Gender Role Attitude of University Students: A Comparison of Implicit and Explicit Measures

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Abstract: The purpose of the study was to examine gender role attitude of university students who are studying in fields that are traditional to women (social science) and nontraditional to women (mathematics and physics). Specifically, the study tried to examine the influences of variables like sex, fields of study and years spent at university on gender role attitude. A cross-sectional survey was used as a research design. Purposive sampling technique was used to select 130 students from the College of Social Sciences and Humanities (CSSH) and College of Natural and Computational Sciences (CNCS) located at Haramaya University main campus. Implicit and explicit measures were used to examine traditional gender role attitude. Percentage, Chi-Square test, one-sample t-test, independent sample t-test, and one-way ANOVA were employed as data analysis techniques. Contrary to what has been hypothesized, the results of the study revealed that participants had a traditional gender role attitude. The implicit test result also showed that a significantly higher number of participants (more than 90%) associated men to Doctor and Engineer than associating women to these professions. As hypothesized, female participants had significantly lower traditional gender role attitude mean score compared to their male counterparts. Moreover, the result showed no statistically significant differences among groups' means for the first year, third year, and students from CNCS as determined by one-way ANOVA. It is concluded that college education in general and training in Gender and Development (GAD) field, in particular, had little influence in changing traditional gender role attitude of the participants.

Keywords: Explicit measures; Gender role attitudes; Implicit measures; University students

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1. Introduction

Ideally, children are expected to develop in a world free of any form of prejudice and stereotypes. Nevertheless, the reality is completely different. From the time of birth, children are categorized under a "boy" or a "girl". This categorization then fosters the creation and maintenance of gender role attitude and occupational segregations between men and women (Ridgeway & Correll, 2004; Blau, Ferber, & Winkler, 2002). Researchers have indicated that children acquired gender role knowledge (e.g., "Who typically becomes a doctor?) as early as two years (Ruble, Miller, & Trautner, 2006). Negative evaluations of cross-gender violations, i.e, engaging in counter-stereotypic behaviors tend to develop afterwards. For instance, Blakemore (2003) found that 7 to 10 year-olds were particularly negative in their evaluations of male nurses and female doctors. These attitudes about gender-typed jobs persist throughout their adult life and affect their career pathways. The differences in gender role attitude have often been interpreted as a possible explanation for why girls do not choose certain professions. Many occupations today continue to be gender-stereotyped. Earlier studies indicated that disciplines such as language, humanities, and social sciences and health sciences had been considered female-friendly. On the other hand, disciplines like engineering, physics, leadership, ICT, medicine, are assumed to be male-friendly (Bain & Cummings, 2000; Bagilhole, Dainty & Neale, 2000).

Consequently, this dichotomy of female-friendly and male-friendly occupations hold true in most countries of the world. For example, in the US women constitutes 4 percent of firefighters, 10 percent of civil engineers, 31 percent of computer systems analysts, 32 percent of physicians (Schaefer, 2013). Women are also the minority in occupations like engineering and technology in most Western European countries (Grevholm, 2002; Lihong, 2009). Likewise, although university-level graduation rates for women and men are equal or women exceed men in most OECD (Organization for Economic Co-operation and Development) countries, the proportion of women in mathematics intensive fields is on average only 30 percent (OECD, 2007). On the other hand, according to the 2010 data, women in the US constitute 98 percent dental assistants, 95 percent of childcare workers, 91 percent of registered nurses, and 88 percent tellers (Schaefer, 2013). In spite of substantial liberalization efforts, these out-dated conceptualizations of gender-typed jobs continue to play an important role in young boys and girls' career potential.

The occupational status of women in Ethiopia seems the worst of all. In this patriarchal society, girls are brought up to conform, be obedient and dependent, and specialize in indoor activities like cooking, washing clothes, fetching water, caring for children, etc (Beyene, 2015; Haregewoin & Emebet, 2003). The survey conducted by the Central Statistical Agency (CSA, 2004) showed that women account for less than half (43%) of the total employees in the country and most of them (78%) in domestic activities. Likewise, the 2014 survey of the Ethiopian Central Statistical Agency (CSA, 2014) indicates that women make up 55 percent of nursing and midwifery associated professionals, 40 percent of elementary school professionals, 16 percent science and engineering, fewer than 10 percent of professionals in the

field of information technologies, and nine percent of higher education professionals. Furthermore, the number of women with a PhD in science and engineering is less than one percent (0.34%) of the total university faculty (FDRE, MoE, 2017). Women are also underrepresented in leadership positions where less than 10 percent of legislators and senior officials and zero percent of university presidents or vice presidents represent women (Beyene, 2015).

