



**‘Can Women Science Teachers Be Role Models?’
Challenging Gender Stereotypes of Science and
Masculinity**

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Contents

<i>List of Tables</i>	<i>vi</i>
<i>List of Figures</i>	<i>vi</i>
<i>List of Appendices</i>	<i>vi</i>
<i>List of Acronyms</i>	<i>vii</i>
<i>Abstract</i>	<i>viii</i>
Chapter 1 Introduction: Setting the Research Stage	1
1.1 Background: contextualizing WSTs in Bangladesh.....	1
1.2. Framing the research issue.....	3
1.3. Relevance and justification.....	3
1.4. Research objective and question.....	4
1.5. Organization of the paper.....	5
Chapter 2 Framework for Analysis	6
2.1. Gender.....	6
2.2. Agency.....	7
2.3. Intersectionality.....	8
Chapter 3 Methodological Journey	9
3.1. Feminist standpoint theory: adjusting my lens.....	9
3.2. Sampling technique and data collection procedure.....	10
3.3. Ethical issues and challenges.....	12
3.4. Limitations of the research.....	13
Chapter 4 Gendered Challenges of Women Science Teachers	14
4.1. Coping with the workload and time conflict in teaching science.....	14
4.2. Gender division in science content: the influence of social construction of knowledge.....	16
4.3. Representation of science teachers and its cultural influence on educational practice.....	17
4.4. Norms that constrain WSTs	20
4.5. School and family politics constraining career advancement.....	23
4.6. Gender power dynamics: where are the WSTs?.....	24
4.6.1. Men's control over physical-spaces.....	24
4.6.2. Decision-making in school: men as gatekeepers.....	25

4.6.3. Feminine traits normalizes subordination.....	26
4.6.4. Sexual harassment: taking shape in a context of gender hierarchy.....	26
4.6.5. Lack of financial strength and politics of time and money..	27
4.7. Chapter summary.....	28
Chapter 5 Negotiating or Accepting Gendered Ideologies?	29
5.1. Weapons to survive: strategies adopted by WSTs.....	29
5.1.1. Exercising agentic actions: moving out of the joint-family settings.....	29
5.1.2. Teaching dilemmas: tackling gendered behavior of students.....	30
5.1.3. Involving students in collecting teaching-aids.....	30
5.1.4. Advancing career first and getting married second.....	31
5.2. Bargaining patriarchy and strengthening the notion of men's superiority.....	31
5.3. Tale of tactical agent: performing in controlled spaces.....	33
5.4. Perception contradicts passion for the sciences: breaking out of the traditional gender mould?.....	34
5.5. Aiming to be a 'good mother' and aspiring for change.....	34
5.6. Chapter summary.....	35
Chapter 6 Conclusions	36
6.1. Revisiting gender stereotypes of science and masculinity: a synthesis.....	36
6.2. Suggestions for further research.....	37

List of Tables

Table 3.1: Intersectional approach in selecting the participants.....	10
Table 3.2: Sample, sampling technique and data collection strategy.....	12

List of Figures

Figure 4.1: Students' perception: "ideal" science teachers.....	18
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List of Appendices

Appendix I: Socio-economic indicators of Bangladesh 2013.....	42
Appendix II: Enrolment in primary and secondary education by sex (%), 2005-2011.....	43
Appendix III: Progress and completion rate in education 2009-2011.....	44
Appendix IV: Percentage of Bangladeshi women and men in education and research careers 2012.....	44
Appendix V: Percentage of men and women faculty in science, Dhaka University 2013.....	44
Appendix VI: Number of secondary schools and teachers 1995-2009.....	45
Appendix VII: Interview guideline for women science teachers.....	46
Appendix VIII: Profiles of women science teachers interviewed.....	50
Appendix IX: Map of Dhaka Division showing study sites of Dhaka and Narshingdi.....	51

List of Acronyms

BIED	BRAC Institute of Educational Development
BSc	Bachelor in Science
FGD	Focus Group Discussion
HSC	Higher Secondary Certificate
ISCED	International Standard Classification of Education
ISS	Institute of Social Studies
MSc	Masters in Science
NOS	Nature of Science
SSC	Secondary School Certificate
STEM	Science Technology Engineering and Mathematics
WST	Women Science Teacher

Abstract

Despite the existing gender stereotypes associated with science and masculinity, there are some women teachers in secondary co-education schools in Bangladesh who are going against the grain by taking up a profession in the science field. This research is an attempt to make visible the lived gendered experiences of women science teachers both in urban and semi-urban areas of Bangladesh. In addition attempts, to shed new light on the debate of masculinity of science and the strategies women teachers' use to deal with the embedded gender ideologies to become role models. By using a feminist standpoint approach, this research unveils married and unmarried women science teachers' struggle with gender structures in schools, families and communities. The findings of this empirical study revealed that, in a classic patriarchal society, it is much difficult for women science teachers to be role models because of their socially prescribed gender-roles, symbolic representation, gender-specific norms and constraints in their institutions. Despite these constraints the teachers have the potential to be role models and they are coping by making different strategic choices to sustain their interest in the science. This study contributes perspectives on how to overcome the fabricated myth of girls' intrinsic incompatibility with science.

Relevance to Development Studies

The following study is relevant to development studies particularly women and gender studies as it investigates in particular women science teachers' day to day gendered experiences and place as role models in a patriarchal society. Furthermore, since science education and teachers are both important parts in the development process of a state, this paper highlights the debate around 'masculinity', 'science' and the position of woman teachers in the societal structure. In a broader sense, this paper contributes to women's struggle in the service sector of Bangladesh through the lived experiences of women science teachers.

Keywords

Women science teachers, masculinity, gender stereotypes, role model, gendered experience

Chapter 1

Introduction: Setting the Research Stage

'Gender tends to be seen in dualistic and oppositional terms with the result that there are just two gendered positions available – the masculine and the feminine – within which men's and women's experience can be located, thus limiting the opportunities for more complex and contradictory gendered-positions to be noticed, let alone explored' (Henwood and Miller 2001:238)

1.1. Background: contextualizing WSTs in Bangladesh

Bangladesh is a densely populated South-Asian country where women constitute nearly half of the population¹ (UNESCO Institute of Statistics 2014a). According to Central Intelligence Agency (2013), the rate of literacy is 56.8% and education expenditure is 2.2% of GDP. Though Bangladesh is one of the least developed countries in the world, it has achieved notable progress in the education sector in the last two decades. The gender-gap which was much wider a decade ago, favoring boys, has transformed a lot in primary and secondary level (BANBEIS 2013). Now, the percentage of girls' enrolment at both levels of education is higher than boys (UNESCO Institute of Statistics 2014b)². Opportunities and physical facilities for girls in primary and secondary level are also increasing leading to a reduction of drop-out rates (Mahtab 2007). Gender parity has been achieved in progression and completion rate³ at both levels (UNESCO Institute of Statistics 2014b). Additionally, considerable progress has been made in the success rate of girls in SSC and HSC examinations (BANBEIS 2013). However, such success related to subject selection varies between girls and boys. In science technology engineering and mathematics (STEM) education in Bangladesh, girls have been found to be less interested than boys and as a result they do not pursue careers in STEM (Mahtab 2007). It is worth mentioning that, according to the formal education system in Bangladesh, if students did not select the science stream at secondary⁴ stage, they are not allowed to pursue higher studies in science, and research shows that about 75% students from a population of five million choose non-science stream i.e. humanities, business at that level (BANBEIS 2013). At higher school certificate level (HSC) more girls are likely to select humanities or social-sciences and at the tertiary level, less than 17% students (overall in public universities) choose a STEM field (Choudhury 2013).

In Bangladesh, the number of women (42%) receiving higher education is increasing tremendously but relatively few are pursuing a career in re-

¹ See Appendix I for more demographic background.

² See Appendix II for detailed information.

³ See Appendix III for relevant data on progression and completion rate.

⁴ The education system of Bangladesh consists of three major levels; Primary, Secondary and Higher education. In the secondary level, there are three different sub-stages, Junior Secondary (grade VI-VIII), Secondary (grade IX-X) and Higher Secondary (grade XI-XII) (BANBEIS 2013).

search (UNESCO Institute of Statistics 2014b). About 14% and 15% of women are working in government and academic sector respectively. Gender-stereotypes for women are a major barrier to their career selection and progression (UNESCO Institute of Statistics 2014b). Less than 15% women are working as teaching staff in tertiary level, whereas 22% and 25% women teachers are working in HSC and SSC level respectively. That means, the higher the education level, the less the percentage of women's engagement (Choudhury 2013). Women's contribution to the country's economy has been increasing since mid-1980s and they are working in several sectors like the STEM field, but gender parity still remains in the job sector in Bangladesh especially at tertiary levels⁵ (Choudhury 2013; Mahtab 2007). According to 2003 statistics on the gender division in science⁶, women are more engaged in the so called softer 'biological sciences' than the harder 'physical sciences' (Mahtab 2007). Overall, less than 15% of women in Bangladesh are pursuing a science career (UNESCO 2007). A high number of women are sacrificing their desired profession to adhere to cultural norms like being a 'good woman' and devoting themselves only to the family (Mahtab 2007).

Women teachers outnumber men in the primary education sector in Bangladesh and the number of women teachers at secondary level is also increasing (BANBEIS 2013)⁷ but because of the male-dominated science field, it is still hard to find WSTs at secondary level, especially in co-education schools (Amin et al. 2006; Hill et al. 2010; Mahtab 2007; UNESCO 1997). In co-education schools, gender discrimination among teachers and students is more visible than in girls/boys only schools (Tapan 2010, Ullah 2008). The tendency to gender a subject often put barriers for women teachers to become role models for STEM education in patriarchal contexts (Huang and Fraser 2009; Kahle and Meece 1994; Kelly 1985). Kelly (1985) notes that, the masculinity of science at secondary level can best be understood by looking at four different factors: a) number of male teachers, male students and recognized scientists all over the world, b) application of science in real life, c) interaction and behavior in science classroom while using different elements which has the tendency to define masculine and feminine activity and d) socially constructed image of 'science' which looks at power and the changing world. Kelly added that, 'science was associated with factors such as difficulty, hard rather than soft, things rather than people, and thinking rather than feeling, all of which are part of the cultural stereotype of masculinity...the image of the scientist is similarly not only male but also masculine in the sense of being cold, unemotional and logical' (1985:135).

In Bangladesh, the male-dominated science field presents WSTs as minorities in co-education schools. When people 'argue that science does not suit women because it promotes presumably masculine qualities of rationality, aggression, and competition, they reinforce the notion that such qualities do not belong to females, culturally developed or not' (Tolley 2003:222). Such supposed 'naturalness' enhances the possibility of devaluing women's work in pa-

⁵ See Appendix V for percentage of women in Science of Dhaka University.

⁶ The gender division of science has been examined among Dhaka University faculty members in 2003, where the ratio of male and female is: physical science 7:2 and biological science 3:1 (Mahtab 2007).

⁷ See Appendix VI for detailed information.

triarchal societies. In addition, the masculine organizational culture creates a barrier with regard to participation in decision-making and role modeling in schools for WSTs (Mahtab 2007). As a work place for teachers, school is a regulator of gendered identities which practices the 'normative' notions of 'masculinities' and 'femininities' (Dunne 2007). Moreover, in Bangladesh, subordination and subjugation of women are part and parcel of patriarchal values that make it difficult for women to continue to pursue their own professional career without the family, organization and government support. Mahtab (2007) states that traditional society does not encourage women to pursue careers which require much effort and dedication, assuming careers will affect their commitment to family affairs.

1.2. Framing the research issue

Despite the gendered cultural norms and practices in Bangladesh, there are some women teachers who are going against the grain by practicing their profession in the field of science. These underrepresented WSTs in secondary co-education⁸ schools need to negotiate the embedded gender relations at multiple levels: within the organization, in relation to students and their own families to challenge the stereotypes of gender-roles and masculinity of science. Despite living in patriarchal societies, women's presence and performance in male-dominated domains like the sciences is providing alternative views and possibilities. Their example shows something has changed partly and that these women can lead the process by challenging the gender stereotypes in the existing structures in societies. The experiences of these women in the field of science needs to be documented and analyzed those through a gender lens, particularly in their local context of Bangladesh.

1.3. Relevance and justification

The gendered norms of science in relation to lower proportional representation of WSTs in secondary co-educational schools reinforce the stereotypical message that boys are more suitable than girls for science careers. In addition, having fewer female representatives in the sciences can have implications for both boys and girls especially how they view the subject. The current lack of representation of WSTs can discourage the next generation of girls who hope to build their career in STEM. Studies indicate male science teachers' negative perception that female science students are less active and this in turn makes them less likely to be interested in science classes compared to male students (Huang and Fraser 2009). Furthermore, stereotypical belief about girls' under-performance in science career affects their own interest in the sciences; if people see any successful women in science; this is seen as an exceptional rather than the norm (Hill et al. 2010). If the girls can see enough women science role models in schools, they will be encouraged to take up career in science and this will lead to more women scientists at top level decision-making roles not only in academia but also in government sectors. WSTs show their own agency by going against the gender norms about science and this might encourage girls to understand the importance of science in everyday life. Apart from that, this

⁸ In this study, I will focus on teachers at junior secondary and secondary level because teacher recruitment process and qualification is different for higher secondary level (MoE 2015).

change in the mindset about women in science might help boys to perceive women differently when it comes to the STEM field.

Existing literature on the gendered nature of secondary schooling have focused on gendered identity of schools, gendering subjects, sexual harassment in workplace, gender bias among students and teachers, gendered authority as well as under-representation of women in science. (Aikman 2011; Dunne 2007; Duffy 2001; Griffiths 2006; Hargreaves 2001; Hill et al. 2010; Kahle and Meece 1994; Kelly 1985; Robinson 2010). There are very few gender-based studies on the nature and practice of secondary schooling including the male-dominated science field in the Bangladesh context. This research paper seeks to fill this gap by addressing WSTs' experience including how they deal with the masculinized organizational culture while teaching a subject which is dominated mainly by men.

