

GENDER PERSPECTIVES OF SECONDARY LEVEL WOMEN SCIENCE TEACHERS ON SCIENCE LEARNING

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ABSTRACT

This paper deals with exploring the major issues about gender and involvement in science teaching in the context of the diverse society of Nepal. This qualitative empirical research was carried out purposively selected three secondary level women science teachers. About twenty- six to thirty-three minutes of in-depth interviews were carried out with them and it was first translated into English and then transcribed and themes were determined. It was found that Nepal is still facing the traditionally gendered concept and due to having a wide range of gender disparities, education needs to be employed as a powerful tool for empowering females by listening to their voice, securing their participation, to mainstream diverse gendered society on the process of development. Gender inequality in science learning is seen in the present modern society due to stereotypical cultural norms and values of society. Women's involvement is seen partially in both science and technology and administrative sectors as well. The constitution of Nepal 2015 is also trying to secure and implement gender equity in every sector of the nation, but the implication is still not found to be a success.

Keywords: : Gender stereotype, Inequality, Science teaching, Women involvement, Cultural value.

Introduction

Women's participation is important in every sector. In the context of Nepal women science teachers are rarely found. The main cause of deficiency of women science teachers is due to the enrollment in science study after passing School Level Certificate (SLC). Parents have the stereotypical concept that their son can study science and technology and be ready to send their son far away to study them but they show their reluctance to send their daughter to read outside/ far away detaching them from home. In our context, it is used to say that women can not read and work in the technical subject as well as can go a far way for professional work. An international study also showed that women are underrepresentation in higher education and only 32% of women studied Science, Engineering and Technology (SET) of the total students (Cronin & Roger, 1999). Dasgupta and Stous (2014) viewed that evidence-based policies and programs promise to eliminate science learning obstacles, increasing girls' and women's participation in Science technology Engineering and Mathematics (STEM) career. However, it is not found in science teaching in Nepalese culture. He further concluded that culturally ubiquitous stereotypes consistently portray ideal scientists, engineers, and technology innovators as male so we can say that gender stereotype is common in society.

In Nepal, in most of the Brahmin cultures, it is taken that women can not actively participate in employment outside of the home, while in others there is a clear specialization of tasks along with gender that women remain within the home and do not participate in activities outside of the domestic sphere (Crespi, n. d). These differences are most clearly illustrated by the vast differences in female labour force participation (FLFP), which is varied in different countries. (Alesina et al., 2011). In Nepal, science teaching up to secondary school (up to class ten) is compulsory. Students enrolled in school should study a science subject without choice. But in the present curriculum structure of higher secondary level (classes eleven and twelve), students can choose the different streams that are science, management, arts, and social science and education. In a rural area, science was not found teaching in more secondary schools (class eleven and twelve). Parents are not ready to send their daughter to study science outside of their residential area. Most of the parents' thought is found that the daughter cannot stay alone outside of the house, the daughter need supports to stay outside, managing her study outside the home is difficult for the daughter. Parents think that daughter is weak, they cannot learn science and they cannot go outside the home environment and daughter should study/take employment within our periphery and should stay

with us is the main cause of low women enrollment in science learning

Like that the government policy is also another cause of girl's outsider in science learning. Most of the higher secondary schools (class eleven and twelve) opened based on available manpower at school. The general subject is the main focus of the main secondary schools. The government was not found serious about what type of manpower is needed for the country, which is the most demanded subject in the society and did not provide an incentive to conduct the science subject in rural areas. The government did not facilitate teachers, laboratory material, lab, lab assistants, and other infrastructure for science teaching at rural secondary schools. There is no school mapping and regular observation of how to conduct the school in a rural area.

The above scenario shows that most of the women are restricted to study science in classes eleven and twelve in the residential area. Ultimately rural women are made compulsory to study a general subject that is taught at a local school. Only limited parents send their daughter to study science in an urban area if their other family members stay or study in an urban area. Otherwise, most of the women do not get the opportunity to study science although they are capable to study science.