This underrepresentation of women in traditionally male-dominated professions has significant social and economic costs to women. From a social justice standpoint, women are denied desirable career positions, equal pay, and power associated with prestigious jobs. From economic points of view, underrepresentation of women in traditionally male-dominated careers widened the gender wage gap. For instance, Beede *et al*. (2011) stated that in the United States workforce women with Science, Technology, Engineering and Math (STEM) jobs earned 33 percent more than comparable women in non-STEM jobs. This figure is considerably higher than the STEM premium for men (which was 25 percent). This analysis indicates that recruiting more women in traditionally male-dominated occupations like STEM is likely to close the gender wage gap that women activists complain about.

Although scholars and policymakers agree upon the underrepresentation of women in traditionally male-dominated careers, no consensus has yet been reached about the reasons behind gender segregation of professional careers. Recently, gender role attitude has attracted quite a lot of scientific attention and publications. Gender role attitudes are one's beliefs about the appropriate role of men and women in society (Xie, 2006). It is important to study gender-role attitudes because one's attitudes have strong associations with impacts on important labor market decisions. Researchers have indicated that most young people give priority to occupations that are compatible with their gender role attitude (Rojewski, 2005; Bryant, 2003; Siann & Callaghan, 2001).

Barnett and Rivers (2004) describe examples of how different stereotypic attitudes and beliefs about gender role affect our lives. For example, if a man believes that women are better caregivers than men, it is unlikely to ask this person to take child-rearing tasks. Similarly, if one believes that men are better engineers, it is unlikely for this person to encourage women to go to the fields of engineering. In sum, the literature demonstrates that attitudes play a significant role in explaining labor market participation. That is why UNESCO (2009) emphasizes school learning to focus on attitude and values.

Generally, progressive gender-role attitudes of young women were associated with, among other things; levels of desired and attained education, an increase in the likelihood of full-time labor force participation decades later and an increase in earnings compared to women with more traditional gender role attitudes (Farre & Vella, 2013).

Unchallenged gendered stereotypic beliefs support the continuity of specific gender roles and occupational gender segregation. To circumvent occupational gender segregation, the Ethiopian government has taken a firm stand starting with the drafting of new laws and policies. Article 35 of the constitution of Ethiopia is totally

devoted to the rights of women. The article states that the "State shall enforce the right of women to eliminate the influences of harmful customs" (Article 35:4). The constitution prohibits laws, customs, and practices that oppress or cause bodily or mental harm to women. The article also approves affirmative measures to remedy the discriminations they suffered. The Education and Training Policy (FDRE MoE, 1994) is another indicator of the emphasis given to the equality of women. One of the objectives of the policy is, "to gear education towards reorienting society's attitude and value pertaining to the role and contribution of women in development" (FDRE MoE, 1994, p.11). As indicated above, gender role stereotypes are culturally constructed standards. Cultures are inherently resistant to change and thus effective and strategic interventions are needed in order to reshape the values and assumptions of their members and to facilitate a cultural transformation (Vazquez, 2006). That is why the ETP emphasized changing society's attitude about the roles of women in development.

To accomplish this objective, the government introduced new fields of study like Gender and Development Studies (GAD) in some selected Universities of the country. GAD graduates are expected, among other things, to change society's traditional gender role attitude, which is instrumental in influencing the occupational choices of men and women. This can happen only if the graduates themselves have been changed first. However, as far as the writer knows, no study has been conducted that addresses gender role attitude of GAD students. The study also tried to compare gender role attitude of GAD students with students in other fields of study that are nontraditional to females (Math and Physics).

