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PSYCHOLOGICAL FACTORS AND PROMOTION OF GIRLS IN STEM FIELDS AT THE UNIVERSITY INSTITUTE OF TECHNOLOGY (UIT) IN CAMEROON

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ABSTRACT

The general observation in the order of higher education reveals a lower representation of girls in the traditionally so-called male streams. This gender disparity is a global phenomenon that challenges the entire educational community and even international organizations. The phenomenon is not different in Cameroon. The University Institutes of Technology (UIT) record a low number of girls enrolled in Science, Technology, Engineering, and Mathematics (STEM) fields. Quantitative in nature, this study aims to demonstrate the existence of a correlation between certain individual determinants and the representativeness of girls in these streams. The results demonstrate that there is no correlation between individual determinants and the promotion of girls in STEM fields. Thus, it is interesting to recommend that girls "overcome their apprehensions and have confidence in their abilities and skills.

Keywords: self-esteem, sex identity, promotion of girl, STEM, underrepresentation.

1.0 INTRODUCTION

The interest in integrating more girls into technical and vocational education derives its relevance from the declaration of the African Union (AU) in 2006. For this international body, African societies must link up with the global modern economy based on new technologies. In line with this, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2017) "recognizes […] encourages transformative, innovative and creative thinking and skills, as well as competent citizens" (p.14). The African labor market is in perpetual shortage of qualified personnel and therefore "it is important to offer boys and girls relevant technical education programs" (AU, 2006) quoted by Sosso, Djeumeni, & Ango, (2019, p. 58). The inclusion of women in technical education promotes scientific excellence, and diverse perspectives and "reduces potential biases." The unequal representation of girls and boys in this field has been the subject of several studies (Hyde, Fennenma & Lamon, 1990, Becker, 1989). The goal of studies of gender disparity in Science, Technology, Engineering, and Mathematics (STEM) fields is to "encourage a more numerous and equitable presence of women in order to abolish the circle of disparities, […] the cleavages of social roles between men and women" (Arena, 1986). It is important to extend this study to the Cameroonian context. The objective of this paper is to analyze the impact of

individual factors on the promotion of Girls in STEM fields in Cameroon within the University Institutes of Technology (UIT). From 2014 to 2018, the results of the baccalaureate in Cameroon show a high success rate for girls in the sciences (58.45% in 2014; 59.03% in 2015; 53.76% in 2017, 55.64% in 2018) and technical fields (56.78% in 2014, 74.48% in 2015, 61.31% in 2017, 61.92% in 2018) (MINESUP, 2017). However, the rate of enrolment of girls in STEM programs at the University Institutes of Technology (IUT) does not reflect these different success rates over the years. The total population of girls at UIT of Bandjoun is only about 26%. In its industrial and development policy, Cameroon emphasizes that its challenge for 2035 is to make its population "a driving force for its development through [...] the training of human capital" (MINEPAT, 2009). Within this national context, this study raises the problem of the determinants of the under-representation of girls in STEM subjects at the IUT of Bandjoun. Previous studies have examined the determinants that can explain the phenomenon of gender disparity in scientific and technical fields. In the Cameroonian context, this field of study has not yet been studied. It is therefore important for us to first question the individuals, the actors of this phenomenon, namely the female students enrolled in the UIT. Thus, we ask ourselves whether psychological factors can have an impact on the promotion of girls in STEM fields. In other words, can gender identity, self-representation, and anxiety justify the under-representation of girls in STEM fields? This article aims to analyze the impact of individual factors on the promotion of girls in STEM fields in Cameroon within the UIT.