Science Learning Context at Gorkha District

In the context of the Gorkha district, most of the secondary schools conducted class eleven and twelve in the general subject. Only five schools out of 126 schools are teaching the science stream. The rural area schools, that conducted education science as a major subject are also going to stop students' enrolment in science subject due to lack of subject teacher, lab, and laboratory materials. One of the head teachers expressed that science teaching is "kept the white elephant to us". He added that we have difficulty managing science teachers and laboratory materials. The government did not support us in conducting science education. Only pure science stream schools are getting economic support from the government. In the constitution of Nepal, there is mandatory that the secondary school will be conducted by the local body but till now there is no clear legislative provision on how to manage it by the local government. These all scenarios hit me that how to increase the number of women science teachers at the secondary level? How to make science education assessable to all

people who are situated in a rural areas? how can the central government enhance the local government to manage the science education in a rural areas and how the women's participation can increase to study science?

Learning Opportunity for Women in a Sociocultural Context

I grew up in the Brahmin community and I have experienced different cultural, social, economic geographical, and linguistic identities of society. My home environment and my sociocultural scenario also indicate that most of the daughter was not getting the opportunity for higher study. Only small number of girls were getting the opportunity to join and study university leaving their homes. In my socio-cultural scenario, when the daughter passed the school level education, their parents thought about their marriage and so many women are found married after the completion of school education.

As a science teacher, I have taught at a different secondary level and seen so many women who were married at the time of school level. After married, they were found left school level education also. When women married, they got pregnant in a very short time so if they want to complete their learning, however, they could be mandatory to leave the school education. In my socio-cultural context, mostly Dalit, Marginalized and Janajati students got married at school level and only a few numbers of them are passed the school level education. In Brahmin community also most parents think that their daughter should be married after completing school education. If daughters are kept a long time without married, they will love to anycast people and will be married without our permission (poila janxan). So that daughter should be married in time.

In these types of stereotypic societies, studying science going outside was challenging (*Falamko chiura chapaunu saraha*). However, I have found some women are studying in higher-level getting permission from their parents due to having a high understanding of their parents about their daughters' education. So that I have taken three women teachers whose home economic environment was not so good, however, their parents taught them up to a higher level and now being the permanent secondary-level science teacher in Gorkha district. In this socio stereotypic cultural background, I want to explore how the

three secondary level women science teachers felt about their learning environment, how they get the opportunity to study science at a higher level and how to improve the socio-cultural situation of learning for women.

Gender Perspective on Science Education and my Arguments

The gendered social and cultural world is accustomed to gender binary choices relating to school uniforms and toilets to sports cultures and friendships (Bragg et al., 2018). It needs to have equal participation of both genders to treat fairly at school. Like that women's participation in teaching science at the secondary level also found less in the context of Nepalese schools. Most parents are not ready to teach science to their daughters, as a result, most of the secondary science teachers at secondary are found, male teachers (This scenario is seen in the Gorkha district). In rural areas, science teaching institutions at a higher level are not found. Arts, Management, and Humanities faculties are opened but science teaching institutions in rural areas are not found. Most science teaching institutions are found in urban areas but their parents are not ready to send their daughter out of their sovereignty. Ultimately most of the girls join the local institution in Arts, Management, and Education faculties. In the context of the Gorkha district, only eleven science teachers are found in the secondary level among 126 secondary-level science teachers.

Another stereotype thought in society is that women are weak in math and science, it is a hard-working subject, women cannot do hard work, only limited extraordinary women study science at a higher level, ordinary women should study an easy subject which makes the women participation outlet of the science learning.

It seems that gender and power are central to gender-equitable practices and relations in schools in which we need careful consideration of the curriculum and teaching practices that promote respectful peer relationships and wider school policies and environments (Mat, 2017). It is necessary to have gender-friendly pedagogy so that the oppressed gender can empower.

An empirical study outlines that girls, who were being taught by a female teacher have increased math and reading performance whereas there was no gender gap for boys, who have been taught by female teachers (Lee et al., 2018). Another hand, traditional academic gender stereotypes remain

prevalent among both male and female teachers. It indicates that female teachers are necessary to reduce the gender gap and empower girls through education.

