



Gender Responsive Pedagogy: Practices, Challenges & Opportunities - A Case of Secondary Schools of North Wollo Zone, Ethiopia

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Authors' contributions

This work was carried out in collaboration among all authors. Author MA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AD and AS as an advisor, advised the researcher and managed overall the research work. All authors read and approved the final manuscript.

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ABSTRACT

The purpose of the current study was to examine the general secondary school (GSS) science teachers' gender responsive pedagogy (GRP) implementation status. To do so, descriptive survey research design was employed. Teachers, department heads and school principals were taken as respondents of the study comprehensively. And students were also participants of the study conveniently. Questionnaire, interview, and focus group discussion (FGD) were considered as the principal data collection tools. The collected data was analyzed both qualitatively and quantitatively: the data collected through questionnaire was analyzed via mean, std., one sample t-test. And the data gathered by open ended items, interview, and FGD as well was analyzed via words, phrases, statements and narration. The analyzed data noted that GSS science teachers of the North Wollo Zone had facilitated GRP fairly. Thus, they found as effective in relation to language usage, classroom setups, classroom interaction, and addressing sexual harassment. To do so, availability of

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qualified school supervisors and principals, and realization of new education training policy (NETP) were considered as possible opportunities. However, teachers as well ineffective to prepare gender responsive (GR) lesson plan, to prepare and use GR instructional materials and to have GR management of sexual maturation. This vanity of teachers was sourced from ranges of challenges: economic, culture, school and teacher related. Therefore, extra support in natural sciences should be given for girls beginning from lower primary education; Confidence building dialogues through involvement of female role model need to be initiated in schools; Gender based counseling, information and remedial learning programs like tutorial classes should be strengthened in schools; Since they used as experience sharing center, gender-sensitive expansion of ICT facilities, including computer labs and internet delivery infrastructure should be expanded in schools.

Keywords: Challenge; gender responsive; opportunity; science; secondary school.

1. INTRODUCTION

Education at all levels promotes health, improves the quality of life, expands access to paid employment, increases productivity, and facilitates social and political participation for men and women (Idowu, Ogunlade, Olatundun, & Afolabi [1]; Kudjo & Kwasi [2]). Education can play great roles for development of a given nation, because it is a means for the wellbeing of individuals in particular and the society in general. It is a corner stone of economic and social development and principal means of improving the welfare of individuals. It advances the productive capacity of society and their political, economic and scientific institutions etc. In its multiple essences, MoE [3], education remains to be one of the key instruments to promote gender equality and to enhance equitable growth.

Particularly, as disclosed by Vincent [4]; Ashebir and Bereket [5], science and technology have immense contributions to the escalation and progress of a country. For example, the Ethiopian science and technology agency (ESTA) [6] announced that the ability of country to sustain rapid economic growth in the long run is highly dependent on the effectiveness with which its institutions and policies support the knowledge generation, technological transformation, and innovativeness of its enterprises. It is evident that science education contributes to the level of prosperity, welfare, and security of a nation. It is also concerned with the development of technologically literate citizens who understand how science, technology, and society influence one another and who are able to use this knowledge in their everyday activities (Feyera [7] & Genene [8]).

Accordingly, Ethiopia has played her initiatives. For example, to realize this, the country has designed science curriculum starting from

elementary school to university level. In Ethiopian context, the natural science core subject at the secondary level (grades 9-10 and grades 11-12) becomes distinctly differentiated as Biology, Chemistry and Physics (Tsegaye [9]). ESDP III for secondary education (grades 9-12), was designed to expand this level to meet the demand for trained middle and higher-level human power and to reflect the intake capacity of the tertiary level (MoE [10]). As MoE added, during ESDP III implementation, many new secondary schools were opened. The total number increased from 706 in 2004/05 to 1202 in 2008/2009, which is a 70% increase over the four years. And technical training would be provided for those who complete grade ten for the development of middle level manpower (TGE [11]).

Revising and modernizing of school curriculum has also conducted with an academic focus on mathematics and science in response to economic needs. As TGE added, the new Education Policy and Sector Strategy addresses issues, for example, the purposes of science education, the context for the science curriculum, teacher education, and conditions that foster the development of practical work in school science. As affirmed by MoE [12], secondary education curriculum update would pay attention to the incorporation of modern technology and vocational topics and education for greater creativity and entrepreneurship. The country gave more emphasis to science fields and students are expected to gain adequate practical knowledge parallel to the theoretical knowledge of science disciplines (Ashebir & Bereket [5]).

It is widely understood that realizing the goal of development cannot be attained without the very significant component of gender, but the issues of equity in education between male and female groups have been a serious problem in Ethiopian education system at all levels in general, and of

secondary education in particular (Amogne, [13]). Improvement in secondary school will be necessary to ensure a skilled workforce, consisting of both males and females, is available for the future but the net enrolment rate of female remains lower than males in the nation (Rose [14]). The literacy rate of women with age of 15-24 years in Ethiopia during 2005 and 2011 survey period was 41.6% and 56.9% respectively. The rate for men with the same age interval during the two survey periods was 67.2% and 75% respectively-considerably higher than women's rate (Amogne [13]).

Science particularly 'hard science' is still also seen by many as a historically male dominated profession to which women have only relatively recently been admitted (Helen [15]). In high schools of Ethiopia, the number of girls voicing strong support of the importance and relevance of science is much smaller than that of boys. Decreasing interest in science amongst girls was also discovered in extracurricular activities (Yazachew [16]).

