more challenging than their male classmates, which contributes to their decision-making, thus affecting gender disparities in STEM higher education. The STEM fields are consistently underrepresented in female participation since it appears that female students do not view them as career preferences. A sizeable chunk of female graduates opts not to actively seek employment after graduation due to housework or family responsibility in Malaysia. To eliminate the gender disparity in the STEM workforce, there needs to be a clear understanding of factors influencing the students' career perspectives. Recent studies have been reviewed to outline the factors demotivating Malaysian female undergraduates' interests in pursuing careers in STEM-related fields. A combination of the confidence factors and the external factors has been identified and discussed. The identified factors have been used to develop a comprehensive conceptual framework. Using these findings, we can design a comprehensive study to investigate gender disparities in STEM career perspectives for female undergraduate students in Malaysia.

Keywords: STEM, Female undergraduate, STEM career, gender disparities, Malaysia

INTRODUCTION

Malaysia is one of the frontrunners in enrolling females into STEM-based programmes, they often even outnumber males. Still, that success is not long-lasting as it deteriorates very quickly towards completion of the higher degrees and transitioning to the STEM workforces. Meanwhile, according to financial data, Malaysia would require approximately eight million STEM based workers by 2050, but "Malaysia is suffering from STEM talent depletion due to lack of interest in STEM among students" (Tey et al., 2019). The situation seems to be dire for women than for men. In average 30% less women join the STEM working pipeline after graduation than man (Teng, 2021). A third of the engineering, construction, and manufacturing courses in Malaysia were enrolled by women, yet only 7% of the female engineers that hold practicing certificates are female (SWE, 2021). Moreover, on average, women in STEM jobs are more likely to report discrimination at work based on their gender than males. One-half of women in STEM occupations say they have experienced at least one form of discrimination in the workplace due to their gender (Funk & Parker, 2020). Due to these male-dominated industries in Malaysia, women trying to break through these barriers mean they need to work harder (Rahim et al., 2017).

Coupled with the professional gender bias, females often get extra pressured for taking care of their families and birthing-rearing children, which further hinders their career options in a rigorous field like STEM (Kossek et al., 2021). According to the Department of Statistics in Malaysia, a sizeable chunk of female graduates opts not to actively seek for employment after graduation due to housework or family responsibility in Malaysia (DOS, 2020). It seems like female students do not regard STEM fields as career preferences making the STEM fields one of the persistently underrepresented in female participation (Rahim et al., 2019). When women have more socio-cultural commitments than men, do they have the leverage to work more than needed? Research on the interest among students to pursue STEM fields is therefore of great importance at this point.

Female students' experiences are unique since they are more challenging than their male classmate, which contributes to their decision-making, thus affecting gender disparities in STEM higher education. Identifying the core issues is essential to understanding female undergraduates' current standing in pursuing STEM careers. Overcoming gender stereotypes and addressing cultural expectations are critical in encouraging young women to explore and pursue STEM careers without being stymied by preconceived preconceptions. Consider the intersectionality of factors such as socioeconomic status and cultural influences. According to studies, resolving inequities in access to education and resources across demographic groups is critical for creating a level playing field and ensuring that all female students have equal opportunities to explore and choose STEM careers. Recognising the diverse nature of factors impacting female students' career choices can help to create a more fair and inclusive landscape, encouraging female students to make educated and fulfilling career choices in STEM and other fields.

To eliminate the gender disparity in the STEM workforce, there needs to be a clear understanding of factors influencing the students' career perspectives. In recent years, a large amount of research has been conducted concerning STEM students and females worldwide. But, exploring gender disparity in STEM from the female undergraduates' career perspective in the Malaysian context is less explored. For that reason, this paper attempts to examine the following research question: *What are the factors demotivating Malaysian female undergraduates' interests to pursue careers in STEM-related fields?*

As discussed, researchers in other countries have been putting efforts to explain the unwillingness of female students toward STEM higher studies as per their social paradigms. There seems to be a missing cord that requires more research-based efforts to diagnose the issues hindering female participation in STEM in Malaysia. A combination of the confidence factors and the external factors; has largely remained unexplored in the Malaysian context. This review article is an attempt to understand the factors contributing

to female Malaysian students' interest in pursuing a STEM career. In this discussion, the factors identified by various studies that affect female students' career choices and decisions are outlined namely interest to pursue STEM career, confidence and external factors. Henceforth, following is the discussion from the preceding relevant literature reviewed.

