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**Assessment of Major Factors Affecting Female Pre-service College
Trainees' Field of Study Selection: The Case of TECs and TVETs in
Oromia Regional State.**

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Abstract

The Purpose of this study was to investigate major factors affecting female TEC and TVET trainees' field of study or department selection. To achieve this objective, 295 female students from 3 TECs and 127 female students from 3 TVETs, totally 422 female trainees, were randomly selected and used as source of information. Besides, department heads and gender focal persons of the sample colleges were included as source of supplementary information. All the necessary information were collected using pilot tested questionnaire and interview. The result of the study indicates that female trainees are influenced by two major factors: internal and external based on their origins. Thus, it was found that the internal factors are factors that emanate from the 'self' such as the feelings of inability, academic anxiety, low self confidence, and fear of practice as well as extra work. On the other hand, peer pressure, inability to get orientation, absence of role models, failure of teachers to encourage females, traditional beliefs and the like are external factors. Generally, the study concludes that the combination of the two factors affects female trainees in the selection of their field of study.

1. Introductions

1.1 Background of the Study

Higher education plays a significant role to enhance positive social changes, economic development and better life style. This is because economic development highly depends on the availability of skilled human power and this, in turn, is dependent up on the type and level of education. Nowadays, it is generally agreed that higher education is one of the key elements for socio-economic development of a country, for poverty eradication as well as for good governance (MOE, 1999; Habtamu, 2003). Accordingly, the Ethiopian Government seems to be cognizant of this fact and is investing more in higher education these days.

However, inequality of access to higher education opportunities among the various social groups in our society was and still is a serious problem. There exist significant variations in the number of admissions and graduates by sex, ethnicity, urban and rural. Evidences indicate that even in developed countries, women do not have equal enrollment in some areas of study such as Physics and Engineering to that of men (Dowd, 1999).

Though not detailed enough; there are adequate policy statements to support these disadvantaged social groups, especially, females in their educational career. Article 35:3 of the Constitution of FDRE of 1995 states the need to fill inequality and discrimination vacuum suffered by women in Ethiopia. Hence, women are stated to be supported through affirmative actions. The purpose of such actions is to empower women so as to enable them participate fully in the political, social and economic life of the country.

Similarly, stemming from the policy statement of FDRE 1995, article 35:3 , the Oromia Regional State Government (2004) indicated that female enrolment at all levels of education should be enhanced and efforts should be made to narrow the gender gaps in education. The policy further states the need to ensure access to quality education and training programs so as to bring about the desired result, to strengthen their competence focusing on the application of quota systems, and various measures of affirmative actions.

As a mechanism of implementing the stated proclamation and alleviating the problem of female students' access to higher education, affirmative action strategy in quota system has been in practice since the new education and training policy of Ethiopia. Consistent with this, Getachew (2007) pointed out that since education is an investment in development, both males and females should benefit equally from the process of development by improving and widening their access to education. In line with this, Fentaw (2001) stressed that the strategy is quite important and helpful in increasing female students' participation in higher learning institutions.

However, as a weak side of these affirmative actions, Fentaw (Ibid.) added that the affirmative action strategy has been limited to admitting more female students without a concomitant effort aimed at helping them to academically cope with higher education demands. Thus, dropout rates of quota students were very high.

Current practices in Oromia Teacher Education Colleges also indicate that high quota in college admission is being given to female students. From this point of view, practical evidences reveal that the Ethiopian Government, in general, and the Oromia Regional State Government, in particular, has given due attention to girls' education extending to the tertiary level. However, there have been complaints from almost all Teacher Education Colleges that female trainees are over-represented in Social Sciences, Languages and Esthetics departments. This implies that female trainees avoid Maths and Natural Science from their selection as their fields of study. In the case of TVETs, similar practice is found that female trainees escape from joining fields such as Woodwork, General Mechanics, Auto Mechanics and Constructions.