Oli [17] also conducted a study to investigate status of students' academic achievement in science education across selected preparatory schools of Ethiopia. And the overall academic attainment in science for male was 47.58% and for female was 39.70%. In all the cases, according to him, the mean scores of female were less than that of males.

This gender gap is particularly great in the secondary schools of North Wollo Administrative Zone of Amhara Regional State, because girls are occupied under multidimensional home related activities; they also harassed in their school, and they are migrated in to Arab countries to support their family members etc.

Moreover, cultural factors such as social and family gender role expectations, parents' low commitment to children's education etc. have affected students' learning (Ashebir & Bereket [5]; Kudjo & Kwasi [2]; MoE [3], Nyevero & Memory [18]; Teklu [19]; FAWE [20]; Mlama, et al. [21]). This means, the long-standing cultural misconception of the community and the family such as forced marriage, early marriage, abduction, verbal insult, beating up, insecurity and rape are disturbed students' schooling (UNESCO [22]; Guday, [23]; Jones, Bekele, Stephenson, Gupta, Pereznieto, Guday, Betlehem & Kiya [24], Kerebih & Mulunesh [25]; MoE [10]). Thus, low completion rate has more implication for girls than boys due to low median

age of marriage for girls (16.5) than for boys (21.8). Girls get married before reaching grade eight (MoE [3]).

Parents also prefer to send girls to Arab countries as home servant than males by considering them as the source of financial income especially in the North Wollo Zone. Karippai and Belay [26] put their witness by saying that many school going girls from Wollo and other parts of Amhara have migrated to Sudan illegally with the help of illegal agents. On the way, according to them, they have waited for one or two months or more in Gondar or Bahir Dar cities, have worked in hotels or bars to meet daily living costs, and have get trapped into sexual exploitations.

This sexual exploitation activity has far reaching implications for the teaching and learning processes which hamper girls' learning (Mlama, et al. [21]). Research output has demonstrated how targets of sexual bullying and harassment experience anxiety, distress, confusion, loss of self-esteem, and depression (NWLC [27]). So, it is possible to say that a sexually harassed student does not feel safe and cannot perform to his or to her fullest potential.

To realize objective of the study, the author has conceptualize conceptual framework as follow.

1.1 Conceptual Framework of the Study

Schools are social sites where the socialization process is reinforced. The social, physical and academic environments of schools often reinforce the construction of masculine and feminine identity starting from early ages (Mlama, et al [21]). For example, teachers demonstrate attitudes and expectations that regard women and men differently (MoE [3]). Many times teachers are not even aware of situations that are discriminatory on the basis of gender. They may use learning materials that depict only one gender performing certain types of activities or they may make disparaging remarks about the capability or characteristics of either gender (Mlama, et al. [21]).

Accordingly, as Duong [28] asserted, girls are excluded from public activities as a consequence of a patriarchal view of gender roles, insisting that females stay home to care for children and family. These notions suggest that women are both unfit for and uninterested in the teaching and learning process. Generally, this discourages the students, girls in particular, from

participating effectively in the teaching and learning process (Mlama, et al. [21]).

So, gender responsive school environment is required which can give an opportunity for all students to exert out their feeling and can motivate them actively in their learning (Mlama, et al. [21]; FAWE [20]; & MoE [3]). A gender fair educational organization, as FAWE [20] noted, is one where the academic, social and physical environment and its surrounding community take into account the particular desires of both male and female students. Mainly, teachers can get opportunities to treat all students fairly. To suggest solutions of the faced gender inequality science teaching, the researcher is developed conceptual framework- see diagram 1.

This conceptual framework helps him to identify major challenges and possible opportunities which could affect teachers' GRP practices. Specifically, it assisted the researcher to see how challenges and opportunities can influence the teachers' activities in line with manipulating elements of GRP such as lesson planning, preparation and uses of teaching materials, language use, classroom setup, classroom interaction, management of sexual maturation and addressing sexual harassment. And, it also enables him to conceptualize the cumulative GRP practicing status of science teachers. Accordingly, the following research questions were entertained in this study:

1. What is the present status of science teachers' gender responsive pedagogy (GRP) practices in the general secondary schools of North Wollo Zone?
2. What are the possible opportunities that prompt science teachers' GRP practices?
3. What are the possible challenges that intrude on science teachers' GRP implementation endeavors?

1.2 Materials and Methods

In view of the fact that the purpose of the study aimed to assess practices and challenges of GRP in science teaching and learning process, descriptive survey design was employed. It is an appropriate method which enables the researcher to assess the existing practices and challenges of the pedagogy in science instructional process.

North Wollo Administrative Zone is one of the eleven zones in the Amhara National Regional State. It is situated in the north eastern part of the region. The zone is geographically located

between 110N-130N longitudes and 380E - 400E latitudes. It is bordered in the north by Wag Hemra Zone and the Tigray National Regional State, in the south by the South Wollo Zone, in the east by the Afar National Regional State, and in the west by the South Gondar Zone. The Zone has an estimated area of 1,902, 200 hectares, which is about 20 per cent of the region. Its administrative town, Woldiya, is located 380km North East of Bahir Dar, and 521km North of Addis Ababa.

This Zone had 14 districts, and four of them (Habru, Kobo, Woldia, and Gubaalafto) were selected purposively since high gender gap was observed there. There are 19 general secondary schools found in these districts. Of these, 8 schools (2 in each district) were selected randomly (lottery method). All 291 science teachers from the 8 schools were part of the study comprehensively and 16 students (2 in each school) also selected conveniently. Moreover, science department heads and school principals were considered as participants of the study comprehensively.

1.3 Data Collection Instrument

To gather the required information from respondents, the researcher was administered the following tolls.