The selection of the topic is also related to my personal motivation. During my studies at Dhaka University, while working as an intern science teacher at an orphanage co-education school I often experienced the different interactions between male and female science students. Additionally, I trained secondary science teachers in Dhaka as a staff researcher at BRAC Institute of Educational Development, BRAC University in 2014. During that time I observed the gendered nature of schooling and realized how important it was to understand the gendered experiences of science teachers to promote gender awareness in school contexts. In a patriarchal society like Bangladesh, women are often lower in the hierarchies of power, making it necessary WSTs, who are the minority, to work even harder if they want their presence felt.

Finally, I hope this study will highlight the challenges WSTs face in trying to be role models. This paper will also focus on the ways of negotiating those gendered challenges in a patriarchal society. If the different aspects and meanings of such practices can be incorporated in the pre- and post-service training sessions for the secondary school teachers, this would be a step in ensuring gender awareness in the school environment. This may lead to more WSTs in secondary schools and more girls will be encouraged to take up the sciences for their future career. Most important of all, people will overcome the myth that girls are intrinsically incompatible to the science subject.

1.4. Research objective and question

In this study, I seek to contribute to existing literature on the gendered nature of science and schooling, specifically by zooming on the gendered experiences of WSTs. The study will shed new light on the debate on masculinity of science and women teachers' role by investigating the strategies that they use to negotiate embedded gender-relations and ideologies and how this affects their capacity to be role models.

To achieve this objective the main *research question* and related sub-questions are:

Do women science teachers provide role models by challenging the gender stereotypes of science and masculinity?

- 1) What challenges do women science teachers face within the school, community and the family?

- 2) What strategies do they develop to deal with traditional gender ideologies?

1.5. Organization of the paper

I have organized this paper into six major chapters; this introductory chapter includes the background of the research problem, the research issue, offers the relevance and justification for embarking on this study and poses the research questions and objectives. In chapter two, I try to expound on the concepts of gender, agency and intersectionality as the framework for analysing the empirical data. This is followed by an overview of the feminist methodological approach and data collection processes including ethical challenges and limitation of the research. I dedicate the fourth and fifth chapters to analyse what gendered challenges WSTs are facing in trying to be role models and how they are dealing with the gendered ideologies using a conceptual framework within a feminist standpoint lens. Finally, I conclude this paper by synthesising the entire study and give an overall reflection of the research questions that may provide suggestions for further research on the basis of findings.

Chapter 2: Framework for Analysis

In this chapter, I develop the framework for analyzing the research findings. The concept of gender is the main analytical tool; intersectionality and agency have been used within this broad theoretical concept.

2.1. Gender

Gender is one of concepts which have been used continuously in different global discourse on women and development studies. During 70s, Oakley differentiated sex and gender for the first time. Sex is termed more as a biological concept where gender refers to a socio-cultural and psychological term. Gender has been argued as both a process and a state having political significance which initiates separation into gender-roles and responsibilities (Wickramasinghe 2010). According to Scott (1986:1067), ‘...gender is a constitutive element of social relationships based on perceived differences between the sexes, and...a primary way of signifying relationships of power.’ These elements are: a) “culturally available symbols,” b) “normative concepts that set forth interpretations of the meanings of the symbols,” c) “social institutions and organizations,” and d) “subjective identity” (Scott 1986:1067-1068). These reveal analytical questions about:

‘...how and under what conditions different roles and functions have been defined for each sex; how the very meanings of the categories “man” and “woman” varied according to time, context, and place; how regulatory norms of sexual deportment were created and enforced; how issues of power and rights played into definitions of masculinity and femininity; how symbolic structures affected the lives and practices of ordinary people; how sexual identities were forged within and against social prescriptions’ (Scott 2010:9).

These elements mentioned by Scott will facilitate analysis of findings in a systematic way by integrating the discussion of gender-roles and relations that the WSTs face within their societies.

The concept ‘gender’ also refers to distinct category of femininity and masculinity which consider the normative way of looking into different activities, interactions and personalities. Such distinctions create different gender identities (Connell 1999). While talking about gender debate, it is important to consider the aspect of ‘hegemonic masculinities’ defined by Connell (1999) which combines the notion of ‘hegemony’ and ‘masculinity’ and is considered as a strategy for subordinating women. Gender is ‘distinguished from other masculinities, especially subordinated masculinities’ and accepted as ‘honored way of being a man’ (Connell and Messerschmidt 2005:832). Gender-roles not only ‘ideologically legitimate the global subordination of women to men’ (ibid 833) but also defines gender power relation. According to Connell (1995:77), hegemonic masculinity is ‘the configuration of the legitimacy of patriarchy which guarantees (or it’s taken to guarantee) the dominant position of men and the subordination of women’. Thus, masculinity cannot stand alone without considering femininity (Connell 1999). Here the concepts of Connell in discussing gender will allow an understanding of the dynamics of social relations in patriarchal society where the WSTs also belong.

Additionally, gender when ‘conceptualized in relation to the accumulation, deprivation and negotiation of power between and among the sexes becomes a

powerful ontology in the demand for change by feminists, across a spectrum of ideological and political interests' (Wickramasinghe 2010:99). Overall, in this study, gender is the crucial concept to analyze the experiences WSTs face in the continuing challenges within the school, community and family in association with masculinity of science.

2.2. Agency

Kabeer (1999:438) has defined the concept of agency as the 'ability to define one's goals and act towards it'. There is an ongoing debate on the notion of agency and its relation to 'silence' within the realm of gender and development. Kabeer views this silence as the strategic choices by women, for example 'withholding information on what they earned, hiding their savings with neighbors, opening hidden bank accounts, as well as walking out on abusive husbands or refusing to cook their food' (2010:17). Kabeer states that agency could assist in coping with inaudible resistance by reproducing the 'inequality' and 'oppression of others' (2010:17). In contrast, Parpart claims, 'silence and secrecy can protect women from disempowering contexts where their voices have no institutional or collective power' (2010:9). Thus, Kabeer's idea of agency which is rooted in taking action challenges Parpart's ideas that are about silent resistance (Kabeer 2010).

To exercise the agency, Kabeer emphasizes "voices" which she counts as women's weapon whereas Parpart views "silence and secrecy" as a weapon for women (Kabeer 2010). Kabeer defines silence 'as the absence of protest in the face of injustice' where 'strategic silence born out of a calculation, often based in fear, of what the costs of protest might be' but 'judicious silence may indeed be the only feasible survival strategy in a dangerous and brutal world' (2010:18-19).

In the patriarchal context, Kabeer argues agency as the 'operationalization of choice. Just as all forms of choice are not empowering, so too there is nothing inherently empowering about the exercise of agency. Agency is relevant to empowerment in so far as it represents the operationalization of strategic choices' (2010:17). Agency can sometimes be passive in a sense that an individual can exercise his/her agency through action by not having any other choice (Kabeer 2010). Agency has both positive and negative forms. It is positive when the individual can go against the obstruction to achieve his/her goal and it can be negative when an individual conducts themselves in such a way as to be dominated by others (Kabeer 1999). Apart from the individuals' own action, agency also refers to the motivations and hidden meaning that an individual pursues to conduct an action (Agarwal 1997).

Through this paper, I aim to add to the debate on the coping strategy which WSTs use to deal with the gendered ideologies and as a means to exercise their agency. Kabeer (1999) also added bargaining as a form of agency which women exercise in resisting power in patriarchal contexts. An important contribution has been made by Kandiyoti in this aspect where she has provided a lens through which 'women's strategies play out in the context of patriarchal bargains that act as implicit scripts that define, limit, and inflect their market and domestic options' (1988:285).

Furthermore, in the patriarchal context of Bangladesh, women have the tendency to normalize gender-roles and patriarchal bargain which can be found in Bourdieu's "doxa" and his notion of cultural reproduction where the traditional ideologies are accepted as something so naturalized that they count

beyond argumentation (Bourdieu 1977). Bourdieu has also talked about “habitus” to ‘capture this socially-structured aspect of subjectivity in social practice’ (Kabeer 2000:43). ‘The possibility of social change is brought into Bourdieu’s analysis through a distinction between different levels of adherence to the established order’ (Kabeer 2000:45). Above and beyond, Mahmood (2004) noted that women can choose to be subordinated in patriarchal authority by reproducing social inequalities. Joseph’s (1999) work has also elaborated on the notion of agency where she talked about the relationship structures vis-a-viz women’s actions.

Additionally, Honwana has talked about two different ways to exercise agency: strategies and tactics. Strategy is considered as a manipulation of forced relationship where the actor has the autonomy to generate that relationship within a physical or social space whereas tactics are taken up by someone who lacks autonomy and acts in a physical or social space which belongs to someone else’s. Thus, tactical agency is used not in terms of changing rather exercising within the given context but often with the advantage of individual opportunities (Honwana 2008). Therefore, the nuances in the concept of agency provides a lens to view how the WSTs negotiate and confront the challenges to deal with the gender stereotype of science and masculinity and understand the actions taken by those women to take up the sciences and to survive in a patriarchal context.

2.3. Intersectionality

‘Intersectionality’ is a concept coined by Crenshaw around the late 1980s, and it ‘underscores the “multidimensionality” of “marginalized” subjects’ lived experiences (Crenshaw 1989:139, cited by Nash 2008:2). Davis (2008) clarifies the concept of intersectionality by saying that multiple factors like age, status, class, geographical background, religion, ethnicity, political influence all intersect in subordinated groups. It has been considered as a tool for ‘analysis, advocacy, and policy development that addresses multiple discrimination and helps to understand how different sets of identities impact on access to rights and opportunities’ and ‘how these intersections contribute to unique experiences of oppression and privilege’ (AWID 2004:1). According to Bartolomei and Pittaway, ‘to understand the concept of intersectionality we need to conceptualize both the “road map” and the woman with her multiple identities. This includes an understanding that at different times, different aspects of our identity are brought to the fore and do not react uniformly with different forms of discrimination and oppression’ (2003:90). Thus gender practices and agentic actions of WSTs can be intersected in different ways. By bringing in intersectional analysis, this research focuses on intersection of marital status, age and geographical background to define experiences of WSTs within the traditional gender ideologies by considering their struggles and that they should not be homogenized as one single category.

Therefore, the three concepts discussed above, gender, agency and intersectionality will work together as a framework in answering the research questions. Whereas the concept of gender will be analyzed as understanding the WSTs’ experiences in the patriarchal context, agency will be an important concept to bring out the nuances in how they deal with the gendered structures. The differences among WSTs’ lived experiences will be highlighted by using the concept of intersectionality.

Chapter 3: Methodological Journey

In this chapter I present the methodology for this research. I selected qualitative methods to understand the lived reality of the participants rather focusing on ‘methodological universalism’ (Mohanty 1988:74) which emphasizes on numerical realities. I also provide ethical issues and limitations of this study.

3.1. Feminist standpoint theory: adjusting my lens

This study makes extensive use of primary data and narratives which focuses on the voices of the WSTs and is anchored within a feminist standpoint theoretical perspective. Harding argued that the feminist theory has credited ‘women’s experience’ in particular and emphasized on generating knowledge from the perspective of marginalized groups. The theory prepares the ground for an analysis of women’s own lives by bringing visibility to issues that are hardly spoken about and provides causal accounts to elucidate the effects of different variables around their issues (Harding 2005:220).

Harding has conceptualized ‘women’s standpoints’ by considering them as ‘feminist concerns with subjectivity, identity politics and personal experience that privilege women’s ways of knowing’ (Wickramasinghe 2010:133). Using a feminist standpoint helped this study to go deeper into women’s experience in dealing with patriarchal ideologies at an epistemological level (Hartsock 2003). I listened to the WSTs and gave highest priority to their “subjective experiences”. By using this theory I aimed to explore the unknown knowledge of the lived experiences of WSTs in the context of secondary co-education schools in an attempt to unveil gendered issues.

Harding also argued that, ‘standpoint approaches require strong objectivity that can take the subject as well as the object of knowledge to be a necessary object of critical, causal-scientific – social explanations’ (2005:230). She emphasized on men’s lives and their relation to women’s experiences to create the ground for feminist research (Harding 2005). Here my study participants were not only WSTs, but also men as principals, male students and science educationist.

Haraway (1988) claimed this feminist theory as knowledge production where one needs to be in the presence of ‘what belongs’ by exercising the agency that the ‘object owns’. She added that, ‘situated knowledge requires that the object of knowledge be pictured as an actor and agent, not as a screen or a ground or a resource, never finally as a slave to the master that closes off the dialect in [her] unique agency and [her] authorship of ‘objective’ knowledge’ (1988:592). This paper reflects on this knowledge by not attempting to universalize WSTs’ experiences and it also understands that such knowledge should be regarded with partiality (Haraway 1988). Haraway (1988:585) has also argued for ‘practice of objectivity that privileges contestation, deconstruction, passionate construction...and hope for transformation’. Here I concentrate on how the gendered experiences of these WSTs are deconstructed as a pragmatic way to comprehend resistance.

The standpoint theory has been criticized for the issues of location and hypothesis that can make the research racist in some way (Haraway 1988). This

paper’s approach is located within the argument of “knowledge production” as Harding (2004) depicted about marginalized groups in a specific context as well as the situated knowledge, which compliments the study by not fully claiming “objectivity”, rather taking a “conscious partiality”. Therefore, this study is an attempt at producing knowledge through the lived lives of underrepresented WSTs from secondary co-education schools in Bangladesh.