Findings have suggested that people are often unwilling or unable to express the stereotypes they hold (Wegner & Bargh, 1998; cited in Steel, 2003). It is a well-known fact that sciences advance by the development of their measurement instruments. Consequently, researchers have begun to study stereotyping using implicit (or indirect) measures. In implicit measures, researchers do not ask subjects to directly reveal their gender-role stereotypic beliefs. The reason for this strategy is to avoid social desirability effects that are known to exist when asking about socially sensitive topics (Cobb, 2001). Gender role attitude of men and women reveal inconsistent results when they are measured using implicit and explicit instruments. For instance, evidence on implicit stereotypes shows that although many individuals express low levels of stereotyping on explicit measures, many men and women hold implicit gender-math stereotypes that more strongly associate men than women with math (Diekman, Weisgram, & Belanger, 2015; Nosek, Banaji, & Greenwald, 2002).

Most of the implicit measures are done using picture drawing. For instance, Chambers (1983) asked children to draw a picture of scientists. The result revealed that out of 5,000 drawings of scientists by children, only 28 were of female scientists, and girls drew all of these. This indicates how girls themselves have stereotypic pictures of scientists. The Draw-A-Scientist task continued to show drawings of men far more than women even 20 years after the original research (Steele, 2003). Similarly, Capobianco & Diefes (2011) and Karatas, Micklos, & Bodner (2011) revealed that children in U.S. Midwestern schools perceived engineers as male as

evidenced by their drawings. Likewise, implicit associations that pair men with math have been documented in children as young as seven years old in Singapore (Cvencek, Meltzoff, & Kapur, 2014). In their experimental studies, Rudman and Phelan (2010) primed female participants with pictures of men and women described as working in either traditionally male or female jobs (e.g., female nurse or male surgeon) or non-traditional jobs (a male nurse). The results revealed that women primed with gender-traditional roles reported less interest in occupations that had been rated as masculine than participants in the typical jobs. Given the fact that gender role attitude differs when it is measured directly and indirectly, it is critical for the present study to measure this variable using implicit measures as well.

Studies indicated that having a college education was one factor that had been shown to increase non-traditional gender role attitudes of students with respect to the activities believed to be appropriate for women (Spencer & Eugene, 1997; Bryant, 2003; Kaufman, 2005). Therefore, the present study hypothesizes that undergraduate students would score low mean in traditional gender role attitude scale. In their drawings, the study expects participants to associate "Doctor", "Nurse" and "Engineer" with both male and female names equally or with no significant difference.

Previous studies indicated the existence of sex differences among college students in gender role attitude, women being more egalitarian than men were (Bryant, 2003; Levant & Richmond, 2007). Weisgram and Bigler (2006) also indicated that even though both boys and girls expressed relatively egalitarian attitudes about women in science during adolescence, girls were more positive than boys about women having jobs as scientists. Moreover, Steffens and Jelenec (2011) indicated the existence of implicit math-male stereotypes among male than female high school and college students in Germany. Therefore, the present study hypothesizes that there would be a significant difference between male and female participants in their explicit and implicit gender role attitudes favoring females. In other words, female participants would score lower mean in the explicit measure and would associate their drawings to male and female.

Moreover, earlier studies indicated that having a college education in general increases non-traditional gender-role attitudes of students (Spencer & Eugene, 1997; Bryant, 2003; Kaufman, 2005). Because of their training in gender-specific courses, the study hypothesizes that GAD students would have significantly lower mean score in measures of traditional gender role attitude as compared to students in the natural and computational sciences (math and physics). Furthermore, because of their relatively longer years of study and more courses on gender-related issues, the study hypothesizes that third-year GAD students would have lower traditional gender role attitude compared to first-year GAD students. In the implicit gender role attitude measure, this study expects third-year GAD students to associate Doctor and Engineer to male and female names equally compared to first-year and natural science students. Thus, third-year GAD students would have lower traditional gender role attitude compared to first-year GAD and natural and computational science students. Finally, this study hypothesized that GAD students would prefer non-

traditional departments (engineering, technology, natural and computational sciences) if they are given a second chance to choose a department.

Hence, the above hypotheses are summarized as follows.

H1: Participants would have non-traditional gender role attitudes. That is, they would score low mean (below the scale mid-point) in a traditional gender role attitude scale. In the implicit measures, they would associate "Doctor", "Nurse" and "Engineer" with both male and female names equally or with no significant difference.

H2: There would be a significant difference between male and female participants in their gender role attitudes favoring females. In other words, female participants would score significantly lower mean in traditional gender role attitude scale and would associate their drawings to male and female names equally or with no significant difference compared to male participants.

