BANGLADESH CONNECTION

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I support 13 educational programs in Bangladesh, seven of which have physics research and education in them and six emphasize STEM (science, technology, engineering, mathematics) education in schools from elementary to higher secondary level. Most of them run fine. However, various issues often cause very long delays (see "Recent Visit to Bangladesh Universities and Physics Prizes" in FIP 2013 Spring newsletter http://www.aps.org/units/fip/newsletters/201302/bangla.cfm). I can sort out many of these problems through discussions and meetings when I visit Bangladesh. This report is on my recent visit in Bangladesh during November-December 2014 that saw number of very positive progress in education and physics research.

Razzaq-Shamsun Physics Prizes

They are of two kinds, annual physics research prize initiated in 1995 and lifetime achievement award for life long contributions initiated in 2008. The objectives of these prizes are to encourage physics research and publications, and continue to contribute in research, teaching, and physics related work. The most satisfying progress seen during my visit was the very positive competition for both of Razzaq-Shamsun physics prizes and increment of number of publications for each prize compared to the past.

At the call of Dhaka University, which administers these prizes, in widely circulated newspapers in November 2014 for applications for the annual Razzaq-Shamsun physics research prizes for the years 2008 to 2013 and Razzaq-Shamsun lifetime achievement prizes for two years a significant number of applications came from Dhaka, Chittagong, Jagannath, Jahangirnagar, and Rajshahi universities. These public universities are the main places where most physics research are carried out. There are also some additional institutes, such as, Science Laboratory in Dhaka, several Atomic Energy Centers, Bangladesh University of Engineering and Technology (BUET) which publish research. Applications for the prizes included quite a number of research articles in various areas of physics published both in well-known international journals and Bangladesh journals. Being a member of the Board of Trustees and a physicist, I participated in the evaluation of the papers. The annual prize winners were Prof Md. A.R. Patoary of Rajshahi University "For study of electron impact ionization using models" in 2008. Dr. A.F.M. Yusuf Haider of Dhaka University

"For study of semiconductor using laser Raman spectroscopy" in 2009, Dr. Kamrul Khan of Jagannath University "For creating sustainable electricity using patharkuchi leaves" in 2010, Dr. Mohammad Idrish Mia of Chittagong University "For study of spin effects in semiconductors" in 2011, Dr. Rezaul Azim of Chittagong University "For study of ultra wide band antenna with multiple notches" in 2012, and Dr. Muhammad M. Rahman of Dhaka University "For study of nanohole surface plasmon resonance'" in 2013. This is the first time winning for Jagannath University and winner Dr. Khan, had already been received the top invention prize for cheap power generation using liquid of patherkuchi leaves in a conference in University of Texas at Austin. Lifetime achievement prize went to Professor K. Siddique-e-Rabbani of Dhaka University, founder of Biomedical Physics and Biotechnology Department of Dhaka University, "For outstanding contributions in physics applications to affordable health care technology and training of many students in Bangladesh" and to Professor Ajoy Roy of Dhaka University for "For electron-spin resonance work". The work of Rabbani is also attracting international attention of developing countries for remote diagnosis of heart condition and other cheaper diagnosis.

The prize event commemorate some inspiring figures, such as, contributions by Professor Satyen Bose for the Bose-Einstein statistics and Professor K.S. Krishnan in the speech by Physics Chair Prof. Azizur Rahman. Although Prof Krishnan is very related to finding Raman effect for his extensive experiments under C.V. Raman, he became more known and received more recognitions for study of magnetic properties of crystals with Professors S. Benerjee, B.C. Guha, and A. Mookherjee while he was at Dhaka University for five years and continued collaboration to develop Krishnan Banerjee method in measuring the magnetic susceptibility of small crystals. I was very thankful to the Vice Chancellor of Dhaka University, Professor A.A.M.S. Arefin Siddique for helping the most to complete the award process delayed by a number of years. At the end of prize distribution the VC gave me a certificate of recognition with deep appreciation and citation "For her continuing inspirational and sincere work for promotion of physics research and education in whole Bangladesh" and trophy of Dhaka University.