2.0 THEORETICAL FRAMEWORK OF THE STUDY

The literature presents the question of the promotion of girls in STEM fields and careers as a phenomenon marked by several educational inequalities. These studies on gender disparity reveal many factors that may explain the reduced presence of girls in these streams. For some authors, individual or personal factors represent the main predictor of the under-representation of girls. For Amouzou-Glikpa (2017), psychological dispositions represent the main indicators of personal factors that hinder the promotion of girls in the STEM field. For this author, psychological dispositions include self-image, the representations of scientific and technological disciplines that girls have, self-esteem, their lack of self-confidence, the feeling of competence, and many others. The analysis of these individual factors is done through the prism of self-identity (Lee, 2013), the identity of science disciplines (Stets et al., 2017), motivation, and personal interest (Lee and Robins, 2016). These studies also reveal the domination of the male sex in the school environment. The prospects for the promotion of girls in this area give us the opportunity to question the psychological factors that justify the under-representation of girls in STEM fields in Cameroon. For this study, these psychological factors have as indicators gender identity or self-representation in relation to STEM disciplines, the relationship between gender identity and STEM fields, and anxiety about these fields.

2.1. Gender identity, self-representation, and promotion of girls in STEM sectors

2.1.1. The notions of gender identity, self-representation, and self-esteem

Gender identity can be understood as a process of differentiation done objectively or subjectively. Objectively, it refers to the differences in social roles attributed to individuals, as well as to differences linked to biological sex. On the subjective level, gender identity is

conceived according to Rouyer quoted by Fournier (2018), as is the feeling that an individual has of belonging to a category of a person distinct from their common sex. It is full of several characters, namely the social character (the environment), the cognitive character (knowledge), and the affective character (feeling). Knowledge is built and constructed in the interactions between the affective character (the individual and his social affiliation) and the social character (the environment). In this logic, identity represents an "unstable" concept, in constant (re)construction, and whose reaffirmation is necessary according to Erouart (2020). In principle, an individual must reaffirm his membership in a sexual category for which it is necessary to prove his masculine or feminine trait. Educational guidance takes gender group membership into account. Specifically, the choice of an atypical sector has a significant effect on the gender identity of an individual, because it represents the source of construction of self-representation. Literature on orientation towards non-traditional pathways reveals the "identity weight" (Gianettono and al., 2010; Bastoul and al., 2016) in the process and decisions related to the choice of pathways. For women/girls, this weight is perceptible and very significant when it is difficult for them to invest in the domains mainly made up of men/boys. In other words, women face several obstacles that undermine their sexual identity, especially when they enter male-dominated fields, such as STEM fields. Gender identity generates various explanatory models in the STEM field. The model linked to self-image can serve as an explanatory paradigm for the choice of the field among girls. This model allows girls to project "a possible self-image … a form of identity that one wishes to achieve" (Vouillot, 2002). Moreover, these explanatory models also highlight the analysis of mental representations (Guichard & Huteau, 2005), where the authors demonstrate the impact of representations of oneself and of the professional world on the choice of the sector.

The notion of self-representation takes into account the concepts of "self-image […] or self-concept" which may be similar or even identical (Lautier, 2001; Ruel, 1987). This notion designates the set of information or knowledge available to an individual about his own person, which is necessary for him to construct his identity in a given environment. We speak of professional self-image insofar as the individual uses his own information to orient himself professionally (Guichard, 2004). The self-image can lead the individual to value himself and to have positive or negative self-esteem.

2.1.2. Gender identity report, self-representation, and presence of girls in STEM fields

The intersection between gender identity, self-identity and educational and professional orientation (EPO) varies according to the process of identification of an individual (girl) with a group to which he belongs. EPO is thus a "process of self-construction" and self-affirmation (Guichard, 2004).

Self-perception and the need to belong allow certain individuals to identify with their sex-social category, offering them the opportunity to orient themselves towards these disciplines which take into account their feminine or masculine gender and which convey a climate conducive to their development. In this regard, we note that boys have stronger self-perception for scientific disciplines than girls. These disparities in perception between the sexes are mainly observed in Germany, Denmark, Luxembourg, and China in the locality of Macao. The PISA database (2006) highlights the fact that many girls claim that jobs related to the STEM field are not compatible with their gender category. This creates in them a lower perceived effectiveness of themselves in mathematical and scientific disciplines (PISA,

2006). Consequently, they turn very little towards these STEM sectors where they remain in the minority. The theory of social dominance (Sidanius, Pratto, & Bobo, 1994) is invoked in this study and implies the sociological thesis according to which society is made up of a dominant group (the male) and a dominated group (the female). This constitution induces the school system to legitimize the social inequalities transposed into the educational context.

