Technological literacy in a developing world context: the case of Bangladesh

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Technological Literacy in a Developing World Context: The Case of Bangladesh.

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Abstract

At 900 persons per square kilometre, Bangladesh is one of the most densely populated countries of the world and is similar to many developing countries in that nearly half the population is under 19 years of age. On average 41% of the population do not complete Primary Education, completion rates being as low as 27.5% in some areas. The reasons for such high school drop-out rates are complex: family poverty, teaching quality and the quality of teacher/student interaction, the school environment and lack of resources all playing a part. A crucial factor, however, is the nature of the school curriculum and its perceived relevance by students and parents.

This paper analyses the nature of the technology curriculum as part of the basic education offered to children in government and non-government schools. A framework of analysis using three inter-related strands is considered: the curriculum rationale (focusing on the specified curriculum); teacher knowledge (focusing on the enacted curriculum); and student learning (focusing on the experienced curriculum).

A consideration of these strands in a developing world context, centred on the relevance of the school curriculum in relation to technological understanding as perceived by children and parents, may have wider implications for the assumptions about the curriculum for 'technological literacy' in other more developed countries as well as for politicians within Bangladesh itself.

Key Words: Technological Literacy; Bangladesh; Curriculum Development;

Introduction

Bangladesh, a semi-tropical country which lies in the north-eastern part of South Asia bordered by India and Myanmar (Burma), is one of the largest deltas in the world. Its land is consequently very low-lying and crossed by three great rivers. The Ganges, the Brahmaputra, and the Meghna all flow south into the Bay of Bengal and their many tributaries make travel within Bangladesh difficult. Bangladesh is one of the most densely populated countries of the world with a population of 138.6 million, crowded into an area of only 147,570 square kilometres, giving a population density of 926 persons per square kilometre. The Netherlands, in contrast, is approximately 400 persons per square kilometre. Over three quarters of people live in the rural areas. Nearly half the population is under 19 years of age (MoPME, 2008).

Primary education is provided to children of 6 to 10 years, in Classes 1 to 5, with an examination at the end of each academic year. In 2005, the Department of Primary Education in Bangladesh conducted a survey, which revealed that the percentage of students not completing primary school is 47.1% with a range in different areas of 72% to 30% not completing their primary education (MoPME, 2008). Secondary

education is Grades 6 to 10, divided into two groups: Lower Secondary is Grades 6 to 8, with a terminal examination, and Upper Secondary is Grades 9 and10 with the public Secondary School Certificate examination (SSC) conducted at the end of Grade 10. Higher Secondary Education comprises Grades 11 and 12 with the public Higher School Certificate (HSC) examination taken at the end of Grade 12. Surprisingly although almost all primary schools are government controlled, of the 18,500 secondary level institutions in Bangladesh (excluding Madrasas), less than 2% (317) are government secondary schools. Nearly all secondary schools are private although the government through the examination system specifies the syllabus and pays the teachers' stipend. Class sizes are large with 60- 90 students not uncommon in primary classrooms in urban areas.

In addition to government schools, there are a number of Non-Government Organizations (NGOs) that contribute significantly to education. The Underprivileged Children Education Programme (UCEP), for example, provides general education and vocational training for over 30 thousand poor working children who have generally missed out on their primary education. The children continue to work and earn while they attend school. UCEP schools operate 3 shifts per day, each of 3 hours duration. This allows a child to choose a shift of his/her convenience, in consultation with their parents, to minimise the economic loss to the family for the children attending school. The schools offer the national curriculum over a shorter period; each year's syllabus being completed over a six month period but using the curriculum and textbooks prescribed by the National Curriculum and Textbook Board (NCTB) incorporating basic elements of technical education too. In contrast to the national picture, the attendance rate at UCEP schools is almost 94% and the drop-out rate is very low (UCEP 2009).

Similarly, schools run by Bangladesh Rural Advancement Committee (BRAC) for the rural and urban poor offer informal education to many children:

> Most BRAC nonformal schools are one-room schools with limited floor space. The classroom is very neat and clean and students sit on mats on the floor. There are commonly about 30 students, two thirds of whom are usually girls. The teacher, generally a female with at least 10 years of schooling, is chosen from the community where the school is situated. […] The informality of the nonformal school environment has flexibility for teaching and learning in a community context where interactions between school and community are very influential and fruitful for students' development. (Shohel and Howes, 2008. pp293-294)

When considering technological literacy for the general population, therefore, one needs to take note of a number of factors. Why do so few students move on to secondary education? What is known about the curriculum, the teaching strategies used by the teachers and the economic context in which teaching and learning takes place?