1.3.1 Questionnaire

So as to gather data from teacher respondents, questionnaire was developed in relation to practices, opportunities and challenges of GRP. Items of the questionnaire were both close and open-ended types. Statements were constructed by considering frequency and agreement likert scales. The frequency likert scale ranges from always to never (Always = 5, Often =4, Sometimes =3, Rarely =2, and Never =1) was applied in relation to items of GRP practices. The agreement scale also ranges from strongly agree to strongly disagree (Strongly agree = 5, Agree = 4, Undecided = 3, Disagree =2, and strongly disagree =1) - was applied for items developed with reference to challenges and opportunities of GRP. Furthermore, open ended questions were administered in an attempt to give opportunities for respondents express their additional feelings about the stated themes.

1.3.2 Interview

To collect data from students, the author had developed semi-structured interview based on

the leading research questions. It permits the researcher to explore issues which may be complex to investigate through questionnaire and to allow better flexibility for interviewer and interviewee that in turn it will give him/her better opportunity to explain what he /she feels on the issue more explicitly (Best and kahan, 2003, cited in Dereje [29]). To have an opportunity to rewind again and again, the interview process was supported by audio recordings.

1.3.3 Focus group discussion (FGD)

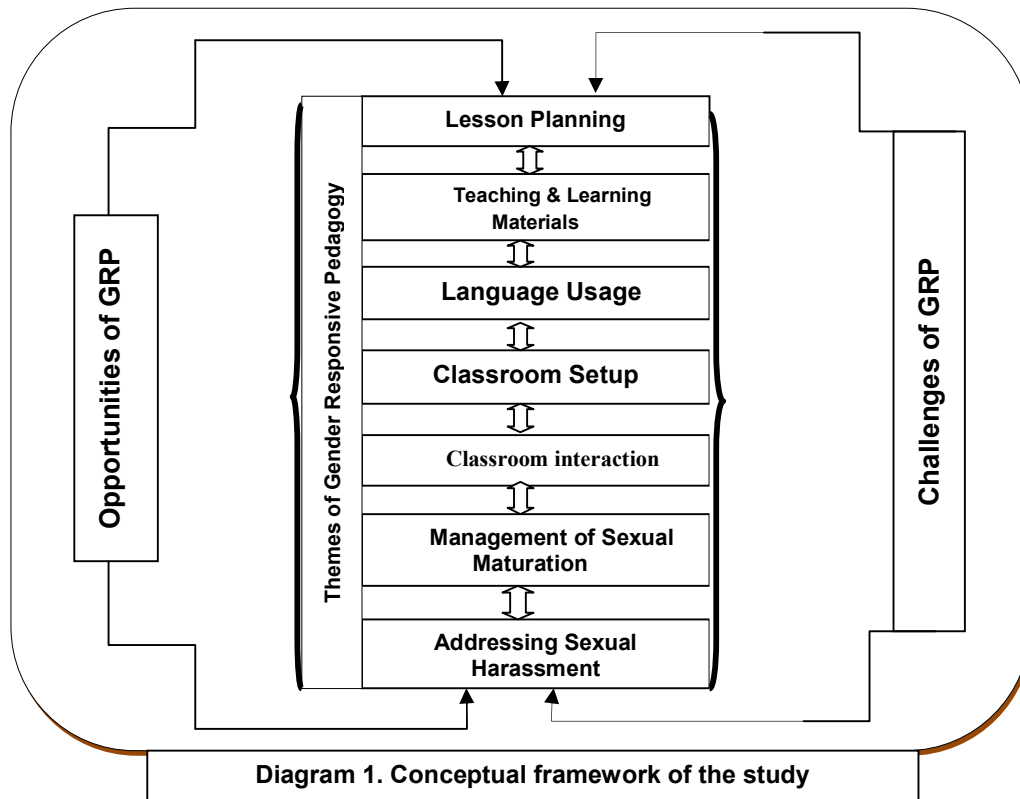
FGD, as data collection mechanism, is vital, because participants can get an opportunity to exert out their points of view related to GRP in the course of discussing each other with guidance of the researchers. By taking this usage in to account, the author would collected required information from science department heads and school principals. To do this, he had designed semi structured questions based on the leading research questions. In addition, audio recording had been conducted upon FGD participants that could help the researcher to get

an occasion to rewind and grasp the responded perceptions of respondents.

1.4 Pilot Study

To see the validity and test the reliability of the data gathering instruments, a pilot test was conducted in Wurgessa, Genetie and Selam GSSs which were not from the participant schools of the study. To do so, the schools were selected purposively, because their proximity with the residence of the researcher enabled him to facilitate the test easily. Moreover, general secondary schools in North Wollo followed similar science syllabus, textbooks and were administered by one education bureau and thus whichever schools selected, far or nearby, can bring no difference in trialing the instruments.

Accordingly, the findings of the pilot study indicated how items in relation to GRP practices, opportunities and challenges of GRP were reliable at .97, .909 and .921 respectively.



1.5 Data Collection Procedure

Before the researcher had collected the required data, he needed to get an agreement from participant general secondary schools. To do so, the author would submit a letter of authorization from district education offices. And the researcher would approach respondents of the study area accordingly. Then, he briefed objectives of the study to the respondents. And the designed questionnaire was distributed to 291 GSS teachers. To ensure a high return rate of the questionnaire, the researcher had made personally the distribution and collection processes from respondents. Accordingly, of the 291, 280 questionnaires were returned back, 9 questionnaires were not returned, and 2 of them were rejected out.

