Looking back at a Science Teachers' Training Program at IGNOU

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Abstract

The Raman Chair for Science and Education (RCSE), an integral part of IGNOU's School of Science (SOS), at IGNOU was established to promote mathematics and science education. The RCSE signed an MOU with Intel for the program "Empowering Educators to Innovate" in 2011. The principle aim of this program was to conduct capacity building workshops for School Principals and Teachers using the relevant Technology Tool. Intel® Teach and IGNOU had partnered in this unique program which is aimed at equipping educators with relevant tools to hone their pedagogic approaches in a transformed learning environment with technology to enhance math and science competencies of students. The program was launched on March 15, 2011 at HRDD Conference Room, Gangtok, Sikkim, India. The program was not limited to only provide teachers with the pedagogical and technical skills needed to integrate technology into their classroom teaching. It also intended to closely work with the network of trained teachers to ensure implementation in the classrooms of the techniques learnt during the trainings and also the Master Trainers must return to their school and train the other science and math teachers in their school in the cascade model. The teachers with their subject knowledge when empowered with the ICT tools would surely innovate for the teaching-learning processes of the learners which would enhance student learning. This programme was intended to revive the enthusiasm in the teachers by empowering them to innovate. In this paper the author would like to share her experience for this teaching training programme for science teachers in which she was the coordinator.

Introduction

The Program "Empowering Educators to Innovate", an initiative by IGNOU's Sir CV Raman Chair for Science Education, School of Sciences, HRDD, Govt. of Sikkim and Intel was launched in March 15, 2011 at HRDD, Conference Hall, Sikkim. The Indira Gandhi National Open University, the National Resource Centre for Open and Distance Learning was established on September 20, 1985, by an Act of Parliament (1985). It is nodal agency responsible for implementing the distance education component throughout the 28 states and 07 Union Territories in India. The Raman Chair for Science and Education, an integral part of IGNOU's School of Science (SOS), was established to promote mathematics and science education. This Chair aims to initiate, plan and coordinate various academic activities in the project mode. The activities include creating courses/programmes, writing books, creating multi-media material for different levels of learning, advice on innovative methods for science education and use of technology in distance mode. The objectives of the program "Empowering Educators to Innovate" were to support the vision of School of Sciences, IGNOU, for creating student interest and enhancing science learning in the secondary schools by sharing innovative ICT integration usage models under the Intel® Teach program, conduct capacity building workshops for Principals and Teachers using the relevant Technology Tools and to promote and nurture an aptitude for scientific research amongst the students of the selected schools by guiding them in creating innovative science projects and providing a platform to compete at national and international events like IRIS and International Science and Engineering Fair (ISEF). IGNOU and Intel collaborated to support the vision of School of Sciences and followed a cascading model for training math and science subject teachers of Sikkim. That science should have synergy with technology was important for the development of the nation. The enormous potential of ICT in the education system was also felt. Sikkim was chosen as it was one of the marooned states with little or no exposure to ICT in education in the government schools till then. This programme was started with training the teachers from the government schools of the state of Sikkim. All this was done keeping in mind the paradigm shift that has taken place in K-12 education, from instructor centric to student centric learning. The government of Sikkim was especially interested in this training programme as it wanted to enhance math and science learning among students which were found to be their major weaknesses. It was

felt by the government that integrating technology as a vital teaching tool in the classrooms was the need of the hour. The problem that the teachers were not equipped to prepare our children for the requirements of 21st century and it was urgently needed to upgrade their skills and change their attitude in teaching science and maths in Sikkim. Also it was felt that "weaknesses" in subjects like Science and Mathematics could be removed by creating a pool of resources for the future. Inadequate teachers for these subjects was a problem in Sikkim and it was envisaged that this programme would bridge the gap. The Intel® Teach Program of Intel was a professional development program that helps classroom teachers effectively integrate technology to enhance student learning. Teachers learn from other teachers how, when and where to incorporate technology to improve teaching and learning, with a focus on developing students' higher-order thinking skills. In India, Intel® Teach Program was launched in February 2000.

1. The Principals' session

A Principals Session with principals from 14 schools was conducted Post Empowering Educators to Innovate Program launch. The session started with the Welcome note and introductions. During a 2 hour Principals Session, all the Principals got orientation on Intel's initiatives in Education. A detailed discussion on effective Technology Integration for whole school development. The Learning Paradigm shift from a Teacher Centred instruction to a student-Centred classroom that would facilitate promoting questioning, and participative learning among the students was envisaged. Post discussion, an interactive session was initiated focusing on Role of School Leaders in Technology Integration in Math and Science. A brief idea of the training curriculum "Empowering Educators to Innovate" that would facilitate their teachers integrating technology aided learning in their existing math and science teaching and enhance student learning. This session primarily intended to motivate the principals so that would happily release their teachers of science and maths for the training sessions.

2. Experiences from the 10 day training session

The teachers' own experiences were taken into account during the training sessions. The experiences of both formal and informal training were monitored by the coordinator through emails, skype and phone calls as well as physical supervision. During physical supervision actual effort was made by the coordinator to see that peer review of the final projects were being done. Also informal contact with the teacher trainees after the sessions were extremely useful. Participants of the training found this sort of training complementary to subject-based mentoring which they had undergone in their formal B.Ed. that is, the Bachelor in Education degree training. This sort of training programmes also provided opportunities for interaction with peers across and within the subject area of the teachers. A questionnaire was prepared and feedback was taken from the 21 participant teachers. The results were analysed.

3. Results and Discussions

3.1 The age profile of the teachers

Table 1: Number of teachers by age	
25-34	9
35-44	6
45-54	4
Age not stated	2
Total	21

From the above observations it may be concluded that 43% of the teachers were below 35 years old, 29% below 45, 4% below 55 and the age were not disclosed by 2% of the teachers. This shows that it was almost a young genre that came for the training programme.

