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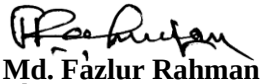
Editorial

The Primary Education Journal, the only intellectual endeavor in primary education sector, is well in the 10th year of its publication. Throughout its journey the journal has been blessed with the contribution of the educational researchers and practitioners in education from home and abroad. As was expected in the first issue, the journal has by this time become a professional forum for the practitioners in primary education. The knowledge of curriculum, methods and practices have advanced greatly through research. National Academy for Primary Education (NAPE) Mymensingh is also trying to disseminate those research efforts, findings and recommendations among those who are working in the field of education and especially in the field of primary education.

In this issue five articles appear of which one is a descriptive study that seeks to investigate the sustainability of pre-primary education program of Plan Bangladesh. The second article seeks to the barriers of re-enrollment of dropped out working children to basic education. The 3rd article seeks to explore the extent of using science process skills and the problems of practicing these skills in promoting scientific literacy in primary science classrooms of Bangladesh. The 4th article reveals the four-year B.Ed. (Honours) students' attitude towards inclusive education in Bangladesh. The 5th article attempts to find the reflection of the components of PCK on the newly formed DPEd science curriculum.

I am indebted to the honorable members of the editorial advisory board for their painstaking efforts in shaping the journal as an international one. I would also like to thank the members of editorial board for the dedication they put in this intellectual endeavor.



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Sustainability of Pre-Primary Education Program of Plan Bangladesh

*** Md. Ishtiaque Azam**
****Dr. Md. Abdul Halim**

Abstract

The purpose of this study is to investigate the sustainability ofpre-primary education program[Shishu Bikash Kendra (SBK)] of Plan Bangladesh. Qualitative method was used to examine the sustainability in this descriptive study. Data was collected from fifty respondents of ten SBK centers of Gazipur and Borguna districts. Semi-structured interview, focus group discussion and observation checklist were incorporated as a data collection strategy. Data revealed that the number of participants in the above mentioned SBKs is increasing gradually, which makes the program sustainable over the years. Along with this, community people's involvement and positive attitudes strengthen the pre-primary education program specifically SBK program effectively.

Background of the study

Early childhood is the most important phase of overall development throughout the life span Children's learning and development are influenced by the multiple factors of the environment they are surrounded by. The immediate and natural environment, in which young children develop and learn, are those of the family and community (Bray, 2000). These may be more, or less, supportive of development and the degree of support does not necessarily correspond to or depend on material well-being (James H. 1994). But even in more supportive home environment, it may not be possible to respond in the most appropriate way to all of a child's basic needs so that a child can develop his or her potential to the maximum.

Plan International has been executing center-based pre-primary programs (Shishu Bikash Kendra) in Dinajpur, Gazipur, Borguna, Lalmonirhat and Nilphamari, as well as in metropolitan Dhaka, where the country office is located since 1997 and is trying to establish a model for the country(Jahan, 2005). The objectives are to prepare children for grade one in a way that respects and encourages individual learning styles and positive attitudes towards education. Shishu Bikash Kendra (SBKs) is a home-based child development center creates opportunities for communities to cary out with three to five years old children. Plan Bangladesh works to assemble children for two hours a day in a community member's residence where a group of trained volunteer mothers perform developmental activities (Mitsue, 1999). The community offers a low-cost schoolhouse or classrooms made available by a local primary school. Activities include brain gym, learning about nature, playing, rhyming, singing, storytelling, arts and crafts, as well as writing, reading and math. (Lusk et. el., 2004). Such centers cannot be run in an effective and sustainable way until and unless the community has a feeling of ownership of the centers. How long with this program be run by Plan Bangladesh? How will the program sustain? What are the supports to run the program? For answering these questions, a study was conducted to know the sustainability of SBK of Plan Bangladesh.

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Objective of the study

The main objective of this study was to investigate the sustainability of pre-primary education program (Shishu Bikash Kendra) of Plan Bangladesh.

Questions of the study

To achieve this main objective, following research questions were addressed:

1. To what extent community members are involved in SBK?
2. What is the community perception about SBKs' future prospects?
3. What are the challenges for sustainable SBK?

Methodology of the Study

The purpose of the study was to investigate the sustainability of pre-primary education program, named Shishu Bikash Kendra (SBK) of Plan Bangladesh. The study was descriptive in nature with qualitative approach. Data and evidence were gathered from ten SBK centers of Gazipur and Borguna districts by using semi-structured interviews, focus-group discussion, center visit with note taking. One parent, one caregiver, one community leader, one donor was selected purposively from each center as a sample of the study. Thus the total respondents were fifty. The respondents were identified with the help of caregivers of SBK centers. Thematic analysis were done to find out the findings of the study.

Analysis and Findings

Participation of community members

At first there was not much enthusiasm among the community participants, but gradually they understood the good values of SBK and now they are thinking as a part of SBK more or less. The number of participants is increasing in number as the days pass by and more are joining every day. From the analysis, it is tried to present how everyone in the society perceived the importance of the SBK and they do their best to help the SBK center by stretching their hand towards it.

Ensuring access of children

According to the participants' view all the children of the related areas go to the SBK in normal circumstances. Almost all the children, who are the only one child of their parents are receiving their education from SBK currently. On the other hand, a parent who has more than one kid usually sends his children to the SBK except a few numbers and currently they are studying in different pre-schools or in level One. So SBK plays an important role in the development of the mental and physical attitude and that's why each and every child goes to the SBK center and this is an indication of SBK sustainability for the long term period.

Increasing donor activities

For the functioning of the SBK center houses are needed and they were provided by the community people themselves without any rental payment. This sacrifice is only made for their children's better future. They are doing, not by alone rather they are encouraging many other community people as well. By supporting this one of the Donor says, *"I have given my house to the SBK and I always encourage others to do the same".*

Building awareness about SBK

When SBK first started their operation in community areas people did not take them for granted, but with the passage of time the total scenario has changed radically as awareness grew among the participants. Now-a-days community people share their views and positive

motivation for the betterment of SBK. Community people are made aware of the usefulness and effectiveness of the SBK center by pursuing the true value of it.

Parents' financial contribution

From the study it is seen that there is almost no cost of the education provided in SBK. All the related materials and support needed for the center are provided by the Plan Bangladesh. The parents can willingly provide a monthly amount of Taka 10 or 20 to the Care Giver, but it is not mandatory for any case. On the other side there are many parents who can't pay a little amount of money, but the other parents fill up the gap for them. From the analysis, it shows that almost every parent contributes a sum of money in the form of remuneration to the Care Giver as much as they can to make the SBK sustainable.

Ensuring safety of children of SBK

All of the SBK centers are totally secure in the sense that these centers are placed in the house of the related community people. By supporting this one of CMC members said, *"SBK is totally home alike as there are no fearing factors for the children".* From the comment of a Community Leader, this SBK center is totally 100% safe as he mentioned in his speech as, *"SBK is 100% safe for the children".* Parents left their children to the SBK and move to their home without feeling any fear or anxiety at all.

Acceptability of SBK in community

As most of the families of this community felt that SBK is providing some serious betterment of their children and they greeted this center with lots of enthusiasm. No sort of impediment is to be faced by SBK. Rather people are helping this center as much as they can. It is seen that people are giving their homes as schooling places for SBK and this is an auspicious sign of social acceptability. Even the community leaders are coming in this place and boosting the Care Giver as well as the children and they are promising their best cooperation if needed. This is happening because people are thinking that these centers are imparting the basic education to their children what might be very costly for some of them and this make the feel of SBK as their own part of the society.

Perception of community to establish a new center

The running of SBK centers is placed in the community people's home and there is a conformity from the parents of those children that if there is any need of expansion in future then they are ready for giving their home or land property for SBK center. That is a positive indication of the social awareness that SBK created among the community people. According to a Care Giver quotation, *"If the SBK center is established in my home I would feel much better because I think that it would be an honor for me"*

The willingness of the community to run SBK

The current SBK centers are running under the support of Plan Bangladesh but this would not continue for eternity. So in that case the community members are willing to provide any support needed for continuing the SBK center. If needed, they will help with money, labor, logical support and above all community support. One Parent said that, *"Now I am giving a monthly subscription of taka 10 or 20 but if needed I will pay more than this".* One Care Giver said that, *"I won't take any money from the parents if needed to continue my teaching in case of adverse circumstances".* One Community Leader said that, *"I won't provide any financial support to the center but, I can provide all other necessary support needed for running the SBK"*

Ownership of community members of SBK

The community people understand the true value of the SBK and according to that they have given their best to support the center by any means required. Now-a-days participants think SBK as their own home and do everything to protect that home from the entire adverse situation. Sometimes the participants also presume that they have an ownership status every SBK center and for definite reason this is very much true in real sense. And this perception makes them believe that they have to participate in all the activities of SBK and send their children who can now move to the center as per age.

Supply materials

Most materials are provided by the Plan Bangladesh but sometimes it's proved to be insufficient for the ever increasing children and that's why an extra need of materials always remains on the card. In this case the extra need of the materials is provided by the parents of that community and they do it for a responsibility reason. Parents make study materials using clay or mud and then make it worthy for the children to use. If the assistance provided by the Plan Bangladesh is terminated, then the center might face the problem of shortage of supply of materials. This phenomenon also could lead to a problem of Care Giver training and remuneration program.

Cooperative approach

SBK center is localized and governed by the local people and that needs a proper care for this center. Local participants have already given their home for the accommodation to SBK center and they always pay regular visit to the center as well. Revered persons from the community come and give their advisory comment on the improvement of the SBK center. Community people also participate in bringing the children to the SBK center and taking them back from there as well. By supporting this one Donor said that, *"Sometimes I bring children by holding their hand to the SBK center and make them a safe return as well to their home".*

Perception of community about improving physical facilities of the SBK

The current SBK centers are carrying their operation in community participants' home, but this cannot go for eternity, so for that reason permanent structure for SBK center become need of time. Sometimes children have sat in a mat to learn their lessons and there was no sufficient light or fan in summer season and not to mention that some centers have no electricity to support the facilities. The floor could be made of concrete and also carpeting facilities could be enhanced to make the sitting of the children more comfortable. By supporting this one parent said, *"It would be better if there was a separate room that is spacious and ecofriendly for the children".* One Care Giver quoted as, saying "*The floor could be made of concrete for the children".* A Community Leader also mentioned as, saying *"I would like to see the floor is covered with good mattress".* Another Donor gave a statement as, saying "*In the hot summer season there is no fan or light that make the children learn through difficulty and that should be improved"*

Financial challenges

The running program can be hampered if the Plan Bangladesh stops the financial support of this center, but this is only a probability of future. So for that reason participants are now thinking of the case seriously and they are preparing for that and they would take the responsibility on their shoulders. If the numbers of the children enrolled in this center increase in the future then this will make the current financial structure in a reasonable question and the current participants have to think of it to come up with a solution.

Logistic challenges

All the education materials are provided by the Plan Bangladesh currently but if they stop this support then SBK will face the problem of running the center with necessary materials. That is a serious concern for SBK operation indeed and for that reason, the participants have to ensure the funding to buy the educational materials.

Plan Bangladesh provides training to the Care Giver for better teaching quality and that might also affect not only the funding problems but also other logistic supports provided by Plan Bangladesh. Participants think that this will cause the SBK to weaken in the future.

SBK center management

According to the participants there are no major problems in the SBK management body and they are running this center quite well but a few adjustments could be made. Although those adjustments are not that major issues to mention but participants mentioned a single problem and that is time management.

A case found in the Borguna District stated that some of the SBK centers start their operation of the afternoon session and according to some parents' statement that time schedule can be fixed in the morning time preferably. By supporting this one Parent said, *"It would be better for me to send my child at SBK in the morning"*

Increasing advertisement

Although SBK is running fine, but there remains a need of some sort of advertisement among the community people for making this center more credible and trustworthy. As found in the Gazipur there is no "signboard" in front of the SBK center but there could have one. By supporting this one Community Leader said, *"For the need of some sort of advertisement a signboard can be hanged in front of the SBK center".*

Child friendly environment (food, dress)

Children are not given food or uniform currently that can be added in the list of SBK program that would certainly encourage the children to join the program and sustain in the long run. By supporting this one Parent said, *"I would feel very happy if my children are given food by the SBK center".* Another respondent Community Leader commented, *"Uniform can be given to the children"*

Discussion

The following discussion is based on the findings and their interpretations considering the research questions of this study.

It has been seen that everyone in the community perceives the true value of the SBK but it doesn't ensure the total development as a whole. Community people are helping the center as much as they can but it needs to be very clear how it would continue to do so in the future as well. This study depicted that it would not be an exaggeration to say that community people also need some education from the society. From the findings, it seems that community people are sending their children to the SBK center willingly, but scenario can be changed when some people have negative impressions of SBK. This issue needs to be addressed more clearly and people need to be conscious enough to send children to SBK. Community people are contributing in the SBK center by various scales as participating in the building of the SBK center and keeping it safe from all threats. This is very encouraging in respect of the community people's determination and responsibilities. The only thing is needed in this respect is some sort of sustainability of this assistance.

SBK programs are functioning in various areas of the country, many of them are remote ones, and making the underdeveloped children start their education from grass root level and thus it helps to construct the brain development of those children. Children are

developing both physically and mentally. From the study it can be visible that these phenomena are not imaginary rather very true in every sense.When SBK first started their operation in village areas, many communities didn't welcome it whole heartedly, but sooner that scenario has changed as community people started understanding the effectiveness and usefulness of the SBK center. If this consciousness prevails in the long run then the total project will be fruitful.Currently Plan Bangladesh is helping the SBK center financially and logistically, but they would render the authoritative power to the local people when they feel that community people are ready to take it. In both respects this might be a chance to prove some points from the perspective or it can go totally wrong if the locals are not able to run the center. Community people pay a handful of money to the Care Giver on monthly basis, but this is not the total remuneration that the CG receives. So maybe there would be a need of self-governing and self-financing SBK center that can be provided by the community people only. At present, all the SBK centers are located in the community people house premises, but in future the center will need permanent physical structure in time ahead and that needs a lot of money and physical endeavor. It is a question as to who would make the task any way and the answer is also obvious that the community people have to come up in large number. From the study it has been seen that the community people are taking a vow to do so, but that also keeps a question mark in the total procedure.