A journey of three women science teachers

1. Sajina Dhakal

I personally recognize Sajina Dhakal. He was my student from school level to postgraduate level. Her and my burn place were the same. He was born in a poor Brahmin community. She has one brother and one sister. He was born in a rural area. Her father and mother were a farmer. They have no extra income however they have conducted their family background smoothly. She got her secondary level of education (up to class ten) in her village. She was an extraordinary girl and secured the 68 % in School level Examination (SLC) held in 2062 BS. After completing her SLC, she has felt somehow mental tension about how to conduct her study. There was a culture that good students should have to study science stream (+2 level or proficiency level or Nursing at that time). Her father also felt somehow tension about his daughter's further education.

The socio-cultural scenario was that the god student's target would be Kathmandu for higher study, however, she decided to study proficiency level at the district headquarter of Gorkha to major in Science and Nepali education. It was one day travel by foot from house to district headquarter, She took rice, dal, roasted corn and vegetables from the house for one month and frequently went to the house for carrying fooding materials and in low cost, she completed her Proficiency and Bachelor level in Science major subject. When her Bachelor's was running, she got married and after that, her husband supported her study and she felt somehow easy for her study. She was an excellent student at the college level also. She got the first position in her subject at the Bachelor's level also.

After completing her Bachelor level, she give burn a child and stopped her one year's study. After that, she joined the Master in Biology in Gorkha campus and completed her Master's Degree securing a good mark in the first position. At the final stage of Mater degree, she applied for the post of secondary level science teacher and success in be a permanent secondary-level science teacher. Now she is working at a reputed secondary school in Gorkha Municipality named Bindyabasini secondary school as a secondary-level science teacher.

2. Sita Adhikari

I personally recognized Sita Adhikari also. He was my student at the graduate and postgraduate levels. Her and my burn place were near about two hours' walking distance. He was born in a poor Kshatriya community. She has two brothers. He was also born in a rural area. Her father worked at a secondary school as a helper and her mother was a farmer. She got her secondary level of education (up to class ten) in her village. She was also an extraordinary girl and secured a good mark in the School level Examination (SLC) held in 2062 BS. After completing her SLC, she has felt somehow mental tension about how to conduct her study. She expects to study at Kathmandu in the science stream to be a doctor and joined I.Sc and studied for about three months but his father pressed her to study science and math education as a major subject at the Gorkha campus and admitted her.

It was also one day travel by food from house to district headquarter, she carried rice, dal and vegetables from the house for one month and frequently went to the house to carry fooding materials. Sometimes his father also carried fooding materials for her from the house and at a low cost, she completed her Proficiency and Bachelor level in Science major subject. Being the small profession of her father, she has felt somehow easy to maintain her daily expenditure. When her Master's was running, she got married and after that, her husband supported her study and she felt somehow easy for her Master's study. She was also an excellent student at the college level. She got the second position in her subject.

After completing her Bachelor's, she joined the Master in Biology in Gorkha campus and completed her Master's Degree securing a good mark. At the final stage of Mater degree, she also applied for the post of secondary level science teacher and success in be a permanent secondary-level science teacher. Now she is working at a reputed secondary school in Bhimsen Thapa Rural Municipality named Dullav secondary school as a secondary-level science teacher.

3. Nirmala Banjara

I have personally recognized Nirmala Banjara when she was Studying Bachelor's level at Mahendra Ratna campus Tachachal, Kathmandu when I was doing teaching practice there. But she was my full student at the postgraduate level at Gorkha campus. Her and my burn place were far away so I had not

personally understood her home family background and school-level education although I have asked her about her education and home background. He was also born in a middle economic family background in the Brahmin community. She has two brothers and two sisters. He was born in a rural area as an elder daughter. Her father has a non-governmental job and her mother was a farmer. She got her secondary level of education (up to class ten) in her village. She was also an extraordinary girl and secured the 62 % in School level Examination (SLC) held in 2057 BS. After completing her SLC, she has felt somehow mental tension about how to conduct her study. She wanted to study Nursing and her illiterate mother also supported her to study but her father did not be agreed to invest a huge amount of money in her technical study however he can teach her about her choice.

The socio-cultural scenario was that a good student's target would be Kathmandu for higher study, however, she admitted proficiency level at district headquarter of Gorkha major in Science and Health education. She completed her certificate level from Gorkha campus and Bachelor level from Mahendra Ratna Campus Tahachal in Science major subject. When her Bachelor's was running, she got married and after that, her husband supported her further study.