H3: Participants from the College of Social Sciences and Humanities (GAD students) would have non-traditional gender role attitudes as compared to students in the Natural and Computational Sciences (math and physics).

H4: Third-year GAD students would have significantly lower traditional gender role attitude compared to first-year GAD students.

H5: Female participants would prefer non-traditional departments (engineering, technology, natural and computational sciences) if they are given a second chance to choose a department.

2. Research Methods

2.1. Participants and Design

The study employed a cross-sectional survey design. The participants were 130 undergraduate students with a mean age of 21 years comprising of 46.5% females and 53.5% males. These participants were selected from the College of Social Sciences and Humanities (CSSH) and the College of Natural and Computational Sciences (CNCS) located at Haramaya University main campus, Ethiopia. The College of Social Sciences and Humanities was purposefully selected for the reason that the Department of Gender and Development Studies (GAD) belonged to this College. As indicated earlier, GAD department was purposefully selected to determine whether the program has brought about positive gender-related attitudinal change among students that attend the program. The College of Natural and Computational Sciences was also purposefully included in the study for the reason that it was one of the colleges located in the main campus where fields that are nontraditional to females (math and physics) were located. All third-year /graduating class students of the selected departments were taken as participants of the study. This year level (graduating class) was chosen purposefully for the reason that students at this year level were about to graduate. Thus, knowing their gender role attitude is important because it shows the effectiveness and quality of college education in general and GAD training in particular in changing gender-role attitudes to the positive direction. GAD first-year students were also considered in the study for the purpose of comparison. That is, how gender role attitude changes along with

the length of students stay in the department. Generally, purposive sampling technique was used to select college, department and year level of participants. Finally, a self-administered questionnaire was distributed to all students who attended that particular class and relevant data were collected accordingly.

2.2. Instruments
The following instruments were used to collect relevant data.

2.2.1. Implicit gender role attitude
This variable was measured by asking participants to draw pictures of three persons in a story and assign arbitrary names to each from the list of names given. Participants were told to draw pictures that show a Doctor and a Nurse helping a Patient (that is an Engineer). They were told not to worry about the quality of the pictures. The drawing was just for fun and that only their attempt was required. The instruction was as follows:

Drawing for Fun

Dear student,

You are going to draw pictures of three people within 15 minutes based on the story provided below. This exercise is just for fun. Do not worry about the quality of the pictures. Your simple attempt is required. Here is the story:

> An engineer was supervising a construction site. All of a sudden, the engineer had felt sick and lied on the ground. The construction workers around took the engineer to the nearby health station. A nurse and a doctor treated the engineer. Using this story, draw the pictures of the nurse and doctor while treating the engineer. You are given 15 minutes to complete the drawing.

To ensure better understanding, the story was read aloud as well. After they had finished drawing the pictures, the participants were told to give a name to each of the three persons in the story (Doctor, Nurse, and Engineer). For this purpose, six names that represent three males and three females were written on the blackboard. The reason behind listing six names on the board (rather than asking participants to give one for each picture) was that some names could serve both sexes. For instance, in Ethiopia, the name "Abiot" can be a name of a male or a female. Finally, participants were thanked and debriefed. They also got a bonus mark for participating.

Traditional gender role attitude was determined by counting Doctor_male, engineer_male, and Nurse_female name associations. That is, participants who associated (paired) Doctor (Engineer) with a male name and a Nurse with a female name were considered to have an implicit traditional gender role attitude towards occupations.

2.2.2. Explicit gender role attitude
Participants completed six explicit measures that corresponded to the implicit ones. This measure was constructed by the researcher. Each item was rated on a five-point Likert scale item format ranging from 5 = Strongly Agree to 1 = Strongly Disagree. The items in the scale measure traditional gender role attitude. Thus, the higher the

mean score, the higher the traditional gender role attitude would be. The Cronbach's alpha for this scale was .703.

2.3. Procedure of Data Collection

The data was collected during class hours. The data collection process took an average of 30 minutes of class time. The participants were informed about issues of confidentiality, anonymity, voluntary participation and method of completing the questionnaires. Verbal informed consent was also obtained. To avoid social desirability effects, the students were informed about the real purpose of the research at the completion of the data collection process.