People from all walks of life are performing the good work under a common umbrella that's showing the harmony and peace among the community people which is a very common feature in the Bangladeshi society. Concerning entities are treating the SBK center as their own and making them home like. Would it last in future as well? There is no straight cut answer to that question but that needs to be answered sooner or later. For some of the SBK centers time management is a big concern as children has to go to the center in the afternoon time, which is not convenient for the children or for the parents. Time schedule should be revised on that reason as soon as possible. Before setting up the time frame the SBK authority should consult with the community people. From the study it is very visible that most of the leading figures of the society are also performing their duties and responsibilities to the SBK center, which is a very good sign for the center as well for the community but this good work should be carried on to the future. So for that reason a strong commitment should be sought from this section of people.

Accommodation problem, hygiene problem and environmental issues should be taken into account for the betterment of the SBK and these issues can be resolved by taking proper steps by the community people. SBK centers should be spacious and well-furnished as most of them show a vulnerable right now.
As the success period is on the path this is the right time to beat the bush as per right decision making is concerned. A community committee can be formed for the maintaining the proper-functioning of the SBK centers. Participation from all sections of community people should be ensured for this. The Care Giver needs a more respectable position in the community and they should be paid some handsome money to feel motivated to do the job. If they feel that they are treated respectably then they would also give their level best to impart the best possible education to the children.

Recommendations
Based on the emerged findings of this study the following recommendations have been made to ensure the sustainability of Shishu Bikash Kendra (SBK):

- SBK centres should be spacious and well-furnished.

- The training of Caregiver should be increased for the development of her teaching qualities.
- The Caregiver needs a more respectable position in the community and they should be paid some handsome money to fell motivated to do the job.
- Time schedule should be revised as some centres as soon as possible. Before setting up the time frame the SBK authority should consult with the community people.
- Uniform and food should be provided as soon as possible by the authority.
- Parents sitting facilities should be ensured for the centres.

The materials provided by the Plan Bangladesh were not sufficient for the proportion of the children taking education in the SBK and that should be increased within a short time. It has been seen that some materials are decaying with the time going by and that should also need a replacement.

Concluding Remarks

Based on the overall discussion about collecting data and their interpretation tend to be accepted that SBK centers are now performing nationwide and creating a positive awareness among the community people. The overall scenario is now indicating the positive change in the society and this is totally because of the success of the SBK as a whole. The challenges are not trivial, but these can be mitigated easily. Participation of the community people is increasing day by day and people are not taking it as a burden, rather they are taking it as a chance to prove their worth. If the long term participation of the community people can be ensured in the future then we can expect a long term or sustainable SBK center. By running the SBK center, we can ensure 100% pre-schooling one day and that day is not far away.

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Barriers of Re-enrollment of Dropped out Working Children to Basic Education

Selina Akter*
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Abstract

The study focused on the barriers of re-enrollment of dropped out working children to basic education. Educationists and working children were taken as sample for finding familial, educational and occupational information of the working children and to examine the possibility of the re-enrollment of dropped out working children. It was found that poverty is the main barrier to dropout, completion and re-enrollment to basic education of the working children. Inadequate education facilities, low income of parents, unemployment of parents and guardians, lack of awareness of parents, lack of consciousness of the community people, non-cooperakion of employer, broken family and unmatched timing of working children are the barriers also to re-enrollment to basic education.

Introduction

Basic learning needs comprises both essential learning tools such as literacy, oral expression, numeracy and problem solving and the basic learning contents such as knowledge, skills, values and attitudes required by human beings to survive, to develop their full capacity, to live and work in dignity, to participate fully in development, to improve the quality of their lives, to make informed decision and continue learning (World Education Forum 2000). Education is the only way to arrange to educate all the people of the country and to make them into human resources. So Education for All (EFA) is to be achieved. It is important for social and economic development and make it a basic right for every child without discrimination. The entire UN member of country is responsible to ensure basic education for all the people (Mohanty, J.2002; Mustafa K.M, 2010). In this regard the Government of Bangladesh is committed to ensure basic education for all the people. Hence primary education completion for all the people is a priority of Millennium Development Goals by the year 2015. Government organization and many non-government organizations are working and taking many steps to attain the goal. But real situation is very much miserable. Net literacy rate of Bangladesh is 55%. Net Enrollment rate in primary education is 89.44% and dropout rate in primary education is 48% (Ministry of Education, 2012). It is on alarming number but it is cruel true that a large number of children drop out from basic education. Why do they drop out?

Certain economic and social factors have made this problem. In developing countries many of the children of poor parents from the countryside who have migrated to the cities to look for work and dreaming of opportunity (UNICEF, 2009). Their parents cannot provide enough food, clothes and educational materials (Chowdhury, 1999; Save the Children, 2012). So the children have to be working children instead of being school children. For

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this, most of the working children do not get a basic education. Without ensuring their education can we attain "Education for all" target? Is it possible to achieve the target? Since, there are some barriers of their re-enrollment to the basic education, it is essential to identify the barriers. Therefore the present study is to focus on the "Barriers of re-enrollment of dropped out working children to basic education in Bangladesh."

Methodology

In order to conduct this research the researcher has used both qualitative and quantitative methods because of its nature and subject matter. Related research articles, documents, journals, dissertation and books were referred for this study. 20 working children from Dhaka University campus and 15 working children were taken as a sample from each of the Bangladesh University of Engineering and Technology and Dhaka Medical College campus. Thus the total sample size was 50. 10 educationists were selected as a respondent who are working in the non formal and basic education sector to know the cause of drop out working children.

Familial, educational and occupational information of dropped out working children were collected with the help of interview schedule for re-enrollment to basic education. The Questionnaire was designed for the educationists with a view to examine the possibility of the re-enrollment of dropped out working children particularly with respect to barriers such as causes to drop out, factors involvement to work, constraints to comeback in basic education and probable ways to return to basic education. Data were collected and classified. The responses to each item of structured interview schedule were analyzed in terms of frequency of responses. The frequencies were further converted into percentage to describe the results. The data supplied by the educationists for each item were categorized on the basis of their contents into different clusters.

Result and Interpretation

Bangladesh is a country characterized by a large number young people. 45% of the country's total population are working children under 18 years (UNDP, 2007). So, many of them become working children and they are dropped out from basic education. Educationists were asked the causes of dropped out of working children from basic education, factors involved in the job market, and constraints to comeback to basic education. Their responses are given bellow:

Causes of dropped out of working children from basic education

The educationists pointed out that poverty is the main cause of drop out from basic education (pre-primary and primary education). 56% people of Bangladesh are landless (http: /www .crin.org/does/resourcestreaties / ere.37/5). So, most of the parents either work on the land of others on a contact basis or become floating labour moving from place to place. Without a stable income the children become a burden to parents and must find work, for their own survival. For this reason most of the children drop out from basic education. 20% educationists say that many parents of working children are not aware their children education. Many poor parents feel that it is better for their children to work rather than to learn or sending them to school. Most of the educationists (80%) said that, many parents of working children are illiterate and they have negligence about education. They say to their children "no need of education. We need to earn money for leading life." Educationists (30%) say that many parents of working children are necessary to change their working place due to earning money for better life or due to destroy house by floods or due to natural disaster. As a result working children are dropped out from basic education. Educationist (20%) opined that most of the working children work from 10:00

am to 8:00 pm. So they cannot attend the school. As a result, they are not interested to go to school and they cannot complete their education cycle due to non-adjustment between working time and schooling. Working children are too much interest as in income than their education. So they get involved in earning. These are the main causes of drop out of working children to basic education. Apart from these, there are many factors associated with dropout to basic education. Such as poor health or malnutrition and motivation, disagreement with the employer, lack of environmental facilities in the school.

Factors involvement appointing in Job market

All educationists opined that poverty is the main factor in the job of working children. Because it affects the inability of households to pay school fees and other costs associated with education. 30% educationists said that, parents of the working children need money for basic needs like food, cloth, residence etc. So increasing the pressure for children to work and earn money for the household in stead of spending time in education. All educationists said that broken family is one of the main factors for involving children in work. In most cases parents of working children do not like each other. Then children are faced with many problems that hamper their own survival. For this children are involved in work or job. 40% educationists opined that most of the working children attitude is to earn money at early age. They are keeping in mind through education how to earn money. It is better to earn money through physical labour. For this reason, they go for income, not for education. 50% educationists opined that lack of awareness on the part of parents of working children and the community people have the chance to invite working children for work instead of education. Educationists opined that parental abuse and abandonment lead to child labour. They have no help from their community people and no attention from society. As a result they involve in work and lose interest in education.

Constraints to comeback to basic education of the working children

Educationists (30%) opined that parents or guardians or family of the working children are not interested to complete their basic education. They prefer earning money because their need money to fulfill basic needs (food, cloths, residence). 20% educationists said that when children are engaged in work, they are often denied right to education, leisure and play. Their opinion is that, lack of self motivation of working children about their right to education. As a result, they do not come back to their basic education. Employers often prefer to employ children because they are cheaper and considered to be more compliant and obedient than adults. All educationists opined that for this reason, employers do not provide co-operation of their working children to come back in basic education and to complete basic education. All educationists opined that the parents of the most working children are unable to bear educational expenses. This is the main constraint to come back to basic education of working children. Educational expenses mean to pay school fees, tiffin and transport costs, cost of educational instruments like uniform, books, note books, pens etc.

Many working children do not have the time to go to school or to study. Because of that working hours are negatively correlated with school attendance time. All educationists said as a result, working children get stuck in low paying, low skilled jobs. All educationist pointed out that, in most cases working children do not get any help or encouragement to take education from their family, community, relatives and neighbor. All educationists said most of the working children's family do not have any person for their academic help. Academic help means to help in reading, writing and understanding their daily lesson. All educationists opined that most of the working children's grow older than existing students of a particular class. So, they shy to get their proper education with small adjustment with the existing students of a particular class. There is no school or any type of institution near

by the employing place. As a result working children do not attend the school due to distance of school. All educationists opined that most of the working children do not understand language and teacher's instruction. As a result they are not interested to read and write and alternatively engaged in work.

Working Children Responses

Information was sought from dropped out working children on the basis of familial, educational and occupational issues of the dropped out working children. Responses of working children were given below:

Familial information of working children

Working children were interviewed to know their father's occupation, mother's occupation, monthly family income, monthly family expenses, monthly family savings and educational qualifications of their fathers and Mothers.

It was found that 20%, 16% and 12% working children's fathers are farmers, rickshawala and labour respectively. It was also reveals that 6% of working children fathers are late and 12% of working children fathers has no occupation. 10% of each working children's father are small businessmen and hawkers. Data also shows that 4%, 8% and 2% working children's fathers are sweepers, cobblers and drivers respectively. This information indicates that working children fathers earn less. Hence it can be concluded that father's occupation of the working children does not favour them to continue their basic education.

It was found that 66% mothers of working children are housewife. However, 18% working children do not have any answer about their mother. Data also shows that 8% mothers of working children are laboures, about 4% garment workers and 4% are beggars. So, it can be suggested that working children mother's occupational situation is very poor. These incomes are not much supportive of their fathers' income. It can be said that parents' income is not much sufficient to support the educational expenses of the working children.

Data show that the highest income of 4% working children's family is Tk. 20,000 and the lowest income of 2% working children is Tk. 1200. Data also show that Tk 3000 to Tk 7000 earn 34% working children's family and 42% working children's father earns only Tk. 8000 to Tk.15000. It is very hard to maintain their daily life with their earnings and at a time not sufficient to fulfill the demand of basic education of their children.

Data show that 12% of working children family monthly expenses is from taka 6000 to 12000. Among 8% of working children's family expense is Tk. 15000. It is found that monthly family expense is minimum of Tk. 1200 and maximum of Tk. 15000/-. Data also show that 22% of working children did not comply with the question. So it indicates that working children's families spend their money based on income limitation. Hence it can be concluded that working children and their family maintain their life with hardship. From survey data show that 44% of working children's family monthly saving is minimum of Tk. 300 and maximum of Tk. 8000 only. About 56% working children have no monthly saving.

It was found that most (76%) of the fathers of working children are illiterate. Data also show that 10% fathers have education upto primary level and only 2% fathers have completed SSC, 2% fathers have completed grade-vi, 4% of each working children's father completed grade-vii and grade-ix. It shows that educational qualifications of fathers of working children are not satisfactory. It was found that most of the mother's (80%) of

working children are illiterate. It also reveals that 6% mother is literate who can only put their signature anyhow. The data further show that 2% mothers each have completed grade-4 and grade-8, whereas another 2% have SSC level of education. So, we can say mother's educational qualifications of working children are not satisfactory also.

Education Information of the working children

Working children were interviewed on educational aspects such as Educational status, level of class, grade dropping out, reasons behind of drop-out, backing school again, barriers of going back to school. Their responses are given in the following way:

It was found from data that working children (78%) have studied at school whereas 22% working children did never go to school. Further they said that most of the working children (70%) have completed their educational level up to grade-v. 22% working children did not complete any grade of education. Data show that most of the working children (66%) are dropped out from grad-1 to grade-v. About 24% working children did not mention that from which grade he/she dropped out. It means that they never go to school. Data also show that 10% working children are dropped out from grade-vi and grade-viii. In this regard it can be said that working children is the prime factor to achieve the target of MDG by 2015.

Data show that poverty is the main reason of drop-out of working children(34%) from school. The second main cause of drop out from school is Lack of awareness (22%) of Parents. Third main cause is corporeal punishment (12%) at school. Apart from these data also show that many reasons behind drop-out of working children from the schools such as not being interested in study (2%), inattentiveness (6%), reiterative failure (8%), earning for livelihood (10%), financial support for the family, helping father's occupation (4%), absence of joyful learning environment (2%) and no guidance either from home or from school in preparing lesson. It is revealed from data that 54% working children have possibility of going back to school whereas 46% working children do not have any possibility. 24% working children opined that they can come back to school if their employers allow them to study. About 16% working children opined that they can come back to school if they get help from their parents. 14% of them pointed out that if night school is available near working place then it may be possible to come back to basic education. working children(12%) told that they need financial assistance to get education. 10% working children said that they can return to basic education if available school near the factory. So there are many challenges to achieve the target of basic education. It can be interpreted that it is not easy in a country like Bangladesh to achieve the target education for all.

It is found from the study that there are some barriers to come back to school which is pointed out here. In this regard 22% working children told that they need money for meeting the basic needs (food, cloth etc.) of their family. About 20% working children have sharp disagreement with their employers. As a result they can not come back to basic education. 18% working children are not interested in study because they have no helping hand for supporting their study. From data it was found that 16% parents of working children are not aware about education. Parents prefer earning of money rather than education. 14% working children do not get opportunity for study. 10% working children say, we need money for their livelihood but not education. They also said that spending time in education is a long term process. It would better for them to earn money in the early stage of life.