3.2. Sampling technique and data collection procedure

The field work took place from 9th July to 23rd August, 2015 in secondary co-education schools in Bangladesh. An intersectional approach was used to purposively select WSTs study participants from urban and semi-urban areas of two districts in Dhaka and Narshingdi, of the broader Dhaka division as shown in **Table 3.1**. Marital status is another significant difference to explore. It is worth mentioning that, unmarried WSTs can hardly be found in secondary schools because of cultural norms like getting married early. I found two unmarried WSTs from the two different districts and tried to analyze their experiences to avoid just having married WSTs’ experiences in the findings. Such a sample size also represents the context where marriage is given greater importance. Five WSTs from Dhaka and three from Narshingdi were selected for qualitative “intensive interview”⁹ which helped to ‘resemble guided conversations rather than structured queries’ (Yin 2014:110). This allowed me to map out these participants’ life stories focusing on the long-term reflections of their societies. Since the sample size of the main participants was small, I do not claim to generalize WSTs as a “category”. I worked within the rich context of few WSTs’ experiences. The reason behind having fewer WSTs from Narshingdi is that, the number of women teachers in semi-urban secondary schools is very low¹⁰ and WSTs from co-education schools hardly exist there. In this case, the convenience sampling technique was used to select teachers who were available and ‘willing to participate in the research study’ (Johnson and Christensen 2008:238).

Table 3.1: Intersectional approach in selecting participants

WSTs from Dhaka Division, Bangladesh	Urban: Dhaka		Semi-urban: Narshingdi	
	Married	Unmarried	Married	Unmarried
	4	1	2	1
	Total urban WSTs = 5		Total semi-urban WSTs = 3	
	Total WSTs = 8			

On average, six students (three girls and three boys) from grade VII-VIII were selected from each school using snowball sampling technique based on their voluntary participation in focus group discussions (FGDs) (Vaus

⁹ See Appendix VII for the interview guideline.

¹⁰ There are about 220 secondary schools (both Junior and High) in this district where the number of female teachers is 673 out of 2633 teachers (BANBEIS 2008).

2001). The FGDs helped to have ‘rich discussion to draw out depth of opinion that might not arise from direct questioning’ (O’Leary, 2010:196). FGD was a crucial tool to understand the provocative issue about whether WSTs can be role models or not according to the students by raising the question about what are their ideas about an ‘ideal’ science teacher. The students drew pictures on perceptions and these images supplemented the discussion.

I interviewed the principals of each school to understand the organizational context and different perspectives of the data given by the WSTs. I ‘appeared genuinely naïve about the topic and allowed the interviewee to provide a fresh commentary about’ the issue (Yin 2014:111).

Field work was conducted in non-government co-education schools because the numbers are much higher than in the government schools in Bangladesh and that the administrative system largely varies in such schools (BANBEIS 2008). Choosing non-government schools allowed me to find participants in a relatively short period of time and provided for more interesting data from the different school contexts. Tapan (2010) noted that the gendered differences are highly visible in co-education schools and that is why I selected such schools to better understand WSTs’ gendered experiences in relation to both male and female students.

I also conducted a semi-structured interview with a science educationist from Bangladesh using purposive sampling technique to select the participant. The aim of this interview was to understand the broader picture of the gendered nature of science education in the country in relation to the WSTs’ experiences. In some cases, the WSTs were interviewed again after collecting data from principals and students for more clarification.

Finally, I triangulated data to understand different points of view on the specific phenomenon which allowed me to reflect on the meanings which were similar or contradictory to ensure the validity of the findings (Laws, Harper and Marcus 2003). In the **Table 3.2** below, I provide all the different samples used in the study including sampling technique and data collection strategy to quickly understand the data collection process.

Table 3.2: Sample, sampling technique and data collection strategy

Sample	Total number of samples		Sampling technique	Data collection strategy
Research sites: urban and semi-urban areas	2 district		Purposive sampling	
WSTs in secondary co-education schools	8		Convenience sampling	Intensive interview
Principals of those schools	8		Purposive sampling	Semi-structured interview
Students from grade VII-VIII	Girls	Boys	Snowball sampling based on voluntary participation	FGD
	3	3		
	On average, 6 from each schools. Total sample of students, $6*8 = 48$			
Science educationist	1		Purposive sampling	Semi-structured interview

3.3. Ethical issues and challenges

General ethical issues were considered in every phase of this study. I started interviews after getting proper permission and ensuring willingness on the part of the participants. I proceeded with tape-recording only after getting consent from the participants and permission to transcribe the data. The participants had the right to withdraw from the study at any point. Permission was also sought from both principals and students to use the students' drawings in the analysis. I used pseudo names¹¹ for the teachers because WSTs in co-education secondary schools are very few in number and therefore can easily be identified.

I had some experience with working WSTs beforehand and therefore tried to ensure any biases emanating from my personal experience were kept in check. During the interview session, I tried to remain neutral and avoided to ask direct questions. Since I brought up at Dhaka, I had the advantage of knowing this urban city well enough. To better understand the context of semi-urban areas, I spent several days at a relative's place in Narshingdi before collecting the data. However, it was not easy going for me at the schools in Dhaka because the WSTs and principals found it difficult to avail time for an interview owing to their busy schedules. I had an inkling that perhaps the teachers were getting tired of my persistent phone calls so I made an effort to try and build rapport with them before the interviews began.

Some challenges were anticipated with male participants taking into consideration that patriarchal context normalizes gender differences and that

¹¹ See Appendix VIII for WSTs' profiles and pseudo names.

some of them may not be willing to open up to a woman interviewer. This was a challenge not only with male participants but also with some WSTs. At times I found that 'asking informants to reveal their "secrets" and "silences"' was 'both difficult and ethically challenging' (Parpart 2010:8). In moments like these, I was more conscientious about building the trust of the informants.

The principals were the "adult gatekeepers" to reach the students for the FGDs (Vaus 2001) and the venue for conducting those discussions remained the prerogative of the principals. For the interviews with WSTs, the venue and time was entirely up to them. Here I draw on the idea of Holland et al. (2010) on what to do to avoid the power asymmetries between myself and the participants depending on the socio-cultural context.

The teachers happened to be on their Eid vacation throughout the month of July, so I was careful about asking if they were willing to participate in this study during this time. Two of them actually agreed to participate during the vacation and were interviewed at their homes while the other six interviewees were keen on being interviewed at the school premises, during school hours. Another challenge that I faced during some of those interviews was that despite setting up designated areas for conducting the interviews, there was constant interruption either from the headmaster at school or the husbands of WSTs at home who were keen on knowing exactly what was happening inside that room. In those situations, the WSTs' confidence did not seem to waver perhaps because of the presence of a 'third person'. It is only later that I realized that the interviewees were not comfortable answer some of my questions because of this constant interference. In such cases, I interviewed them again at later date.

3.4.Limitations of the research

Considering the small sample, this paper cannot claim to represent the whole range of voices of Bangladeshi WSTs from all the non-government co-education schools. I did not find more than two unmarried WSTs in the selected districts because of the culture of getting married immediately after graduation. This means there could be a sample bias in this study represented by the dominance of married WSTs' experiences. The issues that have been raised in this study can be investigated further using a larger sample and by considering more intersectional difference of WSTs.

Chapter 4: Gendered Challenges of Women Science Teachers

In this chapter I present the multidimensional challenges of WSTs which are often inextricably intertwined in their workplace, families and communities. By quoting the narratives of the interviewees, I attempt to create a forum for them to articulate their experiences and ideas using several themes by drawing on Scott's (1986) gender analysis along with other literature.

4.1. Coping with the workload and time conflict in teaching science

The workload for teaching science is more than other subjects at secondary school level because the abstract subject-matter requires concrete teaching-aids and logical explanations with real life-based examples. Science is changing rapidly and the science experiments require much reading and preparation as noted by one of the WSTs:

'With all due respect to all the subject teachers, I would say that a science teacher has to work harder than other subject teachers. For example, if you see the Bangla grammar syllabus, it hardly changes over time. But science is changing constantly. So a science teacher needs to keep updated with these changes and should prepare in such a way that is keeping with the students' demands'. (Monoara, Dhaka).

Another teacher *Sharmin* also gave a similar example this time comparing the history class to science classes. Studies on educational techniques showed that, all individual subjects have their own techniques and strategies (Russell and Martin 2007) but the education system of Bangladesh automatically gives much importance to teaching technical subjects like science. Students usually have the ability to rote recall without necessarily understanding the concepts but understanding is an aspect that has been emphasized with the use of teaching-aids much more in science than other subjects (Tapan 2010). Most schools, both in urban and semi-urban areas do not have enough scientific teaching-aids and laboratories. The head teachers and students in most of these schools said that sometimes their science teachers have to bring in their own equipment. The idea that the sciences are more demanding is supported by the 'educationist' in this study who says expectations are much higher for the science teacher. The 'educationist' stated that, *'a science teacher should be a true investigator and observer. They should think logically and they should have the scientific literacy'*. Data shows that science has been considered as a "difficult" subject where the teachers need more time to comprehend the subject-matters; as a consequence they need to devote more time to the sciences either through further studies or by facilitating science projects/fairs at the school.

There are the general challenges that both men and women face as science teachers and these include the amount of time teaching science consumes, the heavy workload including being logical investigators, are all consistent with Kelly's (1985) argument that such traits associated with the sciences are related to the stereotyped image of masculinity. The WSTs in this study are burdened because they have to juggle between responsibilities at work and home. Majori-

ty of them cannot cope with the demands of the ‘masculine traits’ that come with teaching the sciences. A WST *Shohag* stated that:

I think the workload for a female teacher is much heavier than that of a male teacher because she has more domestic responsibilities which in turn affect her school performance. The main responsibility of our male colleagues is teaching, even in his home or community he will be treated as a respected teacher. It is much harder for a woman because she cannot act as a teacher in her family or community as her main responsibility is maintaining the home’.

Also, because of family responsibilities, some of the WSTs are pressed for time to prepare for class. *Mabbuba*, another WST said that, ‘in our school we have organized training on preparing low cost teaching-aids for science but we cannot get enough time at home to practice or prepare those for students’. The WSTs feel that it is very important to share the latest news on science innovation with students in classroom and an ideal science teacher should practice new knowledge to motivate students towards science but they are constrained by their time at home. They feel the students are disadvantaged by these limitations. This was also echoed by some of the principals. Data from the interview with the ‘educationist’ also supported these intersecting and burdensome responsibilities that WSTs face when he stated that:

‘It does not matter if she is teaching or handling any other profession, at the end of the day an assessment of the WST will be based on her performance in the family; more specifically rearing children, serving her husband, preparing food, attending to guests or pleasing the in-laws. If she is good at all these activities then society may say “okay you can invest some time in your profession”’.

Two of the married WSTs from Dhaka expressed that they are interested in pursuing higher studies but they think that doing so in the sciences means spending long hours reading or in the laboratory. The burden of the responsibilities towards family has already killed any enthusiasm for further studies in science. Teacher *Mabbuba* states that: ‘I want to proceed for a master’s programme but I think I will not able to manage the time for both family and my studies if I take the sciences’. Research on “nature of science” has also shown that this subject requires constant dedication at higher levels if one is to grasp its actual essence (Lederman et al. 2002). However, *Monoara* (another one of the interviewees) had also shown interest in taking any other subject than science at a higher level which may allow her to devote more time to her family. On the contrary, married WSTs from Narshingdi do not have any interest in further studies because they do not have enough time to do anything else except looking after their family. All this is an indication that stereotyped gender-roles in families is more common in semi-urban areas where women are tasked with the nurturing role. This is consistent with Davis (2008) who talked about variations in the lived experiences of women because of geographical factors.

Married WSTs’ contribution to science projects is constrained unlike their male counterparts as stated by Cahusac and Kanji (2014:65) because of “time conflict”. Lack of time is a major source of strain between work and home responsibilities’. Time pressure creates tension in the lives of WSTs to

the point that they become ‘trapped’ in the power relations of the patriarchal society. These women have to choose family responsibilities over their career which is consistent with Mahtab (2007). By drawing on Scott’s (1986:1067) notion of ‘perceived differences’ between men and women, the data indicates that because of the distinct gender-roles, it is more difficult for women to present themselves as ideal teachers because their identity is tied more to domestic work. The masculine image of science as a technical subject puts much pressure on women as Kelly (1985) stated. This study depicts this notion as shown by the responsibilities WSTs have in the home that is given more credence over teaching science. This in turn hinders the prospects of one advancing their careers as a WST because of this extra burden of work within the home.

4.2. Gender division in science content: the influence of social construction of knowledge

WSTs’ involvement in the biological sciences and males in physical sciences can be viewed as influenced by the social construction of knowledge. Here the gender division of labor is associated with the gender-roles, hierarchies in science content and resources available for individuals’ socialization process.

The demography of the WSTs reveals that, five out of eight teachers are from the biology field, with two from physics and one from chemistry. The teachers all are assigned the general science classes for grade VI-VIII where they teach all aspects of science i.e. physics, chemistry and biology. Interestingly, while the WSTs with a biology background are taking biology classes in grade IX-X. Those with a non-biology background do not get to teach physics or chemistry. In all the schools, the male teachers are more involved in teaching physics and chemistry to upper secondary classes.

Apart from the visible hierarchies seen in the sciences’ contents, all the WSTs in this study including some of the principals noted that women have a leaning towards biology while the men’s interest was physics and chemistry. *Rebeka*, one of WSTs stated that: *‘I used to have a fear of the reactions and symbols of chemistry and calculation of physics. I think biology is more suitable for me’*. The teachers found biology more interesting and easier than physics and chemistry which they felt was more suitable for men as some of them perceived men’s technical ability to be superior to that of the women. The WSTs observed that in their classes, the male students were more likely to prefer physical sciences rather than the biological sciences whereas girls were more interested in biology. When asking about the reason for boys’ interest in physical science, another WST *Mabbuba* affirmed that the boys get all the freedom and time to nurture their scientific interests by collecting different equipment like old radios, broken toys and cables with their friends and then making something new out of it. Girls do not do these activities but instead spend most of their time helping their mother with the household chores. Girls are rarely allowed to go outside and so they spend time reading inside their rooms. This is consistent with Wickramasinghe (2010) who noted gender as part of the socialization process which distinguishes the gender-roles.