INTEREST TO PURSUE STEM CAREER

It is reported that only half of the students who enrol in STEM major graduates with STEM degree while others either do not complete or often move to non-STEM majors (B, Wernick, & Ledley, 2020). The rest manage to get the degree scarcely transit into the career fields in STEM (Kossek et al., 2021). A Study of 738 Singaporeans by Nanyang Technological University (NTU) found that 58% of women who graduate with a degree in science or technology pursue careers related to their field, compared to 70% of men (Teng, 2021). Female participation in STEM has been portrayed similarly in several reports showing alarmingly low levels of female entry into STEM careers (UNESCO, 2015; GET, 2021; UNESCO, 2017; UNICEF & ITU, 2020; SWE, 2021). Globally the interest to pursue STEM students are gaining concerns in academic literature as this can help to understand the reasons for low participation by females. The following discussion illustrates the notable studies done on the interest in-STEM outside Malaysia in recent times.

Table 01: Overview of selected studies on STEM interests globally.

No.	Title	Author	Published year	Publication	Study Area
1	A study of factors affecting women's lived experiences in STEM	Prieto-Rodriguez, E., Sincock, K., Berretta, R., Todd, J., Johnson, S., Blackmore, K., Gibson, L.	2022	Humanities and Social Sciences Communications	Australian women employed in STEM career
2	Using design thinking to encourage girls' participation in STEM	Kijima, R., Yang-Yoshihara, M., & Maekawa, M.	2021	International Journal of STEM Education	Japanese female 13 to 18 years of age, participating in a STEM based workshop.
3	Critical contributions to scholarship on women and work: Celebrating 50 years of progress and looking ahead to a new decade.	Flores, L. Y., Settles, I., McGillen, G. G., & M.Davis, T	2021	Journal of Vocational Behavior	women labour force participation depicted academic scholarships
4	SES, Gender, and STEM Career Interests, Goals, and Actions: A Test of SCCT	Turner, S. L., Joeng, J. R., Sims, M. D., Dade, S. N., & Reid, M. F.	2019	Journal of Career Assessment	Both men and women Mexican American middle school students
5	Persistence and representation of women in STEM programs	Wall, K.	2019	The Statistics Canada	Canadian STEM females undergraduate
6	Gendered Pathways to Science: The Perceived Impact of Social Ties and Individual Preferences.	Danilo, E., Shi, Y., & Pflaumer, G.	2018	Columbia Undergraduate Research Journal	American College students on STEM
7	Gender differences in high school students' interest in STEM careers: a multi-group comparison based on structural equation model	Wang, N., Tan, AL., Zhou, X. et al.	2023	International Journal of STEM Education	1240 high school students from Hunan Province, China.

A Study from Croatia suggests that interpersonal factors influence students' career choices, where students may simply be not interested in STEM (Wüst & Šimić, 2017). Investigation on American female students depict those negative experiences shared by other women who entered STEM fields and the fear of facing gender-biased or discriminatory attitudes are some of the reasons they get demotivated toward STEM-related courses (Bohanna, 2016). One classic example in most studies cites Lester's work from 2010, who interviewed women in traditionally male-dominated fields of study. He concluded that negative classroom experiences regarding their gender and lack of institutional or emotional support make it harder for women to be steadfast in these fields. Sadly, the situation has not improved much over the years.

Katherin wall (2019), a researcher from the Centre for Education Statistics in Canada, performed a statistical analysis to examine the trend of STEM women undergraduates leaving their degree or changing majors into non-STEM subjects. She utilised persistence as an indicator to explain "the educational trajectory of women in STEM fields". It was a longitudinal (5 years) analysis of data from education and labour market platforms and Postsecondary Student Information System (PSIS) in Canada. Any girls who were enrolled in STEM subjects during their under-graduation from 2010 was included and traced up until their graduation

in 2015. The study concludes that women are less likely to persist in STEM subjects. The finding which was particularly interesting for the sake of this research, as quoted, “women with STEM degrees are less likely to work in science and technology occupations than men with the same degrees” (Wall, 2019). The research also recommended that to understand the underrepresentation of females in STEM labour market, researchers should focus on the transition of post-secondary education to labour market and “could examine the reasons for women’s and men’s choices”.