Globally, the issue of differences between men and women in their selection of fields of studies has long drawn attention of researchers even in developed countries. Dowd (1999) pointed out that college women in American universities continued to be over represented in traditional female fields of study, such as the Humanities and Education, and under-represented in traditional male felids of study, such as Physical Sciences, Computer Science and Engineering. Surprisingly, studies conducted in this country had shown that Humanities and other Liberal Art majors earn low salaries relative to their

peers. Traditional gender differences related to field of study prevail even among those graduates of highly selective institutions. According to the data, men outnumbered women in Engineering and Applied Science fields, the Physical Sciences, Economics and a greater number of men majored in Business. Contrary to these fields of study, women outnumbered men in English, the Fine Arts, the Social Sciences and the Humanities (which include Philosophy, Foreign Language and Literature). As indicated in the table below, the experiences of our colleges for female students seem to have certain similarity with this.

Table 1: Survey of Elit College graduates respondents: Frequencies by majors

No.	Major Fields	Men	Women	Total
1	Engineering, Computer Sc. & other applied sciences	622	199	821
2	Biology, biochemistry and other Biological sciences	476	490	966
3	Visual, theatre, or other fine Art and music	91	201	292
4	History	243	251	514
5	English	146	373	519
6	Foreign Languages and Literature, Humanities (Philosophy and others)	184	424	608
7	Chemistry, Geology, Physics & other physical Sciences	235	130	365
8	Sociology, Anthropology, & other Social sciences	134	247	381
9	Economics	454	322	776
10	Political Science	287	289	576
11	Psychology	121	276	397
12	Business	180	131	311
13	Communication	33	83	116
14	Education	4	23	27
15	Mathematics & Statistics	70	65	135
16	Nursing	2	123	125
17	Other	76	139	215
	Total	3,378	3,766	7,144

Source: Dowd, A. (1999)

1.2 Statement of the Problem

Both in developed and developing nations, gender inequality had been a major problem affecting the right of women and has continued to be an important barrier to socio-economic development. Never-the-less, the discrimination against women remained pervasive in most developing countries, reaching its peak in Ethiopia.

Recently, with the implementation of the new education and training policy of Ethiopia, a strategy of narrowing this gap has been designed and girls' education has got due attention. Regardless of these efforts, female College trainees' self-concept and their attitudes towards Maths and Physical Science subjects seem to be at its lowest peak. In relation to this, Mead (2006) argued that campaigns to support the college women to enter Science, Engineering or Medicine fields can only reach and help the young women who are interested and prepared with a background in Science and Mathematics to take advantage of opportunities offered by colleges.

The author further contends that female college freshman students seldom shift from traditional female fields to traditional male fields such as from Fine Arts to Chemistry, from Journalism to Engineering, except in rare instances. Researches conducted in Nigeria also indicated that self-concept, & attitude towards science subjects are the causes for the students under-achievement in science subjects (Akubuiro & Joshu, 2004). This practice seems to be reflected in our colleges in relation to first year female trainees' stream/ field of study selection. The following table indicates sample registration data in each department in the last three years.

Table2: Three Years Registration Data of TECs in Four Main Departments (1997-1999)

College	Fields of study/departments												
	Year	Math			N/Science			Languages			Social Science		
		M	F	T	M	F	T	M	F	T	M	F	T
Assela CTE	1997	146	26	172	142	87	229	85	152	237	77	131	208
	1998	23	26	49	22	28	50	16	32	48	20	30	50
	1999	42	8	50	28	23	51	15	33	48	10	38	48
Jimma CTE	1997	191	59	250	182	77	259	57	141	198	96	146	208
	1998	81	27	108	57	53	110	31	78	109	41	69	110
	1999	153	34	187	95	11	106	64	164	228	86	139	225
Roble CTE	1997	131	34	165	124	59	183	109	123	232	165	121	2
	1998	90	4	94	82	54	136	57	91	148	57	52	109
	1999	110	29	139	130	73	203	58	139	197	75	124	199
Nakemte CTE	1997	160	53	213	104	63	167	51	112	163	76	101	177
	1998	65	35	100	47	55	102	28	69	97	49	53	102
	1999	128	39	167	123	94	217	66	164	230	121	158	279

M=Male F=Female T=Total

Source: Registrar Office of the Colleges

As indicated in Table 2, most female trainees rush to Social Sciences and Languages avoiding Mathematics and Natural Sciences in the case of TTCs. In a similar pattern, the data obtained from the registrar office of the colleges indicates that most female TVET trainees are observed escaping from such fields as Mechanics, Woodwork, Metalwork and Constructions.