After completing her Bachelor level, she gave burn a child and stopped her study for about 3 years. After that, she joined the Master in Biology in Gorkha campus and completed her Master's Degree securing a good mark. At the final stage of Mater degree, she applied for the post of secondary level science teacher and success in be a permanent secondary-level science teacher. Now she is working at a reputed secondary school in Shahid Lakhani Rural Municipality named Mahendra Shakti secondary school as a secondary-level science teacher.

Methodology

This study is based on a qualitative case study research design (Creswell, 2013). For this study, the Gorkha district was taken as a study area. Three women science teachers who is teaching at secondary schools and have Master's degree in science education were taken as participants in the study. The record of secondary level women science teachers was taken from Education Development and Coordination Unit Gorkha. There

were found eleven women science teachers at the secondary level. Out of them, I purposively (Yin, 2016) choose Sajina Dhakal, Sita Adhikari and Nirmala Banjara for the convenience as well as having Master's degrees in science education and they are representing of three different geographical areas of Gorkha district for this study because they teach secondary level science at Bindyabasini Secondary School of Gorkha Municipality, Dullav secondary school of Bhimsen Rural Municipality and Mahendra Shakti secondary school of Shahid Laxhan Rural Municipality. I have already recognized personally with them and easily accessible to collect data from them because these three women sciences teacher's residue is Gorkha headquarters. I met them at their residence (Due to pandemic COVID-19 they were taking an online class from district headquarter Gorkha, however, their school being a different area of Gorkha district) and toke near about twenty- six to thirty-three minutes in-depth interviews with three participants (Yin, 2016) related to women's situation in education, lack of women science teacher at Gorkha district, the situation of science learning for women, gender stereotypes and opportunity of women to learn science in the present socio-cultural situation.

The tape-recorded interview data was first translated into the English language and then transcribed separately. Then it was coded as a preliminary theme selecting the main words. And twenty-one basic themes were determined to collect the nearly equal codes from three transcribed data. From the basic themes, four global themes were determined (Koirala, 2018). These global themes were analyzed by connecting with the verbatim of participants relating different codes (Stirling, 2001). For the trustworthiness of qualitative data, the transcribed data were shown to the participants, methodological triangulated, and the validity and reliability of data were confirmed (Creswell, 2007, Yin, 2016). I considered their confidentiality, but they all were my university-level students. So that they were found ready to open their name for this academic research purposes. So, I did not use pseudonyms in this research.

Themes That I Found

The study has presented the following themes by coding and preparing global themes about gender and its social understanding for science learning, traditional gender role and study in the science

stream, Gender roles and gender stereotypes and gender relation in a diverse society.

Gender and its Social Understanding for Science Learning

Gender is a socio-cultural construct of female and male identity that shapes how individuals live and interpret the world around them. Gender is not natural; it is learned in society through direct and indirect means. Although Folami (2017) thinks that gender mainly applies to women, gender refers equally to ideas about females and males. Gender thus refers to the social attributes, opportunities, and relationships that are associated with being feminine and masculine. Folami expresses that it also determines what behaviors are valued, expected, and allowed men and women in a given context.

Similarly, gender roles are perceived behavioral norms associated with males and females within a given social group, culture, or system. Moreover, the ideas of masculinity and femininity exist only in comparative relation to one another (Knapp et al., 2009). In other words, femininity does not exist independently of masculinity and vice versa. Gender affects and is affected by social, political, economic, and religious forces.

As mentioned above Sajina and Nirmala were agreeing with the view of folami and express that, most of the parents are ready to teach science subjects to their son and daughter equally but they feel insecure to send their daughter far from their observation. Parents feel hesitant to send their daughters away from home alone due to their cultural structure. Both Sajina and Nirmala said that *"I am a good girl at the school level but my parent did not agree to teach science/ technical subjects far away from the house. Ultimately, I joined to study I. Ed in science education at Gorkha Campus with my guardian"*. Sajina said it was my victory to get the opportunity to study science education due to my parent's awareness of my study. Few parents are agreed to send their daughters to study science and technology although they are capable to study science. Nirmala added that girls cannot get a science/technical learning opportunity unless science subject is compulsory at the secondary level (up to class twelve). Social unawareness is another main cause lacking the girls' science learning opportunity. In society, there is the impression that *"chori lai science padauna kaha bat tyatro kharcha garne ra"* (How to do so many expenditures to

teach science to daughter). Nirmala added that my interest was a study of Nursing but my father did not agree to invest me in Nursing study which was more expensive than general study. She said, "my father is more serious about my earlier marriage than my quality education".