In the process, the implicit attitude measure was administered first. Students were asked to write a personal profile of themselves/their background information (sex, age, year level, and department) after they had finished drawing the pictures. This was for the reason that the researcher believed that asking the students to write their sex in advance might affect the naming of the drawings. After completing the drawings, participants were told to put their drawings in an empty bag placed in front of them and took the explicit measure from the other bag. Finally, the students were told about the real purpose of the research.

2.4. Techniques of Data Analysis

The collected data was analyzed using descriptive statistics (mean, standard deviations, and percentages), and inferential statistics like one sample t-test, independent samples t-test, Chi-Square test, and one-way ANOVA. One sample t-test and independent samples t-test were used to test gender role attitude and sex differences in gender role attitude respectively. That is, participants would score significantly low mean from the test mid-point and that there is a significant mean difference between male and female participants in gender role attitude measure. Moreover, one-way ANOVA was employed to test if there were significant mean differences in gender role attitude among GAD, Physics and Mathematics students. Finally, a chi-Square test was used to analyze all implicit measures under the study.

3. Results

Data were collected from 130 participants with a mean age of 21 years (SD=1.62). Table 1 below presents the demographic characteristic of participants.

Table 1. Demographic characteristics of participants

			Frequency	Percent
Sex	Male		70	53.8
	Female		60	46.2
	Total		130	100.0
Department	Male	Gender and Development	31	44.3
		Mathematics	13	18.6
		Physics	26	37.1
		Total	70	100%
	Female	Gender and Development	59	98.3
		Mathematics	0	0
		Physics	1	1.7
		Total	60	100
Year	Male	First-year	6	8.6
		Third Year	64	91.4
		Total	70	100
	Female	First-year	44	73.3
		Third Year	16	26.7
		Total	60	100

Source: Own survey, 2017

As shown in Table 1, 69.2% of the participants belong to the department of GAD and the remaining 20.8% to Mathematics and Physics departments. Of the 60 female participants, almost all (59) belong to GAD department. This signifies the disproportional number of female representations across different departments. For example, the 2016/17 student enrollment statistics at Haramaya University where the present study was conducted reveals that females represent 16.6 %, 20.7% and 72.7% of the total students in Mathematics, Physics and GAD departments respectively (Haramaya University Facts and Figures, 2016/17). This is similar to other public universities where females constitute only 7.9 percent of the total enrollment in Physics (Semela, 2010).

The first hypothesis states that participants would score low in traditional gender role attitude such that they would disagree to traditionally phrased items in the explicit measures and would associate "Doctor", "Nurse" and "Engineer" with both male and female names equally or with no significant difference in the implicit test.

In order to test whether the samples differed significantly from the scale mid-point, a one-sample t-test was conducted for the explicit measures using the scale mid-point

(2.5) as a reference value. The result revealed that participants mean score was significantly higher than the test value (M =3.14, SD=.94: t (128) = 7 .81, p=.000). This indicates that participants have adhered to traditional gender role attitude. Participants have reflected their traditional gender role attitude in the implicit measures as well. The results are shown in Table 2 below.

Table 2. Chi-Square test on implicit measure of gender role attitude

			Chi-square test				
			Expected	Observed	X^2	Df	Sig.
Picture representing	Doctor as	Female	65.0	11	89.72	1	.000
		Male	65.0	119			
	Nurse as	Female	64.5	64	.008	1	.930
		Male	64.5	65			
	Engineer as	Female	65.0	5	225.4	1	.000
		Male	65.0	125			

Source: Own survey, 2017

Table 2 above indicates that the proportion of professionals such as Engineer and Doctor represented as male occupations are significantly higher than their representation as female occupations. That is a significantly higher number of participants associated men to Doctor and Engineering professions than associating women to these professions. As can be seen from the Table, 96.2% and 91.5% of the participants associated engineer and doctor as male professionals respectively. This is consistent with traditional gender role attitude. On the contrary, nursing is becoming a gender-neutral profession as a nearly equal number of males and females are associated as a nurse as evidenced in the drawings.