Emphasizing on the issue of field of study selection, Hyde (1993: in Emebet, 2001) described that the inequality of males and females in the area of education is quite staggering. The writer pointed out that the inequality is reflected not only in lower levels of attainment and higher dropout rates for girls but also apparent in different curriculum choices offered to or made by men and women at the secondary and tertiary levels: most notably in the low enrollment figures for women in scientific and technical fields. A similar study conducted in America showed that most U.S. Students' aptitude for Science

and Maths is declining. This was attributed to the effect of role models (Howard, 1996). The existence of such problem is at its peak in the Teacher Education and Technical as well as Vocational colleges of the Oromia Regional State Government.

As can be seen from Table 2, female trainees are concentrated in some fields of study. The reasons behind this problem, in the context of Oromia regional state, are not yet studied. The intention of this study is, therefore, to assess the main factors that hinder female trainees from joining those traditionally male fields of study.

To this end, the following major research questions were formulated to be answered in the study.

1. What are the major factors affecting the first year TEC and TVET's female trainees' preference in their selection of fields of studies?
2. What are the possible measures to be taken to overcome these problems?

1.3. Objective of the Study

The main objectives of this study were:

- Identifying the major factors that affect first year female TEC and TVET trainees' field of study selection; and
- Pointing out some intervention mechanisms to alleviate or minimize these problems.

1.4. Significance of the study

The result of this study will be significant for it:

1. enables Teacher Education and Technical and Vocational Education Training Colleges of the Oromia Regional State to get feedback on main factors affecting female trainees' field of study selection.
2. provides frame-work for the TECs and TVETs to prepare welcoming program, orientation and course clarification for first year students at the beginning of the academic year.

3. contributes to course materials developers to consider the hidden and perceived factors that have negative effect on females' attitude towards traditionally male fields of study.
4. enables instructors teaching at TEC and TVET level to address against stereotyped belief regarding female college trainees' towards some traditionally male fields of study.

2. Research Methods and Design

2.1 Study Population

The population of this study was all second and third year female trainees of TECs and TVETs of the Oromia Regional State. First year students were excluded because this data was collected before their admission to the colleges. Thus, the five TECs and the three TVETs were the focus of the study. Among these, three TECs and all the three TVETs were selected as representatives of the remaining.

2.2. Samples and Sampling Procedure

In order to enhance reliability and representativeness of the sample, systematic random sampling technique was applied using the trainees' identity numbers obtained from the registrar office of the colleges. Because they are supposed to give reliable information for this study, all department heads of the colleges were purposively included in the interview. Besides, gender focal persons from each of the colleges were non-randomly selected for the interview because they are assumed to know problems female students' encounter in their colleges.

2.3. Instruments

In this study, the data collection instrument employed was self-administered, questionnaire to be filled by female college students. The questionnaire has two main parts, i.e., the preliminary section which deals with basic information such as name of their college, department and year. The second part, the main part of questionnaire, consisted of 8 open-ended and 12 close-ended questions. In order to supplement the data

collected through the questionnaire, department heads and gender focal persons of the colleges were interviewed. Both the questionnaire and interview frames were locally developed and commented by professionals, revised, translated into “Afaan Oromo” and pilot tested before final use.

2.4. Methods of Data Analysis

Basically, this study employed descriptive and qualitative analysis. The qualitative description was employed to analyze the data gathered through the open ended items of the questionnaire and the interview to identify the major factors that affect the female trainees’ interest to select the traditionally male subjects as their field of study. In order to make the differences more observable, numbers and percentages are given in tables.