As stated before, science department heads and school principals were the participants of the FGD. To save their time and make easy the process, the discussion was conducted in each school except Kobo and Euketchora schools were considered as one FGD center (there was only one science department in Euketchora school), and the discussion was conducted based on the stated semi structured items. The process had supported by audio recording.

Interview also administered with students of the sample schools. The process was supported by audio recordings. To make the interaction easy and simple, the interview process would be conducted via Amharic language.

1.6 Data Analysis Techniques

As stated before, the study aimed to examine practices and challenges of GRP in science teaching. To do this, the collected data was analyzed quantitatively and qualitatively. The data which collected by questionnaire was analyzed quantitatively: descriptive statistics (percentage, frequency, mean, and standard deviation), and inferential statistics (one sample t-test at the significant level of 0.05). And SPSS 21.0 package program was employed for the statistical analysis.

Specifically, the standard deviation and mean scores were used to interpret data which was collected by the questionnaire. To test the overall GRP implementation status of teachers, and to specify the possible opportunities and challenges of GRP, one sample t-test was applied. In another way, the researcher used words, phrases, and statements etc. to analyze data

which was collected by interview, FGD, and open-ended items.

2. RESULTS

2.1 GRP Practicing Status of Science Teachers

To identify the recent GRP practicing status of GSS science teachers, the researcher was analyzed the collected data and the output is displayed as follow.

The result of one sample t-test in Table 2 ($M=3.14$, $t = 3.480$, $p = .001$) indicated that there is significant difference between the test value (3) and the observed mean (3.14) in favor of the calculated mean. This shows that GSS science teachers were practicing GRP properly in their teaching and learning practices. This, in other words, mean they seem sound in a position of facilitating their instructional activities by considering their male and female students' specific interest, or their background experiences. Accordingly, it is possible to understand that teachers' GRP endeavor is found in an acceptable status. To do so, as stated here under, teachers have their own opportunities.

2.2 The Possible Opportunities that Prompt Teachers' GRP Practices

To gather data in relation to the possible opportunities which enable teachers to facilitate gender responsive pedagogy in their instructional process, the questionnaire composed of nine items was forwarded to GSSscience teachers. And their response was analyzed by using mean, std., and one sample t-test as follow.

Accordingly, the analyzed data indicated how possible opportunities were found for teachers to facilitate GRP since the observed mean (3.217), Table 2, was over weighted the test value (3), and the one sample t-test result confirmed the presence of significant relationship at $M=3.217$; $t=5.051$; $p=.000$.

As an interview output showed, availability of toilet for both male and female students; the presence of water service; and the fenced of the school compound help to motivate all students learn safely. In relation to this, FGD participants from Srinka secondary school added that the educational accessibility for teachers, initiatives of government to provide urban housing site and loan services for teachers may make them to motivate to teach their students properly.

Table 1. One-sample t-test result of teachers' GRP practicing status

Item	Test Value = 3								
	N	Mean	Std. deviation	t	df	Sig. (2 tailed)	Mean difference	95% Confidence interval of the difference	
								Lower	Upper
GRP themes	280	3.14	.660	3.480	279	.001	.137	.06	.21

*P<0.05

Table 2. One-sample t-test result on opportunities of GRP

Item	Test value = 3								
	N	Mean	Std. deviation	t	df	Sig. (2 tailed)	Mean difference	95% Confidence interval of the difference	
								Lower	Upper
Opportunities of GRP	280	3.217	.71905	5.051	279	.000	.21706	.1325	.3017

*P<0.05

Table 3. One-sample t-test result on challenges of GRP

Item	Test value = 3								
	N	Mean	Std. deviation	t	df	Sig. (2-tailed)	Mean difference	95% Confidence interval of the difference	
								Lower	Upper
Challenges of GRP	280	3.269	.63126	7.141	279	.000	.26940	.1951	.3437

*P<0.05

Table 4. One-sample t-test result on the economic related challenges of GRP

Item	Test value = 3								
	N	Mean	Std. deviation	t	df	Sig. (2-tailed)	Mean difference	95% Confidence interval of the difference	
								Lower	Upper
Economic challenge	280	3.37	.880	7.012	279	.000	.369	.27	.47

*P<0.05

Table 5. One-sample t-test result on the school related challenges of GRP

Item	Test value = 3								
	N	Mean	Std. deviation	t	df	Sig. (2-tailed)	Mean difference	95% Confidence Interval of the Difference	
								Lower	Upper
School related challenges	280	3.29	.823	5.958	279	.000	.293	.20	.39

*P<0.05

Table 6. One-sample t-test result on the culture related challenges of GRP

Item	N	Mean	Std. deviation	t	df	Sig. (2-tailed)	Mean difference	Test value = 3	
								95% Confidence Interval of the difference	
								Lower	Upper
Culture related challenges	280	3.24	.855	4.68	279	.000	.239	.14	.34

*P<0.05

Table 7. One-sample t-test result on the teacher related challenges of GRP

Item	N	Mean	Std. deviation	t	df	Sig. (2-tailed)	Mean difference	Test value = 3	
								95% Confidence Interval of the difference	
								Lower	Upper
Teacher related challenges	280	3.19	.671	4.824	279	.000	.194	.11	.27

*P<0.05

However, as they added, the presence of girls' club in the school; launching of gender responsive pedagogy (it is new for them), and introduction of National Women's policy in Ethiopia have not any contribution for teachers' efforts of practicing GRP.

Accordingly, it is possible to argue that school clustering, availability of trained school supervisor and principal, realization of NETP, ESDP and GTP were initiated secondary school science teachers to facilitate GRP in their instructional process. In another way, based on the researcher's opinion, girls club in each schools and the GRP need to be functional in the academic environment of the research area so as to have gender fair instructional process.