Occupational Information of the Working Children

Working children were asked about their occupation, working hour, reasons behind involvement in occupation, monthly income and spending of money that they earned. Their responses are given in the following paragraph:

Data clearly show that working children's are categorized according to their occupations. It indicates that a number of them (22%) are engaged as canteen boys, whereas 18% of them are hawkers, 16% are garage workers and 14% are tea-stall shop workers. They are also involved in some other activities like helper (10%), labour (4%) and mechanic (6%). Working children's work minimum 5 hours and maximum 16 hours. Out of this, about 34% working children work 8 hours daily.

Data show that the main reason of involvement in occupation of working children is for financial support to their family (30%). Study is evident that 24% working children are compelled by parents to do job instead education. Data also show that 14% working children are to maintain a large family. As a result they involve in different occupations. Further data show that due to broken family (10%) and their interest of income (12%), working children involve in work. Study revealed that working children's monthly income is minimum Tk. 500 and maximum Tk 14000. 36% working children expenses their earned money to alleviate their family poverty. 36% working children spend their earning for purchasing food and cloth. 16% working children spend their earned money for maintaining accommodation and 12% for mobile phone operations.

Discussion

The constitution of Bangladesh recognizes the need for basic education as a fundamental right and providing education to all its citizens as one of the responsibilities of the state (UNDP, 2007). The responsibilities include establishing a uniform mass oriented and universal system of education, extending free and compulsory education to all children up-to certain stage to be determined by law and removing illiteracy within a determined time (Article 15 and 17 of the constitution of Bangladesh). The adult literacy rate of Bangladesh in 2000 is 49% male and 30% female. Primary education was declared compulsory in 1991. Enrollment rate in primary education is 89.44% and dropout rate in primary level is 46% in Bangladesh (World Bank, 2010). The primary school completion rate is 65% by the year 2009. What are the barriers of drop-out working children from basic education? How is it possible to re-enroll in basic education? National and International commitments and different constitutional obligation and conference such as World declaration on EFA (1990), World education forum(2000),World children Right Convention(1989) etc are given emphasis on basic education for promoting equity to all children, youth, adults, vulnerable, disadvantage children , ethnic minorities i.e. in all aspects. It is very much challenging to achieve the target of 100% literacy. This support is found from this study that there are many challenges involved in achieving the target. From findings it can be derived that poverty; illiteracy, migration, low income, ignorance of parents etc are the main barriers for achieving the basic education to all. This support is also found from 34% working children. They pointed out that they dropped out from basic education due to their familial poverty. Hence it can be decided that poverty is the key element of dropout from basic education and main barrier to re- enrollment in basic education.

The majority of the children in Bangladesh get enrolled in formal school. They want to continue their study. But the education facilities are still inadequate in Bangladesh. It was found that most of the family needs money for basic needs like food, clothes, residence etc. Parents pressure on their children to earn money. Due to continuous pressure they engage

in various types of occupation such as Canteen boy, Hawker, Garage worker, Water seller, Tea stall helping boy etc. Their monthly income is minimum Tk. 500 and maximum Tk. 14,000. They spend their earned money to eradicate family poverty like purchase of food, clothes, shelter accommodation and to operate mobile phone. This study says that most of children across Bangladesh are forced to work, often in hazardous and low – waged jobs, to help support themselves and their families. Many families depend on their children's earnings to survive because of low family incomes, unemployment of parents and guardians. This support is found from many sources of literature. So many working children cannot afford the time to attend regular schooling. From the study it was found that many working children in Bangladesh are known as homeless children. They face meal problems. Meal would assist the promotion of health. Most of the children could not have nutritional intake. Proper nutritional intake is the link between good health and access to education. Therefore unfavorable health impact is one of the causes to re-enrollment to basic education. As a result most of the children are involved in work and they oppose spending time about their education. Hence it can be concluded that if the children could get access to education then it may possible to complete their basic education. From the above discussion it is clear that inadequate education facilities, low income of parents, unemployment of parents and guardians, unmatched timing of working children are the barriers to re-enrollment to basic education.

I'll health, malnutrition and poverty, poor academic achievement, fear of punishment, poor interest of parents, illiteracy of parents, parental neglect and lack of awareness of parents about education are reasons behind dropout from schooling (Malek & Fakhrul, 2009). It was found from the educationist opinion that, a significant part of parents and their community people are not conscious about their children's education. Parents encourage the children to involve in work or job instead of education. 22% children are dropout from basic education due to lack of awareness of parents. It was also found that employers are not cooperative with working children. It seems that it is main barrier to come back in basic education of working children. Employers prefer child labor due to their sincerity, paying less amount. So, employers do not co-operate with working children to complete basic education. Educationists opine that to bear educational expenses is the main constraint to come back to basic education for working children. Educational expenses mean the cost of uniform, Tiffin, books, note book, transport etc. Most of the parents of working children are not able to bear educational expenses. From the findings it was found that most of the children in Bangladesh do not have any academic help from the family, school authority and community people. This is one of the barriers to complete their basic education. Working children pointed out that their (about 80%) parents are illiterate. Due to parents' illiteracy, working children could not complete their educational cycle1-5. This is also one of the barriers to come back to basic education. Therefore, it can be decided that lack of awareness of parents, lack of consciousness of the community people, non-cooperation of employer, discouragement are the factors to achieve basic education.

Findings and related literature show that teacher's negative enforcement, lack of faith towards education, daily workloads are the causes drop out of working children. It was found that negative enforcement like poor teaching, discrimination by teachers, absenteeism of female teacher, less toilet facilities at school, distance from school, poor job opportunities are the causes of re-enrollment of working children. This support is found from working children. They pointed out that due to corporeal punishment at school, reiterative failure to pass the examination are causes to drop out from basic education. From the study it is found that 46% working children has no possibility to go back to school again. In this connection educationist claimed that this high dropout rate (46%)

impact on high rate of child labour, wages and gender discrimination, non-availability of didactic activities and learning materials. Data also said that many working children work 8-12 hours in a day. As a result they lose interest in education. Working children opined that their employer do not encourage or give opportunity for further re-enrollment in basic education. So it is quite impossible to achieve the target of education for all without participation of working children in basic education. Hence it may be concluded that teachers' negative enforcement and daily workload are the causes to drop out of working children. In this regard, if working children get time from employer, help from parents, financial assistance, and available school near the working place then they have a chance of re-enrollment in basic education.

It is found that parents and Guardians of working children have no faith in existing education system. They think that earning money through education is a long process. So parents and Guardians are not interested to complete their children's basic education. From observation it is found that street based child workers are currently involved mainly in day labour such as shopkeeper, vendor and restaurant helper. These children are not particularly able to attend the school. It is also found that fathers of working children do not look after the children at all. Mother lives along with other children. Therefore majority of the children are deprived from basic education and they involve in various financial activities. Lack of faith in existing education, negligence of parents, faster earning money and broken family are the constraints for working children to en-roll in the basic education.

Conclusion

Education is a key factor in the development of Bangladesh. Basic education is of course an issue in all countries, including the industrialized ones. From the initial stage onwards educational contents should be designed to stimulate a love of learning and knowledge and then develop the desire and provide the opportunities for learning throughout life. Basic education should be extended, worldwide, to the 900 million illiterate adults the 130 million children not enrolled in school, and more than 100 million children who drop out prematurely from school (UNESCO 1996). In Bangladesh, according to World Bank report 2010 enrollment rate in primary education is 89.44% and completion rate is 65% by the year 2009. But majority of the enrolled students drop out due to various barriers. So success has been realized in improving (qualitative and quantity) of primary education, especially basic education. How best to improve the quality of primary education? There are no simple answers. According to the findings of the study it can be said, most of the working children are disadvantaged and enrolled in formal school or education system. But poverty is a major obstacle to regularity, dropout and completion their basic education. Most of the time students have to engage in different financial activities and are deprived of the education for the lack of family support and many socio-economic conditions which acted as a barrier. In spite of a lot of barriers it is our responsibility to ride out these and ensure proper education for the disadvantaged working children. To accomplish this, establishing a school system that is accountable and schools that focus on learning outcomes is imperative. This vast undertaking is a priority for the technical assistance and partnership projects carried out as part of international co-operation. Over all the greater involvement of the country government, NGOs and conscious citizens should be co-operative and work together. Then we will achieve millennium developments goals and target UPE 2015; ensure that all boys and girls complete primary education.

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Problems to implement science process skills in promoting scientific literacy at primary Science classrooms

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Abstract

This study aims to explore the extent of using science process skills and the problems of practicing these skills in promoting scientific literacy in primary science classrooms of Bangladesh. This study followed a mixed method research design to provide a better understanding of a research problem than either qualitative or quantitative method by itself.An observation schedule and an interview schedule were used to collect necessary information for this studyTo address the research questions, a variety of data analysis technique were used. The observation schedule data were analyzed based on Goodrum's (2005) framework. The interview data were analyzed using thematic analysis. The study has revealed that process skills are not practiced perfectly in primary science classroom in Bangladesh. However, teachers claimed that they have to face some challenges if they want to implement process skills in primary science classrooms. It is also found that the current situation of practicing science process skills is not very helpful to promote scientific literacy. As promoting science process skills in classroom, pedagogical aspects of science process skills should be included in the professional development programs.

Key Words: Science Process Skills, basic science process skills, integrated science process skills, Scientific literacy.

Introduction

Science process skills have been described as some abilities and competencies which will help students to learn science and technology (Akinbobola & Afolabi, 2010). One of the aims of science teaching is developing science process skills in classrooms (Sreedevi & Sudhir, 2011). Current science curriculum (National Curriculum and Textbook Board [NCTB], 2012) of Bangladesh places an emphasis on teaching science process skills at primary level. So, it is important to know the practice of using process skills and what are the challenges faced by the teacher in practicing these skills in classrooms of primary science classrooms of Bangladesh.

The curriculum project, Science - A Process Approach (SAPA), defines science process skills as a set of broadly transferable abilities, appropriate to many science disciplines and

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reflective of the behavior of scientists (Padilla, 1990). SAPA grouped process skills into two types-basic and integrated. The basic (simpler) process skills provide a foundation for learning the integrated (more complex) skills. Basic science process skills are observing, inferring, measuring, communicating, classifying and predicting. Integrated science process skills are controlling variables, interpreting data, formulating hypotheses, defining operationally, experimenting formulating models.

On the other hand, scientific literacy is defined as the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and make decisions about the natural world (PISA, 2006). According to Goodrum (2004), the attributes of scientifically literate people are given below:

- Scientifically literate people are interested in and understand the world about them
- Scientifically literate people are able to engage in discussion of and about science matters
- Scientifically literate people are sceptical and questioning of claims made by others
- Scientifically literate people can identify and investigate questions and draw evidence based conclusion
- Scientifically literate people can make informed decision about the environment and their health and wellbeing

Therefore the problems to use science process skills in promoting scientific literacy is very urgent for Bangladesh primary science teaching learning context.

As mentioned earlier, primary curriculum requires practicing science process skills. In Bangladeshi perspective, using science process skills has been studied at junior secondary level. However, it was also explored the level of scientific literacy of the junior secondary level students are not satisfactory (Islam, 2011). The previous study found that basic process skills are practicing to some extent whereas the integrated process skills are highly neglected at junior secondary level. This study intends to explore the practice of basic and integrated science process skills at primary level. From this study, teacher educators will be able to know about the current classroom practice and problems of science process skills at primary level and hence they will be able to take steps to reduce the problem.

Purpose and Research Questions of the Project

The purpose of the study is to explore the extent of using science process skills and the problems of practicing these skills in promoting scientific literacy in primary science classrooms of Bangladesh.

Research questions:

1. To what extent process skills are practicing in primary science classrooms?
2. What are the challenges faced by teacher and students while practicing process skills in classrooms?
3. How scientific literacy is promoting through practicing science process skills?

Theoretical framework

Now a days the term "science process skills" is commonly used. Popularized by the curriculum project, Science - A Process Approach (SAPA), these skills are defined as a set of broadly transferable abilities, appropriate to many science disciplines and reflective of the behavior of scientists. SAPA grouped process skills into two types-basic and integrated. The basic (simpler) process skills provide a foundation for learning the integrated (more complex) skills. These skills are listed and described below.

BasicScience Process Skills

1. Observing - using the senses to gather information about an object or event.

2. Classifying - grouping or ordering objects or events into categories based on properties or criteria.

3. Communicating - using words or graphic symbols to describe an action, object or event.

4. Measuring - using either standard and nonstandard measures or estimates to describe the dimensions of an object or event.

5. Inferring - making an "educated guess" about an object or event based on previously gathered data or information.

6. Predicting - stating the outcome of a future event based on a pattern of evidence.

7. Space- time relationship

Integrated Science Process Skills

1. Controlling variables - being able to identify variables that can affect an experimental outcome, keeping most constant while manipulating only the independent variable.

2. Interpreting data - organizing data and drawing conclusions from them.

3. Defining operationally - stating how to measure a variable in an experiment.
4. Formulating hypotheses - stating the expected outcome of an experiment.

5. Experimenting - being able to conduct an experiment, including asking an appropriate question, stating a hypothesis, identifying and controlling variables, operationally defining those variables, designing a "fair" experiment, conducting the experiment, and interpreting the results of the experiment.

6. Formulating models - creating a mental or physical model of a process or event.

Scientific literacy for all students

There is some agreement within the education community that the purposes of science education are inherently intended to develop scientific literacy (Goodrum, 2004). Scientific literacy involves understanding not only science knowledge, but also understanding the nature of science. Students develop an understanding of the nature of science as a key element for achieving scientific literacy. Scientific literacy includes specific types of abilities.

Goodrum, Hackling &Rennie (2001) defined some of the attributes of scientifically literate students which they saw as informing the type of learning that might be expected from the compulsory years of schooling. They suggested that a scientifically literate pupil should be interested in and understand the world about them and able to engage in discussion of and about science. Such pupils would be able to identify and investigate questions and draw evidence-based conclusions and also be sceptical and questioning of the claims made by others. Finally, scientifically literate pupils are those who make informed decisions about

the environment and their own health and wellbeing. Therefore, scientific literacy implies that a person can identify scientific issues underlying national and local situations and influences and express positions that are scientifically and technologically informed.

Teaching for Scientific Literacy

The following are items where science needs to emphasize more to develop student's scientific literacy (Goodrum, 2004).