The ‘educationist’ expounded on the point of gender division of labor in science by saying: *‘I have visited so many schools in semi urban and rural areas. Most of the time I saw male teachers teach mathematics, physics and sometimes chemistry as well.’*

Subjects like biology and home economics are taught by female teachers'. This was echoed by a principal from Narshingdi who said that,

'The perception when it comes to women is that they are more in sync with their nurturing ability and that they are made to reproduce. That is why mothers can relate more easily with biological sciences. Physical science is actually not for women because it is not always possible for them to be very logical when it comes to handling chemicals, architectural and electronic stuff'.

Such data showed the social constructed notion within patriarchy is similar to Gherardi's (1995:10) argument on 'social construction of knowledge'. Therefore the social construction of knowledge has created the gendered differences within the sciences. Here the presupposed understanding about women's ability in science has a connection with their socially prescribed gender-roles which in turn can influence those girls who may have an interest in 'hard sciences' against them.

The three WSTs who have had their educational background in 'hard sciences' have only just come to the realization that the sciences are not any more suited for boys than they are for girls. I come to the realization that the choices teachers have made may have been influenced by their own role models. For example, *Sharmin*, one of the WSTs said that since she did not get the chance to learn the more about experiments in physics during her school years, she is not comfortable with the subject. She loved chemistry because her chemistry teacher was so enthusiastic about the subject.

Weinburgh (1995) noted that girls who have more interest in physics than biology have a more positive attitude towards sciences. This reinforces the notion of masculinity of science content where physics is considered as more masculine and biology as least masculine (Nasr and Soltani 2011). By drawing on Scott's (2010:9) notion of 'symbolic structures', this study shows such hierarchies in science content and symbolic gendered structure can put pressure on those WSTs who are from a biology background. Such ideals may make women feel insecure and lessen their desire in teaching science at secondary level. In addition, these anxieties may make the females feel inept against their male colleagues who are mostly from physics and chemistry backgrounds.

4.3. Representation of science teachers and its cultural influence on educational practice

The shortage of women in science during the schooling and training period made it more difficult for WSTs themselves to become role model. The ability of WST to motivate girls to take up science is often negatively influenced by their parent's cultural and stereotypical beliefs. Such symbolic representations define the societal culture and practice of male dominated subjects.

The WSTs mainly encountered male science teachers during their own school lives and as well as their training sessions. They also experienced the same at the higher level which had fewer women in science field, which is consistent with Choudhury's (2013) view. *Luna*, a WST from Narshingdi said, *'In my university we were just two girls in our section. The rest were boys*'. She also expressed

how such limited representation of girls in the classroom setting made it uncomfortable to ask questions in front of boys. *Hasina* and *Mabbuba* from Dhaka have also talked about such problem during their educational life. When the WSTs were students they did not see enough WSTs as their role models and it was hard to find girls doing the sciences. When they had any WSTs during school life, they were perceived differently. Another WST *Shohag* expressed that:

‘When I was a student of secondary school, I thought that madams are not much capable of teaching difficult subjects like science and mathematics. We all thought that if a madam is teaching such subjects, she must be someone very aggressive or angry’.

Thus such symbolic representations can lead the students to expect or visualize the ‘masculinity of science’ in the behavior of their WSTs. Data from FGDs with a total of 33 (12 girls and 21 boys) out of 48 students (gender equal) revealed that, the students prefer male teachers in science classes. Some of the data is illustrated in **Figure 4.1**. The reason for such a response may be linked to the masculinized image of science which is consistent with Kelly’s (1985) views. The numerical data from the FGDs revealed the symbolic gendered structures and perceptions in the patriarchal context.

Figure 4.1 Students’ perception: “ideal” science teachers



During the FGD, I asked specifically about biology teachers; all the boys preferred men and all the girls including the 12 who had drawn the image of the “ideal science teacher” as male preferred WSTs because they felt shy to

discuss aspects like the human body or reproductive system in front of opposite sex. In interviews, WST *Hasina* stated:

I was in a mixed school. In our class, the majority were boys. The girls never asked questions on sensitive topics during biology class because they were shy. It was so uncomfortable when the male teachers described the functions of human body and other related topics’.

These sentiments were echoed by the ‘educationist’ who stated that: ‘*In the context of Bangladesh, students usually respect their teachers and like to keep a distance from them unless the teachers go out of their way to create a conducive environment for the students to interact freely with them*’. These feeling of insecurity among the students may have something to do with their socialization where talking about intimate matters is considered taboo. Scott (2010) stated that the ‘culturally available symbols’ around us put pressure on people in general to think within the prescribed gendered box. This view is shown in the effect on students’ choices and their views about role models in the sciences. Having male science teachers in secondary co-education schools is seen as the norm and over the years society has gradually normalized the masculine attributes.

During the training sessions for the sciences, some of the WSTs have also experienced uneasiness emanating from the stares from their male colleagues because these women are the minority. In training sessions, they often found it difficult to build rapport with their male colleagues who are the majority. As noted by *Luna*, another interviewee:

I attended a training session last year in Comilla for 14 days. We were 29 teachers and I was the only woman among men who were unknown to me. I felt too shy to open up, even to ask questions! Though we all had separate rooms, I still felt uncomfortable with the whole setting because I was the only woman there.’

Numerical data in the form of the narratives like the one in this study is significant. Cirlot (1985:33) has written that, ‘the quantitative is transformed into the qualitative at certain essential points which constitute the significance of quantity’ (cited in Gherardi 1995:33). Thus such data reveals the symbolic structures of society. Similarly, WST *Hasina* also talked about the experience of hands-on scientific activities during their training sessions where they felt like male colleagues were looking and treating them differently, as if they are not suited to be at there. Situations like these are a challenge for the WSTs in Bangladesh who are not used dealing with male-networks. Over time, male dominated fields automatically establish a culture where women feel uncomfortable because they are the minority.

WSTs continue their struggle in trying to motivate girls to do the sciences even though they are the minority. The WSTs said that the girls’ parents just want them to complete SSC level (especially in semi-urban areas) and that is why according to the parents, it is waste of time for the girls to study a technical subject. The sciences require one to go for private tuition to make the subject comprehensible, making it more costly than other subjects. The guardians in semi-urban areas are not at all interested in spending extra cash on girls’ education even though they are financially able to. Majority of the teachers claim that the guardians in semi-urban areas are not conscious about students’

performance and career choice. Instead the guardians are keen on students taking the easy way out by taking non-science subjects at SSC level which they can pass easily unlike science which is a more difficult subject. *Shobag* stated that:

I personally went to several girls' home to encourage their parents because their girls are really talented and want to take up a career in science but the guardians felt that science was a difficult subject and therefore their daughters will not be able to study it'.

Such a situation is not very common among the guardians from urban areas. The study showed the WSTs from semi-urban areas are not able to convince the guardians that their daughters can do well in the sciences because most of the guardians are not from privileged backgrounds. It is clear one's physical background is an indication of the multidimensional experiences of women, an aspect depicted by Nash (2008). In the case where the parents have stereotypical beliefs about gendered-roles this limits the chances of their daughters taking up the sciences. Such a situation has proven a challenge for WSTs in their attempts to be role models or an 'ideal teacher', motivating girls to take up the sciences in the patriarchal context at school. This study agrees with Scott's (1986) argument on "symbols", when it shows that the presence of fewer WSTs and the symbolic acceptance of science teachers as men influence the educational practice because the WSTs do not have much of a voice.

4.4. Norms that constrain WSTs

Socially established norms within the patriarchal context of Bangladesh are making it difficult for WSTs to become role models. This study highlighted some of the norms and behavioral patterns that demoralize enthusiastic WSTs within school, family and community. Some of the norms include: attending to guests at home, nurturing children, getting married off at an early age and restrictions on their movements

Within school and family

Some societal norms exercised in school and/or family play a negative role in WSTs' professional life. The WSTs expressed that male teachers are not bound to take leave when guests come into their home because it is the woman's responsibility to take care of them. Married WST *Geeta* stated that:

If a guest comes to your home, it is the woman who should take leave, not the husband. In that case, women teachers are constantly taking leave while the male teachers are not obliged to do so because their wives will take up responsibility for any guests coming to the home'.

The teacher got very upset while expressing this, because the fact that a woman is bound to gendered-roles like hosting guests. Taking too much time off as compared to her male colleagues has a direct bearing on the teacher's career progression.

In addition, because of the norms guiding day to day life in a patriarchal society, during the maternity period for WSTs, the patriarchal institutes try to influence them to leave their jobs. It is as if quitting your job should be a "natural" path to follow once you have a baby. Some of the WSTs' experience

was that during their maternity period (9 months of pregnancy and/or 6 months after giving birth) they had been asked by their families and school authority to leave their jobs. Another WST *Luna* from Narshingdi was approached by the school administration on a number of occasions to quit her job because she reported to duty late owing complications early in her pregnancy. At the time, *Luna's* husband was not financially capable, that so this forced her to resume work within a month after giving birth for fear of losing her job.

When I asked about maternity leave for WSTs, the head teachers of those schools said that the school cannot afford long term leave for WSTs yet there are written agreements for maternity leave. This matter about leave becomes more complicated when it is related to the subjects like science because there are few teachers who can cover for them especially at secondary level. That is why the authority keeps pressuring the WSTs to quit their job once they get pregnant so that their positions can be quickly filled by someone else. *Mabbuba* from Dhaka experienced such pressure from her family when her son was 5-6 months old. She stated that: *My husband has asked me several times to leave my job because it was very difficult for me to maintain my job and at the same time take care of my son*. It was clear from these women's tone that there was pressure on them to quit their jobs and that doing so was the 'norm' in their patriarchal society. Miller (2007) exemplifies the situation WSTs find themselves in when she states that, 'maternity is a time when the dominant group disempowers women by endorsing their exit as a natural, almost inevitable consequence, of the incompatibility of the roles of mother and professional worker. These practices build on powerful societal ideologies of what constitutes good mothering, and to which middle-class mothers are particularly receptive' (cited in Cahusac and Kanji 2014:58). Therefore, by drawing on Connell's (1995:77) argument on 'legitimacy of patriarchy', this study revealed that the dominant masculine context exercises its power over the minorities, in this case by putting some standards in the organizational system in such a way that an 'exit' can be considered as something natural for women during maternity period since one of their main gender-roles is to give birth.

The issues around nurturing children have seen some of the school authorities' preference to recruit unmarried WSTs. This is supported by AWID (2004) who showed how the different sets of identity can effect ones opportunities. An unmarried WST *Rebeka* revealed that the authority at her school does not want to recruit married women teachers for the sciences assuming that they will demand for more leave and the school cannot afford leave especially for science and math teachers. She added that:

The school authority prefers male teachers or unmarried women teachers for sciences. It is because, married women have multiple responsibilities. They frequently ask for leave due to their children's sickness and they rarely agree to work during vacations or for extra hours'.

This is consistent with Cahusac and Kanji (2014:58) who noted that, 'many professional women believe that women are perceived as less committed to the organization after having a child'. In this study, I found that the student's guardians also put pressure on the school's managing committee to recruit teachers in science who can give extra hours after school for students because

the guardians are not able to help their kids at home when it comes to such technical subjects. This whole situation, coupled with a complex chain of relations among different actors in school 'push' married WST out of the school while family obligations 'pulls' them into the home

Within community

While talking about the community-norms, the unmarried WSTs' life is constrained by different societal issues, especially getting married off. The unmarried WST like *Shobag* face different problems from the neighbors and relatives. She states that: *'My neighbors and relatives often come to my parents saying that your daughter is growing old, you should get her married off. Educating girls is unnecessary; they are not going to feed you when you grow old'*. These community members who form part of the patriarchal society are still influenced by stereotypical gender-roles. The community expects a girl to be married off as early as possible and have this preconceived notion that girls stop taking care of their parents once they get married.

Pressures from the communities also has an influence on the life of married WSTs. *Sharmin*, a married WST said that she faced negative comments from the relatives if she came home after sunset. *Hasina* faced such negative comments from the local people when she visited a chemical industry in the country side in the company of her students. A woman was not expected by the society to visit a big industry in the country side unaccompanied. This was supported by the 'educationist' who noted that:

'Science teachers may need to carry out project-based field work. In Bangladesh, male teachers do this with ease. They can easily move out into the field with their students whereas this is a challenge for female teachers because of the cultural barriers that exist.'

Another WST *Mabbuba* has been criticized several times by the neighbors because her husband helps her out with the domestic chores. Dated community norms place restrictions on the lives of WSTs.

Many dimensions of day to day life are socially constructed and legitimize the dominance of masculinities and this is common in patriarchal societies where people assume women are bound by certain gender-roles. Ultimately these gender-specific limitations have an effect on the lives of the WSTs. This is consistent with Connell (1995:69) who notes that,

'If we spoke only of differences between men as a bloc and women as a bloc, we would not need the terms "masculine" and "feminine" at all. We would just speak of "men's" and "women's", or "male" or "female"'. The terms "masculine and feminine" go beyond categorical sex difference in the ways men differ among themselves, and women differ among themselves in matters of gender.'

That means, the socially prescribed gender-roles and norms that society expects from WSTs reinforce their subordinate roles in the community and in turn limit opportunities for them.

4.5. School and family politics constraining career advancement

The masculine culture present in social institutions like school and family is politically structured in such way that it hinders career advancement and affects the general performance of WSTs. According to Scott (1986), the nature of such institutional settings has been considered as one of the elements of the social construction of gender.

Data from the study reveals that, the promotion of WSTs does not always depend on the experience of teachers but rather on the personal relationship with the authority at the school. Gender differences are manifested in the uncomfortable relationships between the WSTs and their male colleagues. WST *Mabbuba* stated that:

It is not possible for me to stay for long hours after school and to have small talk with the headmaster because my son is waiting for me at home. The teachers are not bound to report on what they do every day in school because the attendance sheet and the work routine are supervised by the school authority. Some of the male teachers have informal conversations with the authorities after school hours and this puts them at an advantage over us. During salary increment or promotion, the headmaster addresses those teachers first. Besides, the headmaster assumes those teachers who do not have these chit chats after school hours are not necessarily working well.'