The Specified Curriculum

The specified curriculum relates to the formal intended learning outcomes that are either explicitly or implicitly set out for teachers by government or their employer if an NGO or community school. The government prescribed primary curriculum has the core subjects of maths., English, Bengali (Bangla), science and social studies. The

curriculum in all subjects is dominated by the text book and the examination system tests simple recall. The curriculum books have often been written for different grades by different people at different times and progression in subjects is poor (Smith, 2009). The relevance of the curriculum to the lives of the majority of students is also to be questioned. BRAC schools link the curriculum to basic hygiene and health education but little is done in government schools to consider the usefulness of science to agriculture or the need for clean food and water. Shohel tells of a lesson in a school on home economics on the need for cleanliness in the home to prevent disease taking place in a very dirty classroom (Shohel and Howes, 2008. p 305).

In contrast to the formal education in large primary schools, BRAC informal education encourages creativity with cloth and clay to make decorative items and to link the products to a possible client.

Technical streams are available at both Secondary and Higher Secondary levels, administered by the Technical Education Board. The Bangladesh Technical Education Board (BTEB) specifies the curriculum, and in secondary and upper secondary schools, technical streams are available from Grades 9 and 11. Although the National Curriculum in Bangladesh is specified through textbooks and examination syllabuses, the technical areas available are wide. Through the BTEB, students in Grade 9 in a technical stream, for example, could be offered Automotive, Wood Working, Dress Making and Tailoring / Garments Manufacturing, Fish Culture and Breeding, Fruit and Vegetable Cultivation, Plumbing and Pipe Fitting, and Industrial Electronics (BTEB, 2009). However, it is highly unlikely that a secondary school has the resources to offer these subjects in a practical way. The Campaign for Popular Education, Bangladesh notes:

> A high degree of inequity exists in the secondary education sub-sector in Bangladesh. Inequity starts with unequal distribution of basic school facilities. All types of secondary educational institutions lack basic minimum requirements for quality education. […] As learning performance in secondary education has direct implications for future life, the above inequities persist throughout the life of the secondary graduates, afflicting adversely their further education and employment opportunities. (CAMPE, 2008, pxxxiii)

In stark contrast UCEP schools offer an integrated general and vocational curriculum. Students basically follow the NCTB curriculum both at primary and lower secondary level (grades 1 to 8). However, the curriculum has been abridged in a careful manner so that it remains comparable with that of national mainstream curriculum. The curriculum consists of Bangla (mother tongue), English, mathematics, vocational, social environment and hygiene. The focus is to educate poor working children in Urban environments and so they are accepted into the programme no younger than age 10 for girls and 11 for boys. Each 3 hour shift is focused on general education but where possible examples are drawn from a technical context. For example, the English alphabet is taught through naming of craft tools – D for dividers, H for hammer. Stories in Bangla are linked to the discovery of inventions and the use of agricultural and other devices. After grade 8 UCEP continues Technical Education training on 16 trades:

- Auto Mechanics
- Welding & Fabrication
- Machinist
- Plumbing & Pipe Fitting
- Electronic Technology

- Industrial Electrical and Electronic Control
- Refrigeration & Air Conditioning
- Offset Printing Technology
- Industrial Woodworking
- Tailoring and Industrial Sewing Operation
- Industrial Wool Knitting Operation
- Garments Finishing & Quality Control
- Industrial Garments Machine Mechanics
- Textile Weaving Mechanics
- Textile Spinning Mechanics
- Textile Knitting Mechanics

Here the students learn in a highly vocational and practical way using English where necessary as technical vocabulary (EiA, 2009). At the end of their training they are guaranteed a job. In contrast to the formal government system, these poor working children attend school regularly and complete their education. The attendance rate is over 94%.

The Enacted Curriculum

The enacted curriculum relates to the teaching strategies enacted by the teacher and so is linked to their professional knowledge (See Banks *et al.* 2004, Banks, 2008).

In 2009, the author initiated a large-scale study of pedagogical practices in Bangladeshi classrooms (EiA, 2009). Using a team of eight Bangladeshi colleagues and four Open University researchers, a total of 252 classroom observations were undertaken in both Primary and Secondary schools. Care was taken, using videoed classrooms and live observations in pilot schools, to try to achieve reliability of observations from all observers before the fieldwork took place, and in the field some joint observations were undertaken to see if reliability had been maintained. Information was recorded about the classroom environment and the professional background and experience of the teacher being observed. During the lesson a 'time sampling' technique was used to record what type of activity (from a pre-determined list) the teacher and students were doing at selected points. The observers could also annotate the instrument with any details that would complete the account of the lesson. The observation data collected provides an indication of the types of activity that happen in classes at the start, during and at the end of lessons.

