



2016

Bangladesh

Muhammad Salahuddin

University of North Dakota, muhammad.salahuddin@und.edu

Follow this and additional works at: <https://commons.und.edu/ehb-stu>

Recommended Citation

Muhammad Salahuddin. "Bangladesh" (2016). *Education, Health & Behavior Studies Student Publications*. 15.

<https://commons.und.edu/ehb-stu/15>

This Book Chapter is brought to you for free and open access by the Department of Education, Health & Behavior Studies at UND Scholarly Commons. It has been accepted for inclusion in Education, Health & Behavior Studies Student Publications by an authorized administrator of UND Scholarly Commons. For more information, please contact und.common@library.und.edu.

Bangladesh

Muhammad Salahuddin

Science Teaching in Bangladesh

Backdrop

Bangladesh is a South Asian country. Although it is only 147,547 square kilometers in size, more than 150 million people live there. Within the country, 98 percent of people identify themselves as Bengali and the rest are known as indigenous minorities. Of the 75 indigenous communities living in Bangladesh, 43 have their own language. However, Bangla is the official language of the country, and 95 percent of people use it frequently; English is considered to be the second language. Bangladesh has a per capita annual income of US\$1,190. Despite a GDP real growth rate of just over 6 percent, 69 percent of people live in poverty (Ministry of

Finance 2014).

Quality education is one of the key priority issues in Bangladesh (Government of the People's Republic of Bangladesh 2010). In 1974, only 27 percent of the population was literate, but this figure has since risen to 58 percent. The education system of Bangladesh is made up of five layers:

- Non-compulsory pre-primary education (one year);
- Primary education, five years' duration, free of charge, and compulsory for children once they reach six years of age;
- Junior secondary level, three years' duration;
- (Middle) secondary level, two years' duration and referred to simply as "secondary"; and
- Upper/higher secondary level (two years).

In 2018, primary education will be extended in length from five to eight years (Government of the People's Republic of Bangladesh 2010), thus making the basic education cycle an eight-year one. Primary education in Bangladesh currently has three major strands: Bangla-medium, English-medium, and madrasah education (*Ebtedayee*). There are 12 types of primary schools, including schools attached to high schools and schools attached to primary teacher training institutions. About two-thirds of primary schools are in the government sector. The Ministry of Primary and Mass Education and the Directorate of Primary

Education monitor the entire primary education system. At the end of their primary schooling, students take the Primary School Certificate examination, which controls the transition to secondary schooling. About 75 percent of each primary school cohort make the transition.

At present, secondary education consists of seven years of formal schooling and encompasses three major areas (tracks): general education, madrasah education, and vocational education. The general education system is covered by Bengali-medium and English-medium schools, whereas the other two areas are covered by madrasas and vocational institutions respectively. After completing the junior secondary level, students sit a public examination called the Junior School Certificate; about 84 percent of each student cohort passes it. Three tracks emerge in Grade 9: humanities, science, and business. In most cases, teachers help students choose a track that accords with their interests and previous academic achievement.

Secondary education is designed to prepare students for progress to the higher secondary stage. The examination gateway is the Secondary School Certificate, the completion rate for which is about 75 percent. The transition rate to higher secondary schooling is currently a little in excess of 50 percent (Bangladesh Bureau of Educational Information and Statistics 2013). Higher secondary education is offered by so-called intermediate colleges and by the intermediate section of colleges accredited to award Bachelor's degrees. Students enter one of three tracks (humanities, science, and business), each of which prepares

students for tertiary-level education. At the end of their higher secondary schooling, students sit the Higher Secondary Certificate examination.

School Science

During Bangladesh's colonial period (1757–1947), science education was absent from the school curriculum. However, in 1961, science education (physics, chemistry, and biology) was introduced at the secondary level, and throughout the 1960s, when Bangladesh was part of Pakistan, ongoing effort was made to include science content that would prepare students to secure good jobs and take part in higher education in Western countries. Bangladesh became an independent nation in 1971. The first post-independence education commission, established in 1972, focused on improving education. The commission's report, published in 1974, emphasized the need for science education. It stated the main aim of science as being "to expedite the overall development of society, and not merely to make a particular group of men powerful through application of knowledge derived from the unveiling of the secrets of nature" (Bangladesh Education Commission 1974, 105). The authors of the report recommended that science education should be mandatory for Grades 3 to 5 primary students and for all secondary students. They also recommended updating science syllabi, introducing new methods in science teaching, and ensuring an adequate supply of scientific instruments and books to all educational institutions.