Just like *Mabbuba*, other WSTs have said that they often try to avoid this conversation after school hours because of other household responsibilities or simply because of diffidence. Cahusac and Kanji (2014:63) have also revealed that, 'women found the socializing aspects of their work particularly difficult'. All the WSTs in this study are the sole female science teachers in their respective schools and therefore they have no choice but to consult their male colleagues when they face any difficulties. In addition, six out of eight head teachers in this study are male, making it difficult for the WSTs to open up to them owing to cultural barriers. Drawing on Connell's (1995:77) concept of 'hegemonic masculinities' which 'guarantees dominant position of men', such afore-said situations often works as a positive point for the dominating group who like to socialize after the school hours and masculine nature in itself allows for this. This increases their chances of a promotion.

In such organizational culture, even the type of dominance may vary based on the personal relationship of the WSTs and the authority. *Hasina* has talked about her experience on this and confessed that during her recruitment she got preferential treatment because the headmaster was her relative. The data did not reveal any gendered pattern in such recruitment. However, *Hasina* feels somewhat 'trapped' because she is constantly thinking about her relationship with her in-laws' who got her this job. She is too scared to ask for a leave and other privileges because she 'owes' it to her relatives. She said,

I got better job offers after joining this school, but because the headmaster is my relative, I feel guilty to leave the job. Even when I talked to him about getting a better job; he was not keen on me doing so'.

This situation is in keeping with Gherardi who affirms that, ‘it may be superfluous to insist yet again that organizations are not distinct from society, and that internally, they reflect the patriarchal system of their environment’ (1995:16). Thus the experience of *Hasina* shows how trapped she is, destined to work according to the whims of the organizational head who also happens to be a relative. The complexity of school and family culture reveals that women have to constantly think about their relationship with their in-laws even when addressing personal matters such as career progression.

Another angle to this discussion is where family members choose school-teaching as a career for WSTs who did not otherwise want to be teachers in secondary schools. Some of the married WSTs who have chosen the teaching profession were prevailed upon to do so by their in-laws who believe it is most suitable because it allows them to devote more time to the family. *Mabbuba* was interested in becoming an independent science researcher but could not do so. She said: *‘I was forced to apply to teach in school because it allowed me to spend more time with my family and at the same time I could get some income doing it’*. Different research have also shown that women are somewhat influenced by the state or family obligations to enter into the teaching profession because the work calendar is in sync with school going children at home (Griffiths 2006). Ultimately, such decisions are of no help to women who are interested exclusively in a career in science and not necessarily teaching. WSTs feel kind of trapped in the very limited practice in sciences within the school setting and at the same time they cannot fully commit to these teaching responsibilities. It is clear that, ‘the interactions among individuals in the multiplicity of forms enact dominance and subordination and creates alliances and exclusions’ in women’s career advancement (Gherardi 1995:18). This is an indication of gender discrimination and segregation within institutions and organizations.

4.6. Gender power dynamics: where are the WSTs?

In the patriarchal context, WSTs’ everyday life is characterized by the struggles emanating from the existing power relations and gendered hierarchical structures.

4.6.1. Men’s control over physical-spaces

The WSTs do not have the control over physical-spaces in school and family because of the dominance by their male co-workers and their husbands respectively. Over time, such a setting can deprive WSTs from opportunities to nurture their potential to become the “ideal teacher”.

The WSTs in this study have to work with male colleagues mainly because the nature of sciences is such that attracts mainly men. In addition, the number of women teachers in secondary schools is lower than that of male teachers and this limits the physical-spaces available for the women. *Rebekat* talked about the challenges of space for women teachers’ including the staff-room:

‘In our school, the majority of teachers are men. That is why the main teachers’ room is for them. The five women teachers at the school sit in a corner of the store room. Clearly this is not a conducive environment within which to work’.

During the field study, I found the room for the female teachers had mosquitoes, was dirty and was used as a store. The WSTs also experienced such deprived conditions during their training sessions. This inequality in the use of space between males and females automatically leads to unequal power relations among the male and female workers.

Male domination in the control and use of spaces is also found in the home. The married WSTs do not get enough physical-space to study or prepare for lessons because of their husband's control over all the rooms in the house. This might have something to do with 'patrilocal residence', where the women try to resettle in a place which is already demarcated by the men (Ka-beer 2000:269). Thus, by drawing on Scott's (2010) gender analysis, this paper argues that the very meaning of being "women" is established in certain contexts and physical-spaces in school and at home.

4.6.2. Decision-making in school: men as gatekeepers

The male teachers are gatekeepers in the decision-making process for the WSTs due to the competitive structured work context.

When the WSTs start to handle any official responsibilities, the male teachers feel threatened and say that women are not capable of dealing with 'complex' official tasks. Some WSTs claim that the male science teachers' have negative ideas about the women teachers' ability. As a result, the authority often gets influenced by male dominance and this keeps women teachers from making several important decisions at the school. Drawing on Connell's (1995) idea, these situations can be viewed as a process that legitimizes patriarchy in the school context. When asked about this issue, one of the headmasters said that:

'When it needs to go outside the school like to the ministry office or somewhere else, I do not send women teachers because of lack of transport facilities and there are also more at risk.'

But WSTs are keen on taking up other official tasks at the school and they have the potential to do so. The men at the school pretend to be "caring" by considering the 'activities of each sex as normative-complementary in character' where 'the strength of the man is complementary to the frailty of the woman' (Gherardi 1995:134). Clearly, male teachers put in place barriers that limit women's involvement in decision-making process because of power they yield from their privileged positions at school. This is also a way to regulate "gendered identities" in school according to Dunne (2007).

Issues around of decision-making has been highlighted by WST *Shobag*, aged 25 who said that the senior male teachers never gave her the opportunity to teach physics class for grade 10 although she had her Bachelor's degree in Physics. She has instead relegated to teach General Science to grade 6-7. She is not happy about this because during her recruitment she was asked to teach physics and not general science. This is an indication of the misogynistic nature of the senior male teachers who do not want to 'lose their control' over their specialized classes at higher grades. Thus, unequal gender-relations are forming within the organizational structure (Gherardi 1995). The 'educationist' also stated that: *'In Bangladesh, most of the science teachers are male who are making all the*

decisions in the department on behalf of the schools'. Gherardi (1995:103) noted that, in masculine organizational culture 'gender relations' are formed 'based on a normative order which reproduced femaleness and maleness through socialization'. Ultimately the organization forms the gender power hierarchies by categorizing the meanings of "men" and "women" within the school (Scott 2010).

4.6.3. Feminine traits normalizes subordination

Having feminine attributes often 'normalizes' the subordination of WSTs' within the masculine organizational culture and this is manifested by the presence of power hierarchies among senior and junior teachers.

Some of the WSTs are very sensitive, caring and polite in the way they conduct themselves towards their senior co-workers because of the culture that demands respect for the elders. Unfortunately, such 'attributes of femininity are ingrained in the subordination relationship' even among the women co-workers 'because of a political and organizational social dynamic' (Gherardi 1995:15). An unmarried junior teacher *Shobag* stated that: *I am always been subjugated by my senior female co-workers, but this does not necessarily mean that we have bad rapport...sometimes they tease me because I am unmarried*'. Such 'dominance' occurs despite having good relationship with the senior women teachers. Over time some of these senior women teachers adopt the masculine organizational culture and that is why 'when a woman achieves high status, it becomes legitimate to suspect that she has lost out on femininity' (Gherardi 1995:135). In such cases, the senior women teachers normalize their dominance over the junior women teachers who come across as 'more feminine' by virtue of their status which is tied to their young age. A senior WST *Monoara* said that, the good rapport among the women teachers allows her to demand more work especially from the junior women teachers. It is not actually the lack of women's solidarity since 'in the name of solidarity, similarity has been exalted above difference. This threatens the cohesion of a group of women because it lays bare the problems of power and leadership' (Gherardi 1995:90). In this case the 'status' of the female teachers works as important factor which allows them to have different lived experiences even among the subordinated groups which is consistent with the views of Davis (2008). A headmaster has also touched on this aspect of feminine traits among junior WSTs like 'politeness' which makes it easier for the school authority to work with them. By drawing on Connell's (1999) argument on "women's subordination", it is clear that the relationship between powerlessness and femininity leads to a process of subordination which tends to be normalized in everyday life.

4.6.4. Sexual harassment: taking shape in a context of gender hierarchy

In the patriarchal society, the physical strength and dominance of men over women often leads sexual harassment in all spheres – school, home or community of the life of WSTs.

This study revealed that the problem of sexual harassment within or outside the school campus is more common in semi-urban areas than urban areas. WST *Shobag* said that, when she was a student she loved to organize science fairs and volunteered to do so every month at the school. This meant she had to work until late at school. In the evenings, on her way home, she was accosted several times by the local boys. She stated that:

'They used to tease when I went back home in the evenings; I never said anything to them...but I felt vulnerable. It affected my studies. Sometimes I felt guilty for not working in science fairs...I started to change my route from school to home; it took almost 1hr to get back to home...'

The aforementioned WST has expressed her challenges during her school days. Such harassment affected her ability to effectively organize science fairs. *Mabbuba* another interviewee talked about sexual harassment from the male students inside the classroom. She said, *'Sometimes I heard some of the boys passing comments about what I wore or my figure. This embarrassed me a lot'*. This situation highlights the hierarchies and power relations in sexual identities which emphasized the dominant position and controlling nature of men over women's bodily expressions like the way they walk or dress. Thus the legitimacy of nurturing the power of "being men" depicted by Connell and Messerschmidt (2005:832), can lead to such sexual harassment of even grown women by young men.

4.6.5. Lack of financial strength and politics of time and money

Despite having the potential to earn the same as men in the society, the married WSTs are controlled by a societal structure where they earn less than male science teachers. Such a state is further complicated by normative ideologies about the inferior value of house work. The lack of financial muscle has put the WSTs in the lower echelons of power in comparison to their male science teachers and their position within the family.

WSTs like their counterparts in the other non-government secondary schools are paid between, 5000 to 16000 Bangladeshi Taka. The minimum wage for this profession is about the same as a garment worker but much less than that of government employees (Devnath 2013). Male science teachers bring in more money than the WSTs because they have more time on their hands to do private tuitions which is not easy for a WST owing to obligations within the home. WST *Luna* stated that: *'I want to help my husband to manage the family expenses but I cannot do tuitions or extra coaching like my male colleagues because I have to look after my kids after school'*. There is a sense of dissatisfaction around the politics of time and money where for example WSTs are not encouraged to earn the same or more than their husbands. Another teacher *Mabbuba* said, *'I have the potential to earn the same as my husband but I have other duties at home'*. Kabeer (2000:286) also found the politics of time and money were 'reported most frequently by married women' and the fact that they cannot get their husbands to do their fair share of works around the house. Existing power relation in a family often normalizes women's lower earning power than that of men and legitimizes men's masculinity by maintaining the bread-winner identity (Cha and Thebaud 2009). Therefore, such societal structures exercise the power relations in both school and family where men are found in the upper hierarchies, earning more money than the woman.

4.7. Chapter summary

In this chapter, I have analyzed the gendered challenges that WSTs experienced not only in their professional life but also in family and community. The analysis has shown how their life-struggle is controlled by several actors in the society that include their own students, family members, neighbors, supervisors or the co-workers. The gender stereotypes associated with science and masculinity have also been portrayed under the thematic analysis anchored in

the key concepts. The findings revealed that, it is overall more challenging for a woman to be a role model in science teaching compared to a male teacher because of the socio-cultural constraints and normative practices in patriarchal structures.

Chapter 5: Negotiating or Accepting Gendered Ideologies?

In this chapter I present how WSTs are dealing with the gendered ideologies in their everyday lives. The concept of agency is used here mainly with the support of the concepts mentioned in the framework for analysis, to tease out the meanings of different actions taken by the WSTs in their lives using a feminist lens.

5.1. Weapons to survive: strategies adopted by WSTs

The WSTs are adopting several strategies to survive against the socio-cultural constraints during the different phases and situations of their lives.

5.1.1. Exercising agentic actions: moving out of joint-family settings

Because of the workload presented by teaching science, some of the WSTs are thinking about moving out of their current joint-family setting as a strategy that will help them concentrate more on careers but with the risks of trouble in family relationships.

Some of the married WSTs have talked about the difficulties of coming to terms with negative attitudes from family members about the position of women. The teachers have tried to ignore these sentiments as they forge ahead in trying to meet family and professional obligations. Though some of teachers think that moving out of joint-family set up might help focus on their careers, they would rather keep mum about it at least for now rather than face the wrath of their in-laws. Such ‘silences’ may not change the overall condition of restriction as Parpart (2010) affirmed, and these teachers may have to continue staying with their in-laws in the joint-families arrangement.

Sharmin gave up staying with her in-laws because of such negative comments she received about working outside home. She states that:

My marriage is an arranged marriage and I had to stay with my in-laws in a joint-family where my brother in-laws and sister in-laws were also living under the same roof. It was difficult to understand their mentality; I used to feel so stressed’.

By drawing on Kabeer’s (1999) notion of agency it is clear how *Sharmin* has operationalized this strategic choice as positive agency to empower her by helping her concentrate more on career. Through her action and “voice” (Kabeer 2010) *Shamin* has facilitated some changes in her life, initially she did not want to move out of the joint-family arrangement but at the same time she was resentful. This living arrangement forced *Sharmin* to make the choice to move despite the risk of being called a “bad woman” by her in-laws. Parpart (2010:2) argues that sometimes “personal survival” becomes more important than anything else in life. Agency helps women to make choices about whether to “move out” or “not to move out” of course influenced by a complex “web of relationships” that are context specific. These circumstances are highlighted by

Joseph (1999:17) who goes on to say that ‘individualism and relationality often co-reside in the same societies, families and persons’.

5.1.2. Teaching dilemmas: tackling gendered behavior of students

The WSTs often face dilemmas when teaching because of the gendered nature of behavior exhibited by the students, especially the adolescent boys. The teachers say that, boys become very naughty in their classes yet they do not conduct themselves in the same way when a male science teacher is in class.