2.2. Anxiety, self-confidence, and orientation towards higher education

The affective nature of gender identity is one of the important issues in school orientation and career choices. In the order of higher education, the decision-making of orientation generates among students a source of stress (Lacoste, Esparbès-Pistre, & Tap, 2005). In terms of psychological dispositions, anxiety is also manifested by the underestimation that girls have of themselves in relation to their skills in scientific and technological disciplines. Convinced of their incompetence, students develop self-selection, less enthusiasm, and a lack of will. These elements are the indicators that have a significant impact on the rate of representation and the promotion of girls in STEM sectors. In the same vein, some authors believe that girls' lack of interest in STEM disciplines is the result of a process of intentional devaluation on their part (Azzedine & Si, 2011). This self-devaluation is a construct born of differentiated socialization, gender roles conveyed in the family environment, and the internalization of stereotypes present in the school environment.

On another level, Vignoli & al. (2005) analyze the role of anxiety on the promotion of girls in STEM fields. For these authors, the relational characteristics of the accompaniment and parental support of girls in the choice of fields of study are predictors of anxiety, lack of confidence, and devaluation. According to Stevens (2016), these elements “tend to place the responsibility for their professional orientation or reorientation on women (p. 169). The systems thus aim to “motivate” (Lemarchant, 2017) or encourage girls to move towards fields of scientific, but are essentially based on the assumption that they are not oriented because they do not dare, through lack of confidence or fear.

3.0 RESEARCH METHODOLOGY

3.1. Study participants

The target population of this study is made up of 505 female students enrolled in STEM courses at the UIT Fotso Victor in Bandjoun. Conducted during the 2019/2020 academic year, this unique population made up of girls is distributed as follows: 41 female students enrolled in the Mechanical Engineering (GM) stream; 60 female students enrolled in telecommunications and network engineering (GTR); 78 female students enrolled in computer engineering (GI); 91 enrolled in electrical engineering (GElect); 181 female students enrolled in civil engineering (GC) and 54 female students enrolled in thermal, energy and environmental engineering (GTEE); female students enrolled in education for sustainable development and wood chemistry. In order to have a precise explanation of this reduced representation of girls in STEM fields of study in higher education in Cameroon, a series of interviews were conducted with 4 teachers of the UITs, an official of the Ministry of Higher Education, and an official of the Ministry for the Promotion of Women and the Family.

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3.2. Instrument of data collection and analysis

The triangulation of tools enabled us to collect the data for this study. The questionnaire was administered to a sample of 271 female students at the UIT Fotso Victor in Bandjoun and the interview guide to a sample of 6 participants. This study is a mixed explanatory sequential design. Within this framework, the qualitative data will allow a better understanding of the results of the quantitative study. The interviews were conducted with 6 resource persons.

The questionnaire used aims at collecting data on the impact of parental expectations and the level of education of parents on the participation of girls in STEM fields in some UITs in Cameroon. This questionnaire aims at collecting data on the impact of parental expectations and the level of education of parents on the participation of girls in STEM fields within certain UITs in Cameroon. The questionnaire consists of twenty questions, three of which relate to school history and perseverance, six questions related to anxiety and lack of self-confidence; five questions related to gender identity and self-perception modality, and four questions related to the feeling of self-efficacy. The administration of the data collection instrument was done in two phases. The first step was done during the receipt session's exams within these institutes. This phase did not allow us to obtain a representative sample of the population. A second phase was made during the defense of the end of internship reports. At the end of these two passages of the questionnaire, 500 questionnaires were administered. For a return of 271 or 54.2% achievement. The presentation of the results and the statistical analysis of the data were carried out by the software SPSS (Statistical Packages for the Social Sciences). Using this software, descriptive statistics were generated on the one hand. On the other hand, the calculation of the correlation coefficient (r of Pearson), allowed us to analyze the existing relationships between the various variables.