Unfortunately, these recommendations were not implemented due to political instability. Five more policies were published in 1978, 1988, 1997, 2000, and 2003 respectively. Science education was again highly emphasized in each, but only a few of the reports' recommendations were properly implemented. More recently, and in line with Bangladesh's attempts to develop a comprehensive education policy, the country's National Education Policy 2010 (Government of the People's Republic of Bangladesh 2010) stated that the objective of science education in Bangladesh should be to prepare learners to pursue knowledge and creativity in a way that enables them to reach international standards of achievement in science.

It can certainly be said that science education is seen as an important part of schooling in Bangladesh. It is a compulsory subject for primary students and for students at the junior secondary level. At the secondary level, only students in the science track study physics, chemistry, and biology as separate subjects, while humanities and business studies students study the subject "general science." At the higher secondary level, only students in the science track study science subjects. These include physics I and II, chemistry I and II, biology I and II, and higher mathematics I and II.

Assessment for the science subjects (physics, chemistry, and biology/higher mathematics) has two major components at the secondary and higher secondary levels: a written examination and a practical examination. Physics students, for instance, can gain 75 marks of the

maximum attainable score of 100 through written questions (40 for open-ended questions and 35 for multiple-choice items) and 25 marks through the practical test. The examination is administrated by the secondary and higher secondary education boards.

*Teacher Academic and Professional Education and
Training*

The Public Service Commission (PSC) recruits higher secondary teachers for government schools while the Non-Government Teacher Registration and Certificate Agency is responsible for recruiting and deploying teachers in non-government secondary schools. Entry-level requirements for persons wanting to teach at the secondary and higher secondary levels are a minimum of a Bachelor's degree or equivalent for junior secondary and secondary education and a Master's degree for higher secondary education. Candidates holding a Bachelor of Education (BEd) with or without a Master of Education (MEd) alongside a subject degree get preference. Candidates must present degrees in which they have achieved at least a third-class pass. Although there is no preservice training for people wanting to teach at any level of the education system in Bangladesh, teachers are required to receive in-service training. Bangladesh currently has 209 training institutions. These include the following:

- Two institutes of education and research under the public universities;
- Fifty-four primary training institutes;
- One hundred and eighteen teacher training colleges;
- One technical teacher training college;
- One vocational teacher training college;
- Twenty-nine physical education colleges;
- Five higher secondary teacher training institutes; and
- One madrasah teacher training institute.

Their offerings include the Certificate in Education, Diploma in Education, Bachelor of Education, Master of Education, and Bachelor of Physical Education. They also provide subject-based training, ICT-related training, and training in assessment.

The National Academy for Educational Management (NAEM) plays a major role in providing basic training and subject-based training for newly recruited teachers at the secondary and higher secondary levels. NAEM provides foundation training (120 days' duration), an educational research methodology course (30 days) for government college teachers, a senior staff course on educational management (45 days), advanced courses on education and management (45 days), secretarial work and office management courses (14 days), and educational planning and development courses (30 days) for assistant and associate professors of government colleges. NAEM also provides educational administration and management courses, a Communicative English course for

principals of upper secondary and secondary-level institutions, and training courses on ICT for college lecturers and Ministry of Education officers. Each of these courses is three weeks in duration. NAEM furthermore conducts professional leadership training (21 days) for heads of upper secondary and secondary-level institutions. It carries out this work under the supervision of the Teaching Quality Improvement in Secondary Education Project (TQI-SEP 2007).