Table: Criteria for teaching scientific literacy

Item No	Items
1	Science being interesting for all students
2	Studying a few fundamental concepts
3	Contents that are meaningful to the student's experience and interest
4	Guiding students in active and extended student inquiry
5	Providing opportunities for scientific discussion among students
6	Groups working cooperatively to investigate problems or issues
7	Open-ended activities that investigate relevant science questions
8	Learning broader concepts that can be applied in new situations
9	Learning science actively by seeking understanding from multiple sources of information, including books, internet, media, reports, discussion and hands-on investigations
10	Assessing learning outcomes that are most valued
11	Assessing understanding and its' application to new situations, and skills of investigation, data analysis and communication
12	Ongoing assessment of work and the provision of feedback that assists learning

Methodology

The research design of this project centered on three research questions of this project. The first research question identified the extent at which teachers are practicing process skills in primary science classrooms. The second research question focused on the challenges faced by teacher and students while practicing these process skills in their classrooms. The third research question how scientific literacy is promoting through practicing science process skills. The first research question demanded quantitative data while second and third research question naturally demanded qualitative data. To explore the trend of practicing science process skills, this study followed quantitative approach as this approach helps to describe a trend (Creswell, 2008). According to Creswell (2008), qualitative method is used for research when a detailed understanding of a central phenomenon is required. This study requires detailed understanding of teachers view about practicing science process skills. Therefore, qualitative method is used to explore teachers view about practicing science process skills. The study therefore followed a mixed method research design to provide a better understanding to a research problem than either qualitative or quantitative method by itself (Creswell & Plano Clark, 2011, cited in Creswell, 2012).

The participant schools and teachers were selected from Dhaka and Gazipur according to convenience sampling. According to Johnson and Christensen (2004), convenience sampling is used when the study include people in their sample who are available or can be easily recruited and are willing to participate in the research study. The participant teachers

of this project were ten primary teachers from ten different schools who teach primary science. To explore the issues within research questions, two (2) science classroom teaching each teacher were observed to get more reliable data. Then a follow-up interview of the respective teacher was conducted.

An observation schedule and an interview schedule were used to collect necessary information for this project. A structured observation schedule was prepared to stay on the focus of this study as observation schedule helps us to stay on the focus (Bell, 2005).To what extent teachers are using science process skills in primary level and teachers' trends of teaching towards promoting scientific literacy is intended to address by this observation schedule. Then a follow-up interview was conducted to explore teachers' views about using science process skills in classroom as interview is suited to explore in-depth views of participants (Creswell, 2008).

To address the research questions, a variety of data analysis technique were used. The observation schedule data were analyzed based on Goodrum's (2005) framework. The data will give the mean value for each item that contributes to the attributes of scientific literacy. The interview data were transcribed and analyzed using thematic analysis. In some cases, codes were assigned by numbers and the number of times codes appeared will be developed as numeric data from responses for each category. Finally data transformation procedure was followed to quantify all qualitative data.

Results and discussion

Results of the analyzed data and discussion of the results are presented below in relation to the research questions and reviewed literature.

Practicing process skill in primary science classrooms

Table: Practicing Science Process Skills in Classroom

SL	Items	No Emphasis	Less Emphasis	Moderate Emphasis	Adequate Emphasis	Mean
1	Involving students in teaching-learning activity	6	9	5	0	1.95
2	Make student curious	7	7	6	0	1.95
3	Ask question	2	4	9	5	2.85
4	Make Students able to observe	13	5	2	0	1.45
5	Following teacher's instruction in observation, data collection, data entry and explanation.	18	1	1	0	1.15
6	Create research problem, planning to conduct research and completing the experiment	20	0	0	0	1
7	Acquiring skills of observation, data collection, data entry and explaining	18	1	1	0	1.15

The situation of practicing basic science process skills in the observed twenty classes is presented in the above table. From this table, it is evident that teachers did not emphasize in involving students in teaching learning activities in 6 classes. Whereas teachers gave less emphasis in 9 classes each and moderately emphasized 5 classes to involve students in teaching learning activity. Teacher did provide adequate emphasis in any class for involving students in teaching learning activities. Similarly, we found that only for asking questions teaching gave more or less emphasis in their classes. But teachers did not put adequate effort to make students curious or giving students' any opportunity to observe. All the teachers said in their interview that they asked questions throughout the class. Maximum teachers admitted that they used topic related questions. Some of the teachers claimed that they used questions to provoke students thinking.

The situation of practicing integrated process skills is even poor. Not in a single class, teachers gave students the opportunity to create research problem, planning to conduct research and completing the experiment. Students did not get enough opportunity to collect data, edit, analyze or explaining data. Hence data collecting and analyzing skills were not cherished in these classes. In teachers' interview most of them accepted the fact that they did not give students the opportunity to collect data, analyze or writing report. However one teacher claimed that he gave students the opportunity by asking students' underline necessary information in textbook. The mean value of the situation of practicing science process skills is presented in the following figure.

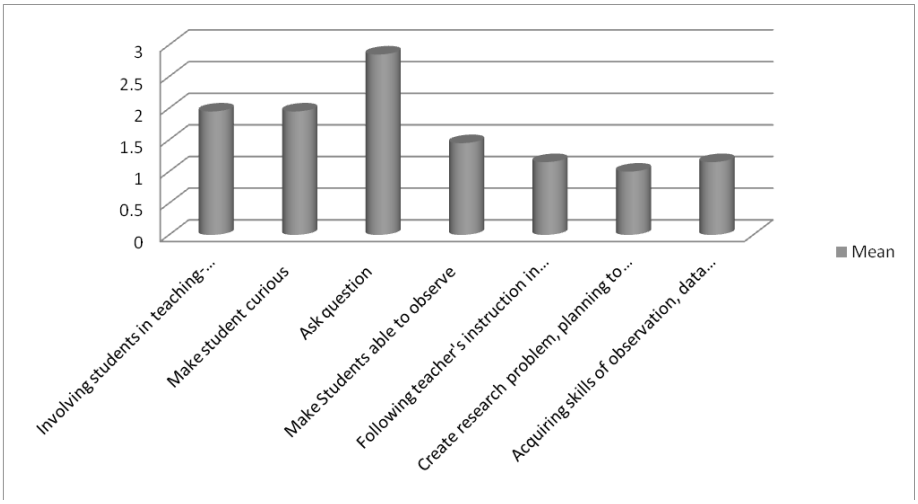

Figure: Teaching for Process Skills (Mean Values)

Current science curriculum (National Curriculum and Textbook Board [NCTB], 2012) put an importance on practicing process skills in classrooms. If we want science process skills should be practiced in primary classrooms, teachers who teach primary science need to be more focused on practicing basic science process skills. Moreover, teachers' need to learn more about science process skills. Therefore teachers' education program should put more emphasis on this issue.

Challenges faced in practicing process skills

Nine out of ten teachers claimed in their interview that they have to face some challenges if they practice science process skills in classroom. The challenges mentioned by teachers are presented in the following table.

Table: Challenges faced by teachers

Challenges faced by teachers	Frequency
Time constraint	4
Number of students	6
No opportunity of practical work at primary level	1
Syllabus load	1
Different family Background of students	1
Lack of information technology	1
Student's interruption	1
Inattentive students	1
Different understanding levels of students	1

Most of the teachers think number of students is the biggest challenge in practicing science process skills. Some teachers pointed out class time is not enough for practicing process skills successfully. They think science class should be fifty minutes to one hour. They also mention some challenges such as students' interruption or inattentiveness hinders practicing process skill. However these challenges can be overcome by practicing process skills in classroom. Because if students observe, measure, classify etc. in classroom, they have to give their whole attention in learning and thus they will not interrupt in other things. Therefore we can say teachers are not well acquainted with the benefits of practicing process skills. However, educators should think about teachers' suggestion about science classroom duration.

Promoting scientific literacy through practicing science process skills

Table: Teaching for scientific literacy

SL	Items	No Emphasis	Less Emphasis	Moderate Emphasis	Adequate Emphasis	Mean
1	Science being interesting for all students	9	5	5	1	2.15
2	Studying a few fundamental concepts	3	3	12	2	2.65
3	Contents that are meaningful to the student's experience and interest	8	2	5	5	2.1
4	Guiding students to active and extended inquiry	17	2	1	0	1.2
5	Providing opportunities for	15	5	0	0	1.25

	scientific discussions among students					
6	Groups working cooperatively to investigate problems or issues	16	1	2	1	1.4
7	Open-ended activities that investigate relevant science questions	15	4	1	0	1.3
8	Learning broader concepts that can be applied in new situations	15	2	2	1	1.45
9	Learning science actively by seeking understanding from multiple sources of information, including books, internet, media, reports, discussion and hands-on investigations	16	3	1	0	1.25
10	Assessing learning outcomes that are most valued	6	6	4	4	2.3
11	Assessing understanding and its' application to new situations, and skills of investigation, data analysis and communications	17	2	1	0	1.2
12	On-going assessment of work and the provision of feedback that assist learning	5	8	4	3	2.25

It is evident from the first item of the above table that teachers did not emphasis in making science interesting for all students in 9 classes among twenty classes. Whereas teachers gave less and moderate emphasis in 5 classes each. Teachers provided adequate emphasis in only one class for making science interesting for all students. Similarly we found that teachers put some effort in assessing students in the classroom. However, most of the time they assess students in asking short questions. Moreover the situation of providing students the opportunities for scientific discussions, working in groups, learning science by active investigation was not ensured. Therefore it is found that the situation of promoting scientific literacy is very poor in those classes where science process skills were not practiced.

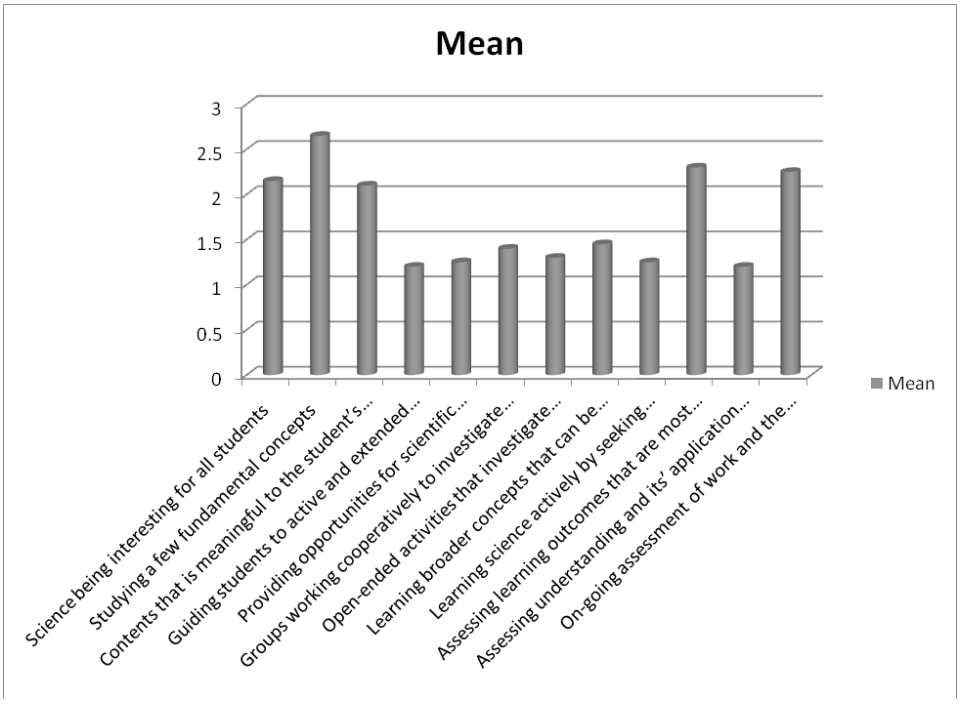

Figure: Teaching for Scientific Literacy (Mean Value)

It is found from above figure (using the mean value of the right column) that only one characteristic of teaching for scientific literacy, studying a few fundamental concepts is moderately emphasized by most of the science teachers of this study. Majority of the teachers have given less emphasis on making science interesting for all, making contents meaningful to students' experience, assessing most valued learning outcomes and doing on-going assessment. Other characteristics of teaching for scientific literacy are not emphasized in most of the classes.

It is essential for learning science actively by seeking understanding from multiple sources of information, including books, internet, media, reports, discussion and hands-on investigations. It is found from both interview and observation that most of the teachers place no emphasis on learning science actively by seeking understanding from multiple sources whereas few of them emphasize this issue lese. Teachers who teach primary science may need to consider using more sources for better understanding of the content for their students. Moreover they should conduct more group work in science classroom.

Conclusion and Implications

It is found from this study that process skills are not practiced perfectly in primary science classroom in Bangladesh. However, Teachers claimed that they have to face some challenges if they want to implement process skills in primary science classrooms. It is also found that the current situation of practicing science process skills is not very helpful to promote scientific literacy. The implication of these findings and related recommendations are presented below.

Implications for policy makers: As discussed earlier, process skills are not being practiced though primary curriculum suggested to practice process skills. Therefore from this study, policy makers will be able to understand current practice and challenges of science process skills. Hence they will be able to take necessary initiatives for proper implementation of process skills.

Implication for professional learning: It is found from data analysis that teachers have a lack of pedagogical knowledge related to science process skills. For proper implementation of science process skills in classroom, pedagogical aspects of science process skills should be included in the professional development programs. Teacher educators will be informed by the findings of the study about teachers' incomplete understanding science process skills and thus, they will be able to identify the area of teacher training that needs to be improved.

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Four-year B.Ed. (Honours) Students' Attitude towards Inclusive Education in Bangladesh

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ABSTRACT

This study reveals the four-year B.Ed. (Honours) students' attitude towards inclusive education in Bangladesh. It also reports their preparedness for inclusive settings and challenges they faced in the preparation for inclusive education and some strategies to overcome the challenges. A two-phase mixed method study was conducted. In phase one, data were gathered from three selected institutes where four years B.Ed. (Honours) is offered. A demographic questionnaire and SACIE-R scale were used in this phase. In this survey 225 participants participated voluntarily. All the quantitative data were analyzed using descriptive analysis process. Multiple regression analysis was also done to see the effect of demographic variables on SACIE –R scale. It was found that knowledge about local legislation and confidence about teaching students with disability had a significant relationship with participants' attitude. After analyzing descriptive data, there rose some issues which need further clarification so an FGD was conducted in phase two. Among participants, 6 students participated in this FGD. Data collected from FGD was analyzed thematically. Interpreting all the data there revealed some challenges and their strategies to overcome those challenges. The implication of the study could be addressed in several areas that include: making B.Ed. (Honours) program more inclusive, revise the curriculum of teacher education program and reform the policy for making the education system responsive to inclusion movements.