Descriptive statistics allow us to describe the trends in the results in terms of frequency and percentage. Invoking the Pearson coefficient (r) signifies the researcher's interest in determining whether within the study population there are correlated variables. In this context, a test between the hypotheses must be performed. The hypothesis test is as follows:

H0: there is no correlation between the two variables studied ($r = 0$),

H1: there is a correlation between the two variables studied ($r \neq 0$).

In concrete terms, to affirm the existence of a relationship between two variables, the coefficient determined and calculated must be different from 0 and the value observed at the sample level must be greater than the theoretical value estimated at the 0.05 confidence level. The Pearson correlation coefficient varies between -1 and +1. The index 0 shows that the relationship is zero. The sign of r refers to the direction of the relationship Negative correlation or negative index refers to the fact that when one variable increases, the other tends to the negative or decrease. On the other hand, when the correlation index is positive (positive correlation), then both variables move together in the same direction.

4.0 PRESENTATION AND ANALYSIS OF FINDINGS

This section revolves around the presentation and analysis of findings obtained from the survey. They relate to the participation rate of girls in STEM fields within these institutes,

and the impact of gender identity, self-confidence, and anxiety on the promotion of these girls in traditionally male fields.

Table 1: Distribution of the participants according to the fields of study and the socio-professional status of the parents

	Training courses	Frequencies	Percentages %
Educational level	Mechanical engineering (GM)	18	6,6
	Telecommunication and Network Engineering (GTR)	20	7,4
	Computer Engineering (Info Engineering))	51	18,8
	Electrical Engineering (Electrical Engineering))	32	11,6
	Civil engineering (GC)	83	30,6
	Thermal Engineering, Energy and Environment (GTEE) (GTEE)	24	8,9
	Sustainable development education (EDD)	8	3,0
	Wood Chemistry/Wood Construction (CB)	35	12,9
TOTAL		**271**	**100**

Table 1 shows that of the forty-one female students enrolled in mechanical engineering (n=18; 6.6%) are part of the sample for this study. Of the sixty registered in GTR, (n=20, 7.4%) answered our questionnaire. In info engineering, (n=51, 18.8%) participants; in civil engineering, (n=83, 30.6%) are respondents to this study. In GTEE, we have (n=24, 8.9%); in EDD, (n=8, 3%) and in BC (n=35, 12.9%) of respondents. With respect to the socio-economic status of the parents, these students come from parents who exercise various professions. These include teachers (21%), traders, accountants, salespeople (26.2%), pharmacists (4.4%), farmers, breeders, gardeners (8.9%), architects, building technicians, mechanics, sheet metal workers and boilermakers (15.3%), soldiers (3.7%), doctors (3%), journalists, and even the unemployed.

4.1. Gender identity and self-perception

Table 2: There is something special about being a girl in these units

	Disagree f (%)	Neither agree nor disagree f(%)	Agree f (%)	Medium	Standard deviation	N
There's something special about being a girl in these units	88(32,5)	15(5,5)	168(62)	3,36	1,336	271
I find it rewarding to be a girl in my field	47(17,3)	7(2,6)	217(80,1)	3,76	1,064	271

From table 2, it appears that more than the majority of respondents (n=168, 62%) agree with this assertion which says that there is something special about being a girl in STEM fields. On the other hand (n=88, 32.5%) believe they disagree with this statement. Only (n=15, 5.5%) respondents neither agreed nor disagreed.

As for a personal valuation, very few respondents (n=47, 17.3%) disagree with the idea of finding the fact of being a girl in a STEM sector rewarding. Only (n=7, 2.6%) neither agree nor disagree while almost all of the respondents (n=217, 80.1%) agree with this postulate (M=3.76; SD=1.064). Following this logic, Arena (1986) states that "the presence of girls in [STEM fields], measured by their rate of femininity, is either above 90% or below 21%" (p. 39). In the same vein, one study participant expressed himself in the following terms: “Systematically [...] the gender inequalities that remain within the UITs are not necessarily linked to the personal characteristics of the girls. We are seeing more and more girls taking up science subjects in secondary school”.