2.3 Challenges that Intrude on Teachers' GRP Implementation Endeavors

To identify faced problems that could influence teachers to exercise GRP in their science teaching, the researcher had collected data from respondents by developing questionnaire which composed of thirty seven items in relation to economic, school, culture and teacher related factors. After gathering the required data, he analyzed it via mean, std., and one sample t-test and the detail is briefly stated - Table 3.

As an outcome of one sample t-test in Table 3 (M=3.269, t = 7.141, p =.000) indicated, there is significant difference between the test value (3) and the observed mean (3.269) in favor of the observed mean.

This noted how there were challenges which affected teachers' initiation of facilitating GRP in their instructional activities. This, in other words, mean the problems were appeared as severe to upset teachers' played roles of exercising GRP – they found in a trouble to satisfy students' particular interest or background experiences. As it is specified earlier, Table 3 demonstrated challenges of GRP in cumulative manner. But, the study has motivated to investigate the four GRP challenges since this would be vital to see effect levels of problems in detail and specifically.

Consequently, challenges of GRP would be displayed independently as economic, school, culture and teacher related as follow.

2.3.1 Economic related problems that challenge science teachers' GRP practices

To identify economic related problems which can challenge science teachers' GRP implementation

initiatives, eight items were raised. And as the t-test result outlined (M=3.37, t=7.012, p=.000), Table 4, the obtained score (3.37) was significantly higher than the expected mean (3).

As interview respondents argued, students need financial support from parents or caregivers to fulfill required instructional materials. But, some students had lack of helpers to do so, and they were enforced to renounce their schooling. For example, a participant student from Woldia secondary was noted that:

There was my classmate in this school that had not money to buy school uniform. And he was briefed the faced problem to the school by saying "I need to learn without having the uniform". But, the school did not accept his request, and the student obligated to gave up his schooling. As a result, he remained as a Bajaj driver in the town.

In line with this, FGD respondents from Srinka secondary school reported that students particularly females were found in serious challenge. For example, they hadn't get secure and safe house to rent. Some of them had harassed by renters or other misbehaves individuals. As a result, they enforced to migrate to Arab countries by give up their learning. Participants from Srinka secondary school as well added by saying that:

It was observed how economical or financial challenge had affected students' learning. To solve it, teachers and the school were tried to help these students by contributing birr and via other mechanisms. For example, there was a student who came from low economic background parent that unable to cover expenses for fulfilling required instructional materials. To solve his problem, the school had hired him as sanitary workers (cleaning classrooms, offices, and the school compound in general) by paying monthly.

Therefore, the researcher would argued by saying that low economic background of female students, their over engagement by excessive work, and girls migration to Arab countries were remarkable troubles that can influence students, particularly, girls' learning in the GSS schools of the setting.

2.3.2 School related problems that challenge science teachers' GRP practices

So as to identify school related factors which hinder teachers' initiation of exercising GRP, the

researchers were requested science teachers to rate ten items and analyzed the data. Accordingly, as stated under Table 5, obtained mean value (3.29) was considerably advanced than the expected mean (3).

This significance relationship is confirmed by the t-calculated at $M=3.29$; $t=5.958$; $p=.000$. The interview participants also argued that there were different clubs found in the school: anti HIV/AIDS, mini media, girls' club, peace and security etc., but, as the respondent from Hara secondary noted, none of them were functional. Similarly, a boy from Kobo reported that the school had its own problems which can hamper teachers' effort of achieving gender equality in their instructional activities. For example, as he briefed, there was no lab service, and there was lack of reference books in the library. The respondent also added that the school was ineffective to put in to practice its rules and regulations as intended.

FGD respondents too argued that schools seemed to relinquish their responsibilities. As they briefed, structures of the school such as parent teachers association (PTA), and education and training board (ETB) were not functional. The condition made difficult to control misbehave male students (one who harassed females, or disturbed teachers particularly females etc.). In addition, according to them, there was weak relationship found between the schools and the community which resulted in unable to solve school related problems by discussing with the society.

Therefore, schools need to work towards making school clubs particularly gender club to be functional; schools need to be initiative to train teachers about concept of gender and how they able to treat both male and female students equally. Not only this, but also they are required to exercise the launched rules and regulations which made schools to be trustful by school community members.

2.3.3 Culture related problems that challenge science teachers' GRP practices

To uncover culture associated factors that can hamper teachers' commencement of exercising GRP, the researcher was analyzed the collected data via one sample t-test. And the finding indicated how tradition based challenges had affected teachers' endeavor of having gender fair

instructional activities since the significant relationship is observed at $M=. 3.24$; $t=4.68$; $p=.000$ – see Table 6.

In relation to this, the interview respondents were argued by saying that there were cultural problems (parents' low attitude towards their children's' schooling; early marriage etc.) which affected students' learning in the schools. For example, respondents from Hara secondary argued that girls have married early and delivered baby by relinquished her learning. The respondent from Euketchora secondary stated that there were four early marriages had carried out upon the school girls. The condition was highly aggravated by parents , because their fear of having child without husband – locally termed as DIKALA, or they think how she may labeled by others as KUMOKER (losing the normal period of marriage in lacking of husband). If the married girl need to continue her schooling, there are some challenges not let her to do so. For example, some teachers motivated to say 'are you coming with your new born baby?' instead of accepting politely to encourage the girl. This like teachers' argument had broken girls' motivation to continue the females' learning.