WSTs have adopted interesting strategies to cope especially during biology lessons when discussing sensitive topics. Some of them try to avoid eye-contact and at times ask the students to read those topics at home so that they do not have to deal with uncomfortable situations during class time. *Rebeka* stated that:

I always ask the students to go through such sensitive topics at home, otherwise they get cheeky during class and it becomes very difficult for me to control them’.

Honwana’s (2008) notion of ‘tactical agency’ related to advantage of “opportunities” is illustrated in the aforementioned context. The data revealed that such ‘calculated’ and ‘isolated’ actions gave WSTs the confidence to continue teaching and to “complete” the syllabus without distraction. *Monoara*, another interviewee thinks that the boys’ behavior needs to be ‘controlled’ using stern warnings and a firm voice; otherwise they will continue to be naughty. *Monoara* went on to say that:

‘The boys flirt with and tease the girls while I am teaching. That is why I have forbidden talking during my class. Now they are afraid to talk during my lesson and this how I have controlled my class to date.’

Monoara was only too happy to explain her class control method. Although such an option could strain her relationship with her students who fear instead of respect her. Hackling (2004) affirmed that such dominating teaching approaches can negatively affect students. Drawing on Honwana’s (2008) notion of tactics related to ‘physical or social spaces’, being strict in class can be a tactic employed by WST to have control over the school space.

Strict control of the class is a tactic that can be counter-productive and affect learning because it creates long-lasting negative effects on the students. Here, again ‘we need to distinguish between the myriad of largely trivial and inconsequential choices we all make on a daily basis and choices that have implications for our lives and relationships’ (Kabeer 2010:17). By illustrating Scott’s (2010) gender analysis, this strategy of not going in-depth of these topics of a sensitive nature because of personal discomfort lies in how we are socialized with our gender-roles and how we view our own body.

5.1.3. Involving students in collecting teaching-aids

Collecting and preparing teaching-aids for everyday science lessons is difficult for the WSTs so one of them has made a strategic move to involve the students. *Monoara* stated that, *‘It is really difficult for me to collect and prepare the day to day teaching aids for the students. That is why I ask my students to collect those materials on*

my behalf and then I go on to explain and demonstrate in classes’. This is her strategy to cope with challenges of handling scientific apparatus in a classroom setting. Hackling (2004) stated that it is crucial to demonstrate teaching-aids in science lessons. Drawing on Kabeer’s (2010) notion of strategic actions, such strategy allows the WST to demonstrate and explain the scientific experiments within the constrained environment.

5.1.4. Advancing career first and getting married second

The unmarried WSTs felt somewhat ‘free’ well at least for now but had misgivings about advancing their careers once they got married so they are keen on doing so while still single. Unmarried WST *Shobag* stated that:

I have so much pressure from my relatives and neighbors to get married because girls in semi-urban areas usually getting married off when they are 20...If I were married, I would definitely have to concentrate on various aspects of family responsibilities’.

The unmarried WSTs know that after marriage, girls have to concentrate fully on the family responsibilities. The teachers are making the strategic choice by using their agency to come up with strong defined goals for their lives and to act upon them (Kabeer 1999). But when they encounter negative comments from communities, they remain silent. Parpart’s (2010:23) argument on “silences” states that, ‘respect for the power of silence, of control over voice is influenced by culture’. These teachers are using this survival strategy of being “silent” when faced with negative sentiments from members of their patriarchal society.

5.2. Bargaining with patriarchy and strengthening the notion of men’s superiority

The WSTs have found it easier to deal with the constraints of gender inequalities by upholding the patriarchal norms and accepting gender-roles which ultimately devalue their work. Such reinforcing notion of men’s superiority is conceptualized as “patriarchal bargain” by Kandiyoti (1988).

Within school

WSTs accept that male teachers should be engaged in decision-making processes at school. *Shobag* stated that: *‘it is okay to give the administrative and financial responsibilities to the male teachers, that is what we do in our school. The female teachers are usually involved in minor duties at the school*’. When *Shobag* was probed about what she meant by ‘minor duties’, she gave an example and said, *‘...during cultural programs, we usually decorate the stage or fill up the gas balloons. Such “minor duties” are not meant for the male teachers*’. Such gender-roles inside the workplace can be ‘operationalized at the level of individuals through their shared understandings of what constitutes appropriate ways of “being and doing” for women and men’ (Kabeer 2000:328).

Because of the workload and family obligations, teachers like *Sharmin* have already accepted that as women they will not be able to become the ‘ideal science teacher’. In her words: *‘A male teacher can commit 100% of his time if he wants to but women can hardly commit to 70% because of household responsibilities*’. Con-

sequently by normalizing domestic-roles, a woman is reproducing her subordination in the society which is consistent with Mahmood's (2004) views. Women mainly apply the "lecture method" rather than focusing on "demonstration" or "inquiry methods" which are known as appropriate teaching techniques for science (Hackling 2004). That is why Kandiyoti (1988:280) affirms, 'women in areas of classic patriarchy often adhere as far and as long as they possibly can to rules that result in the unfailing devaluation of their labor'. Therefore these WSTs have assumed their 'feminine position which is in keeping with what Gherardi (1995) found in several women working in male-dominated sectors. The 'feminine position' makes women withdraw them from the competition at the workplace and in turn make them view their male co-workers as superior.

Within community

Some of the married WSTs accepted their main responsibilities are in the home yet should their husbands try to help, this reflects negatively on the women in the eyes of the community. This shows, communities play a major role in the lives of women because it dictates the gender-roles (Kabeer 2000).

Luna insists that her husband should not help with house hold tasks because this will make her look bad in the eyes of her community members which is consistent with Kabeer's (2010:19) views about the influence of gender-roles on day to day life. This example shows how a woman may be bound by the gender-roles in her community, yet her 'preferences and priorities reflect [her] own unique histories and subjectivities, but also bear the imprint of the complex social relationships to which she belongs and which determine her place in society' (Kabeer 2000:327). In such cases, the WSTs are under pressure to maintain community norms hereby strengthening the notion of men's superiority and according to Kabeer (2000:357), such anxiety may constrain 'their behavior in various aspects of their lives, acting as a constant reminder of the need to conform to community norms as much as possible'.

This study revealed that some middle-aged teachers do not want to negotiate their community gender-roles because they are comfortable maintain the status quo. One of the woman head teachers, aged 57, said that: '*it is the rule provided by Allah, no-one can change it. You have to be convinced that women are weaker than men, they never can do those things that are harder for men*'. Here, 'gender is one of the most powerful of symbols; indeed, the very word "gender" encapsulates all the symbols that a culture elaborates to account for biological difference' (Gherardi 1995:31). Such narratives reproduce the naturalization tendency of patriarchal bargain where the traditional beliefs are so taken-for-granted that it is acknowledged without any dispute (Bourdieu 1977). I found such a mentality among other WSTs including *Geeta*, aged 45, who were trying to deal with all the challenges in their lives in a very positive way using their agency in already existing kinship structure among the community members, which is consistent with Joseph's (1999) view. The teachers believe that a woman who has excelled in teaching the sciences may be exceptional but not necessarily 'an example' on how to live their lives, sentiments shared by Hill et al. (2010). Kandiyoti noted that, 'patriarchal bargains do not merely inform women's rational choices but also shape the more unconscious aspects of their gendered subjectivity, since they permeate the context of their early socialization, as well as their adult milieu' (1988:285). Because of the life experiences shaped by the communities,

some of the middle-aged WSTs in this study have a 'gendered mentality'. Such perceptions can be varied according to different age group that share personal experiences but at the same time we need to avoid categorizing into distinctions (Davis 2008).

Within family

Some of the WSTs have expressed their relief that their husbands are the main bread-winners of the family which made it easier for them to attend to their domestic-roles. Even though it is possible to do so, these teachers are not keen on earning more than their husbands and besides, their husbands would not prefer it that way. In such cases, it is difficult to work out whether the 'choice' came first or the 'constraint'. Kabeer (2000:243) has explained such decisions 'as "passive" on the grounds that they necessitated a qualitatively different form of choice to those made by women due to their child care obligations, their lack of proper qualifications or even their own subjective preferences'. *Geeta*, an interviewee stated that: '*women like me are not taking the full financial responsibility for the family; there is no extra pressure to earn more.*' Another WST, *Monoara* also feels that she is at advantage because her husband is responsible for the income in the house. It is somewhat of a relief for these teachers that they are not answerable for the finances in the home. Finally, such an arrangement allows women's dependency on men's superiority where the women themselves often choose to be subordinated by reproducing inequalities which is consistent with Mahmood (2004).

5.3. Tale of tactical agent: performing in controlled spaces

Some of the WSTs who lack independence also try to take control of some actions in the restricted context of the school. For instance, some of the secondary schools prefer the teachers to work under the authority's supervision and the WSTs revealed that the school authority praises those teachers who devote extra time after school hours which is difficult for the WSTs. These teachers have no choice but to do so, otherwise they will not be acknowledged by the school authority. A WST, *Monoara* stated, '*I never said "no" to our headmaster and I try to work after school hours. That is why he respects me.*' By drawing on Honwana's (2008) suggestion about 'tactical agency' where she noted that the agents who lack autonomy take advantage of "opportunities", the WSTs in this study use their agency to navigate the troublesome social and political circumstances in which they find themselves so as to get valued in their organizational context. Cahusac and Kanji (2014:59) found that, 'working long hours has become emblematic of a new kind of masculinity' and it is highly 'associated with masculine practices in many organizations'. There is a possibility that women who do work extra hours can be brought into the male fold and these actions can be perceived as "negative forms" according to Kabeer (1999) since they are conducting themselves by allowing domination. Furthermore, *Monoara* also tries to carefully manage her relations with the school authorities so that she earns some degree of respect. Her story provides insight into the complex choices that WSTs make as tactical agents who seek to navigate their professional life by using different strategies. In this way, the so called subordinated WSTs exercises tactical agency to maximize her chances of survival in a restricted school environment in which they are forced to operate.

5.4. Perception contradicts passion for the sciences: breaking out of the traditional gender mould?

Seven out of eight WSTs accepted gendered ideologies in science¹² and that science is more applicable for boys in the Bangladesh context because of the ‘masculine image’ of this subject. Interestingly, many of them have actually developed their passion for this subject despite all the gender-specific constraints they faced during their education life. Such passion had developed with the support from the family and coupled with interest and sheer hard-work.

Family support was crucial in the lives of the teachers because this is where they exercised their agency to choose the sciences in the first place. *Luna* said, *‘When I used to face any difficulty in understanding any science topics during my school life, I would ask to my father. He was a teacher and used to help me out in any way’*. Another teacher, *Monoara* expressed how important it is particularly for a woman to have family support otherwise it was not possible for her to be succeeded. Some WSTs got the encouragement from the family when they were in the schools and treated equally with their brothers but when they become adult they had to involve in prescribed gender-roles like, helping mother in the kitchen, washing clothes of other male members of the family etc. which often broke their concentration for their passion for science. The way they gave time to the laboratories contradicted their feminine-roles which did not seem to be submitted to the male members like father or brother in the family. The predictable kinship structures in the family relationship are often considered as the ‘central to the reproduction of patriarchy’ (Joseph 1999:139) which created much restriction to their life. The findings in this study are consistent with Bartolomei and Pittaway (2003), where they say that the forms of women’s discrimination can change with time based on their multiple identities.

As ‘active agents’ these women have to stick it out and to try to stay the course once they select the sciences, rather than thinking about the ‘masculinities of science.’ This is similar to the argument made by Agarwal (1997) when she says how agency is exercised within the inner psyche of individuals. Thus with or without the resources and despite the discrimination they face, WSTs broke the gender mould in the first place when they opted to study challenging subjects like the sciences.

5.5. Aiming to be a ‘good mother’ and aspiring for change

The WSTs note that their main aim in life is to be a ‘good mother’. This subjective identity of WSTs shows how they perceived their socially prescribed gender-roles. When I asked *Geeta* about her aim in life, she said: *‘I want my children to be educated and successful in their life. I want all three of them to be doctors’*. She also explained how as a science teacher, she encouraged her children to take up a career in the sciences. Here *Geeta* is not only conforming to the patriarchal demand on her gender but also providing an opportunity to pass on her passion for the sciences to the next generation. This is consistent with Kabeer (2000) who has talked about the aspirations of women. By drawing on

¹² Unmarried WST Shohag is exceptional one who thinks that boys and girls are equally suitable for science in any context.

Agarwal's (1997) idea of having hidden meaning in agentic actions, the data in this study indicates that the agency for WSTs is about devoting one's life to be a "good mother" with the 'hidden' meaning here being one of nourishing the interest in the science.

WST *Luna* has also focused on her role as mother and said that,

When I came to school, I always tense about whether my daughter has gone back to home after school or not, if she had her meal or not. I want to focus on my profession but it is not that easy, I realize it is better for me if I focus mainly on my daughter'.

Teacher *Hasina* also wants to focus on the life of her only daughter rather thinking about her own career. She is 39 years old and thinks that it is not the right age to think about her own career and she has already decided to work fewer hours in school. According to Bourdieu, such "sense of limit,...underpins their adherence to the social order by "naturalizing" some aspects of reality, placing the behavior associated with them in the realm of unquestioned routine, habit and tradition, the realm of "doxa" (Kabeer 2000:43-44).

The WSTs think prioritizing their children's life is something normative for a 'mother' which shows their positive affirmation of motherhood where they want to see their dreams fulfilled through their children. They have also naturalized their motherhood where the culture of reproducing a 'good mother' exists beyond argumentation in such patriarchal context which is consistent with Bourdieu (1977). Such thoughts of WSTs give the 'socially structured aspect of subjectivity in social practice' where they are generating the aspirations by reflecting 'the objective range of possibilities available in given social contexts' (Kabeer 2000:43). Furthermore, my argument is similar to Joseph (1999) where she talked about the kinship structures. It indicates, as active agents the WSTs do not want to subvert their children's success in their own accomplishment, thus they choose to be protective for their children's life by transferring their long-term aspirations to their children.