Table 3: I think of myself as a role model for other girls in STEM

	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Medium	Standard deviation	N
I consider myself a role model for other girls	47(17,3)	13(4,8)	211(77,8)	3,78	1,109	271
I pave the way for other girls who would like to get involved in this sector	40(14,7)	13(4,8)	218(80,5)	3,36	1,074	271

According to the results presented in table 3, (n=211, 77.8%) of participants enrolled in STEM fields within university institutes of technology consider themselves role models for other girls. Moreover, (n=47, 17.3%) think the opposite and disagree with this assertion. We also note that (n=13, 4.8%) neither agree nor disagree, i.e. a mean and a standard deviation of (M=3.78; S.D=1.109).

In the background of this table, the majority of respondents (n=218, 80.5%) believe that she opens the way for other girls who harbour the idea of moving into technological and scientific fields in the order of higher education. On the other hand, (n=40, 14.7%) disagree with this idea. Only (n=13, 4.8%) neither agreed nor disagreed with this idea (M=3.36; 1.074).

Table 4: Being a girl makes her more determined to pursue studies in STEM series

	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Medium	Standard deviation	N
Being a girl makes her more determined to pursue studies in STEM series	54(19,9)	28(10,3)	189(69,7)	3,64	1,212	271

According to table 4, several participants in this survey (n=189, 69.7%) believe that gender identity (being a girl) is a determining factor for the pursuit of studies in the STEM series at

higher education. Only (n=54, 19.9%) disagree and (n=28, 10.3%) neither agree nor disagree. Consider a mean and a standard deviation (M=3.64; 1.212).

4.2. Anxiety and lack of self-confidence

Table 5: Fear of being alone in STEM fields can prevent girls from enrolling in these fields within UITs

	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Medium	Standard deviation	N
The fear of being alone in STEM fields can prevent girls from enrolling in these fields within UITs	84(31)	4(1,5)	183(67,5)	3,54	1,502	271
Fear of failure can influence girls' choice of STEM fields	53(19,5)	11(4,1)	207(76,4)	3,84	1,301	271

Chipman, Krantz & Silver (1992) demonstrated in their study that the more girl students develop anxiety toward scientific disciplines, the less they turn to STEM fields. Based on this observation, the table above shows that, although a large number of female students disagree (n=84, 31%) with the postulate that the fear of being alone in STEM fields influences the representation of girls in IUTs, they agreed more (n=183, 67.5%) with this assertion. Only (n=4, 1.5%) neither agreed nor disagreed.

In view of this (table 5), we also note that anxiety about performance in mathematics described here by the fear of failure can influence the rate of access of girls to STEM fields. The statistics obtained here reveal (n=207, 76.4%) that the participants agree with this assertion. Very few of these respondents disagree (n=53, 19.5%) while (n=11, 4.1%) do not express their opinion. In this logic Bergeron (2016), states that "it is therefore not wrong to believe that anxiety in mathematics could contribute to directing girls into different fields" (p. 74) of STEM fields.

These findings are corroborated by the head of the subject department at UIT. According to him, the rate of representation of girls in STEM fields can be justified by the girls' personal factors. For this head of department, "if girls are not significantly represented in these courses, it is because of a lack of motivation, self-esteem and self-confidence. Their lack of interest in scientific and technical subjects is in short, factors linked to themselves".