FGD participants added by supporting the issue by saying that:

Cultural problems are highly observed in the school and in the community in general. This means, parents have a slogan which says "SETN MEDAR, WENDEN MASTERMAR". To brief, let girls to marry and allow boys to learn. Not only this, bus also parents have an attitude to exercise early marriage, because unless girls marry early, they become develop unwanted sexual practices untimely. Moreover, the society has a tendency of sending their girls to Arab countries to have financial wellbeing instead let children to school.

Thus, based on the outcome of one sample t-test result, the conducted interview and FGD, cultural problems particularly parents' low attitude towards girls learning, early marriage, and socially constructed gender roles were considered has the significant problems to facilitate GRP.

Therefore, it is important to make parents to be aware about importance of educating students particularly girls for national development since females are one parts of the society. To do so, it is expected to work cooperatively among

responsible bodies: schools, district education offices, zonal education departments, Regional education bureaus and the MoE in general.

2.3.4 Teacher related problems that challenge GRP practices

Although teachers are the notable individuals to lead the instructional activities in the given schools, there are some teacher context problems which obstruct their roles and responsibilities.

In order to specify these problems, the researcher had analyzed the collected data from respondents via using mean and one sample t-test. According to the finding ($M=3.19$; $t=4.824$; $p=.000$, see Table 7, there is a significant difference between the observed mean (3.19) and the test value (3).

In relation to this, the participant students in interview session noted that to teach students by considering gender equality; some teachers have their own problems. As they briefed, science teachers had knowledge gap - they were weak to clarify mean concepts of given subject matters; some others also were ineffective to teach their students by considering students' level of understanding (contents are difficult which are out of learners' status). Not only this, as the respondent from Kobo secondary noted, but also some of them as well simply come to the class only to open plasma (they are not initiated to introduce what the plasma teacher is going to teach and to summarize the main concepts which the plasma had introduced).

The FGD respondents also had shared their belief by saying as:

Not only parental economic challenges, but also teachers recently found under shouldering skyrocketing living conditions. Thus, they think more for having additional income sources to resist this costly world rather teach their students by considering students' particular interest or cultural backgrounds. For example, there was a teacher in our staff who has worked as waiter in his rest time. Accordingly, teachers hate their profession instead of teaching their students lovely by considering what teaching occupation needs to exercise by them.

So, the researcher initiated to argue as lack of commitment to work towards gender equality; knowledge gap; unable to organize contents

based on students' level of understanding; living sky cost; teachers' lack of consideration of gender; their lack of gender skill; and their low commitment to prepare gender fair supportive instructional materials were regarded as teacher related harms that could affect their played efforts of getting gender equality in the instructional process.

Therefore, it is vital to make teachers to have economic wellbeing to lead their life without more tightened manner, and also important to create awareness on teachers how to treat male and female students in their instructional activities.

To summarize, the analyze data out lined that poverty, girls' migration, girls' over work engagement etc. under economic related; low attitude of parents, early marriage, traditional expectations of gender roles etc. under culture related; shortage of gender fair teaching materials, ineffectiveness of the designed rules and regulations, dysfunctional school clubs etc. under school related; and low commitment to have gender fair teaching, inappropriate content usage in teaching etc. under school related had considered as the notable problems to facilitate GRP.

3. DISCUSSION AND IMPLICATION

As stated above, the present study indicated how science teachers of the setting were effective to facilitate gender responsive pedagogy (GRP) significantly. Inversely, Nabbuye's [30] findings noted that GRP approach has not fully translated into changes in the classrooms of Uganda.

Although the current study showed GRP implementation effectiveness of teachers in general manner, the conducted interview and FGD noted that teachers as well vain in line with lesson planning; preparation and utilization of instructional materials; and in the management of sexual maturation.

Thus, FGD respondents argued that teachers were motivated to consider subject matters, teaching methodologies, activities, teaching materials, assessment techniques but not gender while preparing lesson plan. Likewise, the conducted study by National Institute for Excellence in Teaching (NIET) [31] indicated that instructional plans that designed by teachers include few goals aligned to state content standards; activities, materials, and assessments that are rarely aligned to state standards, rarely logically sequenced, rarely

build on prior student knowledge, and inconsistently provide time for student work, and lesson and unit closure; and little evidence that the plan provides some opportunities to accommodate individual student needs.

FGD participants on their side argued that teachers did not use teaching aids always, and the school has not resource center which makes the production and utilization of instructional materials to be difficult for teachers. Even though teachers initiated to use the materials sparingly, they will give emphasis for content rather than gender.

This indicates to what extent they were ineffective to modify learning materials so as to reflect all students' feeling in their note preparation, they were also poor to develop GRP encouraging materials to facilitate their classroom practices, and as well, they were unproductive to initiate their students to prepare and use GR instructional materials in the instructional process.

Furthermore, science teachers of the setting were ineffective to play their responsibility of working towards achieving GR management of sexual maturation. FGD respondents added by saying that girls club was not functional and there was no guidance and counseling service, and sanitary assistance service in the school for females in the time of menstruation. As they noted, there were no regular and programmed services in the secondary schools, and students themselves, particularly females have not clearly or explicitly exerted their faced problems in the time of sexual maturation.

This also confirmed by UNESCO [32] which argued that the full engagement of girls in school activities is negatively affected, with many girls reporting they stayed home from school due to menstrual cramping, insufficient menstrual hygiene materials, inadequate water and sanitation facilities in schools, unsupportive environments, and fear of a menstrual accident. Generally, this teachers' ineffectiveness, as the one sample t-test result briefed at Table 2, had resulted from economic, school, culture and teacher related factors. To clarify, the finding has conceptualized to what extent girls' over engagement by financial based activities and their migration (economic related); parents' low considerations of their children's' learning, traditional constructed gender roles, early marriage (culture related); knowledge and skill

gap, low commitment to practice GRP, inability to prepare and use GR teaching materials etc. (teacher related); and scarcity of GR instructional materials, dysfunctional school clubs (school related) were affected teachers' initiation of facilitating GRP.