The second hypothesis tested whether traditional gender role attitude differs between the two sexes using independent sample t-test. The explicit measure of gender role attitude result showed that there was a significant difference in mean scores for males (M=3.34, SD=.90) and females (M=2.93, SD=.95: t (127) =2.46, p=.01) such that female participants have significantly lower mean score in traditional gender role attitude than their male counterparts. For detailed information, the results of each item are shown in Table 3 below.

Table 3. Independent sample t-test on sex difference in explicit measure of gender role attitude for each item

Items	Sex of participants	N	Mean	Df	t	Sig.
On the whole, men make better leaders than women do.	Male	70	3.42	128	2.44	.016
	Female	60	2.78			
Care of children is a mother's duty before it is a father's.	Male	60	3.65	128	1.61	.11
	Female	60	3.26			
If I had to go to a hospital I prefer a male doctor than a female.	Male	70	3.02	128	2.11	.037
	Female	60	2.53			
If I am to employ a secretary, I prefer a female secretary than a male.	Male	70	3.28	128	.350	.727
	Female	60	3.20			
Generally, I prefer a female nurse than a male nurse.	Male	70	3.12	128	-.487	.627
	Female	60	3.25			
Men are better suited to be Engineers than women.	Male	70	3.27	128	2.64	.009
	Female	60	2.5667			

Source: Own survey, 2017

Table 3 above depicts that male participants' mean score for all items is above 3 which reflects traditional gender role attitude. In some occupations like nursing, secretary and childcare both male and female participants agree to be women's occupations. However, there is still a significant difference between the two sexes in some occupations like engineering, leadership, and physicians. Female participants believe that these professions represent both sexes whereas male participants still believe that the professions principally belong to men. The sex difference is also reflected in the implicit gender role attitude measure as indicated in Table 2. Male and female participants did not differ in the other pictorial representations of males and females in that both adhere to the traditional gender role attitude.

   The other hypothesis the study attempted to test was whether gender role attitude significantly differs between first year and third year GAD students, and students in the natural and computational sciences (math and physics) and GAD students. The result showed no statistically significant differences among groups means for first-year ($M = 3.02$, $SD = .85$), third-year ($M = 3.08$, $SD = 1.24$), and natural science students ($M = 3.38$, $SD = .64$) as determined by one-way ANOVA [$F (2, 128) = 1.69$, $p = .189$]. The explicit gender role attitude scores reflected that training in GAD course did not bring change in gender role attitude in a positive direction.

The results of implicit attitude measure also indicated adherence to traditional gender role attitude. The details are presented in Table 4 below.

Table 4. Chi-Square test on implicit measure of gender role attitude by year level and departments

Year in college and department	Picture representing	Sex	Observed	Expected	Chi	df	Sig.
GAD 1st year students	Doctors as	Female	7	25			
		Male	43	25			
	Nurse as	Female	21	25			
		Male	29	25			
	Engineer as	Female	4	25			
		Male	46	25	3.86	2	0.145
GAD 3rd year students	Doctors as	Female	3	20			
		Male	37	20			
	Nurse as	Female	25	20			
		Male	14	20			
	Engineer as	Female	0	20			
		Male	40	20	4.78	2	0.92
Natural Sciences	Doctors as	Female	1	20			
		Male	39	20			
	Nurse as	Female	18	20			
		Male	22	20			
	Engineer as	Female	1	20			
		Male	39	20	4.13	2	0.127

Source: Own survey, 2017

As can be seen from Table 4, there was no statistically significant difference among the three groups. That is, year of study and field of study did not influence the traditional gender role attitude of participants. For instance, out of 50 first-year students participated in the study, 46 (92.0%) represented engineering as a male profession. Unfortunately, all third-year students (100%) represented engineering as a male profession. Similarly, 97.5% of participants from natural science departments represented engineering as a male profession. From the above analysis, it can be concluded that neither year in college nor department type has a significant impact in changing gender role attitude of students from traditional to egalitarian as measured by implicit tests.

The majority of the present participants (66.4%) reported that they joined their current department as per their first or second choices. Among the 60 female students who participated in this study, none belonged to physics, one belonged to the department of math, and all the remaining (59) belonged to the GAD department. Participants might have chosen their current fields of study through the influence of traditional gender role attitude they held while joining the study programs. Here, participants were asked field of study they would choose if they were given second chance. The result is displayed in Table 5 below.