Continuing Professional Development

TQI-SEP plays a key role in the provision of continuing professional development (CPD) for teachers working at the secondary and upper secondary levels. The aim of the project is to further develop secondary education teachers' subject-based knowledge and skills (TQI-SEP 2007). In pursuit of this aim, TQI-SEP has formed collaborations with the University of Dhaka's institute of education and research, 14 of Bangladesh's teacher training colleges, the country's five higher secondary teacher training institutes, and its madrasah teacher training institute. It also works closely with NAEM. During the first phase of the project (2007–2011), the University of Dhaka's institute of education and research provided training known as "training of trainers" to "master trainers" at the teacher training colleges, higher secondary teacher training institutes, madrasah teacher training institute, and NAEM. The master trainers of all these organizations except NAEM then provided CPD for secondary teachers. During the current second phase of the project (2012–2017), the master

trainers are providing CPD for teachers, including biology and mathematics teachers, at the upper secondary level. Various experts and consultants have been preparing a CPD training manual for use at the upper secondary level, which at the time of writing was expected to be implemented during 2015.

The subjects for which TQI-SEP provides CPD training at the secondary level include Bangla, English, social science, physics, chemistry, biology, mathematics, and agriculture. Training encompasses 14 days (24 sessions), and the manual includes 32 lesson plans for each subject. Training seeks to instill basic understanding about basic issues such as the teaching profession, lesson planning, teaching aids, the teaching–learning process, classroom management, participatory and inclusive teaching, gender issues, classroom questioning, and techniques of assessment. After successfully completing CPD-I (subject based), teachers can take CPD-II training directed toward further improvement in the above listed areas. This training is often needed because a good number of teachers have difficulty implementing CPD-I at classroom level. TQI-SEP accordingly develops its CPD-II content with reference to CPD-I feedback and question-and-answer sessions about CPD-I. It also offers information about teaching methods and aids and provides guidance on formative assessment. Effort is made throughout these courses to enhance the quality of teaching and learning by nurturing positive attitudes and practices at the classroom level.

The CPD courses at the secondary level take place at the teacher

training colleges, the higher secondary teacher training institutes, and the madrasah teacher training institute. During the year that ran from November 2013 to November 2014, more than 2,000 biology teachers and 2,700 mathematics teachers received CPD training. Four hundred and seventy-one of the biology teachers and 237 of the mathematics teachers were female.

The government has the right to take action against teachers at the upper secondary level who infringe their conditions of employment. These infringements include examination-related issues, inferior educational performance, and absenteeism. If government or government-supported colleges contravene government standards, the government can stop their financial assistance. However, it is rare in Bangladesh for any kind of official action to be taken against college teachers.

Science Teacher Professional Associations

Within the local context, a number of professional associations support teachers' comprehensive development. These are the Bangladesh Civil Service General Education Association, Bangladesh College Teachers' Association, Bangladesh College Teachers' Association Federation, Bangladesh Teacher Association, Bangladesh College University Teachers' Association, Bangladesh Technical College Teachers' Association, and Bangladesh Jomiaytul Modarresin. Bangladesh has no science teacher associations per se.

All of these organizations have political affiliations and negotiate teachers' conditions of employment with the government. Consequently, their focus is on teachers' wages, opportunities, and facilities rather than on teachers' professional development. The Bangladesh Teacher Association, one of the largest teachers' associations in the country, works for the welfare of teachers, students, and schools. It takes action on behalf of teachers against discrimination and harassment and for teachers' legal rights. It also helps teachers by giving them appropriate advice and guidance for their retirement; its over-arching aim is to facilitate quality education through quality teachers. As part of its commitment to developing the education sector, the association has recommended decentralizing the education sector, initiating radical changes in the existing examination system, and establishing a teachers' recruitment commission and a permanent education commission.