Interest in STEM careers was likewise measured by a group of USA-based researchers for both men and women Mexican American middle school students (Turner et al., 2019). They have examined factors like socioeconomic statuses, self-efficacy and parent-peer supports resulting in the STEM career development perception of the high schoolers. Additionally, they have also sectioned how the results vary differently for females. 366 participants of 10th to 12th graders from a mid-Western metropolitan area in the USA filled out an online survey in a group of 45-80 students in a school computer lab classroom setup. According to their findings, they believe that, when the self-efficacy and expectations of students were solely measured, the results were very promising, but when the other factors like father support, mother support, and socioeconomic constraints were added the interest inevitably plunges. They quoted “results of this research also show that father, mother, and peer support negatively covaried with barriers, indicating that this type of support can lessen their impact”. The gender in this research was utilised as the control variable to examine efficacy and outcome expectations only and concluded that the relationship of gender with career choices was not significant.

Nevertheless, most research have conferred noteworthy impact of gender playing key role, when amalgamated with several factors, do tend to affect the career interests in undergraduates. The researcher trio Danilo, Shi, and Pflaumer (2018) from Columbia University in US conducted a similar survey to offer an insight of the determining factors that influence the students to “chose and continued to study STEM at college”. They have also efforted to sketch if these perceived determinants vary with gender. Their conclusion was affirmative to our research concern, that even though individual preference does not differ with gender with regards to STEM, their interest perception significantly changes in effect to their social environment. This study investigates the interest towards STEM of college student by taking several factors into consideration like Personality tests, perceived interest and performances and social environment (school, parents, peer influence). The research’s findings highlighted significant disparity in how man and woman perceive their social network support. Most women have reported negative support from parents, friends, and community where most men reported to have positive supports. Flores et al. (2021) employed multicultural and intersectional feminist perspective to undertsnd the context of women labour force participation. They identifies five variables, namely labor empowerment, work climate, interpersonal mistreatment, multiple roles and mentorship, as external factors that prominently effect the work decision of women in STEM fields. Another study (Prieto-Rodriguez, et al., 2022) on 25 Australian women employed in STEM field reveals that, apart from strong interest in STEM, resilient or persistence was an important component for them to survive the STEM career. Even though, each of them had their own unique journey, but all of them reported having experience of similar social pressures. A similar pattern was depicted earlier as well. Using multinomial logistic regression analysis, four psychology academics examined the survey data of 696 female college students majoring in STEM in Midwestern States in US (Wang et al., 2017). Their paper termed interest to pursue STEM career as “female students' transfer intent”. The paper considered three factors: motivational, contextual, and socio-demographic background and each of these factors has a set of variables that were measured in a quantitative analysis. Their variable included self-efficacy beliefs, racial/ethnic backgrounds, marital status, and childcare obligation. When their intent to transfer was measured from the self-efficacy scale, the result came out significantly positive. Yet ethnicity and gender showed influence over the participants perception as explained, “despite the positive relationship between transfer-oriented interaction and the intention to transfer into STEM fields, black women were less likely to have intent to transfer into STEM fields”. The result of this study was further backed by recent studies on highschoolers in China (Wang, et al., 2023)