5.0 PRESENTATION OF CORRELATIONAL RESULTS, HYPOTHESIS TESTING AND DECISION

Table 6: Correlation coefficient and hypothesis test

	Psychosocial or individual factors	Promotion of girls in STEM sectors

Psychosocial or individual factors	Pearson's correlation	1	-,006
	sig. (bilateral)		,918
	Sums of squares and cross products	40, 344	-,207
	Covariance	,149	-,001
	N	271	271
Promotion of girls in STEM sectors	Pearson's correlation	-,006	1
	Sig. (bilateral)	,918	
	Sums of squares and cross products	-,207	27,004
	Covariance	-,001	,100
	N	271	271

The results obtained in Table 6 clearly show that the psychosocial determinants are not significantly correlated with the promotion of girls in STEM fields ($r = -0.006$, $p = 0.918$; $p < 0.05$). This relationship is negligible.

After showing the overall results, we will analyze the significance of the correlation between the two variables.

Ho: Psychological determinants do not influence the promotion of girls in STEM fields.

Ha: Psychological determinants influence the promotion of girls in STEM fields.

According to the inferential statistic, $r = -0.006$. The correlation is negative and is between ($-1 < r = -0.006 < 0$, $p = 0.918$ ($p < 0.05$),

Ha is rejected and Ho accepted, it is thus admitted that psychosocial factors negatively influence the promotion of girls in STEM fields in the Cameroonian context. This conclusion is supported by some of the resource personnel interviewed for this study. For the head of the schooling department and the teacher of the IUT interviewed, it appears that the psychological factors of girls do not impact their rate of representation. According to this teacher, "it is a matter of government policy if girls are less numerous in the scientific and technical fields".

6.0 DISCUSSION

The sample of this study reflects the current situation of enrolment in STEM fields in UITs in Cameroon. Despite the increased enrolment of girls in these streams recently, female students remain under-represented in science and technology streams in higher education. This gender disparity in STEM has been the subject of several studies that have looked at the various obstacles that may help to understand this phenomenon (Hango, 2013). The present study shows that despite the evolution of girls' schooling and education in general in Cameroon, they remain under-represented in UITs. The aim of this study was to demonstrate the existence of a correlation between the components of the psychological domain of girls and

their representativeness or promotion in STEM fields. The results obtained from this study highlight the fact that psychological determinants are negatively correlated with the promotion of girls in STEM fields in the Cameroonian context. The conceptual framework of our study presents the concept of psychological factors as a set of personal elements interacting with the environment. These include self-image, gender identity, self-representation, and lack of self-confidence. Thus, the gender identity questioned by the modalities of self-image and self-esteem in an atypical environment (STEM fields of study at the UIT) shows that, at the end of the descriptive analysis, the girls who have a positive self-image (77.8%) consider themselves as models for female students who will opt for male-dominated fields of study.

The attitude that girls develop here, their state of mind in a context where they are in a minority, is an explanatory element of their gender identity or femininity. According to some authors, the difficulties faced by female students in STEM fields cannot be attributed solely to differences in ability or competence, but also to their attitude (Duru-Bellat, 2004). Thus, the decision by female students to go into non-standard fields of study is "a way of differentiating themselves" (Erouart, 2020) and reaffirming their identity as being able to cope in a male-dominated environment. The results in Table 4 corroborate that gender identity (being a girl) is a determining factor in the pursuit of STEM studies in higher education (69.7%).

For the anxiety questioned by "the fear of being alone in one's field" or "the fear of failure", the descriptive analyses derived from the empirical results reveal that anxiety is manifested in several forms. Referring to it in terms of 'fear of being alone in your course', these results show that 67.5% of female students believe that anxiety may be a predictor of gender disparity in STEM courses. The fear of being alone in a highly masculine world may lead girls to practice self-selection. For Duru-Bellat (2004), the process of self-selection by girls explains to some extent the lower proportion of girls enrolled in industrial and technological streams at UIT. Ashcraft (2002), affirm that female students develop a high level of anxiety concerning mathematics disciplines. This is because the latter are more likely to opt for traditional courses of study. Through this orientation, female students anticipate the failure that they may experience in the STEM streams. On the other hand, Bergeron (2016), pointed out that female students who have a low level of anxiety relating to scientific subjects are oriented at 74% toward STEM fields. In sum, math anxiety is present in women and therefore plays an important role in openness to STEM careers when making a choice.