In his study, Keski [33] revealed that existing practical arrangements at the school of Ethiopia do not support the use of a student centered teaching method. For example, a detailed curriculum, annual tests, a high student-teacher ratio and a lack of teaching and learning materials support teacher-led teaching and make it difficult to implement student-centered teaching methods. The study conducted by Jhpiego Ethiopia [34] also noted that female students face greater financial constraints in paying for their basic needs while in school compared to male students, due to increased obligations to take care of children and families outside of school and less family support for their studies.

The FGD respondents of the current study as well supported the issue by arguing that some students who come from the rural parents, and learn their schooling by ranting house. This condition leads them to expense more money which influenced their teaching process. Thus, according to them, some parents cannot cover the require expenses, and accordingly they enforced to give up their schooling.

Equally, the conducted FGD in Kelala by Bekele, Pereznieto and Guday [35] has confirmed the present study that elaborated as there is a severe economic problem in their community driving youth out-migration:

The economic problem is common for boys and girls. They do not have any alternative options here for them. There is no promising future even after 'completing' their education. Therefore, we let them go freely. The potential negative outcome does not bother them much or hinder them from migrating. They prefer to face the challenges. Young adolescent girl group discussants in Kobo cited at least one person from their families (a sister, brother, aunt or uncle) who had migrated to Saudi Arabia, and most of them had had to dropout from school to migrate (Bekele, Pereznieto & Guday [35]).

Reviewing a large number of different studies relating to young people's experience of violence in Ethiopia, as Mulugeta [36] argued, traced how

dimensions of poverty impacted on young women's experiences of sexual violence. She found that vulnerability to sexual violence was particularly high for young women living away from families, engaged in domestic labor, commercial sex work, or living on the streets rather focusing on their instructional process.

So, according to the one sample t-test result – see Table 3, it is possible to say that economic challenges are the proponent obstacles for teachers of facilitating their instruction based on particular students' need and experience. Therefore, the country is required to satisfy the economic need of her people by transforming the country's agro economy to industrial economy.

Secondly, this study was tried to dig out school related factors that can affect GSS science teachers' effort of achieving gender fair instructional activities in their science teaching. Accordingly, the t-test finding – see Table 4, indicated the availability of significant difference between the test value and the observed mean. Thus, as participants in interview noted, launching of school clubs for reporting purpose; ineffective or dysfunctional school rules and regulations, and school leaders' lack of commitment to work towards gender equality were the notable problems that hampered teachers' effort of having gender fair instructional activities. Likewise, FGD respondents briefed the issue as "GSS secondary schools are ineffective to train both teachers and students about concepts of gender and how to get gender fair teaching in schools; and they also weak to put in to practice the rules and regulations of the schools".

The finding supports the research findings of Feyera [7] which argued that general secondary schools factors at Ilu Aba Bora Zone of Ethiopia such as absence of laboratory chemicals, rooms, apparatuses, technicians and well organized laboratory manuals were negatively affected the effective implementation of science education and students' academic achievement as well. In their study, Zewde and Adamu [37] indicated that school facilities which include absence of attractive classrooms, desks, chairs, tables, black board, chalk, stationeries', laboratories, libraries which have direct negative impacts on academic performances of students. For example, according to them, students' cannot concentrate on their studies when there are lacks of enough classrooms which leads to overcrowding and leads to poor performance.

The study conducted by Brightone [38] found that performance in Newala District was low due to; Shortage of teaching and learning materials and physical facilities.

Equally, the research finding by Maikuva [39] showed that understaffing, overcrowded classrooms, inadequate syllabus coverage, inadequate classrooms, inadequate instructional materials and inadequate lesson preparations were considered as factors that impacted on quality of education in schools. Acharya [40] was conducted a study to explore the causes of learning difficulties in mathematics, and the finding showed that school management system, lack of infrastructure of school and lack of regular assessment system of school are main causes of difficulties in learning mathematics.

This condition even observed in Ethiopian higher education instructional process. For example, Mulugeta, Solomon and Mathivanan [41] argued that major factors for implementation of student centered physical education in Kotebe and Addis Ababa universities are lack of swimming pool, large class size, shortage of instructional materials like modules and reference books.

To overcome these challenges, as Shumetie and Wondemu [42] recommended, concerned bodies should strive to reduce large numbers of students per class; and school administrators should also initiated to fulfill the required gender responsive instructional materials so as to motivate both male and female students equally.

Thirdly, studies undertaken at various times pertaining to girls' education ensure that the deep rooted misinterpretation and biased attitudes in the community, economic and education inequality related issues, and far less attention are the main causes to the problems of the education of girls (MoE [10]; UNESCO [43]). To brief, socio-cultural factors such as social norms and traditional practices about the role and position of women in Ethiopian society, gender-based violence, early marriage and teenage pregnancy are affecting girls' and women's access to and completion of education (UNESCO [43]).

Based on the analyzed data – see Table 5, the current study found out how cultural problems were affected teachers GRP practices. Thus, as a student from Kobo secondary noted, parents need to get extra labor from their children so as to facilitate home and farm related activities. So,

as he added, they initiated not to send children to school. Moreover, a respondent from Merssa secondary school also added as:

Parents have traditional outlook in relation to interaction of opposite sex. For example, if they get a girl with a boy in discussing issues of teaching learning process, parents will link it directly with sexual matters. Not only this, but also they have not any space or value for students who could not pass grade ten national examination.