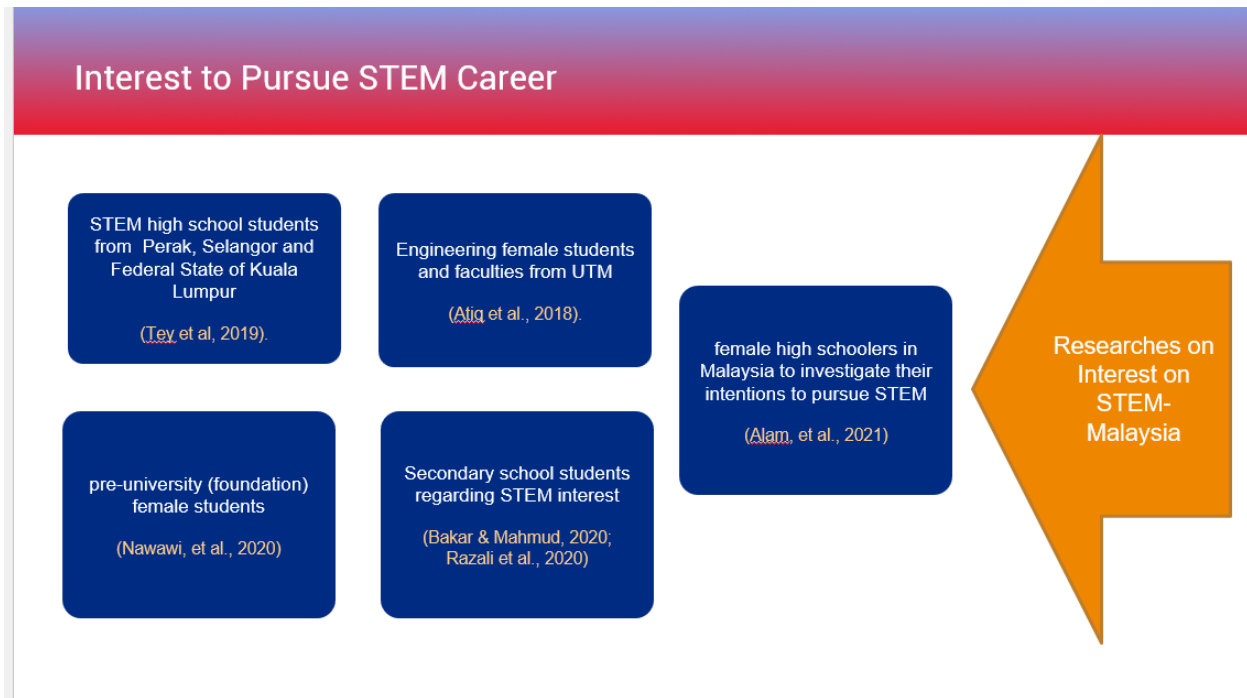


Figure 01: Overview of selected studies on STEM interests in Malaysia.

Social researchers have efforded to realize this phenomenon from Asian perspectives as well. The perception of Malaysian female engineers pursuing an academic versus industry career was surveyed (Atiq et al., 2018). It was conducted though group interviews with a total of 38 female participants from the engineering department of University Teknologi Malaysia (UTM), ranging from undergraduates to faculties. The study took number of pull and pushes factors into consideration and utilised variables like personal desires, faith, math ability, marital status, importance of family and having children. Working through the detail findings of this paper, emerges a tendency that more female engineers in Malaysia feels teaching is suitable career for them and engineering is just a subject to teach, rather than considering themselves as engineers and participating in the industrial career. Concerns like their engineering career will be seen as hindrance to marriage is also an important reason among the engineering undergraduate participants in this study that deters them to choose the industrial path. Reasons include “the societal perceptions” regarding engineering career as negatively inclined towards femininity and less marriageable. The perception and STEM career interest of Malaysian students were similarly measured in a study by Tey et al. (2019). They investigate 204 STEM stream students from Perak, Selangor and Federal State of Kuala Lumpur. The variables for the reseach was the STEM programes and strategies adopted by different states and how it influence the perception and interest of students regarding STEM career. “A statistically significant difference across the states” were found dependeing on the varies strategies adopted by the sates. It appears once again that different factors influence students' perceptions and interests regarding STEM careers.

Career aspiration and interest among Malaysian secondary school students regarding STEM and TVET (technology and vocational education training) in selangor was conduct recently (Bakar & Mahmud, 2020). Their Career Exploration Test had three variables determining the interest types. Their findings shows that even though in social types gender does not come up with any significant difference in their career aspiration and interest, there other two types of career preference do have gender prominence for school students. Female students have shown less interest in realisitic type which is “based on concrete and physical activities; materialistic in nature, stabil and not socialable”. A small number of females have chosen to join investigative as well, as it seems to emphasize on high intelligence, and most females do not feel confident about themselves for that. A similar investigation was done on “interest in a STEM career among secondary students in Malaysia” by another set of researchers from Universiti Putra Malaysia (Razali et al., 2020). From 419 respondents in Selangor Malaysia, they tried to understand their motivational factors through variables like self-efficacy, self-determination, intrinsic, grade, and career. In this study, 53% of students were female, but there is no gender-specific data provided. Researchers found that the combination of the motivational factors mentioned above significantly impacted the students' interest in STEM careers. Further studies have been conducted on female high schoolers in Malaysia to investigate their intentions to pursue STEM (Alam, et al., 2021). They outlined five independent variables, which include "attitude towards STEM, self-concept, gender stereotype, motivation, and teacher stereotypes". This study's findings are also consistent with those done previously, where self-efficacy and motivational variables were involved in influencing a female student's interest in STEM fields. Malaysian students' interest in STEM was further observed by another group of researchers from the Universiti of Selangor (Nawawi, et al., 2020). Their study focused on the pre-university (foundation) students where a majority of the participants were females. They followed the pattern of changing perceptions among 100 students before and after attending a STEM-based activity. For that their variables were the personal background of the students and their knowledge of STEM. Results depicted that although these students come from the STEM streams in secondary schools, 30% of them do not wish to pursue STEM as a career. Being part of STEM-based activities has shown an increase in confidence for students towards STEM careers. Yet interesting enough, most of the females showed a decrease in interest in STEM careers after participating in the activity. In this sense, it implies that we need to explore "intrinsic motivational" factors in order to entice young people to pursue STEM careers.