Keywords: Student teachers, pre-service teachers; attitudes; inclusive education; Bangladesh

Introduction

Inclusive education (IE) has been given the highest priority as the equal right to education for all people irrespective of their diverse circumstances–declared in the UNESCO's Salamanca Declaration (UNESCO, 1994). There are many countries like Bangladesh which are moving towards inclusive education. For this purpose, Bangladesh has signed in many international declarations like Education For All- EFA 1990 (UNESCO, 1990), Salamanca Framework of Action (UNESCO, 1994), Dakar Framework for Action (UNESCO, 2000),the Convention on the Rights of Persons with Disabilities (UN, 2008) and SDG4 (UN, 2015). Bangladesh has also gone through a number of policy reforms like many developed countries to promote Inclusive education.

Bangladesh made primary education compulsory for all children by legislating the Compulsory Primary Education Act 1990 (Ministry of Primary and Mass Education [MOPME], 1990). Moreover, Bangladesh enacted the Bangladesh Persons with Disabilities Welfare Act (Ministry of Social Welfare [MSW], 2001) in 2001. The act stressed the need

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to educate children with disabilities either in mainstream or special schools. (National Plan of Action Phase II 2003-2015 (MoPME, 2003). More recently, Education Policy 2010 recognized IE as a viable strategy to ensure education for all citizens (Ministry of Education [MOE], 2010). The overall goals and objectives (Objective Number 10) section of the Pre-primary and Primary Education Section of the National Education Policy 2010 further emphasized, "Equal opportunities have to be ensured for all kinds of disabled and underprivileged children" (MOE, 2010, p. 12). National Child Policy 2011 (MoWCA, 2011), Persons with Disabilities Rights and Protection Act 2013 (MSW, 20130, Proposed Draft Education Act 2013 (MoE, 2013) - these are some polices which Bangladesh has taken to promote inclusive education. There are some major intervention programs which are also taken by the government of Bangladesh for inclusive education: Second Primary Education Development Program [PEDP II] 2003-2010 (DPE, 2005), Third Primary Education Development Program [PEDP III] 2011-2015 (DPE, 2011) and Teaching Quality Improvement [TQI] project at Secondary level (TQI-SEP, 2006). Bangladesh govt. is committed to promoting inclusive education for ensuring education for all learners.UGC has already sent an office order/circular to all universities in Bangladesh to include IE in their regular programs.. It is important to know how trainee teachers are being prepared for the inclusive classrooms.

A working definition of IE has been adopted in a consultative workshop on IE in Bangladesh, 2001. The workshop was organized by UNESCO Dhaka with different stakeholders. It was defined as:

Inclusive Education is an approach to improve the education system by limiting and removing barriers to learning and acknowledging individual children's needs and potential. The goal of this approach is to make a significant impact on the educational opportunities of those: who attend school but who for different reasons do not achieve adequately and those who are not attending school but who could attend if families, communities, schools and education systems were more responsive to their requirements (Ahuja&Ibrahim,2006, p.6).

A few authors expect IE as an unpredictable conviction that has been deciphered through these last decades in an assortment of courses by distinctive educational agents (Ainscow& Cesar, 2006). Some authors imagine IE as the privilege of an education that values the wealth of every one of the students' voices that develop in particular times, spaces and societies(Cesar, 2009; Cesar, Santos, 2006). Consequently, organizations should be occupied with the change procedure of examining approaches to utilize values, attitudes and force relations, adding to the development of further social assets that are adjusted to every one of the students' necessities(D'Alessio, 2011; Slee, 2012). IE is a method for encouraging all students' cooperation as democratic citizens(Biggeri& Santi, 2012).

In this research, the researcher wants to see what attitude the four-year B.Ed. Honours student possesses in inclusive classrooms. The findings of this research may help to improve inclusive education not only in Bangladesh but also in many developing countries like Bangladesh. This study will see Four-year B.Ed. Honours students' attitude towards inclusive education in Bangladesh.

Background of the study

Bangladesh is a signatory to all the universal declarations and arrangements that address IE; it began its adventure towards IE changes by establishing the Compulsory Primary Education Act 1990 in the early 1990s. From that point forward, Bangladesh has made a decent attempt to accomplish both quantitative and subjective improvement in training.

Amid the most recent decade, it has gained huge ground in shutting the gender crevice in enrolment at both the primary and secondary levels (ADB, 2010). It has also gained ground in the essential enrollment rate, crossing the 90% mark in 2006 (DPE, 2008).

The National Education Commission report of 1997 (MoE, 1997) was the first to perceive IE as a strategy to incorporate hindered children in the instructional framework to guarantee training for all. National Education Policy of 2010 (MoE, 2010) likewise saw IE as essential, however, it took a befuddling stand some place in the middle of mainstreaming and inclusion. In its objectives and target segment, it specifies the need for incorporating in the standard instruction framework different gatherings of children: young girls, children with special needs, children from ethnic groups, and children who are distraught by financial variables. Four of its objectives and destinations address the estimations of IE:

07: Eliminate discrimination, on the grounds of nationality, religion, class and gender; buildup an environment that promotes secularism, global brotherhood, and empathy towards humanity and respect towards human rights
22: Bring all socio-economically disadvantaged children into education including street children
23: Ensure the development of the cultural and linguistic characteristics of all indigenous and ethnic groups in Bangladesh
24: Ensure the rights of all children with disabilities (MoE, 2010, p. 1–2).

It is true to say that when we are discussing Government Education, we are presumably in the period of integrating children with disabilities in mainstream schools as education for other marginal groups are yet to be contemplated. In Bangladesh, the Ministry of Primary and Mass Education in its Primary Education Development Programme(PEDP) II had incorporated a segment of comprehensive training for children with disabilities since 2004. Toward The end of the year 2005, Ministry of Primary and Mass Education distributed a circular to every single Primary School for enrolling children with mild degrees of disabilities. To accomplish the EFA target in PEDP3, it is expressed that inclusive primary education will empower elementary school-age children to finish great quality essential schooling. The entrance bit will concentrate on coming to the unreachable, especially disabled, working children, children in troublesome circumstances, and children fitting in with ethnic minorities or living in remote territories. Tribal children are urged to learn in their mother tongue.

On the off chance that we distinctly experience the record of PEDP3, we would see that there are more other minimized gatherings like sex laborers children, children of Dalit group, children of the Urdu talking group, tyke local specialists are imperceptible here and to some degree disregarded. For instance, it is evaluated that 100,000 individuals are included in sex work (Sabet & Sate, 2012) while more than 20,000 kids were conceived and are living in the 18 enrolled red-light territories of Bangladesh. The result demonstrates that children of sex specialists' have a constrained access to formal education (Alam & Ballestr, 2013); the individuals who infrequently persuade opportunity to be conceded by meandering tremendous embarrassment from each circle of the affirmation and lesson learning procedure, are additionally wound up as dropout after a brief period of time. A gigantic lack of awareness and hesitance is likewise found from the education provider's end (Billah & Baroi, 2012). Another case ought to be Dalit group (there are 10 sorts of Dalit group, for example, Bahera, Hajam, Muchi) and just 4% of the whole school age children of these groups are in instruction. Thus, the inquiry "do approaches address the

distinctions in ideas of 'unique needs' education and IE" - ought to be replied as it has been expressed in Policy rules on IE (UNESCO, 2009) to guarantee an informed position on IE through country's respective education policy. In this setting, we have to think what our stand in respects of IE is, are we concentrating on just the children with disabilities to include in mainstream schools or do we need consideration in a more extensive sense where social inclusion is the significant concern? According to Ainscow's (2006) definition, it can be said that we are not concentrating on the more extensive idea of inclusion instead of having limited our vision inside children with special needs and ethnic minority only.

There are countless difficulties that may affect the achievement of IE change. Various studies (Ahsan, 2013; Ahsan & Burnip, 2007; Ahsan & Mullick, 2013; Munir & Islam, 2005) have distinguished that the arrangement of pre-service teachers in Bangladesh does not satisfactorily address IE. All pre-service teacher education curriculums in Bangladesh incorporate parts of content knowledge (i. e. content information and pedagogy); professional practice (i.e. dynamic learning, intelligent practice) and expert practice (i.e. practicum). As for teaching in inclusive settings and reacting to student diversity, there is significant variety in the curriculum of pre-service programs. The pre-service teacher education curriculum, offered by the Government Primary Teachers' Training Institutes (PTIs), incorporates a one-day IE training part. In secondary pre-service teacher instruction, through the Government Teachers' Training Colleges (TTCs) IE relevant substance has been inserted over the educational program in a one-year B.Ed. program (TQI-SEP, 2006). Likewise, a few colleges offer four-year B.Ed. programs for secondary teachers which included chosen content (e.g. three one-hour classes on 'educating children with special needs').

Teachers' attitudes towards incorporating students with diverse needs are influenced by various variables. More positive attitudes are by and large found in teachers who teach lower grades; incorporate students with mellow learning issues; or who have encountered meeting and taking up with individuals with disabilities in schools and the community(Sharma, Forlin & Loreman, 2008). Teachers, by and large, have been discovered to be less eager to incorporate students with emotional and behavioral disorders(Hastings & Oakford, 2003). Female teachers have regularly been found to have more noteworthy resistance in implementing inclusive education(Ellins & Porter, 2005) and normally has higher levels of sympathy and lower levels of fear than reported by male teachers (Carroll, Forlin, & Jobling, 2003). A teacher's conduct in class is prone to be covered by their own adequacy desires and their conviction that what they do will be compelling (Palmer, 2006). Teachers with positive attitudes towards incorporation all the more promptly changes and adjust the ways they work keeping in mind the end goal to advantage students with a scope of learning needs (Sharma et al., 2008). These teachers likewise impact the attitudes of classroom peers without disabilities towards students with disabilities in a positive manner (Norwicki & Sandieson, 2002).

Recent studies outlined that teachers' attitudes toward inclusive education can be emphatically affected by components, for example, educators' sexual orientation (Ellins & Porter, 2005), severity of the students' disability (Burke & Sutherland, 2004; Cook, Cameron, & Tankersley, 2007; Jung, 2007), and sensitivity training (Jung, 2007; Pivik, McComas, & LaFamme, 2002; Rice, 2005). Along with these factors, different variables incorporated the quantity of pre-service special education courses completed (Bradshaw & Mundia, 2006; Burke & Sutherland, 2004), core subjects taught by educators (Ellins & Porter, 2005; Scruggs, Mastropieri,& McDuffie, 2007), teachers' apparent absence of

experience and information (Idol, 2006; Pivik et. al, 2002), instructors' self-confidence (Jung, 2007), accessibility of bolster administrations (Scruggs et. al., 2007), and encounters and/or guided field experiences with students who have disabilities (Burke & Sutherland, 2004; Cook, et.al., 2007; Ellins & Porter, 2005; Idol, 2006; Jung, 2007;Pivik, et.al., 2002; Rice, 2005; Scruggs et. al., 2007).

Conceptual Framework

The theory of Planned Behavior(TPB) predicts that rational considerations governs the choices and behaviors of individuals (Ajzen,1985; Ajzen,1991; Ajzen & Fishbein,2005). This theory also emphasizes that human behaviors are governed not only by personal attitudes, but also by social pressures and a sense of control Ajzen (2005) in his theory has shown that several background factors such as age, gender,social norm, surroundings etc. can influence one's behavior.

The researcher did not use this theory as the replica in her research, whereas it had only been applied to observe how the four-year B.Ed. Honours students' attitude towards inclusive education would predict their future performances in the inclusive classroom. Therefore, the whole theory was not necessary to use but only the"Attitude" part. For conducting the research, the researcher had used two-part survey method with a structured questionnaire and FGD.

Pre-service teacher's attitude

Attitudes of pre-service teachers towards inclusive education teacher attitudes are critical components that could impact the achievement of inclusion (Martinez, 2003; Sharma, Forlin, Loreman, & Earle, 2006). While positive attitudes towards executing inclusive practices in schools could decidedly influence practices of instructors, their negative attitudes are frequently reflected in a secretive and unmistakable dismissal of learners with disabilities (Avramidis & Norwich, 2002). There is a few research (Kagan, 1992; Pajares, 1992; Richardson, 1996) proposing that convictions and dispositions framed at the season of teacher education projects are troublesome, if not, difficult to change.

A few studies have examined pre-service teachers' worries about inclusive education (Loreman et al., 2005; Bradshaw & Mundia, 2006; Subban & Sharma, 2006), their availability for teaching diverse learners (Forlin et al., 1999; Engelbrecht & Forlin, 1998; Forlin, 2001), and their attitudes towards inclusive education practices (Carroll et al., 2003; Sharma et al., 2003; Loreman et al. et al., 2005; Subban & Sharma, 2005).

Demographic variables

Instructor's attitudes have been found to be emphatically impacted by variables, for example, the nature and seriousness of the disabling states of the learners, teacher training and accessibility of physical and human resource (Bradshaw & Mundia, 2006). In a late worldwide study looking at pre-service teachers' attitudes towards inclusive education, it reported that there was a critical contrast in the middle of eastern and western nations with the previous one demonstrating more worries about inclusive education while the latter showed more positive attitudes towards students with disabilities (Sharma, Forlin, Loreman, & Earle, 2006). It is clear from the international literature that attitudes play a vigorous part on teachers' ability to participate in inclusive education practices.

The greater part of the TPB variables may be impacted by the demographic variables of the individual (Ajzen 2005). In fact, as already observed, demographic variables represent a lot of fluctuation in members' behavioral goals (Armitage, Norman, &Conner 2002). The

study hence additionally analyzed the impact of different demographic variables on teachers' aims to include students with disabilities in regular classrooms; these variables were members' sexual orientation, age, educational qualifications, length of teaching experience, contact with a student with disability in the classroom, associate with a person with a disability outside the classroom, past training in IE, and past achievement in teaching students with disabilities.

Teachers' attitudes towards inclusion of children with disabilities in their classrooms may be affected by a heap of demographic variables (Avramidis, Bayliss &Burden, 2000; Chhabra, Srivastava &Srivastava, 2010; Forlin, Loreman & Sharma et al., 2009; Van Reusen, Shoho &Barker, 2001). There are mixed discoveries in connection with some of the demographic variables (Brady & Woolfson, 2008).

Age

While Sharma, Forlin and Loreman (2008) and Avissar, Reiter and Leyser (2003), Berryman (1989), Center and Ward (1987), Clough and Lindsay (1991) found that younger teachers had more positive attitudes than older teachers, Avramidis et al. (2000) reported that age was not identified with the attitudes of the educators. With respect to sexual orientation, the proof seems conflicting.