Bose Centre for Advanced Study and Research in Natural Sciences

Bose research center, established in honor of Satyendra Nath Bose in 1974 at Dhaka University, had a low key profile all these years. But now it has become much more active as government has allotted research grant to it. Individual amount is small as it gets distributed to about 15 applicants, mainly junior faculty members


Figure 1: L:Winners of physics prizes: From left Haider (4), Khan (12), Roy (13), Rahman (14), Patoary (16), Azim (17) with VC Siddique (11), Sultana (8) and others. R: Rabbani's telemed invention - a doctor in a remote village uses a system of a simple computer and 12 lead to take ECG and transmit through internet to an expert in a hospital

and senior students for research projects, but they do bring some incentive and honor for the recipients. It now holds international conferences and the last one was in collaboration with CERN. The other university based center is Center for Mathematical and Physical sciences at Chittagong University which was led by well known Mathematical Physicist and Cosmologist Professor Jamal Nazrul Islam who brought well known international scientists to the center. The activity has gone down since his death in 2013.

Physics Teaching, Research and Academic prizes in individual universities

My work with five individual public universities for physics teaching, research, and academic excellence made good progress and had significant success. I visited these universities, Dhaka, Chittagong, Jagannath, Jahangirnagar, and Rajshahi and had meetings with the Vice Chancellors and faculty members of the physics departments for the programs, discussed research and presented physics seminars. My program includes prizes for best teachers, best researcher and best undergraduate students.

Selection of best students is not a problem since they are already qualified through their academic excellence in the exams. The objective of these prizes is to encourage students to make their best effort and compete positively with fellow students. At the end of the prize ceremony at Chittagong University, a student stood up and asked permission to speak on stage. On stage he expressed gratitude for the recognition and

Figure 2: L: Bose Centre Director Professor Shamima Chowdhury of Physics Department and display of two recent books published under the center, R: Bose Centre workshop banner on particle physics sponsored jointly with CERN hanging on Physics Department behind Professor Haider and Sultana.

how inspired he felt to continue his hard work in the prospect of getting attention and joy of getting recognition. Student prizes are included in four universities, but there is no undergraduate student prize for Dhaka University yet since it has number of established prizes.

Faculty members can improve the weak education and research in Bangladesh. Physics research prize is based on research publications and involvement of graduate students. The teaching prize is based on students learning in-class. In-class learning is very important for a student to avoid additional expense for the tutor to explain the materials in the syllabus. Only the best students from high schools are able to enter the university after tough admission tests. They have passion to learn and use up the savings of their parents for their education (very little scholarship is available). The winning teachers are nominated by student votes. These ideas are new in Bangladesh and take time to appreciate, adopt and implement by institutions.

Rajshahi University in Rajshahi made the most successful implementation of the promoting program. Their detailed evaluation from students went beyond and more precise than what I proposed. This university went through many troubled times for a long time in the past, but has found the way to concentrate on education and carrying out research more than others. Well known Professor Bary Malik of Southern Illinois University had long collaboration this university and participated in its international conferences. In a very enlightened ceremony, three very well deserved faculty member received the prizes, Professor Aminul Islam for excellence in teaching,

Figure 3: Award ceremony in Rajshahi University. L: Professor Saleh H. Naqib for excellence in research, R: Professor Aminul Islam for excellence in teaching.

Professor Saleh Naqib for excellence in research, and Professor Alfaz Uddin for lifetime contributions in research, and the student scholarship went to female undergraduate student Mahmuda Akter. Physics Chair Dr. Somnath Bhattacharjee (behind the winners in the picture) is one dedicated member of the department. Studying with almost blind eyes who could never read the blackboard, learnt by listening and reading with his eyes a few inches from his eyes got his Ph.D. and became a faculty. A few years ago, the best eye hospital in Dhaka carried a successful cataract surgery on him and now he can see what he could not see most of his life.

Jahangirnagar University in Savar university has discussed to accepting students evaluation for teachers conditionally for 5 years. All three Vice Chacellors of the University supported the policies, but need consent from Department of Physics for implementation. With favorable condition during my visit, we were able to select the winning candidates and we wait now for the university approval. Approval also came from various faculty members in Dhaka University. The prizes were already approved by the syndicate of Dhaka University. We found two strong candidates for the prizes. Even with busy schedule, students came forward to show support for the program and write detailed comments of their teachers. I spent most of my time in Dhaka University. However, a few physics faculty members and the authoritative officer in Dhaka University strongly opposed students evaluation. So the candidates files will remain closed and uncertain.