THE CONFIDENCE FACTORS

Pioneering gender researchers, states that females are sensitive to their self-image which is often in pessimistic connotation resulting in their performance to drop. STEM is perceived as male/masculine while the overly critical self-aware tendency of women, made them believe that their skills in STEM fields are inferior. The authors explained that because of overly critical self-concept, women believe that their skills in STEM fields are inferior. With time the perceived self-image develops into their cognitive ability and impetus for the individuals, affecting their career decisions (Danilo et al., 2018). Lack of self-confidence has been identified as a hindering factor for Malaysian women in STEM career 4% more than it effects the male STEM career holders (Rahim et al., 2019). In addition, there is a common assumption that most of the females lack the confidence on their own intellectual ability that is needed to devote into such challenging roles (Wolters, 2004; Grata, 2019). No wonder, the pattern of females avoiding or giving up on challenging roles are common in Malaysia (Goy et al., 2017).

There is potentially greater cost of socialization on the 'contingent self-worth' of women, which is often dispiriting or belittling (Danilo et al., 2018). These feelings are inherently attached in context to biological practices and broader sociocultural experiences females receives resulting into fascinating drop in their confidence through the image of STEM career (Turner et al., 2019). Thus, this research is adopting the notion of "the confidence factor" from the study conducted on Zambian women's performances in higher education (Tommie & Xiu, 2015). Here the researchers have identified a correlation of females' academic performances and career decision-making being directly influenced by their self-confidence. Tommie and Xiu (2015) regarded the self-confidence as a "critical wing" that women should enhance along with their competency to "progress and function in male dominated environments". The positive thinking and persistence are two attributes considered to be essential to female students' confidence in STEM subjects, and vice versa, the absence of it can hinder their interest in STEM subjects.

POSITIVE THINKING

A lack of positive attitudes poses a problem for females because they tend to believe that studying STEM subjects requires an inherent intelligence that they lack because of their gender (Wang, et al., 2023). In Malaysia, similar tendencies in female STEM career holders exist, most of whom tend to leave their careers or persist in a very snail-paced growth (Rahim et al., 2019). As quoted powerfully by the author Wang and Degol (2017), women erroneously believe that innate intelligence is needed for success in these fields but also because they erroneously believe that they belong to a group that is less likely to possess the qualities needed for success in these fields-

Having positive thinking is also referred to in some studies as a "growth mindset" (Meier & Kropp, 2010). These studies have shown that students who received a growth mindset or belief in positive achievements, had higher academic performance and higher completion rates than those who lack it (Blackwell et al., 2017). Rather than feeling inadequate and accepting faith, females with a belief in positive achievements would understand challenges as chances to learn and grow (Eatough, 2021). This bold perception of looking into their challenging times as the time to invest, to enhance themselves rather than as a disturbance that interrupts their career is what helps them in climbing towards success. A workshop designed to promote positive thinking was performed among young female students in the USA and Japan, where researchers observed a positive attitude shift among female students in their confidence to pursue STEM arenas after instilling their belief in positive achievements (Kijima et al., 2021).

Belief in positive achievements is a component of an individual's confidence that is rooted in positive thinking (Tommie & Xiu, 2015). Surprisingly, women tend falter often in inclining such positive thinking about themselves and are often found to doubt their cognitive ability regarding STEM (Dweck, 2006; Altoum, 2021). Meier and Kropp (2010) used the term "mindset" to refer to the state of mind. Other research also mentioned mindset as being a "psycho-social attitude" that dictates their relationship with their career decisions (Farrington, et al., 2012). The mindset is therefore the mental attitude that renders positive thinking, which enables individuals to use their utmost potentiality and face life challenges with optimism (Sherwood, 2022; Eatough, 2021). Such assessment also needed to be looked at the Malaysian female undergraduates to understand their perception of the STEM career.

PERSISTENCE

Persistence is referred here as the "resilient practice" that is necessary for any women to retain if she wants to progress in academic and professional career (Lester, 2010). Statistics shows a worrying pattern of women who takes STEM often switch to other subjects due having lower persistence (Wall, 2019). It is one of the keys yet undervalued elements that impacts how students perform academically, particularly in Asian communities (Vang, 2017).