3. Results of the Study

In this study, the first question was related to their department selection in both the TEC and TVET cases. Analysis of the result obtained is summarized as follows.

Table 3: Department Choice of the Participants

TEC Participants				TVET Participants			Remark
No	Department	No. of respondents	percent	Department	No. of respondents	Percentage	
1	Social Science	134	45.4	RWS	4	32.4	Candidates under No.1 are assigned not have chosen their own choice.
2	Language	56	18.9	Electricity	32	25	
3	Natural science	44	14.9	Surveying	16	12.6	
4	Math	29	9.8	Drafting	15	11.8	
5	Esthetics	9	3.1	GM	6	4.7	
6	EDPM	14	4.7	Road Construction	5	3.9	
7	ANFE	9	3.1	IT	4	3.1	
8	Total	295	100	Electronics	3	2.4	
9				Auto Mechanics	2	1.6	
10				Building Construction	2	1.6	
11				Masonry	1	.8	
12				Total	90	100	

GM: General Mechanics

RWS:

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As can be seen from the table above, the majority of TEC respondents (45.4%) admitted that they had selected Social Science as their major field of study. Language, with 18.9%, is found to be a second preferred field of study. From the above table, it is observable that many of the TVET female trainees (32.4 %) indicated that RWS was their first choice by the time they joined college. However, it was known that they were assigned to this field of study by the district that sent them for training without providing them options to select from or without considering the interest of the trainees. Thus, analysis of their responses reveals that, about 25 % of the students had selected electricity as their major. Information obtained from the instructors disclosed that such kind of females' inclination towards electricity is a recent phenomenon. It is also possible to see that, Surveying (12.6%), and Drafting (11.8%) excluding RWS were the second and third preferred fields of study respectively.

Secondly, it was designed to investigate the departments/ fields of study that female trainees prefer least. Accordingly, the following result was obtained.

Table 4: Less Preferred Fields of Study / Departments by Female TEC Trainees.

No	Department	No. of responses	Percentage
1	Maths	263	89.2
2	Natural Science	24	8.1
3	Languages	5	1.7
4	Esthetes	2	0.7
5	Social Science	1	0.3
	Total	295	100

The above table reveals that the majority of respondents (89.1%) reported that they are less interested in majoring in Maths. It is also found that, Natural Science, with 8.1% respondents is the second less preferred department. Similar item was presented to TVET respondents and similar result was obtained. This result was also summarized as follows.

**Table 5: Less Preferred Departments/Fields of Study by Female Trainees
(TVET respondents)**

No	Department	No. of responses	Percent
1	Auto Mechanics	31	24.4
2	General Mechanics	28	22.0
3	Woodwork	18	14.2
4	Electronics	12	9.4
5	Building Construction	9	7.1
6	IT	8	6.3
7	Building Massonery	6	4.7
8	Electricity	6	4.7
9	Metalwork	3	2.4
10	Drafting	3	2.4
11	Road Construction	2	1.6
12	Surveying	1	0.8
	Total	127	100

As reported by the participants, it was known that Auto Mechanics (24.4%), General Mechanics (22%) and Woodwork (14.2%) were the three less preferred or most disliked fields of study.

As the main purpose of the study, the students were made to respond to the reasons why most of them avoid Math and Natural Sciences from their choices. The majority of them listed out factors such as fear of numbers, lack of Mathematical ability, poor-self confidence, exaggerated information about Math being a difficult subject, and societal pressure or traditional belief that Math to be males' field of study.

The responses obtained from their instructors somehow supplement the reasons indicated by the students. The instructors also added that most females have Math anxiety. Moreover, Math courses are related to Physics and Chemistry. However, most female students call these subjects 'hard sciences' and perceive them to be difficult.

On the other hand, it was found that most female trainees want to join Social Sciences and Language. As a reason behind it, most of them pointed out that such fields are not challenging for females because they have no calculations and they demand less practice as they are more of theory.