Issues in Upper Secondary Science Teacher Quality

Teacher Supply

The main supply of teachers for the secondary level is from the universities, of which there are 86. As mentioned earlier, the Public Service Commission recruits teachers for government upper secondary schools and colleges while the Non-Government Teacher Registration and Certificate Agency mainly recruits teachers for non-government

secondary schools and colleges. Candidates must have a subject-related degree, the minimum being either a second-class (or equivalent cumulative grade-point average) three-year Bachelor's (Pass) degree, or a second-class (or equivalent) four-year Bachelor's (Honors) in a relevant subject (physics/ chemistry/ biology/ mathematics) from any recognized university. Teachers for government secondary schools and colleges are recruited through the Public Service Commission examination, which involves a multiple-choice test in the first phase, a written test (general and subject related) in the second phase, a viva examination in the third phase, and a medical test in the final phase. Candidates should be between the ages of 21 and 30 years at the time of application and must be citizens of Bangladesh. Teachers for non-government secondary schools and colleges must complete the subject-related multiple-choice test and written test administered by the Non-Government Teacher Registration and Certificate Agency. They must also undertake a viva examination at a school. Around half (49 percent) of secondary-level science teachers have Bachelor's (Pass) degrees while 43 percent have a Master's degree in their respective science subjects (Tapan, Rahman, and Ahmed 2014).

Upper secondary science teachers receive a monthly salary, house rent, medical allowance, and festival bonuses. Government college teachers are also entitled to retirement benefits (superannuation). However, most teachers at the upper secondary level are not satisfied with their job, the main sources of dissatisfaction being salary, social status, and workload. Most teachers receive less than US\$150 a month,

and many teachers' families experience financial problems. However, teachers have a relatively high social status because teaching is considered a respectable profession in Bangladesh. There are no national statistics on teacher supply, but there is no evidence of a critical shortage. However, there is a lack of qualified teachers in science, particularly in rural areas (Tapan 2010).

Professional Education and Training Issues

Although, as noted earlier, Bangladesh does not have a system of preservice teacher education and training, professional education for science teachers is gradually developing in the country. A good number of the government and private teacher training institutions provide inservice teacher training for all subject teachers, including science teachers (Bangladesh Bureau of Educational Information and Statistics 2013). In addition, secondary education and science development centers have been established within the campuses of nine teacher training colleges. Their purpose is to provide inservice training to secondary and upper secondary teachers.

About 10,000 teachers every year undertake inservice training of two to three weeks' duration in physical and biological sciences, mathematics, social science, and Bengali (Tapan 2010). Some private organizations offer short term science teacher training in various subjects. The University of Dhaka offers secondary and upper secondary school

teaching professionals a Master of Education evening course on science, mathematics, and technology in education through its institute for education and research.

Secondary school teachers nonetheless require more training in science content, practical work, teaching methods, and assessment (Rashid 2001). Upper secondary science teachers need an even greater amount of training in science education and teaching (Tapan 2010), but they do not currently have enough opportunity to pursue it. However, programs designed to address this situation should begin appearing in 2015.

Issues at the Chalkface

Most upper secondary science teachers in Bangladesh use the lecture method of teaching. They sometimes do use more participatory approaches and set peer- based and group-based work, but they rarely have sufficient motivation to conduct practical work. Science laboratories and equipment bases are inadequate throughout the country, a situation that has contributed to the rapid decline over the past few years in the number of students taking science subjects at secondary, upper secondary, and higher education levels (Ashraf 2008). The lack of facilities such as laboratories and equipment, as well as of qualified teachers, is more acute in rural areas than in urban areas (Tapan 2010).

A study conducted through the Foundation for Research in

Educational Planning and Development (Tapan et al. 2014) found that while most schools had science laboratories, specialized laboratories for the individual sciences were much less prevalent. Only 41 percent of schools had physics labs, and only 37 percent had separate laboratories for chemistry and biology. Necessary materials and equipment were found in only 53 percent of schools, a deficit that was impeding use of the laboratories. Seventy-three percent of schools were using their laboratories no more than one day each week; others no more than three times a week. Only 8 percent of the schools were using their laboratories on a regular basis.

The study also found that only 67 percent of schools were regularly using their laboratories for practical lessons, and that only a few schools (10 percent) could avail themselves of lab demonstrators; in the majority of schools (76 percent), science teachers themselves were conducting practical classes. Eight percent of rural schools had no laboratory facilities at the secondary and upper secondary levels. Practical classes were not being conducted properly due to lack of facilities and teacher motivation. Despite these shortcomings, another study (Ashraf 2008) found that 80 percent of students studying science received pass marks simply for attending the practical examination, even though the schools were supposedly conducting those examinations in accordance with ministerial guidelines.