The level of participation and success can be attributed to the competence of the student and equally to the intensity of persistence the individual possesses (Koyuncuoğlu, 2021). Mueller and Dweck (1998) in their experimental study found that when experimenters praised the efforts given by the students rather than the result of the task given, participants were more likely to endure the challenging tasks, exhibited more task enjoyment and task performance proving their higher persistence capability. Hence persistence is regarded as equally important personality trait as the cognitive capability of the students in academic performance and career development (Benton, 2020). As Lumsden (1994) explains, a student's performance and their "desire to participate in the learning process" is heavily influenced by their set goals where persistence is formed from the feeling of accomplishment or fear of failure through a series of experiences, social expectation and/or direct instruction from significant others. When it comes to female, they often feel less capable to take on the challenges STEM fields requires (Wall, 2019). Likewise, a study on Indonesian college students also found that low rate of persistence is one of the leading reasons for students not majoring in STEM subjects (Zamista, 2018). The low ability of women being persistent is affecting the STEM workforce negatively as much that this phenomenon is commonly referred as the "leak" in the "pipeline", where women tend to get lost in different point through

high school to receiving degree and their career trajectory in STEM fields (Wall, 2019). Hence this study will take into consideration, persistence as another independent variable to understand the perception of female Malaysian undergraduates towards STEM based career.

While confidence factors will deal with the internal aspects of female undergraduates' perceptions, there are also external factors that have been associated in all key gender research being responsible in shaping their decision making on STEM related career. External factors will be discussed in depth in the next part of the discussion.

EXTERNAL FACTORS

In contrast to men, women have been known to be pressured or influenced to make lifestyle decisions that conform to society's norm (Eccles et al., 1999; Flores et al., 2021). The outside elements seen to be influencing students' decision, especially for females are termed by researchers as external factors. Male students perceive success as personalised attributes, on the other hand female undergraduates are greatly inclined with these components of external factors while defining their success in STEM studies. Bohanna (2016), in his doctorate thesis worked with college female students from Iowa- USA, to develop in-dept understanding of their experiences regarding STEM majors. Among multiple factors that negatively impacted women's participation in STEM, Bohanna (2016) highlighted external factors like, socio-cultural expectation and gender role concept as major players. Hence, these points are further elaborated as follows.

SOCIAL AND CULTURAL EXPECTATIONS

Social and cultural expectations often make it harder for women to give the time necessary and effort needed to maintain a flourishing STEM career (Bohanna, 2016). Indeed, gender differences in STEM careers are similar reinforcement of the same socio-cultural gender-based stereotypes women are dealing in regular life. Externalities like social behaviour and expectations are proven to be more prominent on females than males in any society (Elizalde, 2021). These expectations are further binding by the cultures they belong to as the magnitude differs by the level of patriarchy present therein (Rahim et al., 2019). Several cross-national studies also stated that imbalances between males and females in sciences are results of greater social and cultural biases favouring males more than females in scientific academic performance and careers (Else-Quest et al., 2010). The prevalent cultural stereotypes about females being bad in science and math related areas are constantly at display in the forms of media and other social engagements, which have detrimental effects on female's participation in STEM fields (Goy, et al., 2017). At the same time science fields have a working culture which is not comfortable for females, consequently, affect their choice in their pursuit of STEM careers (Kelly, 2016). Scientists have repeatedly claimed that "male superiority has been a dominant factor in the development of STEM education as well as STEM occupation" and that "biases against women's capacities have constrained them from establishing themselves as legitimate aspirants in STEM fields" (Danilo et al., 2018).

In the social role theory, the traditional breadwinner is given to the men while a female is assigned the caregiving roles and, in most cultures, women's reproductive capability is looked at from the angle of how they split work roles by gender. The cultural standards and beliefs about individuals' abilities and roles based on gender are transmitted as early as childhood until it automatically manifests into their adult self (Umberson, Lin, & Cha, 2022). From here it can be understood that the inclination of women perceiving themselves as more obligated towards familial responsibilities in providing physical and emotional care than men. The social structure constructed by very restrictive expectations from women is resulting in women professionals in reduced working hours and taking career breaks to leaving the workforce (Stewart, 2021). A survey report on female career holders conducted and published by Australian companies Talentcorp & ACCA (2013) emphasized that three out of four of its respondents asserted the reason for the under-representation of women in leading positions is family commitments.

Interestingly, since early in their academic journey there are also deep-rooted prejudices against STEM fields tagging it as unethical and anti-communal, that are ingrained into girls' minds making them believe that these fields are not suitable for them (Kang et al., 2018). These stereotypes have also made many women believe that science-intensive careers are isolating and anti-social. The impact of these social and cultural expectations incites girls to believe preconceptions that STEM careers are not for them (Jiang, 2021) despite their achievement of high grades and performances (Zeldin, 2000). What is expected of a woman and man are often distinctively established since early childhood and reinforced throughout the milestone years of a student's life, impacting female students' assessment of STEM careers (Bohanna, 2016). Looking into the Malaysian context, this research will comprehend the social and cultural expectations that female undergraduates are facing.