Table 5. Participants' college preference by sex

	Technology & Engineering	Natural and Computational	Health and Medical Sciences	Language and Arts	Social Sciences, and Education	Business and Economics	Other
If you are given a second chance to choose a college, what would that college be?							
Male	5	20	3	1	17	10	5
Female	0	0	1	3	29	20	4
Total	5	20	4	4	46	30	9

Source: Own survey, 2017

Table 5 indicates that female participants still stick to their present fields of study. As can be seen from the Table, the female participants preferred neither engineering nor natural and computational sciences. This result contradicts the assumption that participants would prefer non-traditional departments as a result of their college-level training in general and GAD training in particular.

4. Discussions

The purpose of the present study was to examine gender role attitude of university undergraduate students enrolled in CSSH and CNCS at Haramaya University, Ethiopia. The study expected that university students in general and GAD students, in particular, would score low mean for items that measure explicit traditional gender role attitude. It was also hypothesized that participants in their drawings would associate occupations like medicine, engineering, and nursing more or less equally to men and women in the implicit measures. The results of the study revealed contrary to what has been assumed. The result showed that participants' traditional gender role attitude was significantly higher than the test value reflecting adherence to traditional gender role attitude. The results of the implicit measures also reflected a traditional gender role attitude. That is a significantly higher number of participants associated men to a career as medical doctor and an Engineering occupation than associating women to these professions.

Previous studies showed conflicting results about the power of college education in changing traditional gender role attitudes. For example, like the present study university students in Hungary (Hajnalka, 2014) and Malaysia (Sultana, Nallusamy, Suhaili, & Yaacob, 2015) reflected traditional gender role attitudes. Similarly, high school students in Ethiopia and children in the Awra Amba community hold traditional gender role attitude (Martha, 2015; Seid, 2015). On the contrary, unlike the results of the present study, other similar studies indicated that having a college education was one of the factors that had been shown to increase non-traditional gender-role attitudes of students with respect to activities believed to be appropriate for women (Spencer & Eugene, 1997; Bryant, 2003; Kaufman, 2005; Fazeli, Golmakani, Taghipour, & Shakeri, 2015).

These conflicting results signify that education alone may not be an important factor in predicting gender role attitude. Rather it is the quality of education and the level of exposure to the attitude element that determines gender role attitude. In this regard, exposure-based theory (Davis & Greenstein, 2009) states that exposure to situations, individuals, etc will play a role in developing one's gender-role attitudes. According to Seid (2015), Awra Amba is one of the communities in Ethiopia where non-traditional gender role attitude is widely held. In this community, age is a significant predictor of modern gender role attitude than education.

The results of the present study also showed a significant difference between male and female participants regarding gender role attitude. That is, female participants scored significantly lower mean score of traditional gender role attitude compared to male participants. In the implicit measures, female participants associated being a

Doctor with a female more often times than their male counterparts. This finding is in line with similar studies that attested female participants' egalitarian attitude toward gender roles (Hajnalka, 2014; Fazeli *et al*., 2015). Female high school students in Ethiopia also demonstrated a nontraditional gender role attitude than their male counterparts (Martha, 2015). However, the two groups did not significantly differ in the other implicit measures where they associated engineering as a male occupation and nursing as a male and female occupation. Furthermore, there was no statistically significant difference between adult Awra Amba males and females in gender role attitude. Both males' and females' gender role perception are non-traditional (Seid, 2015).

The results of the present study also revealed no significant difference among GAD first year, GAD third year, and participants from CNCS in implicit and explicit measures of traditional gender role attitude. This implies that the courses delivered at GAD department did not have a significant positive effect in changing traditional gender role attitudes.

Previous research indicates that a curriculum that is critical of the existing stereotypic gender relations and cultural norms is a fundamental building block for individual and societal changes (Vaughan, 2016; UNESCO, 2009). For instance, Isaac, Kaatz, Lee, & Carnes, (2012) showed that a 16-week long educational intervention improved not only females' leadership self-efficacy but also increased their self-esteem and personal mastery and most importantly decreased perceived constraints. Based on the findings, Isaac *et al*. (2012) recommended that educational interventions aiming at weakening societal negative stereotypes about women's choice and performance in certain domains. However, curriculum modification alone will not bring the desired effect as long as stereotyping of women continues in textbooks and in day to day interactions and decisions. For example, out of 65 GAD first-year students, six were male and the class representative was a male too.