The fear of failure due to the inferiority complex can be equated in this context with the lack of confidence of female students in their skills. According to the results of the descriptive statistics, 76.4% of female students enrolled in STEM fields of study at UITs believe that anxiety about failure explains the gender disparity in these fields. Some studies show that anxiety is more prevalent in girls than in boys, and consequently, it keeps girls away from the so-called pure science fields. Inferential analysis shows that psychological factors namely gender identity, self-image, self-confidence, and anxiety impact the promotion of girls in STEM fields. The correlation recorded is significantly negative, despite an enhanced self-image, integrated gender identity, and strong self-confidence among female students enrolled in STEM fields at the UIT. In view of this result, it can be noted that in Cameroon, girls who are enrolled in STEM fields develop a strong gender identity through a good self-image, and

a strong self-representation. To some extent, this gender identity is undermined by a strong sense of anxiety. These manifest themselves in the form of fear of failure, and fear of being alone among the boys. Some authors have arrived at the same result by showing that "girls' perception of their skills in mathematics or science could influence their choice of education" (Bergeron, 2016).

In terms of contributions, this study allows us to understand the so-called psychological factors in the context of gendered orientation to higher education in a different way. This result shows that gender identity is less correlated with the representation of girls in male-dominated fields of study. Given the state of the question and the descriptive analysis made, we expected to highlight a factor that could explain the rate of representation of girls in STEM fields in Cameroon. In short, the psychological factors mentioned in this study do not explain the under-representation or promotion of girls in STEM fields. This result leads us to question other hypotheses. Thus, by moving away from their socially ascribed gender roles, these students demonstrate the ability of girls to integrate and evolve in a male-dominated environment. This change can be attributed to the issue of self-assertion through gender identity, or the issue of determination and self-confidence contrary to the explanatory model developed by Beaudelot & Establet (2009, p.101). In future perspectives, it would be interesting to dwell on the qualitative approach to the analysis of modalities related to psychological factors on the one hand or on a comparative study of psychological factors that explain students' orientation towards STEM fields. A study on the relationships of domination in relation to the traditional definition of the social roles of individuals may also be interesting in this Cameroonian context.

7.0 CONCLUSION

In conclusion, this study has enabled us to understand the phenomenon of the under-representation of girls in STEM fields in the Cameroonian context. As a reminder, the objective of this study was to analyze the impact of individual factors on the promotion of girls in STEM fields at UIT. The following research question arose from this objective: Can psychological factors, namely gender identity, self-representation, and anxiety, impact the promotion of girls in STEM fields? Based on the descriptive and inferential analyses, it was found that psychological determinants related to female students have a negative impact on the promotion of girls in STEM disciplines in the Cameroonian context. The correlation coefficient (Pearson's r) is negative and is between ($-1 < r = -0.006 < 0$, $p = 0.918$ ($p < 0.05$), Ha is rejected and Ho accepted, it is thus accepted that psychosocial factors do not influence the promotion of girls in STEM fields in the Cameroonian context ($r = -0.006$, $p = 0.91$; $p > 0.05$). This relationship is negligible ($0 > r > 0.10$). However, we note in our results that 76.4% of female students believe that performance anxiety in mathematics described by fear of failure can influence the rate of access of girls to STEM fields in higher education. On the basis of the new economy and modernization, the massive integration of girls into STEM fields is necessary. Because "everyone is born a scientist. Every child has that sense of wonder and admiration that scientists have. The problem is to maintain this state of mind in adulthood!" (Mukashyaka, 2020). In this vein, focusing on individual factors limits the process of promoting girls and increasing their representation in the STEM field. Actions must be taken upstream, both to encourage girls in this direction and to highlight their interest in these professions. Furthermore, it is interesting to recommend that girls overcome their

apprehensions and have confidence in their abilities and skills. Beyond stimulating girls' psychosocial capacities, is it not appropriate to question the education systems in their various policies and processes of vocational guidance?

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