5.6. Chapter summary

In this chapter I analyzed ways in which WSTs are dealing with the gendered ideologies. The majority of them conform to these ideologies because of the presence of the patriarchal system that was part and parcel of their day to day life. Growing up, many had a passion for the sciences but when they got married and started their professional life, the gender-norms impinged on their ability to progress in life. Their struggle to be ideal science teachers is often carried on by taking strategic actions and tactics but their silences in such contexts is also a way to survive even with these constraints.

Chapter 6: Conclusions

In this chapter, I present a comprehensive discussion of the empirical findings by drawing a synthesis of the analysis. The main research question is revisited by highlighting the major findings. Finally, I conclude by reflecting on some of the issues that might be considered for further research.

6.1. Revisiting gender stereotypes of science and masculinity: a synthesis

This study set out to examine the main research question; *do the women science teachers provide role models by challenging the gender stereotypes of science and masculinity?* Here I adopted feminist standpoint as the major methodological approach and used the concepts of gender, agency and intersectionality to analyze the gendered experiences of WSTs and their ways of dealing with the gendered ideologies. Taking a broader view of WSTs' experience from secondary non-government co-education schools, this research presents several critical points on the debate about masculinity of science in the secondary education sector of Bangladesh.

Firstly, the number of WSTs in secondary co-education schools is few all over the country and even fewer in semi-urban areas compared to urban areas. Such limited representation in science makes life challenging for a WST and is more visible in semi-urban areas which is manifested through cultural norms guiding how they relate with their co-workers, students and their guardians. These norms and relations more often than not conform to the 'masculinization' of science.

Secondly, WSTs in Bangladesh are found more likely to engage in biological science which is stereotypically believed to have less masculine attributes and much suitable to the gender-roles of a woman. WSTs' interest in the subject, the teaching profession, their performance and success highly depends not only on the family members but also on the organizational culture in the school. Some of the gender-roles like, cooking and nurturing children are found more stereotypically embedded in the experiences of semi-urban WSTs' than those in the urban.

Thirdly, the double burden for married WSTs in schools and at home has been revealed in several ways: how they have suffered because of perceived 'masculine image' of science is directly relates to how women are viewed culturally and socially. Women have often positioned themselves in the lower strata of gender power dynamics because of such gender-specific constraints. Unmarried WSTs have less pressure when it comes to domestic chores and therefore they have more time and space to pursue their interests in the sciences. When talking about gender power dynamics, the geographical differences come to play especially in the realm of sexual harassment as experienced by WSTs where this problem is much more pronounced in semi-urban areas than the urban areas.

Fourthly, despite being brought up in a patriarchal society, there are few WSTs who have taken agentic actions to break free from the existing gendered structure but majority of them have strategized their actions in a way that is acceptable to the gendered ideologies resulting from their own socialization. Additionally, the tendency of naturalizing the community gender-roles is more common among the middle-aged women. The WSTs reproduce culture and

traditional beliefs where their agency is often circumscribed by the contextual and relational aspirations and whether or not they can bring about change to the next generation.

Overall, this study has provided a glimpse into the intersectional gendered experiences of WSTs within their schools, families and community and shows how they are challenging the gender-stereotypes of science and masculinity. The study revealed that, in the structure of classic patriarchal society it is difficult for WSTs to be role models due to their socially prescribed gender-roles, symbolic representation, gender-specific norms and constraints in institutions. However, despite these constraints, these women have the potential to be role models and are coping with their circumstances by making different strategic choices in the hope that they will pursue their interest in the sciences. Such aspiration reinforces the notion that girls are not intrinsically incompatible to this subject. To ensure the credibility of the findings, this paper highlights several narratives about the WSTs; largely coming from middle-class families which acknowledge that this issue is multifaceted and diverse.

6.2. Suggestions for further research

Although the study has addressed the research questions, there are still some areas, which might benefit from the possibility of further research. The findings on WSTs' experiences of workload show that, their counterparts who teach subjects like, Bangla Grammar, English Literature or even History had a lighter load which highlighted the masculine images of science. Therefore comparative studies across different subject may also provide an understanding of the gendered experiences of women teachers in relation to masculine subjects like science.

In addition, this study also highlighted WSTs' gendered perceptions about the sciences. Because this study did not aim at exploring the individuals' perception about the "nature of science" it could not tease out the intricacies underlying their gendered teaching practices. The "nature of science" also known as NOS research is considered as an important area for the science research community (Lederman et al. 2002) and hence future studies can also focus on science teachers' NOS knowledge to examine the masculinity underlying this subject.

References

- Agarwal, B. (1997) “Bargaining” and Gender Relations: Within and Beyond the Household’, *Feminist Economics* 3(1) 1-51.
- Aikman, S. et al. (2011) ‘Conceptualizing gender equality in research on education quality’, *Comparative Education* 47(1): 45-60. Accessed 20 January 2015 <http://dx.doi.org/10.1080/03050068.2011.541675>
- Amin, S. et al. (2006) ‘Causes and Consequences of Early Marriage in Bangladesh’. Background report for workshop on programs and policies to prevent early marriage, Dhaka: Population Council.
- AWID (2004) ‘Intersectionality: A Tool for Gender and Economic Justice’, *Women’s Rights and Economic Change* 9. Accessed 4 June 2015 https://lgbtq.unc.edu/sites/lgbtq.unc.edu/files/documents/intersectionality_en.pdf
- ‘Bangladesh Bureau of Educational Information and Statistics’ BANBEIS (2013). Accessed 14 May 2015 http://banbeis.gov.bd/data/index.php?option=com_content&view=category&id=131:basic-tables-2013&Itemid=226&layout=default
- ‘Bangladesh Bureau of Educational Information and Statistics’ BANBEIS (2008). Accessed 14 May 2015 http://www.banbeis.gov.bd/db_bb/secondary_education_3.htm
- Bartolomei, L. and E. Pittaway (2003) ‘Who am I? Identity and Citizenship in Kakuma refugee camp in northern Kenya’, *Society for International Development* 46(3): 87-93.
- Bourdieu, P. (1977) *Outline of a Theory of Practice*. Trans. Richard Nice. Cambridge, U.K.: Cambridge University Press.
- Cahusac, E. and S. Kanji (2004) ‘Giving Up: How Gendered Organizational Cultures Push Mothers Out’, *Gender, Work and Organization* 21(1):57-70.
- Central Intelligence Agency [CIA] (2013) ‘The World Factbook: Bangladesh’. Accessed 14 June 2013 <https://www.cia.gov/library/publications/the-world-factbook/geos/bg.html>
- Cha, Y. and S. Thébaud, (2009), ‘Labor Markets, Breadwinning, and Beliefs. How Economic Context Shapes Men’s Gender Ideology’, *Gender & Society* 23(2):215-243
- Choudhury, S.K. (2013) ‘Challenges of Women in Science: Bangladesh Perspectives’. Department of Physics, University of Dhaka. Accessed 1 June 2015 http://www.ias.ac.in/womeninscience/7_Challenges_of_Women_in_Science-Shamima_K_Choudhury.pdf
- Connell, R.W. (1995) *Masculinities*. Berkeley: University of California Press.
- Connell, R. W. (1999) ‘The Social Organization of Masculinity’ in *Masculinities*, London: Polity Press.
- Connell, R.W. and J.W. Messerschmidt (2005) ‘Hegemonic Masculinity Rethinking the Concept’, *Gender & Society* 19(6): 829-859. Accessed 4 June 2015 <http://gas.sagepub.com/content/19/6/829.full.pdf+html>
- Davis, K. (2008) ‘Intersectionality as a Buzzword: A sociology of science perspective on what makes a feminist theory successful,’ *Feminist Theory* 9(1): 67-85.

- Devnath, A. (2013) 'Bangladesh Raises Minimum Wage for Garment Workers After Unrest'. Accessed 19 October 2015 <http://www.bloomberg.com/news/articles/2013-11-13/bangladesh-garment-factories-to-stay-shut-amid-worker-protests>
- Duffy, J., K. Warren and M. Walsh (2001) 'Classroom Interactions: Gender of Teacher, Gender of Student, and Classroom Subject', *Sex Roles* 45(9-10): 579-593. Accessed 25 January 2015 <http://link.springer.com/article/10.1023/A:1014892408105>
- Dunne, M. (2007) 'Schools and Gendered Identities', Commonwealth Education Partnerships 2007, pp. 26-29. Accessed 16 April 2015 <http://www.cedol.org/wp-content/uploads/2012/02/26-30-2007.pdf>
- Gherardi, S. (1995) *Gender, Symbolism and Organizational Cultures*. SAGE Publications.
- Griffiths, M. (2006) 'The Feminization of Teaching and The Practice of Teaching: Threat or Opportunity?' *Educational Theory* 56(4): 387-405. Accessed 1 March 2015 <http://onlinelibrary.wiley.com/doi/10.1111/j.1741-5446.2006.00234.x/full>
- Hackling, M.W. (2004) 'Investigating in Science' in Venville, G. and V. Dawson (eds) *The Art of Teaching Science*, pp. 88 – 105, National Library of Australia, Cataloguing in publication entry.
- Haraway, D. (1988) 'Situated knowledges: The science question in feminism and the privilege of partial perspective', *Feminist Studies* 14(3): 575-599.
- Harding, S. (2005) 'Rethinking Standpoint Epistemology: What is Strong Objectivity?', in A.E. Cudd and R.O. Andreasen (eds) *Feminist Theory: A Philosophical Anthology*, pp. 218-236. Australia: Blackwell Publishing Ltd.
- Harding, S. (ed.) (2004) *The feminist theory standpoint reader: Intellectual and political controversies*. New York: Routledge.
- Hargreaves, A. (2001) 'The emotional geographies of teachers' relations with colleagues'. *International Journal of Educational Research* 35: 503-527
- Hartsock, N.C.M. (2003) 'The Feminist Standpoint: Toward a Specifically Feminist Historical Materialism', in C.R. McCann and S. Kim (eds) *Feminist Local and Global Theory Perspectives Reader*, pp. 292-307. Great Britain: Routledge.
- Henwood, E. and K. Miller (2001) 'Boxed in or Coming out? On the treatment of science, technology and gender in educational research', *Gender and Education* 13(3):237-242.
- Hill, C. et al. (2010) *Why so few? Women in Science, Technology, Engineering and Mathematics*, AAUW, Washington, DC. Accessed 7 May 2015 <http://www.aauw.org/resource/why-so-few-women-in-science-technology-engineering-mathematics/>
- Holland, S., E. Renold, N.J. Ross and A. Hillman (2010) 'Power, Agency and Participatory Agendas: A Critical Exploration of Young People's Engagement in Participative Qualitative Research', *Childhood* 17(3):360-375.
- Honwana, A. (2008) *Culture and Politics; War, Reconciliation and Citizenship in Mozambique*. Prince Clause Chair in Development and Equity. Hague Netherlands: International Institute of Social Studies; 2008:14-15.
- Huang, S.L. and B.J. Fraser (2009) 'Science Teachers' Perceptions of the School Environment: Gender Differences', *Journal of Research in Science Teaching* 46(4):404-420.

- Joseph, S. (1999) *Intimate Selving in Arab Families: Gender, Self and Identity*. Syracuse University Press.
- Johnson, B., and L. Christensen (2008) *Educational research: Quantitative, qualitative, and mixed approaches (3rd ed.)*. Los Angeles: Sage publications. Inc.
- Kabeer, N. (2010) 'Voice, Agency and the Sounds of Silence: A Comment on Jane L. Parpart's Paper', Working Paper No. 297. Michigan State University, 206 International Center, East Lansing, MI 48824-1035.
- Kabeer, N. (2000) *The Power to Choose: Bangladeshi Women and Labour Market Decisions in London and Dhaka* Verso, London, New York.
- Kabeer, N. (1999) 'Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment', *Development and Change* 30 (4):435-464.
- Kahle, J. B. and Meece, J. (1994) 'Research on gender issue in classroom', in D. Gabel (ed.), *Handbook of research in science teaching and learning*. Washington, DC: National Science Teachers Association.
- Kandiyoti, D. (1988) 'Bargaining With Patriarchy', *Gender & Society* 2(3): 274-290.
- Kelly, A. (1985) 'The Construction of Masculine Science', *British Council of Sociology of Education* 6(2):133-154. Accessed 25 January 2015 http://www.jstor.org/stable/1393046?seq=1#page_scan_tab_contents
- Laws, S., C. Harper and R. Marcus (2003) *Research for Development: A Practical Guide* Sage Publications: London.
- Lederman, N.G., F. Abd-El-Khalick, R.L. Bell and R.S. Schwartz (2002) 'Views of Nature of Science Questionnaire: Toward Valid and Meaningful Assessment of Learners' Conceptions of Nature of Science', *Journal of Research in Science Teaching* 29: 331-359.
- Mahtab, N. (2007) *Women in Bangladesh, From Inequality to Empowerment* Dhaka: A H Development Publishing House.
- MoE (2015) Ministry of Education. Government of the People's Republic of Bangladesh. Accessed in 14 May 2015 <http://www.moedu.gov.bd/>
- Mahmood, S. (2004) *Politics of Piety*. New Jersey: Princeton University Press.
- Mohanty, C.T. (1988) 'Under Western Eyes: Feminist Scholarship and Colonial Discourses', *Feminist Review* 30:61-88.
- Nash, J.C. (2008) 'Re-thinking Intersectionality', *Feminist Review* 89:1-15. Palgrave Macmillan. Accessed 4 June 2015 <http://davidmcnally.org/wp-content/uploads/2011/01/Nash-Rethinking-Intersectionality.pdf>
- Nasr, A.R. and A. Soltani (2011) 'Attitude towards Biology and Its Effects on Student's Achievement', *International Journal of Biology* 3(4):100-104. Accessed 10 June 2015 <http://ccsenet.org/journal/index.php/ijb/article/view/12442>
- O'Leary, Z. (2010) *The Essential Guide to Doing Your Research Project* London: SAGE Publications
- Parpart, J. (2010) 'Choosing Silence: Rethinking Voice, Agency, and Women's Empowerment', Working Paper No. 297. Michigan State University, 206 International Center, East Lansing, MI 48824-1035.
- Robinson, K. (2000) '#Great Tits, Miss!' The silencing of male students' sexual harassment of female teachers in secondary schools: A focus on gendered authority', *Discourse: Studies in the Cultural Politics of Education* 21(1):75-90.