The instructors' responses exactly go with the trainees' idea that most female trainees prefer Social Science because they perceive it easily achievable. It was also found that most of them were told by their seniors to join Social Science Department. Contrary to their friends, some participants reported that their parents encourage them to study Natural Science or Math. However, most of the respondents indicated that their parents are not educated and had no role to guide them in field of study selection.

Similar to the TEC respondents, the TVET participants were made to respond to the reasons why most of them avoid GM, Auto Mechanics, Constructions and the like from their choices. The nature of such fields being high labor demanding on practice and actual job, traditional belief that assigns Math/ Natural Science as males' field of study, perception of difficulty of the subject, less probability of getting jobs, societal and cultural pressures are some of the possible reasons forwarded by the participants.

Their instructors also suggested that most of female trainees escape from General Mechanics or Auto Mechanics and Constructions because these fields require laborious practice as well as job. The instructors further added that these fields are related to Math but most females have feelings of lack of capacity in Math. They also pointed out that the TVET participants suspect that they may not be able to get job because of traditional believes. This is because of organizational bias in favoring males for employment especially in such fields as Mechanics, Woodwork, Electricity and Constructions. Because of such factors, most TVET female trainees prefer Secretarial Science, Surveying, Drafting, Office Management and the like.

In order to investigate their earlier experience, they were made to respond to items dealing with role models. Analysis of the result, therefore, shows that more than half of the participants (51.2 %) had no female teachers when they were students at lower grade

levels. Just opposite to practical experiences, 43.7% of them indicated that they had been lucky in getting female Math/Natural Science teachers.

A similar question with different content was presented to TVET participants and similar result was obtained. The majority of the students (58.3%) reported that they did not know any female engaged in vocational areas. However, 36.2 % of the respondents indicated that they are familiar with females being engaged in the vocational area, such as Woodwork, Mechanics and Electricity.

The other suspected reason to have influence on department selection of female trainees' was peer pressure. The participants' response to these items treating this aspect was summarized and indicated as follows.

Table 6: "Had your seniors told you that studying Math/Natural Science is difficult for females?"

No	Responses	No	Percent
1	Yes	243	82.4
2	No	50	16.9
3	I am not sure	2	.7
Total		295	100

A result given in this table shows that 82.4% of the respondents indicated how they are influenced by their seniors. A similar result was obtained in the case of TVET respondents. About 59.1% of them reported that their seniors had persuaded them that such fields as General Mechanics and Woodwork are difficult fields for female trainees.

With regard to their self-concept, 57.6 % of the TEC respondents and 67.7% of the TVET participants indicated that they do not believe in the presence of high probability of dismissal if they join Math /Natural Science, General Mechanics, Auto Mechanics, Woodwork. Contrary to this, 28.1% of the TEC participants and 21.3% of TVET participants indicated that the probability for their dismissal would increase if they join the mentioned fields of study.

To investigate whether the respondents are influenced by traditional beliefs or not, they were made to respond to items dealing with such issues.

Analysis of the result indicates that in both the TEC and TVET cases, the majority of the respondents are not influenced by traditional attitudes. Surprisingly, 84 % of TEC and 66.1 % of TVET respondents indicated that they do not believe that fields such as Math/Natural Science, Woodwork, Mechanics and the like are fields to be studied only by males.

Relating some fields of study to job world, 66.8% of the TEC respondents indicated that they will not be challenged in the world of job if they study Math/Natural Science. Contrary to this, 26.4 % of them argued that it would be difficult to them in the world of job if they study Math or Natural Science. Different results were found in the case of TVET participants. Among the participants, 69.3% of them reported that it will have some sort of difficulty later in their job if they study such fields as Woodwork, Mechanics, Constructions, Metalwork and the like. Contrary to this, 26 % of the TVET respondents indicated that it would not be difficult for them in the course of their job if they study such fields.

From practical point of view, it is actually speculated that access to information on how to be successful in Math/Natural Science could influence students' selection of fields of studies. In this regard, 56.6% of the participants indicated that they didn't have access to information on how to be successful in Math or Natural Science subjects. Similarly, 47.2% of the TVET participants indicated that they had no access to information about these fields of study.