Finally, participants were asked departments they would choose if they were given a second chance. This question was asked to check if participants had changed their mind regarding gender-related attitude to occupations. Accordingly, the majority of the participants favored their current departments and colleges. And the female participants opted for neither Engineering nor Natural and Computational Sciences. This is the other indicator that participants still hold traditional gender role attitude that nullifies the value of higher education in general and gender-specific courses in particular in improving gender role attitude.

Empirical studies also demonstrated that female enrollment was very low and attrition was very high in most Ethiopian Universities (Beyene, 2015; Robsan, 2014). For instance, a study on ten selected universities of Ethiopia in the 2007/08 academic year indicates that females constituted only 7.9 percent of the total enrollment in Physics (Semela, 2010). Furthermore, many female students are reluctant to study STEM even if they are provided scholarships in these fields (Robsan, 2014). The attitude of female students themselves and that of department heads might have contributed to such low enrollment rates of females in science-oriented fields. For instance, about 35.1 percent of department heads of technology-intensive universities

are of the opinion that being male or female affects one's performance in science and technology and females are better at biology than physics and Mathematics (Beyene, 2015).

In conclusions, the results of the present study have shown that participants hold traditional gender role attitude in both implicit and explicit measures irrespective of the year level, sex and the type of departments they attend. These results are surprising as many other studies indicated modern gender role attitude as a level of education increases and females having modern gender role attitude than that of males. These inconsistencies should be interpreted from contextual points of view. As can be easily observed, gender is a complex issue and that a single factor like sex, education level or the type of education one attains cannot explain it.

In the Ethiopian context, gender role attitude should be viewed from a cultural milieu, parental gender role attitude and the economic points of view as a whole. First, parents play a significant role in children's behavior. Empirical studies (for example, Caner Guven, Okten, & Sakalli, 2016) showed that parental traditional gender role attitude has a serious impact on the educational attainment of school children. Similarly, a child growing up in a family where the mother has a higher level of education and participates in the workforce has more progressive gender-role attitudes (Martha, 2015; Farre & Vella, 2013). Most Ethiopian parents have a low level of education (if they have any). This might have contributed to the maintenance of traditional gender role attitude of participants as reflected in the findings. Therefore, it is recommended for future researchers to empirically test the influence of parents' level of education on gender role attitude. Second, Ethiopia is a country with a deep-rooted patriarchal system where conservative culture prevails. In such a country, it may be formidable to change students' gender role attitude with three years of education. Even if three years of study is assumed to be enough to bring the sought attitudinal change, it would be impossible in a country with a poor education system where education quality is still a vision, not a reality. Hence, the results of the present study would be meaningful with the consideration of contextual factors of the country.

5. Implications of the Study
The results of the study have important practical and policy implications in efforts to change gender role attitude

First, the educational program in general and GAD program in particular, are not effective in changing students' gender role attitude in a positive direction. In the present study, GAD participants still hold traditional gender role attitude, which is contrary to the program objectives. This necessitates the importance of revising the courses of the curriculum. For instance, social psychology deals with attitude and is believed to contribute to attitude change endeavours. Even different writers define social psychology as the scientific study of attitudes. Thus, including social psychology as a course would positively contribute to attitudinal change endeavour.

Second, it is true that addition of courses alone cannot guarantee the attitudinal change of students. The relevance of the course contents and delivery mechanisms in

relation to the goal of the program should be closely examined. The contents of the courses should be critical of the existing stereotypes and cultural norms rather than being silent on them. Similarly, course delivery mechanisms should be modified so that active, experience-based and student-centredd approach of learning and assessment should be enhanced.

The third implication is related to increasing the number of female teachers in schools in general and in nontraditional disciplines like math/science and technology domains in particular. Social cognitive theory suggests that role models affect career choice directly and indirectly through their influence on self-efficacy. Observing female teachers in math/science domains lead female students to be confident that they can also manage tasks in similar fields. Similar research suggests that focusing on successful women mathematicians helps alleviate women's mathematical stereotype threat. On the contrary, studies indicate that the absence of role models in an environment where group stereotypes might apply induces threat which results in reduced efficacy and career intention.

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