- Russell, T. and A.K. Martin (2007) 'Learning to teach science', in S.K. Abell and N. G. Lederman (eds) *Handbook of research on science education*, pp.1151-1178. Mahwah, NJ: Lawrence Erlbaum.
- Scott, J. (1986) 'Gender: A Useful Category of Historical Analysis', *The American Historical Review* 91(5):1053-1075.
- Scott, J.W. (2010) 'Gender: Still a Useful Category of Analysis?', *Diogenes* 225:7-14. ISSN 0392-1921.
- Tapan, M.S.M. (2010) 'Science Education in Bangladesh', in Y.J.Lee (ed.) *Handbook of Research in Science Education Research in Asia, 4*, pp.17-35, Sense Publishers.
- Tolley, K. (2003) *The science education of American girls: A historical perspective*. New York: Routledge Falmer.
- Ullah, M. R., (2008) An Investigation into Implementation of Knowledge and Skills on Gender Issues of TQI in-service Trained Teacher in Classroom, Thesis No-D-238, Unpublished master's thesis, Institute of Education and Research, University of Dhaka.
- UNESCO Institute of Statistics (2014a) 'Data Centre: Country Profile Bangladesh'. United Nations Educational, Scientific and Cultural Organization. Accessed 6 June 2015 <http://www.uis.unesco.org/DataCentre/Pages/country-profile.aspx?code=BGD®ioncode=40535>
- UNESCO Institute of Statistics (2014b) 'Women in Science: Science, Technology and Innovation'. United Nations Educational, Scientific and Cultural Organization. Accessed 6 June 2015 <http://www.uis.unesco.org/ScienceTechnology/Pages/gender-and-science.aspx>
- UNESCO (2007) 'Science, Technology and Gender: An International Report' Science and Technology for Development Series: UNESCO Publishing. Accessed 5 May 2015 <http://www.uis.unesco.org/ScienceTechnology/Documents/unesco-science-technology-gender-2007-en.pdf>
- UNESCO (1997) 'International Standard Classification of Education (ISCED)'. Accessed 15 May 2011 http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm
- Vaus, D. (2001) *Research Design in Social Research* London: Sage Publications.
- Weinburgh, M. (1995) 'Gender differences in Student Attitude toward Science: A meta-analysis of the literature from 1970 to 1991', *Journal of Research in Science Teaching* 32(4):387-398. Accessed 12 June 2015 <http://onlinelibrary.wiley.com/doi/10.1002/tea.3660320407/pdf>
- Wickramasinghe, M. (2010) *Feminist Research Methodology: Making meanings of meaning-making* London and New York: Routledge.
- Yin, R.K. (2014) *Case Study Research: Design and Methods*, 5th ed. Thousand Oaks: Sage.

Appendices

Appendix I: Socio-economic indicators of Bangladesh, 2013

Total population (in thousands)	156 595
Annual population growth (%)	1.2
Population aged 14 years and younger (in thousands)	46 977
Rural population (% of total population)	71
Total fertility rate (births per woman)	2.2
Infant mortality rate (per 1,000 live births)	33
Life expectancy at birth (years)	70
Prevalence of HIV (% of population aged 15-49 years)	0.1
Poverty headcount ratio at 2 PPP\$ a day (% of population)	76.5
GDP per capita - PPP\$	1851
Annual GDP growth (%)	6.2
Total debt service (% of GNI)	1.2
GDP in billions - PPP\$	286

(Source: UNESCO Institute for Statistics 2014a)

Appendix II: Enrolment in primary and secondary education by sex (%), 2005-2011

Primary Education	2005	2006	2007	2008	2009	2010	2011
Gross Enrolment Ratio (%)							
Total	98.5	99.7	99.3	97.6	101.2	104.5	114.2
Female	101	102.7	103.1	100.8	103.9	108	117.8
Male	96.2	96.8	95.7	94.5	98.6	101.1	110.8
Net enrolment ratio (%)							
Total	91.8	92.9	–	90.8	91.8	91.5	–
Female	94.6	96.2	–	92.1	96.1	93.3	–
Male	89.1	89.7	–	89.5	87.8	89.8	–
Secondary education	2005	2006	2007	2008	2009	2010	2011
Gross enrolment ratio (%)							
Total	45	45.6	46.4	44.5	48.2	49.9	50.8
Female	46.6	46.9	47.6	47.2	50.1	52.9	54.5
Male	43.5	44.3	45.1	41.9	46.3	47	47.2
Net enrolment ratio (%)							
Total	42.1	42.8	43.6	–	44.6	46	45.8
Female	43.6	44.1	44.8	–	46.5	48.8	49.3
Male	40.7	41.5	42.4	–	42.8	43.4	42.5

(Source: UNESCO Institute for Statistics 2014b)

Appendix III: Progression and completion in education 2009-2011

	Total	Male	Female	Year
School life expectancy ISCED 1-8 (years)	10	9.7	10.3	2011
Percentage of repeaters in primary (%)	9.4	9.7	9.1	2011
Survival to the last grade of primary (%)	66.2	61.9	70.6	2009
Gross intake ratio into the last grade of primary (%)	74.6	69.5	79.8	2011
Primary to secondary transition rate (%)	94.5	–	–	2010

(Source: UNESCO Institute for Statistics 2014b)

Appendix IV: Percentage of Bangladeshi women and men in education and research careers 2012

	Women	Men
Bachelor	42%	58%
Doctoral Students	38%	62%
Researchers	14%	86%

(Source: UNESCO Institute of Statistics 2014b)

Appendix V: Percentage of men and women faculty in science, Dhaka University 2013

Teachers			
Physical science		Biological science	
Male	Female	Male	Female
85%	15%	78%	22%
Professors			
Physical science		Biological science	
Male	Female	Male	Female
82%	18%	79%	21%
PhD			
Physical science		Biological science	
Male	Female	Male	Female
86%	14%	80%	20%

(Source: Choudhury 2013)

Appendix VI: Number of secondary schools and teacher 1995-2009

Year	No. of schools	Number of Teachers		
		Total	Female	% of Female
1995	12012	140059	19436	13.88
1996	12978	145188	20198	13.91
1997	13778	157077	22334	14.22
1998	14518	165213	24106	14.59
1999	15460	173897	25867	14.87
2000	15720	174146	26290	15.10
2001	16166	183277	30196	16.48
2002	16562	186949	31311	16.75
2003	17386	206557	39580	19.16
2004	18267	214673	47255	22.01
2005	18500	238158	48290	20.28
2006	18700	239431	48615	20.30
2008	18756	209496	46788	22.33
2009	19083	213482	53363	25.00

(Source: *BANBEIS* 2013)

Appendix VII: Interview guideline for women science teachers

Date: Total year of work experience:
Name: Current city:
Age: Brought up in (City):
Position: Educational background:
School: Marital status:
Years of work experience in this school:

- Do you enjoy your profession? Why?
- Why have you chosen this profession? Did anyone motivate you to choose this profession? How?
- You are a science teacher, how do you experience teaching science? Please explain.
 - What content do you usually teach in science? Physics, Chemistry or Biology? Or mixed?
 - Are there any other science teachers in this school? What do they teach?
 - Which contents do you prefer to teach the most?
 - Have you faced any difficulty in teaching this content? Please explain.
 - Have you ever noticed any difference in how male and female teachers teach science contents? Please be specific for Physics, Chemistry and Biology.
- How do you prepare yourself for the class?
 - Do you use models/teaching aids? If yes, how often and why? If not, why?
 - Do you manage to keep yourself in touch with the latest interventions in science? If yes, how? Why? How does that knowledge help you? If not, why?
 - Science is advancing every day, do you think it is important to update the students with latest interventions of science in the classroom?
 - Is it possible for you to engage your students to practice the knowledge of science in everyday life? If yes, how? If not, why?
 - Does your family support you in this regard? If yes, how?
- While we open our science books from the National Curriculum and Textbook Board (NCTB) we get to see the images of only the male scientists. We hardly see any female scientists, what is your opinion about that?
 - Do you think it can impact students' own motivation in pursuing a career in the sciences? If yes, how? If not, why?

- Do you think, such representation of images in the textbooks can have some impact on how the students view their role models in the science? Why? How?
- Because of such representation, do you find it challenging to teach them science as a ‘woman’ teacher? Please explain.
- How do you feel about the relationship that you have between you and your students? Please explain.
 - Have you noticed any difference between male and female students in science classes? Are there any differences in terms of interest in science, achievement, respecting science teachers or performance in class/lab? Explain. What is the best way to deal with that? How do you deal with that?
 - Have you ever find your male students behaving differently towards you compared to other females? If yes, how? And how do you deal with that?
 - What do you think is the best way to deal with male and female student specifically? Do you think it’s important to treat them differently or not?
 - How do you usually respond to them?
- When you were a science student, did you enjoy learning the subject?
 - Did you find it as interesting as other subjects? Why?
 - Did you chose to study science or did your parents decided for you?
 - Did you feel interested in science education? Please explain.
 - Have you found any difference in the achievement level and behavioral between male and female students in science while you were a student? Explain.
 - From your secondary level to tertiary level, did you find the same number of girls as boys in a science class? Or who were the majority students in the class? How did you experience that (both in class and laboratory)?
 - Who were your science teachers at the different educational levels? Tell me something about your interaction with them. Who is your ideal science teacher? Explain.
 - How did your family support you to pursue your career in science? Was that challenging in your community? If yes, how? How did you deal with that? If not, what was the role of your community (neighbors/relatives)?
 - Did you find it challenging to grow up as a science student? Do you think your student life could be much different (interesting/easier) if you took another stream like commerce or humanities? If yes, in what way?
 - Did majority of your classmates from science pursue their career in the same subject? Were majority boys or girls? What do you think about that?
- Have you ever heard about any stereotypical notion that either boys or either girls are more suitable in science than other? How do you perceive that? How do you deal with that?

- Now let's talk about the environment of your school outside the classroom.
 - Who usually supervise you in the school? What is your experience of that?
 - Are you satisfied with your salary, the infrastructural facilities? Do you think it can vary between male and female teachers? How? Why?
 - What types of extra workload do you have outside the classroom teaching? Do you have any difficulty doing those chores?
 - Do you think as a teacher of a technical subject (science) that you have to allocate more time and effort than other teachers (teachers who are teaching different subjects) to make this subject easier for your students? Do you think all the teachers in the school have the same workload for their respective subjects?
 - Do you find that all the teachers are comfortable doing all types of work? More specifically, do you notice any difference between your male and female colleagues when it comes to particular tasks? If yes, please give some examples.
 - What types of relationship do you maintain among your co-workers? Who are most supportive? Have you ever been 'controlled' by your co-workers in the school? If yes, from whom?
 - Do you participate in decision-making body of your school? If yes, please explain your role here.
- Have you ever felt, your life as a science teacher could have been different if you were a man? If yes, how different?
- Tell me something about your experiences in during training. Were you comfortable in the environment? Who were the trainers? Who were in the majority – female or male trainees?
- Did you get sufficient opportunities to share your opinion and ask questions during the training session?
- Would you like to talk about some more about the challenges that you face as a woman science teacher in your school environment? Please tell me how you deal with that?
- Would you mind telling me something about your family members? What types of responsibilities do you have there? Tell me something about your family culture and tradition.
 - Do you find it challenging to manage both family and work? If so, how do you manage it?
 - Do you think, the male science teachers have the same challenges/workload in the home as their female counterparts? How do you view these household responsibilities effect on the performance of science teacher? Do you think it affects the ability to concentrate as a teacher? If yes, in what way? If no, what is the best way to manage that?
- How do your communities (neighbors/relatives) treat you? Are you comfortable with your living conditions? Did you ever experience anything negative from your community because you are a woman?

- What is your main priority between family and work? How do you usually like to introduce yourself? And at the end of the day, how do you view yourself as a woman?
- What do you hope to achieve in your life? And what do you hope to achieve as a science teacher?
- Finally, do you find your life challenging as a science teacher who is dealing with several responsibilities in the society?

Appendix VIII: Profiles of women science teachers interviewed

Pseudo names for the WSTs	Description
Geeta	45 years; married; from Narshingdi; total 17 years of work experience; BSc in Biology; now working as senior science teacher. (interviewed on 11 th July'15 at her home)
Mahbuba	32 years; married; from Dhaka; total 10 years of work experience; MSc in Zoology; now working as an assistant teacher. (interviewed on 12 th July'15 at her parent's home)
Shohag	25 years; unmarried; from Narshingdi; total 2 years of working experience; MSc in Physics; now working as an assistant teacher. (interviewed on 25 th July'15 at the school premise)
Monoara	50 years; married; from Dhaka; total 22 years of working experience; BSc in Biology; now working as a senior science teacher. (interviewed on 26 th July'15 at the school premise)
Rebeka	26 years; unmarried; from Dhaka; total 3 years of working experience; MSc in Zoology; now working as an assistant teacher. (interviewed on 27 th July'15 at the school premise)
Sharmin	27 years; married; from Dhaka; total 2.5 years of working experience; MSc in Chemistry; now working as an assistant teacher. (interviewed on 30 th July'15 at the school premise)
Luna	35 years; married; from Narshingdi; total 5 years of working experience; BSc in Physics; now working as an assistant teacher. (interviewed on 1 st Aug'15 at the prayer room of the school)
Hasina	39 years; married; from Dhaka; total 16 years of working experience; BSc in Biology; now working as a senior teacher but not specifically in science. (interviewed on 2 nd Aug'15 at the school premises)

Appendix IX: Map of Dhaka Division showing study Sites of Dhaka and Narshingdi



(Source of map: https://upload.wikimedia.org/wikipedia/commons/9/9d/Dhaka_Division_districts_map.png)