In 2012, Dr. Satyabrata Roy, having received financial assistance from the Foundation for Research in Educational Planning and Development,

evaluated the status of practical science education at the secondary level of Bangladeshi schools (Roy 2014). He found that 31 percent of schools and 50 percent of madrasas had no laboratory while 37 percent of urban and only 7 percent of rural schools had subject-specialized laboratories. Half of the laboratories had only one door (two doors being required), and 73 percent of the laboratories did not present viable learning environments with respect to features such as a display board, graph board, gas and water supply, water basin, water tap, gas tap, smoke detectors, tool box, first aid box, and fire extinguisher. Roy also reported that 34 percent of schools and 20 percent of madrasas did not hold physics practical classes; the corresponding figures for chemistry were 40 percent and 53 percent and for biology were 60 percent and 67 percent. The majority of secondary and upper secondary schools had no lab assistants. The school principals who participated in Roy's survey said these deficits were just two of the many problems adversely affecting science teaching and learning in their schools. The additional problems included lack of technical and chemical materials, lack of skilled science teachers, practical classes not being scheduled into the class routine, pressure on teachers brought about by large class sizes and heavy timetables, lack of teacher training in conducting practical classes, low teacher motivation, inaccurate assessment of student achievement, financial corruption (i.e., teachers being bribed to give passing grades), and lack of an overall adequate budget. Finally, more than half of the schools and two-thirds of the madrasas in Roy's study had no practical assessments during semester examinations. Also, in most cases where schools did have practical

classes, these tended to be only arranged, and hurriedly so, shortly before the final examination (see also in this regard Ashraf 2008).

Continuing Professional Development Issues

As stated above, teachers obtain basic training after joining the profession. The Ministry of Education intends to introduce continuing professional development for all teachers at the upper secondary level during 2015. At present, the ministry is developing training manuals for physics, chemistry, biology, and mathematics. The content of these manuals lists and describes teachers' work and responsibilities, discusses the teaching-learning process, emphasizes the importance of lesson planning and evaluation, and focuses on classroom management. The manuals also cover teaching aids and their use in the classroom and how to develop such aids cheaply using local materials. The manuals furthermore highlight the development of yearly plans for specific subjects and provide advice on how to ensure inclusive teaching and learning-friendly environments in classrooms.

The upper secondary science manual additionally accentuates gender issues with respect to developing and ensuring participatory learning environments in the classroom. Assessment and feedback-related issues, open-ended questions, written and practical examinations, interconnected topics, and other issues are also part of the manual's content. The manual is being developed in line with Bangladesh's National Education Policy of

2010 and the country's new curricula program. University teachers, subject experts, educationists, training experts, and TQI-SEP officials are all involved in the process.

Teachers participating in the training set out in this manual will be required to set aside 24 days to complete the course. At the time of writing, training was expected to begin during the first quarter of 2015. The agencies responsible for providing this training (all working under the supervision of TQI-SEP II) include the aforementioned 14 teacher training colleges, 5 higher secondary teacher training institutes, and the madrasah teacher training institute.

Trends and Developments in Upper Secondary Science Teacher Quality

Upper secondary science education in Bangladesh has developed gradually over the last five decades. In 1961, science education was accorded a strong emphasis in the school curriculum, a development that prompted the addition of physics, chemistry, and biology as different subjects, each with theoretical and practical components. Major reforms occurred in 1983 and 1995. Today, upper secondary science students can study physics, chemistry, biology, or higher mathematics.

Since the beginning of the twenty-first century, the government has undertaken many initiatives directed toward developing science education in Bangladesh. The new education policy developed in 2010 emphasizes the modern world and competitive global market (Ahmed

and Salahuddin 2014). In 2012, a new curriculum accompanied by new textbooks was introduced into upper secondary schools. Changes have also been made to the country's system of assessing educational achievement, with students from junior secondary level to upper secondary level now being assessed through questions requiring open-ended responses.