In the same way, FGD respondents from Sanka secondary school argued that parents have attitudinal problems that give warning to their daughters not to interact with males since it leads them to develop malpractices (sexual practices). As they tried to clarify, this may be one reason that students not to sit in group work or to make line with males in the schools' anthem ceremony.

Furthermore, parents develop low commitment to control or advise their children especially males to learn properly in the school. According to FGD respondents from Sanka secondary, male students show unethical characteristics in the school than females in terms of wearing styles of their uniforms (made the uniform to be tighten, torn, or made it to have twigs). Not only this, but also hair style of male students as well unacceptable which is not related to the Ethiopian culture. As they added, parents seem to be weak to control or advise their boys not to initiate to facilitate unwanted practices: smoking cigarette, chewing chat, drinking alcohol etc. which in turn the scenario hampered their instructional involvement.

Therefore, parents' low attitude for girls' learning, socially constructed gender roles and early marriage were taken as the major cultural problems which affected students particularly girls' schooling. Thus, as Kudjo and Kwasi [2] noted, educating the girl child in some African cultural settings is seen to be a taboo even in this twenty-first century. Parents in parts of Africa still feel that by giving the girl child the opportunity to go to school is a waste of resources, but by preparing such girls for marriages are seen to be the most profitable venture because of the expected bridal price.

Traditional stereotypes of what jobs are appropriate for women in one hand and family and environmental influence associated with the traditional role of women on the other hand often

discourage female students from enrolling in science, mechanical and technological courses (MoE [3]).

In Ethiopia, as UNESCO [22] argued, women and girls are given low status in society, have a low level of participation in decision-making, and have limited employment opportunities. Many of them are subjected to violence of different kinds ranging from sexual violence to harmful traditional practices such as early marriage, female genital mutilation (FGM), HIV/AIDS, gender-based violence (GBV), etc (UNESCO [22]; MoE [3]).

Female trainees who do choose to enroll in non-traditional programs still face discrimination from instructors, employers and the community at large, and they encounter fewer prospects for employment and practical field assignments unlike males (MoE [3]). The largely impediment to progressing female participation and attainment in education is the cultural misunderstanding of the community and the family more purposely early marriage and verbal upset etc. continue unsolved till at present (MoE [10]). For example, girls generally find themselves with much less time for other activities than boys. Further, girls often do not have a say in how they allocate their time, following parental orders before marriage and orders from their husbands or parents-in-law after marriage (Bekele, Pereznieto & Guday [35]). Education for All [44] briefed that one of the critical problems of the Ethiopian education sector is a high dropout rate in almost all levels. Many students, particularly in emerging regions and pastoralist areas drop out of school at early grades. One of the reasons for this to take place is that parents do not want to send their children to schools since they are using them as a workforce in securing their livelihood.

Thus, parents in the rural communities of Kobo and Kelala used to have very high expectations when they sent their children to school. They hoped their children would be able to obtain gainful employment in the civil service, which would enable them to support themselves and their families. Currently, however, parents have lost hope in formal education when they see formally unemployed youth in their locality who have completed Grades 10 and 12. This lack of hope in the returns of formal education is one of the drivers of migration of adolescent girls and boys in the study communities (Bekele, Pereznieto & Guday [35]).

Therefore, it is vital to reinforced consciousness raising and capacity development initiatives for students, staff and community members in relation to sexual violence avoidance. To do so, awareness-raising activities and a “zero-tolerance” culture to the violence should be promoted in all school environments and surrounding communities through school festivals, community dialogues, and public and education media. Life skills education, including the topic of harassment prevention, should be provided through expanded co-curricular modalities in schools (MoE [3]).

Finally, one sample t-test finding noted the proponent teacher related challenges which hampered their teaching significantly - see Table 6. This result is consistent with what Feyera’s [7] finding reported. As he briefed, teachers have not used their maximum potential to implement science education effectively. Zewde and Adamu [37] as well stated that teacher qualification, teachers’ working conditions and interests have been affected their students’ involvement. Teachers’ use of more lecture method rather than student centered method has influenced their students’ learning (Mulugeta, Solomon & Mathivanan [41]). This means, as Acharya [40] briefed, teachers lack of linkage between new mathematical concept and previously learned mathematics structure, mathematics anxiety, negative felling of mathematics, economic condition and their educational backgrounds are the notable challenges which have disturbed their activities.

Therefore, concerned bodies such as school directors, district education offices, zonal education departments, the regional education bureau and the MoE in general are expected to motivate teachers, and also they need to aware them how to facilitate gender responsive instructional activities in their schools. Thus, trainings on gender-responsive pedagogy will be integrated as part of the pre-service, in-service professional development programs of teacher education. The current GRP training manual is expected to be adapted in the educational organizations of Ethiopia (MoE [3]).

4. CONCLUSION

Based on the conducted data interpretations and discussions above, it is possible to argue that GSS science teachers of the North Wollo Zone had facilitated GRP fairly. Thus, they found as effective in relation to language usage,

classroom setups, classroom interaction, and addressing sexual harassment. To do so, opportunities such as introduction of NETP, GTP, and ESDP; school clustering; presence of trained school supervisors and principals were initiated teachers to practice GRP.

However, they as well ineffective to prepare GR lesson plan, to prepare and use GR instructional materials and to have GR management of sexual maturation. This ineffectiveness of them was sourced from ranges of challenges: economic related, culture related; school related and teacher related.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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