Prize ceremony held at Chittagong University during my visit included only student prizes. Both Pro-Vice Chancellor and Dean of Faculty of Science appealed in

Figure 4: L: Jahangirnagar University where Prof. A.A. Mamun, most active researcher and recipient of two awards from Germany, is introducing Sultana's seminar presentation., R: Dhaka University: Students writing positive and detailed comments on teachers they appreciate.

their speeches to Physics Department to accept the faculty prizes. Number of faculty members also came forward personally to me to support the policies. However, a young faculty was very negative about the policy and left the meeting room. Two of his young colleagues argued their beliefs of insincerity of students. Similar difficult time came for Jagannath University where again where several teachers opposed students opinion. One professor, who was in line to be the next Physics Chair, even looked down the research publications of his colleagues and disapproved research prizes. His comments are obviously biased since it is the same university where research on cheap power supply generated from patherkuchi leaves received Razzaq-Shamsun Research prize and innovative prize in Austin, Texas. A young faculty here just received his Ph.D. with good publications in Japan and was introducing new astronomy course with the books I gave them.

Wayne State University, Detroit, Michigan, USA

As explained above my effort for the needed boost in education and research in Bangladesh encounters acceptance problems mainly because it involves students participation and hence requires intense dialogs to convince the impact. Once accepted, it works only in very positive way. During receiving the Distinguished Alumni Award in 2014 from Wayne State University (WSU), I found the scope to do something for and remain attached with my Alma Mater. The urge had been with me for quite sometime. I explored implementing the same policies, as formulated above,

Figure 5: L: Prize ceremony at Chittagong University where both ProVice Chancellor and Dean of Sciences urged Physics Department to accept the policies. R: Sultana increased the trust fund in Jagannath University where the Vice Chancellor Professor Mizanur Rahman is very supportive.

for Physics and Astronomy prizes in teaching and research for faculty members and thesis prize for a Ph.D. student at Wayne State. Getting evaluation from students on teaching and research is an integral part of US educational system. So my offer was very much welcomed and accepted by the Department of Physics and Astronomy which worked with me to finalize the terms and conditions within six months, and by the university soon after. The award process is scheduled to start by the end of 2015. The acceptance of policies came as a refreshing prize for me.

STEM Education in Primary, Secondary and Higher Secondary Schools

For these institutions, it is mainly a success story. The longest success has been with Maniza Rahman Girls High School which adopted students evaluation for the best teachers in 2003. From a break point of becoming from a secondary school (up to Class X) down to a school of Class VIII, this school has seen a reverse turn. Students are performing better in board exams in increasing number in each. The school has grown not only from about 500 to 2000 students in current enrollment, it has expanded to college (higher secondary) programs in several arts subjects. I found new class rooms being constructed. A significant number of poor students are being supported with tuition. Enthusiastic students filled out the large room as prize ceremony was held during my visit.

The two primary schools, one in the city and one in a village, both with poor students are making amazing progress. Teachers have become dedicated in the class