CONCEPTUAL FRAMEWORK

Introduced in 1980, the Social Cognitive Theory focuses on self-efficacy development focusing on elements like strength, confidence, and trust that may affect the quality of an individual's career and life, while The Social Cognitive Career Theory (SCCT) is the improvised version adding interest, choice, and performance aspects of career into the mix (Yusoff et al., 2019). SCCT incorporates variety of concepts or factors that impact the career development of individuals. These factors are umbrella terms that can be further broken into many subfactors forming the way one deal with her career.

Primarily three factors are considered as the building block of this theory, which are self-efficacy beliefs, outcome expectancy and goals. Here self-efficacy is referred to the individuals' opinions about their own capabilities to perform certain actions. In this theory, outcome expectancy means the thoughts people have about the consequences of certain actions, the choices they make based on the thoughts they have, and their effort along with persistence to achieve the goals they have set. Goals, on the other hand, have two types in SCCT: choice goals and performance goals. Goals are effectively linked with the other two factors of self-efficacy and outcome expectancy. Goals are usually set in accordance with what people believe their capabilities are and what they

expect from pursuing a particular action to accomplish. In turn, success, or failure in achieving personal goals can shift or confirm self-efficacy beliefs and outcome expectations. As illustrated in the diagram as follows: -

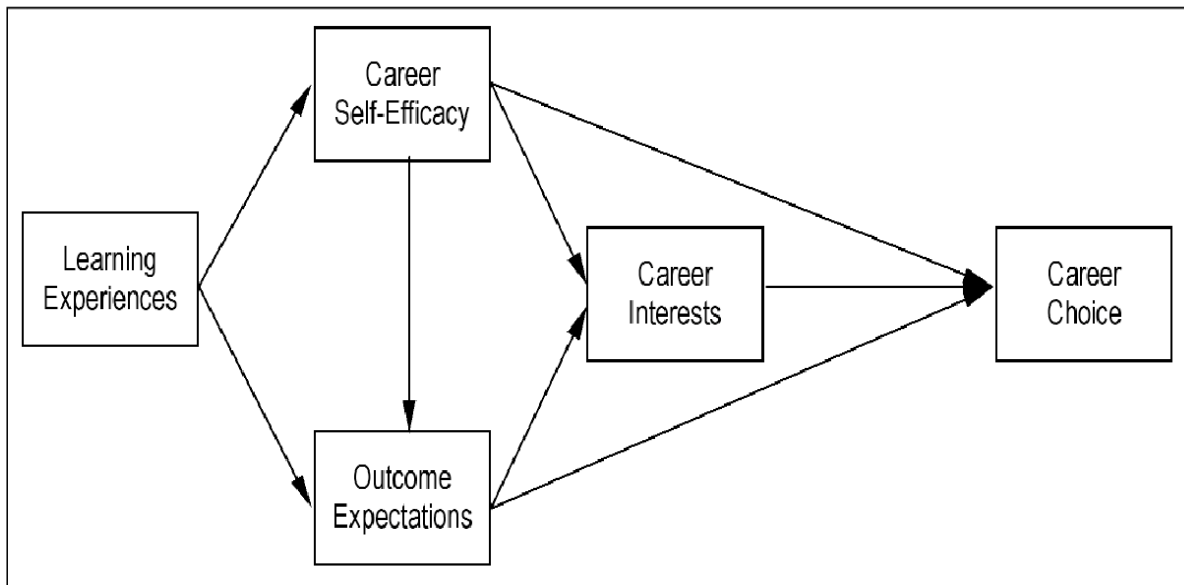


Figure 2: The Social Cognitive Theory (SCCT) Model, Source: (Tang & Newmeyer, 2008)

Using the SSCT model, it predicted that student learning experiences, personality variables, and environmental conditions (Lent & Brown, 2006), affect self-efficacy and outcome expectations, which involve career interests resulting in their career choice (Tang & Newmeyer, 2008). The personality variables in the learning experiences of SCCT model is subjective to interpretation as the researcher finds fit in tandem with their sample contexts, for example “personal motivation constructs” or “personality traits” (Wang, Liu, & Deng, 2022) or “ethnic identity” (Byars-Winston & Rogers, 2019) etc. SCCT also recognises that interests in career developments are fluid and shaped by culture and experiences during the formative years of students’ transitions (Lent, et al., 2002).