3.2 The distribution of gender amongst the teachers

Table 2: Number of teachers by gender	
Male	15
Female	6
Others	0
Total	21

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These data show that 71% male and 29% female teachers participated. In general, female participation as teachers in school education is considerably higher in India. However in this training there was more male participation, perhaps because it was a backward region.

3.3 The distribution of religion of the teachers

Table 3: Number of teachers by religion	
Hinduism	16
Christianism	1
Buddhism	4
Total	21

About 80% of the participating teachers in the training programme were Hindus, which is similar to their distribution in the overall population in India.

3.4 The distribution of caste of the teachers

Table 4: Number of teachers by caste/tribe	
ST	4
SC	1
OBC	14
Others	2
Total	21

The above data shows that out of 21 participants, 19 were from the backward communities of India.

3.5 The distribution of previous knowledge of computers of the teachers

Table 5: Number of teachers by previous knowledge of computer	
No	12
for simple use	2
Yes	7
Total	21

The above data shows that 57%, that is majority of the teachers did not have any previous knowledge of computers.

3.6 The courses/topics within their teaching-learning which were considered to be more effective by using ICT tools (most useful) by the teachers

Table 6: Distinct topics considered most useful for ICT by number of times it has been mentioned by a teach			
Topic	Frequency	Topic	Frequency
Life Processes	9		
Shape & size of 3D objects	5	States of Matter	5
Soil	5		
Diversity in Living world	3	Reproduction	3
Electricity	3	Tissues	3
Magnetism	3	Trigonometry - Height & distance	3
Data Handling (statistics)	2	Mensuration	2
Geometry	2	Our Environment	2
Health & Diseases	2	Polynomials	2
Light	2	Trigonometry	2
Addition & subtraction of rational number	1	Algebraic expression	1

Table 6: Distinct topics considered most useful for ICT by number of times it has been mentioned by a teach

Topic		Topic	
Air	1	Area of triangles	1
Atoms and molecules	1	Circles	1
Carbon & its compounds	1	Classification of Living thing	1
Cell division	1	Digestive system	1
Cell structure	1	Fractions	1
Chemical reaction and Equation	1	Geometrical constructions	1
How do we fall ill	1	Geometry - proof of theorem in triangles	1
Natural resources	1	Graphical solution of Linear Equations with two variable	1
Nutrition	1	Statistics- Bar Graph	1
Pie chart	1	Structure of atom	1
Pollution	1	Structure of plants	1
Probability	1	The food	1
Respiratory system	1	to draw ogive	1
Similar Triangles	1	Triangles & its properties	1
Statistics	1	Universe	1
Total			90

The above data shows that the topic Life Processes was considered more effective by using ICT tools (most useful) by a majority of the teachers, followed by topics like Shape & size of 3D objects, Soil and States of Matter. All other topics were considered to be useful by different teachers which perhaps shows, that technology can be useful for many topics and depends on the teacher how he/she would implement it in the classroom situation.

3.7 The courses/topics which would were considered as not to require ICT tools to improve the course (least useful) by the teachers

Table 7: Distinct topics considered least useful for ICT by number of times it has been mentioned by a teacher

Topic	Frequency	Topic	Frequency
Acids Bases and salts	3	Solving linear equations	3
Algebra	3		
Language of chemistry	2	The universe	2
Number system	2	Work & Motion	2
Polynomials	2		
Addition and Subtraction etc.	1	Is matter around us pure?	1
Communicable diseases	1	Mean & median	1
Euclid's postulates	1	Measurement	1
Food	1	Medicinal plants	1
Friction	1	Metals and Non-metals	1
Microorganism	1	Soil	1
Organisation in Living world	1	Square and square roots	1
Our earth	1	Statistics	1
Our Scientist	1	Technology in Everyday Life.	1
Periodic Table	1	Work and energy	1
Quadratic Equation	1		
Total			40

Acids, Bases and salts, Algebra and Solving linear equations were considered as not to require ICT tools to improve the course (least useful) by a number of teachers.

3.8 The one/two more points which the teachers felt most useful during the workshop

Many teachers felt that students would learn faster in a class room situation in which new technologies were implemented. Few felt that the lesson plan templates, making lesson plans, Blooms Taxonomy in the field of Education, samples of essential questions, unit questions were most useful. Some of the teachers felt that thinking about higher level thinking skills was a high point of the training. A number of the teachers felt that exposure to the computers was the greatest use of the programme. Since Sikkim suffered from frequent power cuts so undisturbed power supply was a blessing for some of the participants. One of the maths teacher felt that it would enhance his teaching skills and he would be able to teach mathematics in a much interesting way. One of the teachers mentioned that teachers would be able to create more innovative methods to make children get more motivated towards gaining knowledge. A few of the teachers felt the most useful part of the training programme was learning the use of power point presentation & lesson plan implementation. They especially liked the power point mode of presentation inbuilt in the lesson plan, where they could do custom animation and record their own narration. Pondering over reflective questions was another part of the training material found much useful by the participants. The five teachers who did not provide any feedback regarding the workshop was of relatively higher age group.

4. Conclusion

In this paper the author has discussed the experiences during the training of science and maths teachers with the help of the Intel Teach modules. Thus was the situation of an interdisciplinary and collaborative learning and teaching experiences in the context of K-12 education in government schools in a remote area of my country. After a couple of such training sessions in Sikkim the principal trainer intended to closely work with the network of trained teachers to ensure implementation in the classrooms of the techniques learnt during the trainings and also the Master Trainers after returning to their school had to train the other science and math teachers in their school in the cascade model. Thus the situation of science and maths teaching-learning had a lot of impact in Sikkim after the EEI Project.

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