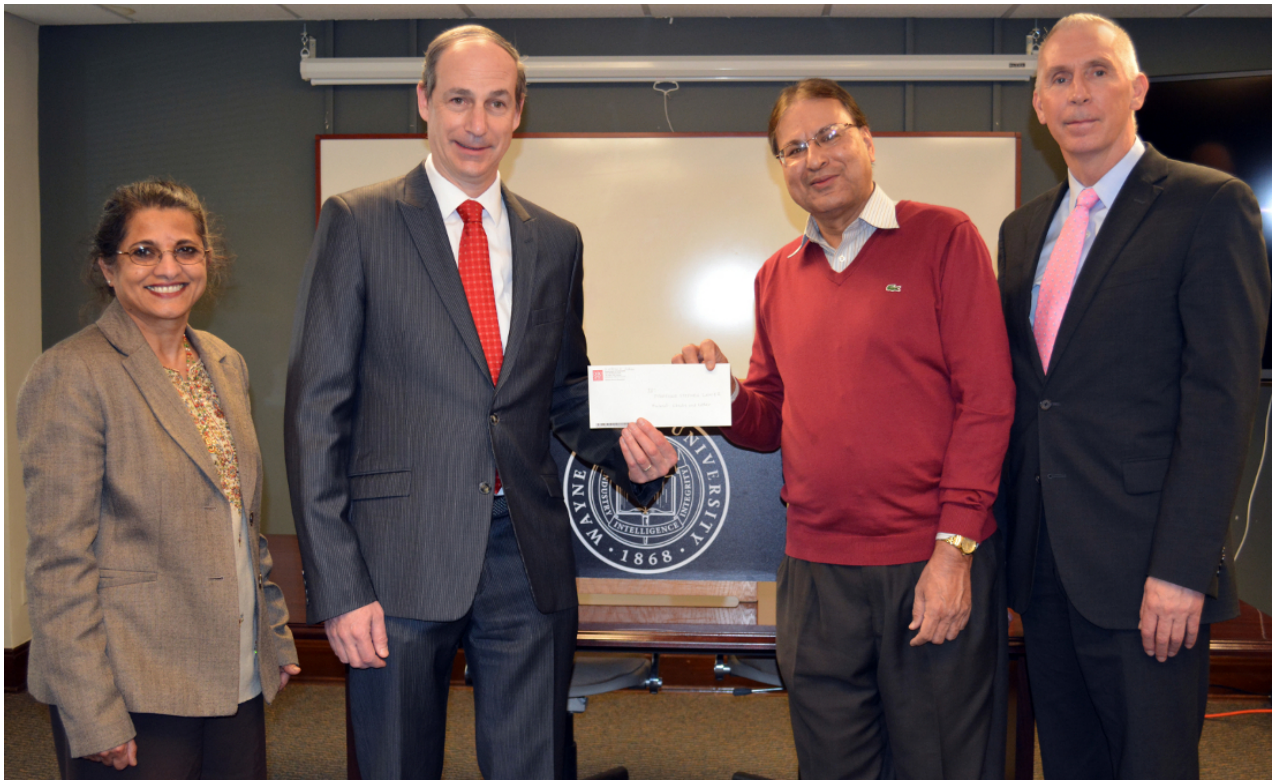

Figure 6: Completion of formalities for establishment of the awards at Wayne State University where Physics Professor J.M. Wadehra is handing over the check to Dean of Sciences Professor Wayne Raskind on Sultana's behalf at the office of Vice President of Research Professor S.M. Lanier (on the right) and in presence of Chair Professor R. Naik of Physics and Astronomy.

Figure 7: L: Winning teachers of Maniza Rahman Girls High School standing in the back R) Very supportive audience where students cheers up when their voted teachers names would be announced.


Figure 8: L: The best students in various classes in Domdoma Primary School in Sripur who were called out from the students assembly are happily showing the cash prize while teachers are standing behind. R: Students at Gandaria Mahila Samitee Primary School are responding with raised hands at Sultana's question who want to be a scientist in the future.

and are very pleased to hear when their names are announced in the ceremony. More students are getting high grades and government scholarships. Both teachers and best graduating students receive certificates and honorarium money at the ceremony. To keep the spirits of achievements high I gave cash prizes to the current best students during my visit. I have been told by the headmasters about the beaming students reporting their parents the honored cash prizes and how other parents are encouraging their children to be honored. In my address to students, I explained how good and helpful knowledge is and how far they can go with discoveries and inventions. When asked students each institution I visited who wanted to be a scientist or a great scholar and students from each institution responded with enthusiastic "I want to be" with their raised hands.

I have been working with Panchdona madrasa and orphanage to promote general education, particularly math and science, along with Islamic education since 2008. The school teachers accepted very politely the evaluations of students for the best teachers and now it has become a celebration day for receive the prizes. Students started participating the government Board exams several years ago and number of students passing the exams is increasing. A few years ago, at the interest of a few teachers, I sponsored a computer lab. Students of Classes 6 and 7 are having hands-on skill by a young teacher. I was moved by the English letter they wrote for me while I was busy in the meeting.

Figure 9: L: A student is demonstrating his computer skill in the computer lab sponsored by Sultana. R: Curious students asking Sultana about the country USA and its education.

Some progress has been made at Kabi Nazrul Government College which also faces irregularities by its large body of students. The evaluation gets delayed by management. The recent retired Vice Principal of the college has volunteered to oversee the process. No progress was made in Central Women's College where the principal has suspended the recognition because of complain of a number of teachers claiming students are biased.