Sajina, Sita and Nirmala's motive and success in science show that girls are capable to learn science and technology. They view that we are the lucky women to get the opportunity to study science leaving home. So many women are interesting and capable to study science but our stereotyped social structure provides obstacles to choose the subject and institute freely. They cannot cross the social norms and values for their academic advancement. Ultimately, they are made compulsory to study the authorized subject in rural schools without their interest.

Traditional Gender Role and Study in Science stream

The meanings of gender are learned and internalized through every-day life. Children come to understand what masculinity and femininity mean through seemingly inconsequential practices (Han & Borgonovi, 2020). The spatial organization of residences is one example of an ordinary practice that deeply affects how gender is learned by young children. Gender roles of men and women are reflected in spatial distinctions of the street and the home (Knapp et al. 2009). Men can leave the home freely, whether it be for work or leisure; because part of their gender role is to support the family, they are not required to ask for permission to be in the street. Women are largely expected to be homemakers, ensuring that the home and children are adequately cared for while men work outside of the home (Folami, 2017). Folami added that there are not many opportunities for women to work outside of the home, and women can be chastised if seen outside the home without a man. About traditional gender roles, Knapp et al. (2009) explained that "a woman's primary role in Mexico is to obey her husband and her family while caring for the home and children" (p. 15).

According to Sajina and Nirmala's experience, society and the home environment is not crucial for girls to study and work outside. There is a concept that scientific study is to be a doctor and engineer. It is an outsider work. Doctors and Engineers should go anywhere in the country, stay anywhere which is difficult work for women. Sajina and

Nirmala added that "women should be pregnant and burn the child so that most of the parents feel uneasy to teach science and technology to their daughter".

Nirmala viewed that "I have a curiosity to study Nursing at certificate level, however, my parent and maternal uncle said that it is a difficult field for women. We should manage the house, children and culture so that it would be better for you to study science education to be a teacher in our village. My guardian's view oriented me to study science education at a certificate level".

This scenario shows that most of the cultural groups of Nepal are obeying the traditional practice of women's roles. Male partners as well as other family members are not aware of for caring the child and providing education to them. Women are taken only as household managers and child keepers. Quality education for them is being "Akashko fall akha tari mar"

Gender Roles and Gender Stereotypes

Gender stereotypes are very influential; they affect conceptualizations of women and men and establish social categories for gender (Reeves & Baden, 2000). These categories represent what people think, and even when beliefs vary from reality, the beliefs can be very powerful forces in judgments of self and others, as the headline story for this chapter showed. Therefore, the history, structure, and function of stereotypes are important topics in understanding the impact of gender on people's lives (Baig, 2014; Guder & Ata, 2018).

Sajina also felt the gender stereotype in society. Her parents as well as the neighbor did not believe that she will do her best in science. She added that "society questioned me why you are studying science as being woman"? Science can only read male children. Women cannot do well in science, science cannot teach by women but I passed M. Ed in Biology Education and became a permanent secondary level Science teacher of secondary level. I manage the house as well as the teaching profession properly. If we struggle with the situation, we can digest the stereotypic culture of society. She added that so many women show their higher-level capacity in different fields such as doctor, engineer, administrative, political, and planning field if they try to break the social norms and values.

Nirmala felt better in her teaching experience. She said that "I took a better mark in the written

examination of local level science teacher selection but male teachers were selected in the interview. I was not selected being a woman but I did well in the examination of teacher service commission and now working as a permanent science teacher". But Sita did not feel such types of stereotype situations till now on the way of her family level and job as well. She added that "I am being the selective teacher after being the permanent at a secondary level however headteacher hesitates to provide the more responsibility of school being women teacher".

Nirmala and Sajina's view reflects the conflict theory which mentioned that struggling inside and outside the home environment depends upon the capacity of women. If women can cross the home as well as societal norms, they will be able to develop social prestige and uplift their professional capacity. Otherwise, women are under the sovereignty of males and social mobility cannot see.