Throughout the lessons, teaching from the blackboard or front of the class was the predominant pedagogic approach. As the lesson progressed, teachers tended to read from the textbook, ask closed questions or move around the classroom monitoring and facilitating students as they worked individually. The use of teaching aids (other than the text book) was infrequently observed: in 2% to 6% of classes at any of the times sampled. More frequently, teachers gave instructions for student activities (from 5% to 8% at any of the times sampled) or listened to students as they read aloud from the textbook (from 2% to 8% at any of the times sampled). At the end of a lesson teachers usually assign homework (53% of classes) and/or recap what the lesson has just covered (49% of classes). In many cases teachers provide feedback on the students' performance throughout the lesson (43%) and assess students' understanding by asking summary questions (34%). In almost 10% of the lessons observed, the teacher simply stopped teaching and left the room. The majority of teachers appeared to be fully or partially confident with the subject matter of the lesson. Teachers with a general training in education appeared to be more

confident than others. However, there was little evidence of a lesson plan being used for guidance by most teachers – only 14% did so 'regularly' or 'occasionally'.

Most teachers interacted positively with their students and maintained good discipline. Few teachers focused their attention only on those students at the front of the classroom (only 8% overall) while the majority focused on students throughout the class. However, most teachers did not adopt a stimulating and task-based approach to their lessons. Overall, 58% did not ask any thoughtful questions to stimulate students' interest and 48% did not set any challenging tasks for the students to make them think.

Although not seen in this observation study, Shoel and Howes make reference to the use of excessive corporal punishment in secondary schools, particularly in contrast to the pedagogy of nonformal education in BRAC schools.

> You know, in high school, teachers don't bother whether you've learnt anything or not. Don't care whether you come to school or not. You see, she was […] like our mum [teacher in BRAC school] she hardly hit us. But in this school if you fail to answer the teacher's question, you definitely will be slapped or beaten [either with hand or stick]. I hate punishment in high school (Grade 6 student reported in Shohel and Howes, 2008. p 300).

The Experienced Curriculum

The experienced curriculum relates to student learning. Clearly students can only experience the curriculum if they attend school and, as is indicated above, many students in Bangladesh drop out of school before the end of primary education. A key reason often given is poverty and the need for students to help support the family by working. There is evidence for this. Poor children are most likely to drop out of primary school, and the government realizes the need for targeting poor locations of the country to add enhanced stipend (proportionately greater for poor boys), school feeding, and school health programs, from pre-primary to primary school levels (MoPME, 2008).

Such inducements would no doubt help in encouraging school attendance, but students want to also enjoy coming to school. Our observations of the classrooms showed that in most classes, students were not interactive at all; rather they were very passive learners. They were only participating by answering the questions asked by the teacher. Generally the students were well behaved in class and in the majority of classes there were few students who had problems concentrating and/or displaying inappropriate behaviour. They were generally passive, and generally bored.

Consequently, the predominance of memorisation for a knowledge recall examination and the rationale for covering so much content, is itself not proving highly successful,. Pass rates of SSC are about 60% (MoPME, 2008).

Moreover the environment was uninspiring. Classrooms are generally clean and tidy, have good natural light and basic teaching equipment like a blackboard and chalk are present. Often there is sufficient furniture for the students present in class. However, there is little evidence of students' work on display and learning and teaching materials are usually not visible.

In contrast he UCEP experience shows that imaginative teaching in a stimulating environment and a relevant curriculum linked to real-life technological literacy, even

at the primary stage, can encourage very poor underprivileged students to attend school.

Conclusion

The UCEP model illustrates the over simplification that school drop-out in Bangladesh is largely due to poverty. It is certainly a factor, but possibly more significant are;

- The need for a relevant curriculum. Technological Literacy at the primary level, particularly prominent in UCP but also in BRAC schools shows the need for easily perceived links between education and real life. Education needs to be seen as more than simple memorisation for an examination by both teachers and parents.
- The need for a stimulating environment with an increase in student-centred learning. Even in low-resourced schools BRAC have shown that students can engage in designing and making for a specified client.
- The rhetoric of Technology Education for All in the global north has been to distinguish it from vocational education. In the UK, for example, technology as a school subject has tried, sometimes unsuccessfully, to move away from its roots in Craft. In the USA, care has been taken to show Technology Education is not the same as Industrial Arts or 'shop'. In Bangladesh and in other emergent economies, however, the relevance of education to everyday life is paramount. As England embarks on its expansion of 14-19 Diplomas, much could be learnt from the success of UCEP and BRAC schools.

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