On the other hand, it is suspected that orientation provided at the beginning of the year, could have influenced their selection. The responses to a question eliciting this idea were summarized as follows.

Table 7: "Did you get enough information/orientation about the departments before you select departments?"

No.	Response	TEC Participants		TVET Participants	
		No.	Percent	No.	Percent
1	Yes	110	37.3	53	41.7
2	No	177	60.0	69	54.3
3	I am not sure	8	2.7	5	3.9
Total		295	100	127	100

As it is given in this table, a similar and related response is obtained in the case of TVET and TEC participants. Thus, 60% of the TEC and 54.3% of the TVET respondents revealed that they did not get ample orientation about the fields before they were made to select the fields that they are studying.

As a consequence of the above failure, the participants in both cases pointed out that the absence/ inadequacy of prior orientation to be the most likely cause for their failure of selection of some traditionally labeled male fields of study. From the TEC group, 45.8% of them reported that absence of early orientation and course clarification can be the cause for their lack of willingness to select these traditionally male fields of study such as Math and Natural Science. However, 40.7% of them reported just the opposite of what is stated above.

In a similar fashion, 56.7 % of the TVET participants reported that absence of early orientation had negative influence on students' choice. Only 24.4% of them indicated their belief that absence of early orientation might not have negative influence on their field of study selection.

4. Discussion

In this study, attempt was made to investigate female trainees' field of study selection. As it is indicated in Table 6, most of them, i.e., 45.4%, described that Social Science was their first choice. Following this, 18.9 % of them pointed out that Languages were their first choice. Hence, their response implies that most female trainees are attracted more to Social Science and Languages. As a contributing reason, it was found that most female trainees perceive Social Sciences and Languages as less challenging, easily achievable

and less demanding. The result of this study is found to be consistent with the result of a study conducted in the USA, which indicated that females outnumber males in English, Fine Arts, Social Sciences and Humanities - including Philosophy, Foreign Languages and Literature (Dowd, 1999). Dowd further indicated that in such fields as Engineering, Chemistry, Math and Statistics males outnumber females (Table 1).

Similarly, TVET participants' selection of field of study indicates that females commonly avoid some traditionally male dominated fields of study. It was found that such fields as Electricity, Surveying, Drafting, Secretarial Science, and Information Technology are the most preferred fields of study by female collegians. This result again seems to be congruent with the American experience; the Elite College graduates (Table 1)

Generally, the figures given in table 3 and 4 are indicators of the over representation of female trainees in some traditionally female fields of study. The opposite of this, i.e., less preferred fields /departments are also given in table 4 and 5. Accordingly, it was found that Mathematics is the least preferred field of study by female trainees (89.2% given in table 4). To some extent, this result is congruent with the result of a study conducted in Assela College three years back (Boki, 2006). This result confirms the current observed practice. Most students, including males, are suspected to have a feeling of Math incapability and at times Math anxiety. This issue works even for developed nations. These days in America, it is strongly argued that American students are performing less in Math and Physical Sciences (Mead, 2006). However, evidences indicate that Mathematics is favored by boys. Girls, on the other hand, favor language and arts (Brintner, 2002). The basic reasons for gender differences in Mathematics attitudes and abilities seem to be the stereotyped beliefs that Math as an exclusive domain of knowledge for the male. Studies have shown that traditionally Math has been a masculine discipline. According to some evidence, although girls seem to believe that studying Math was just as appropriate as for men; their behavior in course selection was more stereotyped (Ernest, 1976, in Seleshi, 1995).

In a similar manner, TVET participants pointed out that fields such as Auto Mechanics, General Mechanics, Woodwork and Constructions are less preferred by females.

Basically, these fields are highly related to Mathematical concept. However, it was indicated that most females are suspected to have a feeling of Math incapability.

In this study, the primary objective was not to find out the departments that female trainees' favor or disfavor. It was rather to investigate the reasons why female trainees do not join those traditionally male dominated fields of studies. Accordingly, participants pointed out various reasons.