The availability of quality teachers has been one of the main obstacles facing science education in Bangladesh since independence (Ashraf 2008; Rashid 2001; Roy 2014; Tapan 2010). Tapan (2010) attributed the lack of effective change in science education at the secondary level to this problem. In every education policy, teacher training has been assigned high importance, but the reality has not reflected this. Until very recently, secondary teachers, including science teachers, have had no continuing professional development, but major effort to ameliorate this situation was implemented in the first quarter of 2015. Today, various training programs in teaching and learning are being conducted all around the country through the teacher training colleges, the higher secondary teacher training institutes, and the madrasah teacher training institute.

At present, almost all science teachers for the upper secondary level are recruited through a recruitment examination, and all candidates must have at least a BSc. These individuals should be well disposed to gain benefit from inservice training on different issues and to make use of the new textbooks and teacher guides developed in pursuance of quality education. Practical classes and examinations for science subjects are

gradually being given more attention, and the government is providing more funding than it has in the past for establishing upper secondary science laboratories. The convergence of these various interventions bodes well for science teacher quality in Bangladesh in the years to come.

References

- Ahmed, Shah Shamin, and Muhammad Salahuddin. 2014. "Impact of Globalization on Education Policy: Bangladesh Perspective." *The Dhaka University Studies* 68 (2): 117–28.
- Ashraf, Shamim. 2008. "State of Science Education in Bangladesh: Current Status and Future Trends." *The Daily Star*, July 27.
- Bangladesh Bureau of Educational Information and Statistics. 2013. *Bangladesh Educational Statistics 2012*. Dhaka: Ministry of Education.
- Bangladesh Education Commission. 1974. *Bangladesh Education Commission Report 1974*. Dhaka: Ministry of Education, http://www.banbeis.gov.bd/devnetsolutions/BANBEIS_PDF/BANGLADESH%20EDUCATION%20COMMISSION%20REPORT%20%20-1974.pdf.
- Government of the People's Republic of Bangladesh. 2010. *National Education Policy 2010*. Dhaka: Ministry of Education, http://planipolis.iiep.unesco.org/upload/Bangladesh/Bangladesh_National_Education_Policy_2010.pdf.

- Ministry of Finance. 2014. *Bangladesh Economic Review*. Dhaka: Author.
- Rashid, R. 2001. "Determination of Training Needs of Physics Teachers at the Secondary Level." Master's diss., Institute of Education and Research, University of Dhaka.
- Roy, Satyabrata. 2014. *Evaluating the Present Status of Practical Science Education in Bangladesh at Secondary Level*. Dhaka: Foundation for Research in Educational Planning and Development (FREPD).
- Tapan, D. M., D. H. Rahman, and Shah Shamin Ahmed. 2014. "Problems of Science Education at the Secondary Level in Bangladesh" (unpublished manuscript). Dhaka: Foundation for Research in Educational Planning and Development (FREPD).
- Tapan, M. Shahjahan Mian. 2010. "Science Education in Bangladesh." In *Handbook of Research in Science Education in Asia*, vol. 4, edited by Yew Jin Lee, 17–34. Rotterdam: Sense Publishers.
- Teaching Quality Improvement in Secondary Education Project (TQI-SEP). 2007. *Subject Bases Training of Class Teachers: Secondary Physical Science Training Manual*. Dhaka: Ministry of Education.

Further Reading

- Choudhury, S. K. 2009. "Problems and Prospects of Science Education in Bangladesh." In *AIP Conference Proceedings* 83–84. College Park, MD: AIP Publishing.
- Tapan, M. Shahjahan Mian. 2010. "Science Education in Bangladesh." *Handbook of Research in Science Education Research in Asia*, vol. 4,

17–34, edited by Y. J. Lee. Rotterdam: Sense Publishers,
[https://www.sensepublishers.com/media/1167-the-world-of-science-
education.pdf](https://www.sensepublishers.com/media/1167-the-world-of-science-education.pdf).