It will be difficult for people to develop interests in activities where there is doubt about their competence and a negative outcome expectation. Choice goals are said to be heavily influenced by environmental factors besides self-efficacy and outcome expectations. SSCT authors further mentioned that the choices of career are often restricted by many factors like family, finance, educational limitations, and cultural values. In these instances, people may often forgo their interests and make choice pragmatically.

CONCLUSION

Having fewer women in STEM fields means a lesser workforce to train and a marginal contribution to the economy. Yet most countries have fallen short in providing adequate support needed to bridge the gender disparity prevailing in these areas for decades. Studies show that women remain characteristically under-represented in STEM-related careers even though most universities notice a promising enrolment. Many qualified students change their major before graduation or do not continue to pursue higher degrees in the STEM-related fields. Studies show that women remain characteristically under-represented in STEM-related programmes, even in progressive countries. Despite the government of Malaysia taking significant steps to recover the gender-related gaps in STEM education, women are still unwilling or unable to persist interest for STEM careers. Furthermore, there is a tendency among its female students to be less inclined toward STEM-related qualifications even though most of them outperformed their male counterparts at the entry-level university examination. So, to address the habitual gender disparity in STEM fields, the researchers should focus not only on technical explanations but also on how female students view themselves from a cultural viewpoint.

Evidently, gender played an important role in determining participation in STEM for students. Gender research regarded that the interest of women towards a career is often sequences of personal and environmental factors. It is a global challenge, and each society marked by its unique socio-economic factors is up in its sleeves to deal with the gender disparity in STEM. In addition to their financial and intellectual impact, social-cultural constructs also shape how each person's contributions are valued, resulting in a large part of the future workforce constantly struggling with these social and cultural expectations (Funk & Parker, 2020). As a result, the economy and community are missing out on many innovations, opportunities, solutions to pressing issues of the century, talents, and many other possibilities that diverse participation brings (Corbett & Hill, 2015). Therefore, mitigating the gender disparity remains one of the biggest challenges today, especially in predominantly male-led areas, because of gender discrimination and gender-based preferences (Reuben et al., 2014; Funk & Parker, 2020). A talent pipeline should be built to provide the necessary support to rectify the glaring under-representation of females in STEM related fields (Lim, 2020).

In summary, the bulk of past scholarship shows a common pattern of both internal factors that incorporates personal traits like confidence and external factors influencing students' perception of STEM career. The impact of these factors intensified in the context of female students' decision-making. We need to empower female students to grow interested in STEM education and pursue their careers in these fields. Graduation is the borderline of the transition from education to career, so this stage is vital for ensuring productivity in the STEM workforce pipeline. However, also seen from the above discussion studies focusing on the perception of female undergraduates' interest in STEM careers have yet to be explored. Linking this to the research question mentioned earlier, which is to explore the factors demotivating Malaysian female undergraduates' interests to pursue careers in STEM-related fields, this study shall contribute in tackling the demotivating factors. By finding out the demotivating factors impact female students' decision-making processes is crucial for addressing gender disparities in STEM fields. Beneficiaries of this research are diverse. First and foremost, policymakers and educators can utilise the findings to inspire targeted interventions and activities aimed at establishing a more supportive atmosphere for female STEM students. This may entail implementing confidence-building programmes, providing mentorship opportunities, and tackling external impediments that may discourage women from pursuing STEM career.

Furthermore, educational institutions can benefit from introducing diversity and inclusion policies within STEM subjects. Recognising the importance of the graduation transition from education to career, institutions should adjust their support mechanisms to ensure that female graduates are well-equipped to enter and prosper in STEM disciplines. This is especially critical for Malaysia to retain a strong STEM workforce pipeline. Additionally, the research findings may benefit the broader academic community by filling a vacuum in the existing literature. The study emphasises the importance of further targeted research on female undergraduates' interest in STEM careers, emphasizing an area that has yet to be properly investigated. This not only contributes to the body of information, but also lays the groundwork for future studies and efforts aimed at better understanding and addressing gender gaps in STEM education and careers. The study acknowledges the recurrent trends observed in previous research, emphasising the need of empowering female students and cultivating their enthusiasm in STEM education. This empowerment is vital not only for individual students, but also for the larger objective of cultivating a diverse and inclusive STEM workforce.

ACKNOWLEDGEMENT

We would like to acknowledge the funding provided by Universiti Tunku Abdul Rahman (UTAR), Malaysia for carrying out this research.

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