An attempt was made to find out most preferred fields of studies by female trainees. Accordingly, results of the study indicate a phenomena matching with the reality of our region. As indicated in the result section (Table 3), most female TEC students prefer Social Sciences. In the analyses of the result, the reasons can be summarized as 'self-related' and 'demand' factors. The 'self-related' factors are the self-concept the individual has towards that subject.

Hence, it includes feelings such as "I am incapable of this subject" and the like. On the other hand, the 'demand factors' are such factors as absence of calculations, less practical demand and absence of other challenges linked with the subject.

As in the case of TVET participants, most of them give high weight to demand factors and challenges that are expected to appear later on their job. As it is given in the result section, they pointed out that such fields as Surveying, Drafting, and Secretarial Science do not require much labor or practice.

Theoretically, the reasons for differences in students' selection of fields of studies could be various. One of those reasons could be the presence or absence of role models. As it was described in the result section, more than half of TEC participants reported that they have had no good role model. Similar result was noted from TVET participants as well.

Studies in the field of Psychology provide evidences of locus of control as a changeable variable which can be affected by modeling. From the results of her study, (Teglasi, in Howard, 1996), indicated that internal locus of control in women is stronger in relation to other women than in relation to men. In this study, most of the participants revealed that

they didn't have good female Math/Natural Science teachers, or didn't know any female technician or wood worker or Mechanic. Having strong theoretical background, this might have negative effect on the students' selection practices of fields of studies. The participants themselves admitted that their inability to get good role models has discouraged them towards these traditionally male dominated fields of studies.

The other factor assessed in this study was peer pressure. Peer pressure, accompanied with traditional attitudes, could have a magnified effect on the female trainees. The result shows that, 82.4% of the participants indicated that they were told by their seniors that Math/Natural Science is challenging for females. In relation to this, the National Assessment of Education Progress (NAEP) in America revealed some basic differences between boys and girls. Thus, Mead (2006) stated that boys out perform girls at all grade levels, very slightly in Math and Science. She further described that girls in American schools have just improved their performance, and as a result, they have narrowed or even closed some academic gaps that previously favored boys.

As to the case of our colleges, the results obtained in this study seem to be contrasting to the Americans case. Evidences obtained from the instructors' shows that most female trainees who have already joined Math or Natural Sciences are scoring low. However, the instructors admitted that there are few females who are competent and who outperform their male counter parts.

In this study, it was also slightly attempted to know the extent of their self-concept in relation to these traditionally male dominated fields of studies. Accordingly, it was found that 57.5% of TEC and 67.7% of TVET participants do not believe that they will be likely to be dismissed if they join these traditionally male dominated fields of studies. Never-the-less, most of them had reported that their first choice was non-Math (Table 2 and Table 3). The instructors' responses were also found to be contradictory with this view. As to the responses of the instructors, most of the warnings/low achievers in Math or Natural Science departments are females. The instructors had indicated that only few female students in such departments are competent enough to their male counterparts.

Thus, the students' responses are found to be contradictory with what is practically observed in the colleges.

After studying a given field, it is obvious that the next step is joining the professional world. Thus, it is suspected that the trainees might have retreating from selecting some of the fields because of fear of challenges/difficulties later in their professional work. However, 66.8% of the TEC respondents indicated that they have no fear of challenges on work if they study Math or Natural Science. However, 69.3% of TVET participants reported that studying such fields as Mechanics, Woodwork and Metalwork and Constructions would lead them to face challenges at the job world. The supplementary information gathered from instructors also indicates that females do not favor some challenging works such as Mechanics and Constructions.

Another possible factor is that female students' selection of field of study is affected by prior access to information that leads to success in these fields. With this respect, 60% of the TEC and 54.3% of the TVET participants reported that they did not get enough orientation about the fields of study that they are made to select. Hence, absence or inadequate orientation most probably leads to less awareness of what to do, what challenges to confront and what benefits to gain later. Thus, the absence or inadequacy of early orientation is suspected to have imposed negative impact on students' choice.