Sex

It has been recorded that female pre-service teachers are more positive towards inclusive education as opposed to their male partners. A study was directed by Forlin et al. (2009) to think about pre-service teachers' attitudes towards inclusive education in four nations: Australia, Canada, Hong Kong, and Singapore. Their study observed that in each of the four nations female pre-service teachers demonstrated more positive attitudes towards inclusive education than their male partners. This finding was upheld by Australian (Woodcock, 2008) and Israeli (Romi & Leyser, 2006) studies too. Essentially, numerous separate studies (Kuyini & Mangope, 2011; Loreman, Sharma, Forlin, & Earle, 2005; Tait & Purdie, 2000) additionally reported that female pre-service educators had more positive attitudes towards inclusive education than their male partners. Be that as it may, Haq and Mundia (2012), and Rana (2012) discovered no huge relationship between members' sexual orientation and their dispositions towards IE.

Knowledge about local law and policy of disable person

In some studies (Forlin et. al, 2009; Forlin, Chambers, 2011) it was found that participants who have knowledge about legislation have more positive attitude.These results also supported the previous studies (Forlin, Chambers, 2011; Forlin et al., 2010; Stella et al., 2007).

Confidence about teaching disabled students

Effective inclusive classrooms are reliant on confident teachers with a high sense of efficacy and positive attitudes who accept that all students can learn in the same classroom (Avramidis & Norwich, 2002; Lancaster & Bain, 2010). Research has shown that pre-service education ought to incorporate down to earth encounters in "genuine settings" teaching assorted gatherings of youngsters incorporating those with disabilities (Brownlee & Carrington, 2000; Campbell & Fyfe, 1995; C. Forlin, 2008), and emphasize teaching practices that have been shown to be powerful in inclusive settings (e.g., cooperative learning, see works by Johnson; peer tutoring; and differentiated instruction, see Carroll,

Forlin, & Jobling, 2003; Moeller & Ishii-Jordan, 1996) to feel more certain and positive about teaching children with diverse needs in their classrooms.

Besides these variables there are some more variables such as contact or interaction with disabled persons, training and education in IE,length of teaching experience,level of teachingexperience of teaching disabled students. In many studies it was found that these variables had effects on changing attitudes towards IE. In some studies (Forlin et al., 2009; Oh et al., 2010; Sharma et al., 2007;Hadjikakou &Mnasonos, 2012; Parasuram, 2006; Sharma et al., 2008)pre-service teachers additionally found that contact with persons with disabilities is a critical indicator of positive attitudes towards IE.Studies have demonstrated that there is a relationship between teachers' positive attitudes towards inclusion and particular training and education (Fulk & Hirth, 1994; Gemmell-Crosby & Hanzlik, 1994). Specialists in Australia (Woodcock, 2011), Mexico (Forlin et al., 2010)andBaker(2005) reported that primary level pre-service teachers hold more positive attitudes towards IE than their secondary level partners.Surprisingly,it was found in a research that pre-service teachers at the secondary level had more positive attitudes towards IE than their primary level counterparts(Ahsan etal., 2012).The length of teaching experience is recognized as a vital variable in forming teacher attitudes towards inclusive education (Avramidis &Kalyva, 2007).Some other investigators have reported that teaching experience was not significantly related to teachers' attitudes (Avramidis et al., 2000; Leyser, Volkan &Ilan, 1989; Rogers, 1987;Stephens &Braun, 1980).In some studies (Forlin et al., 2009; Oh et al., 2010;Sharma et al., 2007) it was seen that teachers having previous experience of teaching with children with special needs had positive attitudes towards IE.

Methodology

Nature of the study

The researcher requires exploring an in-depth attitude towards the inclusive education of four years B.Ed. (Honours) students'. The study is a mixed method study in nature. Both qualitative and quantitative method have been applied. For quantitative data, a two-part questionnaire was used. In part 1 there are some questions about demographic information of the participants and in part 2 SACIE (sentiments, attitude and concern regarding inclusive education) scale (Loreman, Earle, Sharma &Forlin, 2007) has been used to see the attitude of four-year B.Ed. (Hon's) students' towards inclusive education.Qualitative data has been collected through focus group discussion (FGD).

Purpose of the study

The purpose of the study was to find out the preparedness of the four-year B.Ed. Honours students' for inclusive classrooms by measuring their attitudes towards Inclusive education in Bangladesh.

Research Objectives

The objectives of the study was to

1. explore the status of four-year B.Ed. Honours students' attitude towards inclusive education.
2. identify relationships between demographic variables and attitudes with four-year B.Ed. Honours students' towards inclusive education.
3. identify challenges for the preparation of trainee teachers' for inclusive classrooms.
4. identify strategies to overcome the challenges for inclusive classrooms.

Sample and sampling

The purposive sampling technique has been applied to select the sample size. In purposeful sampling, the aim is to choose cases that are liable to be information rich with respect to the purpose of the study (Gall et al, 2007).The concept of purposeful sampling is utilized in mixed research. This means that the researcher has selected individuals and cited for the study because they could purposefully inform an understanding of the research problem and the central phenomenon of the study (Creswell, 2008). One reason for choosing this group was that it would predict their preparedness for inclusive settings as they would step in the real world of teaching in a few days.

Phase 1
There are three institutes where four year B.Ed. Honours course is offered. In this research, all three institutes' final year students have been selected. Survey method has been conducted with the students who had voluntarily participated.

Phase 2
Focus group discussion(FGD) has been conducted in this phase. There were 6 participants in FGD. The participants were from the selected participants' who voluntarily participated in the survey method. Two participants from each institution have been selected. The issues which have been addressed in the survey method were discussed in this part. The participants' have identified the challenges and strategies to overcome those challenges for the preparation of trainee teachers'.

Instruments
This was a two-phase study. Phase 1 was quantitative and phase 2 was qualitative.

Phase 1
In the quantitative method, data have been gathered through a two-part survey. The latest revision of the Sentiments, Attitudes, and Concerns about Inclusive Education (SACIE), a numeric scale developed by Forlin, Earle, Loreman and Sharma (2011) was employed to gather the research data. The instrument is composed of two main sections: **Section One** addresses the general demographics of each respondent, and **Section Two** consists of a 15-item questionnaire that elicits information about each participant's sentiments, attitudes and concerns regarding teaching students with disabilities. The two-part survey questionnaire was translated in Bangla language and then piloted on 1623 samples by Ahsan et al. (2012; 2013) in his study.

Part 1: Questionnaire on demographic information such as age, gender, educational qualification, experience in teaching with special needs, having inclusive/ special education-related components in the course, knowledge about local education policies and legislations, confidence level and in teaching in inclusive settings.

In the study questionnaire was applied to collect quantitative data from the final year students.The questionnaire was developed with close ended questions so that the students can express their opinion.

Part 2: Sentiments, Attitudes, Concerns regarding Inclusive Education (SACIE) scale. For this study, the Sentiments, Attitudes, Concerns regarding Inclusive Education (SACIE-R) scale (Forlin, Earle, Loreman &Sharma, 2011) has been used with four-year B.Ed. Honours

student-teacher. This scale was used in Bangladesh perspective as well by Ahsan,Sharma and Deppeler (2012).

Phase 2
Based on the analysis of phase 1 of quantitative data on the issues that may require further clarification would be addressed through FGD with the selected participants who took part in phase 1 survey. In addition, FGD was also trying to explore the challenges trainee teacher face while being prepared for the inclusive classroom and the strategies they suggest minimizing those challenges.Data analysis was thematic. After analyzing all the quantitative data, there were some issues which needed more clarification. So, an FGD was conducted among 6 participants of the three institutes.

Data collection and analysis techniques

As this is a mixed method research, so both quantitative and qualitative approach has been applied to collect the data. For quantitative data, researcher needs permission to access the site because he has to get to the site and interview people or observe them (Creswell, 2008). So the researcher has first managed a request letter from the supervisor regarding seekking the permission of the institutional heads'. Then students were sought in response to the questionnaire. Students' permission was also taken for focus group discussion. The participants were supplied the questionnaire and they reflected their opinion on the question paper. After analyzing the quantitative data, there rose some issues which need more clarification, for this reason, a focus group discussion was conducted. Two participants from each institution were invited to come to one selected institute for focus group discussion. All the data were collected by the researcher herself and in focus group discussion researcher played the moderator role.

When the researcher found any incomplete data she completed it by asking them again. Data processing makes up editing, coding, classifying and entering them for interpretation. Field notes from interviews (FGD) which were written in Bangla were translated in to English. This is because the researcher used Bangla language during the interview (FGD), as it made the respondents not to confront any barrier during the interview. From the field notes, themes were formulated which were applicable to the data collected from the interview (FGD) in accordance to the specific objectives of the study.

To analyze the gathered data, some steps have been applied. The researcher has used two types of data analysis procedures. In quantitative part- 1) Level or Nature of attitude has been analysed through using descriptive analysis (Mean, SD).Students' attitudes and data were analysed by using SPSS software. Means and Standard Deviations were calculated for the total score as well as factor scores. 2) Regression analysis has also been applied to see the relationship between attitude and background factors. In qualitative part- a general thematic analysis has been used to analyze data obtained from the interview.

Reliability of SACIE scale
The attitudes towards Inclusive Education Scale (ATIES), Interactions with People with a Disability Scale (IPD), the concerns about Inclusive Education Scale (CIES), all have moderate to high reliability (Loreman et al., 2007). This indicates that the sentiments, attitudes, and concerns about Inclusive Education Scale (SACIE), developed based on research data using a modified IPD, ATIES, CIES, also should have moderate to high internal reliability.

The SACIE scale, developed from two pilot studies with a combined size of 483 respondents from universities in Canada, Hong Kong and Australia, demonstrated high internal reliability and cross-validation with a second independent set of data consisting of 542 respondents that confirmed the three-factor substructure of the instrument (Forlin, Earle, Loreman, & Sharma, 2011). The internal reliability of the instrument as measured by Cronbach's alpha was relatively high for both the final stage of the development study (α = 0.85) and the cross-validation study (α = 0.74) as declared by the developers. The authors noted that values above an α value of 0.70 are considered high, especially given the small number of items comprising the instrument (Netemeyer, Bearden & Sharma, 2003). The two-part survey questionnaire was translated in Bangla language and then applied on large number of teachers (n=1623) from both primary and secondary levels in Bangladesh by Ahsan, Sharma and Deppeler (2012).

It was assumed that SACIE could be divided into three dimensions that the developers of the scale had named as sentiments, attitudes, and concerns. Contrary to the expectations, these assumed subscales did not have adequate alpha coefficient reliability in the samples. Reliability of the scales and sub-scales was established using Cronbach's alpha. The total scale score (*TSS*) for SACIE (*α= .589= .60*), indicates acceptable and the subscales of *Sentiments* (*α* = .391) very low, *Attitudes* (*α* = .706) acceptable, and *Concerns* (*α* = .428) low.

The items of concern sub scales were reverse coded so that scale's total high score indicates a positive attitude towards IE.The Cronbach's alpha of concern and attitude subscales of the SACIE scale for the Bangladesh sample were 0.60 and 0.63 respectively and alpha for the sentiment sub-scale was quite low in Ahsan et al. (2012) study. Therefore, in this study, the SACIE scale was used only as one-dimensional measure of the general attitude towards inclusive education.

Table 1 *Reliability of SACIE Scale*

Scale Factors	**Cronbach's Alpha**	**Interpretation (DeVellis, 2003)**
Sentiment	.39	Very low
Concern	.43	Very low
Attitude	.71	Respectable
Total scale score	.60	Minimally acceptable

DeVellis (2003) suggested that coefficients of .65 or above provide evidence of at least "minimally acceptable" internal consistency of a scale or sub-scale. As the total scale score was close to .65 so the interpretation was minimally acceptable.

Ethical consideration

Studies that involve collecting data from participants' researchers should consider protecting research participants from possible harm and how to secure privacy and confidentiality and make a plan or how to do this (Gall et al, 2007). Working with attitude is a complex task involving human psychology. Therefore, ethical issues are more important here. Ethical consideration is part of the research works and cannot be avoided Bryman (2004). Ethical issues related to social research that includes paraphrasing of documents, appropriate referencing, taking consent from participants maintaining anonymous identify required has been followed in this study.

A literature review of this study was avoided from plagiarism. For collecting data, the researcher used consent letter that was provided with the main purpose of the study. All the participants took part voluntarily in the data collection procedure. The researcher didn't select any participants who refused to take part in this study. Name of the participants was not obligatory to be written. Photocopy of the questionnaire was supplied. The researcher didn't provide own opinion and make any judgment to respondents so that it could not make any kind of reflection on respondents. The researcher personally collected all the data herself. In analyzing and reporting data, researcher didn't use participant's real name, location, institution name or any other information that could be a threat to participant's anonymity and confidentiality. No data was manipulated and so, findings came out from the actual data.

Findings

Demographic information analysis

In part 1 of the questionnaire, there were 15 questions about the demographic information of the participants. As all the participants are getting 4 years training and their highest level of education is higher secondary or equivalent so the question no. 2 & 6 are not analyzed here. All the participants' age is between 18-26 years. So, question no 4 could not be analyzed among this short range. Another question no. 9 is not analyzed because only 4 participants have a disability and all have the visual disability. Hence, it is not required to analyze. The rest of the questions are analyzed according to the participant's response.

Among the participants 12.4% (n=28) work as teachers in the primary level, 27.6% (n=62) at secondary level and 60% (n=135) have no relation to teaching and 55.6% (n=125) are male and 44.4% (n=100) are female participants among 225 participants. It was also noticed that among the participants, only 1.8% (n= 4) have a disability and 98.2% (n= 221) have no disability. A notable percentage 70% (n= 171) participants have no training about teaching disabled students, 15.6% (n= 35) participants have some training about teaching disabled students and 8.4% (n= 19) participants have sufficient (more than 40 hours) training about teaching disabled students. Of the participants majority 24% (n= 54) have no knowledge about the disabled child's local law, 31.6% (n= 71) have poor knowledge about the law, 33.3% (n= 75) have average knowledge about the law, 8.4% (n= 19) have a good knowledge about the law and 2.7% (n= 6) have very good knowledge about the disabled children's local law. Regarding confidence in teaching42.2% (n= 95) participants have average confidence, 24.4% (n=55) participants have high confidence, 14.2% (n= 32) participants have low confidence, 10.7% (n=24) participants have very low confidence and 8.4% (n= 19) participants have very high confidence about teaching disabled students.