Gender Relationship in Diverse Society

Gender relations are how a society defines rights, responsibilities, and the identities of men and women about one another (Chege, 2016). When we relate gender with community development it is very important to change the perspectives of men toward women. Unless and until the perspective of the people does not change towards women they are somehow always to be dominated in the society. When we talk about gender and community development there must be gender equity in the society (Thompson, 2013). Gender equity means fairness and impartiality in the treatment of women and men in terms of rights, benefits, obligations, and opportunities (Reeves & Baden, 2000).

Gender mainstreaming is a globally recognized strategy for achieving gender equality (UNESCO, 2000). Gender mainstreaming is defined by the United Nations as the process of assessing the implications for women and men of any planned action in all areas and at all levels.

According to Sajina's view, different social and cultural groups have different norms regarding the woman's involvement in social function. Generally, Janajati culture has more freedom for girls to choose their profession than Brahmin and Kshatriya communities although they were low educated. She added that "*if we equally uplift the boys and girls both in education and professional area, girls' participation could be enhanced*" which was agreed

by Sita also. Nirmala added that "*when we see the gender and community development from the surface layer we cannot see the problem deep down there*". To remove the gender disparity, it is very important to look down on the root cause and change the perception of the people towards women and the third gender. For this, our learning institutions and social service-providing institutions should be actively and positively involved in this purpose (USAID, 2008). Moreover, it would be better to provide them with equal opportunities to learn science at a higher level also.

This scenario shows that if we dig out the social reality and provide them with equal opportunity, women would have got the chance to uplift the capacity. Ultimately their capacity would be helpful for the capacity enhancement of institutions as well as building the nation strong.

Discussion and Implication

There is a huge gap in accessing the rights and power between the male and females in Nepalese society. Rural areas women are more deprived compared to women in urban areas both in education and opportunity. The Constitution of Nepal 2015 has provided equal access in every sector although women have less access than men to productive resources, services, and opportunities, such as land, livestock, financial services, education, and another profession. The third gender seems to be somehow excluded from society even though the government has made policies for them and provided them with identity. Both education, as well as a financial enhancement, will help to reduce the gap between males and females both in the rural and urban areas in education and selection of professions.

The stereotype concept is deeply rooted in the culture showing that parents are still hesitant to send their daughters outside to study science and technology subjects. So adequate manpower is lacking in the field of science and technology. As said by Cronin and Roger (1999) and Dasgupta and Stous (2014), the attraction of women students is seen as very poor in the field of SET and STEM field. However, from the example of three science teachers it can say that when they get the study opportunity, they can do well in their field.

In the context of Nepal, due to such a stereotype of understanding women are forced to study the general subject that they can study in their village. They are being an outsider the opportunity for

technical and vocational education. So that most of the educated women are seen as unemployed in the rural areas. The women who have difficulty getting the opportunity to study science are in different professions and doing well. However, there is still not seen such an acknowledgment to study science and technology for women who have passed SLC with a good grade. If both women and men have the same qualification, the job opportunity is mostly provided to the male candidates rather than the women due to professional gender stereotypes (Dasgupta & Stous, 2014).

There are some limitations to this study. First of all, this study was carried out by only three purposively selected permanent/successful secondary-level women science teacher and their perceptions of the learning situation and professional scenario of science learning and teaching in the Gorkha district. It would be better to generalize this result if we would try to incorporate the viewpoint of other secondary-level male science teachers. Second, this study was carried out on women science teacher

who is teaching near the district headquarter of Gorkha district, if similar types of research are carried out far away from the district headquarter, the different scenario of gender discrimination may be seen.

Third, this study was carried out on the educated and professional women, if similar research is carried out those women who are lacked the reading and job opportunities, may be seen in other scenarios about the condition of gender equality. Fourth is; that this research was carried out only through interviews with educated and professional women, if it was carried out the observation of the situation of women and focus group discussion with the other participants, different types of results may be seen.

Finally, if we are serious about women's enrollment in education as well as the professional sector, both policies, as well as implementation, strong policy should be applied from the central governmental as well as local government level.

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