As to the measures to be taken by the concerned bodies, participants requested for different affirmative actions. As it is given in the result section, their responses ranges from simple orientation and course clarification to the extent of demand of different grading. The participants' demand for positive discrimination; such as the affirmative action, have got some acceptable ground. The instructors also supplemented the students' responses by indicating the appropriateness of some affirmative actions forwarded by the participants. They added that, it would be right to minimize the problem by attracting females to these traditionally male dominated fields of studies through job opportunities and further education. Thus, the request for such affirmative actions is congruent with actions that had been taken by such countries as Malawi, Gambia and Mali (MOE, 1999).

The result of this study, therefore, shows that affirmative actions should extend beyond the quota system of admission of females to colleges.

5. Conclusions and Recommendations

The overall objective of this study was to assess factors that affect female pre-service college trainees' selection of field of study. Accordingly, the results obtained show that most TEC female candidates select Social Science and Languages as their major field of study. It is also known that most TVET new entrant female trainees favor Surveying, Drafting, Secretarial Science and Electricity as their major field of study.

On the other hand, it was also found that female candidates in the TECs avoid studying Mathematics. Likewise; TVET participants rarely select Auto Mechanics, General Mechanics, Woodwork and Constructions as their major fields of study.

To find out the reasons for such failure, attempts were made to get information on various factors. Accordingly, participants of the study tried to list out different factors they encountered personally and/ or their friends. For the sake of simplicity of presentation, the various reasons were compressed and summarized into two major categories. These factors are:

- 1. Internal factors:** these factors are factors that originate from the female trainees themselves. Though these factors are not studied in detail, potential factors include academic self- concept, attitude towards some subjects and positive/negative self talk. Generally, the trainees' self made' doubt, which may be objective or subjective, was found to be one factor hindering female trainees from joining such fields of studies as Math, Natural Science (in TECs,). In the case of TVETs General Mechanics, Woodwork, Metalworks & Constructions.
- 2. External factors:** these factors are factors that emanate from the “out-of-self” or from the environment. Naturally, these factors have high explicit and implicit pressure on the internal factors. These factors too, are not deeply and independently investigated in this study. However, from the results obtained, such factors as absence of role

models, peer pressures, absence of information and orientation/course clarification, failure of teaches to encourage female students are grouped under this category.

With regard to the solutions, affirmative actions apart from encouraging female students are quite essential. Offering role models for them and positive discrimination favoring females starting from the elementary schools through freshmen and senior college students need to be planned both in short- and long-term.

In concluding the study, the authors propose the following recommendations for the consideration of policy makers and stake holders. This proposal has been summarized in to two, based on the time frame of implementation.

Recommendations for short term (immediate) implementation

1. The colleges, i.e., the TECs as well as the TVETs, should provide brief orientation and course clarification in the presence of female instructors and gender focal persons, from the respective fields, if possible, before the students select their field of study.
2. Special attention should be given to those female college trainees who have already joined those fields that are avoided from by most female students. Based on their interest, the colleges should arrange tutorial programs and extra curricular activities to enable them compete with their male counter parts.
3. The colleges should provide incentives for female trainees who have been successful in such fields so that they can gain recognition and confidence and they can be exemplary for other students.
4. The college gender committee should not only be established but also be fully functional and well staffed. The gender committee should also provide guidance and support to female trainees in relation to their selection of field of studies.
5. Female trainees who complete their study from TVETs in such fields as Woodwork, Mechanics, Constructions and the like should be provided equal job opportunities with males.

Recommendations

1. The districts, collaborating with the Oromia Education Bureau (OEB), should recruit more female teachers who graduated in Natural Sciences and Mathematics so that they can act as role models for their students starting from the primary level.
2. Teachers, teaching both at primary and secondary levels, should encourage and pay more attention to girls, especially in relation to such subjects as Math and Natural Sciences. They need to work towards the development of feelings of capability and self-concept towards Mathematics and Natural Sciences.

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