Relation between demographic information and attitude towards IE

In this section the researcher tried to find out the relationship between demographic information and attitude towards IE. Through this analysis it was presented that how demographic variables could affect the attitude towards IE. Though all the participants' highest degree was higher secondary certificate and all were getting four-year training so these two variables have no effect in changing attitude towards IE. Besides all the participants' age range was 18-26 year which was very short,so it was difficult to find the effect between age and attitude.

From the analysis, it can be said that those who are working as teachers at secondary level has less positive attitude (M= 2.5, SD= .26) towards IE than those who are working as teachers at primary level (M= 2.62, SD= .3). Interestingly, those who have no relation with

teaching showed the most positive attitude. The male has a less positive attitude (M= 2.5, SD= .31) towards IE than female participants. (M= 2.66, SD= .255).From the analysis it can be interpreted that among the participants who have some training for teaching students with disability have a more positive attitude (M= 2.6, SD= .3) towards IE. But it is also seen that those who have sufficient (at least 40 hours) training for teaching students with disability have a less positive attitude (M= 2.6, SD= .266) towards IE.

From the analysis it can be said that knowledge about the children's with disability local law and the attitude towards IE has a positive relation. If knowledge is nil, then their attitude is also less positive (M= 2.5, SD= .23). After increasing the level of knowledge to very good, their attitude becomes more positive (M= 2.8, SD= .29). Very interestingly, those who have poor knowledge showed more positive attitude than those who have average knowledge about the children's with disability local law. The analysis indicates that attitude becomes more positive, according to the increasing level of confidence about teaching students with disability. When the confidence level was very low (M= 2.4, SD= .23) their attitude was less positive towards IE and their attitude become very positive as the level increased very high (M= 2.75, SD= .29).The analysis demonstrates that participants who have some experience about teaching students with disability have a more positive attitude (M= 2.6, SD= .31) towards IE than who don't have experience of teaching students with disability. But it is also noticed that those who have a high (more than 30 days) experience about teaching students with disability have a less positive attitude (M= 2.5, SD= .24) towards IE.

Multiple Regression analysis

Table 2*Multiple regression analysis between demographic variables and SACIE scale*

Dependent Variable	**Predictor Variables**	**Standardized Coefficient Beta**	**Standard Error**	**t value**	**Sig.**
Total scale score	Knowledge about local law	.208	.022	2.680	.008
	Confidence about teaching students with disability	.195	.020	2.633	.009

(F=2.099,p <0 .05 Adjusted R square=.056, Standard Error=.28063)

FGD analysis

After quantitative data analysis, there rose some issues which need further clarification, for this reason, an FGD was conducted among the participants. The number of participants was 6 from the three selected institutes. There were 3 female and 3 male participants in FGD. A summary of the findings of phase 1 was presented to the participants in FGD. They were asked about the **challenges** which come from the quantitative findings and the **strategies** to address those challenges. According to the participants' response there emerged 7 themes of challenges.

Challenges:

a. Teaching experience at different grade level
b. Skill
c. Teaching-learning style
d. Complexity of the subject matter
e. Attitude
f. Gender
g. Patience

a. Teaching experience in different grade level

Some participants said that teaching at primary level was quite different from the secondary level. At secondary level teacher taught only subject knowledge because they didn't like to do any other activity. Inclusive setting needed a much skilled teacher who could teach the students according to their need. From participants view it was revealed that the secondary teacher didn't have that skill and attitude to teach students according to their need.

One of the participants said:

> "In the secondary level, students are more mature than primary level. So, teachers do not have to work very hard unlike the primary teachers."(FGDP-3)

b. Skill

At primary level teacher has to teach very patiently but at the secondary level, students are grown up, so they didn't need to work so hard. In an inclusive setting, teacher had to learn many skills that how to cope with every student. Participants believed that those who were working as a teacher at the secondary level had fewer skills about teaching in inclusive settings.

One of the participants said:

> "In the inclusive education system, there are many types of students. To maintain and control this, it needs a perfect environment and skilled teacher."(FGDP-1)

c. Teaching-learning style

Participants thought that at primary level teaching, a teacher could do many other works besides subject teaching. In inclusive setting, a teacher had to modify their teaching-learning strategy according to the students need. Students were less than the secondary level according to the participants so it was easy to execute unique teaching-learning strategy. The secondary level teachers felt less interest towards IE.

One of the participants said:

> "In our education system, we mainly instruct in simple to complex form. The Education system at the primary level is simpler than secondary level. At the Secondary level, you have to understand everything in details."(FGDP-4)

d. Complexity of the subject matter

There were more subjects at secondary level than the primary level. The subjects were also more complex than the primary level. Teachers have to have more subject knowledge. In an inclusive classroom, it becomes highly difficult for a teacher to support all the students.

One of the participants said:

> "Who are working as a teacher at the secondary level they like to teach subject wise, so IE to them seems difficult. They don't want to work in the different sector."(FGDP-5)

e. Attitude

According to the participant's opinion, it was a natural matter that female has a more positive attitude towards IE than males. They also said that females have more sympathetic, caring attitude than males. For successful inclusive education teachers have to have all the qualities.

One of the participants said:

> "It should be compulsory for all to have an idea about IE. IE is very difficult work and time-consuming activity. So, male individuals feel less interest towards IE."(FGDP-5)

f. Gender

Most of the participants said that the females have a motherly attitude which was the cause they had for more positive attitude towards inclusive education than male. In inclusive setting, one has to understand the child first and for this he has to work with the child like a mother.

One participant's dialogue was:

> "Females generally seem to look motherly. They are more careful about the child. They can easily cope with any child."(FGDP-2)

g. Patience

In inclusive setting, there were different types of children and their needs were also atypical. So, one needs to be very patient to deal with these children. From participants view, it is revealed that the female had more patience than males.

Among the participants one said:

> "Female has much patience, so they are more eager to teach different types Of child"(FGDP-3).

Strategies to address the challenges

From the FGD interviewees, they suggested some strategies to address the challenges which were raised in quantitative analysis. Strategies suggested including up-to-date curriculum, Go & NGO role, social awareness, news, print, television media's role, compulsory training on disabled students teaching, course on IE for all learners and inclusion on inclusive issues.In the strategies section, there were 7 themes categorized.

a. Up-to-date curriculum

Most of the respondents noted that there needs to be up-to-date content in the curriculum about IE. Students should get a clear knowledge of IE. They also suggested that written documents on IE and related factors need to be available.

One of the participants said:

> "There needs to be more detailed information about IE". (FGDP-3)

b. GO & NGO role

For bringing any change, government & non-governmental initiatives could play a great role according to the participants. They mentioned that government & non-government agencies might take various programs to change the attitude towards IE.

One of the participants said:

> "Government & non-government agencies can arrange many campaigns, workshops & training programs".(FGDP-4)

c. Social awareness

Interviewees believed that society might be playing a crucial role in changing the attitude towards IE. They noted that in the rural area many programs could be arranged to give a definite idea of IE. They also said that the people who were giving the idea about IE they needed to have a right and a clear concept about it first.

One participant stated:

> "Those who have a clear concept about IE can be a source to change the attitude"(FGDP-5)

d. News, print, television media's role

The participants agreed that all the electronic & printing media could change the attitude through their work. People from various remote places could be able to get to know about IE. In numerous distance education programs, IE could be included if the government took the necessary steps, according to the participants.

One participant suggested:

> "Cartoons like "MINA" can be made to change the attitude"(FGDP-6)

e. Compulsory training for teaching students with disability

Some of the participants complained that training on students with disability teaching was limited and only a few students got the opportunity. Besides the theoretical knowledge if they had the training opportunity their attitude would be more positive towards IE.
One participant demanded:

> "There needs to be compulsory training for students with disability teaching for all B.Ed. (Hon's) students'."(FGDP-6)

f. Course on IE for all learners

Most of the participants believed that positive attitude towards IE would be possible if there was a compulsory course on IE for all students. One participant complained that only special education students had a course on IE. Most of the students only learned about IE through peer groups or news media.
One of the participants said:

> "Through the compulsory course on IE, every student can at least know about IE".(FGDP-5)

g. Inclusion of inclusive issues

According to one participant, inclusive issues only become most talked about topic during many disabled related day. However, to make the attitude more positive it is required to be talked continuously. In many activities, it is required to be included. So that students could have the positive idea about inclusive schooling.

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Discussion

After analyzing the mean score of the total scale it was found that students in Bangladesh have a moderately positive attitude towards inclusive education. In some researches Pre-service teachers' attitudes are found to be major factors that significantly affect the success of inclusion (Carpenter et al., 2005; Martinez, 2003; Sharma et al. 2006). The researches by Davies and Green, 2003; Gordon, 2002; Van Reusen, Shosho & Barker, 2001; Agran, Snow &Swaner, 1999, found the same that teachers are positive towards inclusive education.

Effect of two demographic variables

Knowledge about children with disabilities local law had a significant effect on the attitude of the students; it was noted in this study. As the knowledge increased the attitude became more positive. This finding supported some studies (Forlin et. al, 2009; Forlin, Chambers, 2011) it was found that participants who have knowledge about the legislation have a more positive attitude. These results also supported the previous studies (Forlin, Chambers, 2011; Forlin et al., 2010; Stella et al., 2007). But there was an interesting finding that those

who had nil knowledge had more positive attitudes than who had average knowledge. Similar study was conducted by Ahsan, Sharma and Deppeler (2012) and in their study they did not find any significance effect on changing attitude towards IE.
From the FGD findings, the participants suggested that local law has to be included in the curriculum so that everyone could know about this. Govt. and NGO could play a vital role in this section. The knowledge about this law could change the attitude of the students towards inclusive schooling.

Confidence about teaching students with disabilities also had an effect on the attitude of the students towards inclusive education in this study. There are more findings which reveal the same findings. In Bangladesh context Ahsan, Sharma and Deppeler (2012) found significant effect in their study. Research has shown that pre-service education ought to incorporate down to earth encounters in "genuine settings" teaching assorted gatherings of youngsters incorporating those with disabilities (Brownlee & Carrington, 2000; Campbell & Fyfe, 1995; C. Forlin, 2008), and emphasize teaching practices that have been shown to be powerful in inclusive settings (e.g., cooperative learning, see works by Johnson; peer tutoring; and differentiated instruction, see Carroll, Forlin, & Jobling, 2003; Moeller & Ishii-Jordan, 1996) for them to feel more certain and positive about teaching children with diverse needs in their classrooms. . It has been found previously that (e.g., Sharma et al., 2008) the teachers' dispositions towards inclusion, nonetheless, continued to remain more positive for teachers who had previously had considerable interactions with people with disabilities and who considered they were more confident about teaching students with disabilities. According to Wood cook (2011) it was reported from his study that proper inclusive settings and training courses on IE could increase the confidence level.

From the FGD findings, it was revealed that adequate training and knowledge about IE could increase the confidence level. There should be a compulsory course and training on IE. This has also been reported by other studies of Ahsan et al., (2011; 2012) in Bangladesh Context. If the students get the chance to teach disabled children in their practicum, than their confidence level would become high in the real situations.

Impacts of some other demographic variables can also be discussed in light of the international studies
Females have a more positive attitude towards inclusive education than their male counterparts; it was found in this research. This study was also supported by a few studies that female teachers have more positive attitudes than male teachers (Aksamit, Morris & Leunberger, 1987; Eichinger, Rizzo & Sirotnik, 1991; Ahsan, Sharma & Deppeler,2012), in spite of the fact that Jobe and Rust (1996) prominent that male educators have more positive attitudes, A study was directed by Forlin et al. (2009) to think about pre-service teachers' attitudes towards inclusive education in four nations: Australia, Canada, Hong Kong, and Singapore. Their study observed that in each of the four nations female pre-service teachers demonstrated more positive attitudes towards inclusive education than their male partners. This finding was upheld by the Australian (Woodcock, 2008) and Israeli (Romi & Leyser, 2006) studies too. Essentially, numerous separate studies (Kuyini & Mangope, 2011; Loreman, Sharma, Forlin, & Earle, 2005; Tait & Purdie, 2000) additionally reported that female pre-service educators had more positive attitude towards inclusive education than their male partners. In spite of the fact that Jobe and Rust (1996), prominent male educators have more positive attitude. Different researchers (e.g., Leyser, Kapperman &Keller, 1994; Parasuram, 2006) discovered no critical relationship between gender and gender attitude.

From the FGD findings, it was interpreted that to teach in an inclusive setting, one needs more patience. They suggested that females have more patience than males so they are more positive. Besides this females have a motherly attitude which is also essential for inclusive settings.

Among the participants who work as primary level teachers have a more positive attitude towards IE than secondary level, this was reported from the study. This finding was supported by specialists in Australia (Woodcock, 2011) and Mexico (Forlin et al., 2010) who reported that primary level pre-service teachers hold more positive attitude towards IE than their secondary level partners. In another study (Baker, 2005) on similar variables primary level pre-service teachers were found to be more positive. Surprisingly, it was found in research that pre-service teachers at the secondary level had more positive attitude towards IE than their primary level counterparts (Ahsan et.al. 2012). The center of teaching in secondary classrooms in showing topic and covering a lot of substance may make these teachers less slanted to concentrate on individual students and location of their unique needs (Avramidis & Norwich, 2002).

In the FGD interpretation, it was reported that teaching experience in different grade levels, skill, teaching-learning style, the complexity of the subject matter- all are the reasons why the secondary teachers have less positive attitude. For inclusive settings, teachers have to be more skilled about how to deal with different needs of the children. At the same time, he has to understand different teaching-learning styles. At secondary level, subjects are more complex than the primary level so it is quite difficult for a teacher in inclusive settings. Rest of the variables didn't show any significant effect in changing attitude towards IE.

Recommendations

Based on presented result, several issues need to be addressed in order to enhance the positive attitude towards IE. The following recommendations are among the issues that can be addressed to enhance the implementation of inclusive education practice in four years B.Ed. (Honours) program.

The teacher education curriculum should be revised and include up-to-date content of IE. Local legislation about children with disability and other information should be included. There should be one compulsory course on IE, so that students can at least have knowledge about IE. For successful inclusion students need training in IE, how to teach the person with disability, so if it is possible then all should receive the training. Policies should be to reform for making the education system responsive to inclusion movements. Initiatives need to be taken to make classroom inclusive, so that students come to the real world of teaching will feel more confident. Since the study covered Four years B.Ed. (Honours) institutes in Dhaka city only, it is important that other studies be carried out in the whole country in order to make the comparison.

Limitations of the study

The researcher put a lot of efforts to ensure the study successful. But still there were some limitations while conducting the study. The sample of the study was short, only final year students were the respondents of the study. As this study is a partial requirement of masters of education program and there is a time limit for presenting the study report. Therefore, it was quite tough to enlarge the sample size. Considering time and financial limitations, researcher collected information from 3 institutes of Dhaka city only. So, the sample is not representative of the population and hence the findings of this study could not be generalized to the whole population. For this reason, careful consideration is needed in

order to generalize the findings of this study. At the time of data collection, sufficient data could not be gathered from some sample. As the researcher was an unknown person, participants were not feeling free to say in FGD. The findings may not reveal the real scenario about the attitude towards IE of the students. If the researcher could collect the data from all students of four years B.Ed. (Honours) course all over Bangladesh, the collected data could become more representative and reliable.

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Reflection of Pedagogical Content knowledge (PCK) on DPEd Science Curriculum

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Abstract

Over the years many educators argued Pedagogical Content Knowledge (PCK) as a significant construct in the educational lexicon. In line with the development of PCK and the arguments about its significance in several literatures, this study attempted to find the reflection of the components of PCK on the newly formed DPEd science curriculum. The DPEd is an 18 month long pre-service training program for primary teachers of Bangladesh.

Magnusson, Krajcik and Borko (1999) conceptualized PCK as consisting of five components: (a) orientations toward science teaching, b) knowledge and belief about science curriculum, (c) knowledge and beliefs about students' understanding of specific science topics, (d) knowledge and beliefs about assessment in science, and (e) knowledge and beliefs about instructional strategies for teaching science. We used these components as our framework to analyze the DPEd science curriculum. This study showed that all PCK's components are reflected on DPEd curriculum to some extent. It is expected that trainee teachers will gather knowledge and skills on specific aspects which are aligned to the different components of PCK. Besides learning about science curriculum and scientific literacy, after completing this program, trainees are expected to develop skills on using appropriate lesson plan along with appropriate strategy and curricular materials in a science classroom.

Introduction

The DPEd is an 18 month long pre-service training program that provides teachers with the skills and knowledge to improve the quality of education delivery to primary level children in Bangladesh (DPED, 2011). The curriculum content of the DPEd has been upgraded from the former Certificate in Education (C-in-Ed) course. Child-centered pedagogy is emphasized in order to improve teaching quality and ensure student's engagement and participation in learning. Children's achievement of learning outcomes is also more focused in this new curriculum (DPED, 2011).

Teacher's Knowledge and beliefs about the purposes and goals for teaching science at a particular grade is very important. Considering this importance, science educators worked for more than two decades regarding what should be the domain of science teacher's knowledge.Over the years, many educators came with various models. Shulman (1986) offered a new model of hypothetical domain of teacher knowledge. He argued that the study of teacher's cognitive understanding of subject knowledge and the relationships between such understanding and the instructions teachers deliver for the students may be

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the missing program in educational research. He mentioned three types of content understanding: subject matter knowledge, curricular knowledge and pedagogical content knowledge (Shulman, 1986). Among these, Shulman described Pedagogical Content Knowledge (PCK) as "the most useful form of (content) representation, the most powerful analogies, illustrations, examples, explanations and demonstrations- in a word, the ways of representing and formulating the subject that makes it comprehensible to others" (p.4).

In 1987, PCK was listed by Shulman as one of the seven knowledge bases for teaching, removing it as a subcategory. Soon, PCK was projected as having the greatest impact in teacher's classroom actions among all the general areas of teacher knowledge (Grossman, 1990). Later on, PCK got accepted widely as a significant construct in the educational lexicon, and has been used as a major organizing construct in reviews of the literature on teacher knowledge (Borko & Putman, 1995).

Purpose and Research Questions of the Study

In line with the development of PCK and the arguments about its significance in several literatures, this study attempted to find the reflection of the components of PCK on the newly formed DPEd science curriculum in Bangladesh. To fulfill of this purpose this study was undertaken to answer following questions:

- Is the concept of PCK reflected on the organization of DPEd science curriculum?
- How are the units of the DPEd science curriculum aligned with the components of PCK?

Methodology

This study was carried out to analyze a newly developed curriculum in which we tried to investigate the reflection of PCK which are previously found significant in several literatures. We adopted an interpretive-qualitative approach (Guba & Linclon, 1994) for undertaking this study because this approach guide to investigate any central phenomenon (Creswell, 2010). The central phenomenon of this analysis was to investigate reflection of PCK on DPED Science Curriculum The methodology of this study consists of: i) a critical analysis of DPEd curriculum to find if there is any reflection of PCK on it, ii) analyzing and listing the units of DPEd curriculum aligning to the PCK components in order to examine to what extent the components are reflected on the curriculum.

Theoretical Framework

Magnusson, Krajcik and Borko (1999) argued for the importance of PCK within science education research and teacher preparation. They conceptualized PCK as a separate domain for science teaching as consisting of five components: (a) orientations toward science teaching, b) knowledge and belief about science curriculum, (c) knowledge and beliefs about students' understanding of specific science topics, (d) knowledge and beliefs about assessment in science, and (e) knowledge and beliefs about instructional strategies for teaching science. Those components are shown in Figure 1. We used these components as our framework to analyze this newly developed science curriculum for DPEd program.

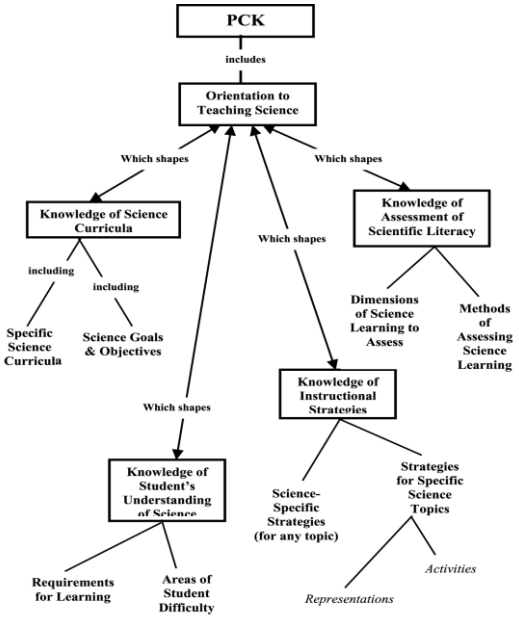

Figure 1: Components of pedagogical Content Knowledge for science teaching (Magnusson, Krajcik & Borko, 1999)

It is found from the analysis framework that PCK (Pedagogical Content Knowledge) Includes Orientation to teaching science Which shapes Knowledge of Science curricula. This includes Science goals and objectives as a core part. This course aims to build a conceptual understanding on common goals and objectives of science education among the trainees. The 1st chapter of Pedagogy part of DPEd curriculum deals with general science goals and objectives, along with a brief explanation of 'Nature of Science'. As there is a common misconception that science education aims to prepare 'scientist' or science and technology oriented professionals; this course explains the term 'Scientific literacy' which is considered as the ultimate goal of science education nowadays. The prerequisites of being a scientific literate person are discussed in this section. Also, scientific values are emphasized. Nature of science and scientific inquiry are described to give an idea of scientific process of thinking. The difference between science and pseudoscience are discussed in order to develop scientific mindset of the trainees.

The knowledge of science curricula also includes Specific Science Curricula. Primary science curriculum of Bangladesh is discussed in the 2nd unit of DPEd course material. To fulfill the purpose of science curriculum of primary level, teachers need to have a clear and extensive concept on the curriculum itself. Also they have to understand what goal they have to accomplish by this curriculum. Therefore, a broad picture of the primary science curriculum is embedded in the DPEd course. During the course, trainee teachers will come to know about the specific terminal competencies students need to attain after studying primary science curriculum. Grade-specific competencies are also discussed in this unit. To attain these competencies, appropriate contents are defined according to the expected learning outcomes. Trainee teacher will have a holistic idea on this total process and identify his/her role in this process accordingly.

The knowledge of student's understanding of science includes both requirements for learning and areas of student difficulty. Inquiry and investigation in science is discussed in 4th unit of the course material. A number of process skills required to carry on an effective scientific investigation are explained thoroughly as modern educators mostly emphasize on inquiry based learning in science education. Hands on activities make science learning more life-oriented and concrete evidence based which eventually depict this subject as more interesting and less difficult to the learners. In this chapter, different types and levels of investigation are discussed from simple to complex. That helps the trainees to facilitate even the slow learners to find their learning easier.

Chapter 6 (Modern theories of science learning) discussed the modern constructivist theories of learning. Trainee teachers learn about different learning theories in other courses of DPEd program. This chapter focuses on the use of constructivist theory on science learning specifically along with relevant examples. With respect to constructivist theories- concept change model has been discussed in this chapter. The five steps of concept change model are described and it helps the trainees to understand the justification of incorporating this model in their real classroom situation. Different strategies also are mentioned that will help them to follow the steps accordingly. As teachers need to play a number of diversified roles to apply those strategies, their role is explained in detail at the end of the chapter. When the trainees practice them in their classroom these will also help to address students' difficulty and weaknesses, since constructivist theory acknowledge students prior knowledge and synchronizes the new learning with the existing ones.

As teachers act as researchers in their own class and have to take necessary steps to solve all sorts of difficulties related to students' learning, the 3rd chapter of the course material

discusses action research in detail. Though the trainees get introduced with this kind of research in their professional studies course under the same program, it is again discussed in primary science curriculum so that they understand the use of action research in a science classroom. Relevant examples related to students' learning pattern are given. Trainees also come to know how they can improve their teaching learning procedure using action research.

The knowledge of instructional strategies includes both science specific strategies and strategies for specific science topic. Using instructional materials is included in pedagogical content knowledge since using the different instructional materials appropriately and effectively is very important to carry on the classroom teaching learning successfully and add value in it. In 5th unit trainee teachers are introduced with various types of instructional materials. Different local and global resources are mentioned in discussion. Using recycled and low cost materials has been appreciated so that teachers get inspired to prepare innovative and effective materials using available resources. A number of examples are given that they can apply in their real classroom. Besides, they will also be informed about available online resource.

Since it is essential to know about the modern learning theories to determine appropriate learning strategies in specific science class modern constructivist theory of learning is discussed in the 6th unit. As has been discussed earlier, concept change model has been introduced in this unit so that trainees can play their required role effectively in their own science classroom.

At the 7th unit of the DPEd Primary Science course material, teachers will be introduced to different teaching strategies- specifically effective for science. Many science specific teaching strategies consistent to the 'Concept Change model' are discussed in this section. 5E model and some other useful strategies like concept mapping, brainstorming, POE (Prediction-Observation-Explain) etc. are explained in detail so that trainees can determine the appropriate strategy in a particular science class. Teachers will be also trained to engage their students in group work and cooperative learning effectively.

To conduct a successful session, teachers need to have a proper planning of the full session. Unit 9 gives a guideline of preparing a lesson plan. All three parts of a session- beginning a class, active teaching learning process and concluding a session are explained in this unit. At the end of the chapter, two sample lesson plans of two different styles are given so that trainees can follow and apply in their own session for any particular science topic.

Teaching learning process mostly takes place in the classroom, but modern educators also emphasizes on learning outside the classroom along with regular classroom activities. As our primary school teachers are usually not very much familiar with these additional activities, last unit of DPEd primary science course material suggests some ideas for carrying out such activities outside the school territory. It also explains the manner of selecting an appropriate place for study tour. Trainee teachers will figure out their role to make the students get most of it and make their learning sustainable. Besides study tour or such activities outside the school, in recent times there is a huge influence of mass-media on student's learning. This unit suggests the trainee teachers to make the students learn from mass-media in a structured way.

The knowledge of assessment of scientific literacy includes both dimensions of science learning to assess and methods of assessing science learning. The 8th chapter of the course

material discusses the assessment process of science learning. Different modes of assessment regarding different respective use are explained. The interrelation among learning outcome, teaching learning process and assessment is illustrated so that the trainees can hold an integrated approach of assessment and thus interpret and use the results of assessment both for giving feedback and improvise their teaching learning procedure. A number of assessment strategies are discussed followed by relevant examples. Both formative and summative assessments are discussed along with different strategies. Besides traditional question-answer method trainees will be able to apply different sorts of assessment both in classroom and outside the classroom, like- self assessment, peer assessment, project based assessment, portfolio, observation etc.

Discussion:

According to Borko and Putnam (1996), the significance of PCK's component 'Orientation toward Teaching Science' is that these knowledge and beliefs serve as a 'conceptual map' that helps the teachers to undertake instructional decisions about issues such as daily objectives, the content of student assignments, the use of textbooks and other curricular materials, and the evaluation of student learning. This orientation consists of a number of components which are mentioned before. Analyzing DPEd science curriculum, it is clear that all these components of Pedagogical Content Knowledge have been reflected on this curriculum.

Firstly, trainee teachers will learn about the nature of science and the goals and objectives of science education and thus scientific literacy. Also they will gradually gain knowledge about the primary science curriculum currently practiced in Bangladesh. These will help them shape their knowledge of science curricula.

To address the next component 'Knowledge of Students' understanding of Science' a number of concepts are incorporated in this curriculum. Science process skills and inquiry based learning have been discussed. When discussing modern learning theories, using concept change model has been rationalized with respect to constructivist theory. Particularly focusing on solving the difficulties and managing different types of situation, one unit is dedicated to train the trainee teachers to conduct action research in their classroom.

Knowledge of instructional strategies has been found to be emphasized the most. In line with the concept change model, a number of instructional strategies have been discussed, particularly for science learning. It is expected that after completing this program, trainees will learn to develop appropriate lesson plan using appropriate strategy and curricular materials for a specific science topic. In addition, learning outside the classroom has also been focused regarding this component.

Finally, when focusing on assessing students' scientific literacy, several strategies of assessment have been discussed integrally with the science learning outcomes of different dimensions.

Conclusion

There are four basic aspects of PCK's component 'Orientation toward Teaching Science' as mentioned by Magnusson, Krajcik and Borko (1999). From the above discussion it can be said that all those components are reflected on DPEd science curriculum to some extent. It is expected that trainee teachers will gather appropriate knowledge and skills on different aspects which are aligned to the different components of PCK. Since in the literatures, PCK is stated to have the greatest impact in teacher's classroom actions among all the general

areas of teacher knowledge, we argue that the newly formed DPEd science curriculum will serve as an effective means to improve the teachers' quality and eventually classroom situation.

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