



DEPARTMENT OF BIOTECHNOLOGY
Ministry of Science & Technology



MHRD
Pandit Madan Mohan Malaviya National
Mission for Teachers and Training



Centre of Excellence in Science and Mathematics Education (COESME)
at
Indian Institute of Science Education and Research (IISER) Pune

Report to Department of Biotechnology

STEM workshops on Research Based Pedagogical Tools
(RBPTs)

Jan 2017 – March 2017

STEM Workshops on Research-Based Pedagogical Tools

The Centre of Excellence in Science and Mathematics Education (COESME) at IISER Pune, jointly with Newton Bhabha Fund of the British Council is organizing a pan-India series of three-day pedagogy workshops for undergraduate science teachers at various levels. The project will be implemented over three years, starting from 2017 and is funded by the Department of Biotechnology, Govt. of India. This report briefly outlines the workshops conducted during January to March 2017, as a part of this series.

The aim of the workshops was to introduce and train participants to use a new pedagogical technique - Research-Based Pedagogical Tools (RBPTs) - which can be used for science teaching at the undergraduate level. This method focuses on understanding the process and concepts of science, rather than memorizing facts. Through these workshops teachers would be trained to use (RBPTs) in their regular classrooms, in order to improve critical thinking and research skills among students. The workshops will encourage teachers to explore alternative methods of pedagogy and make undergraduate science education more learner-centric. Teachers would also be given information on various government schemes (e.g., DBT-Star / DST-FIST) that they can utilise for their college and their own professional development. The workshops also aimed to create opportunities for participants to interact with education experts from India and Britain, and with peers from other colleges.

A pilot workshop of this kind was held in IISER Pune in March 2016, supported through the Centre of Excellence in Science and Mathematics Education (COESME) at IISER Pune, the Star College scheme of the Department of Biotechnology, and Newton Bhabha Fund of the British Council. Based on the success of the pilot workshop, this series of workshops has been envisaged pan India in order to ensure benefit to maximum number of teachers from all corners of the country.

In this series, workshops would be conducted at three different levels:

- Level 1 workshops - Three-day national workshop consisting for 150 participants pan India to provide training in the core concepts of Research Based Pedagogical Tools.
- Level 2 workshops - Three-day training for 50 selected participants from level 1 workshops to train the participants to become trainers themselves.
- Regional workshops - Three-day workshops of 50 participants held in different parts of India to help disseminate skills for designing and using RBPTs amongst a wider range of teachers, across the country in smaller, localised groups.

Over three years, nine Level 1 workshops, three Level 2 (advanced) workshops and 18 regional workshops to reach close to 2250 teachers across the country are planned. So far, three Level 1 Workshops and one level 2 workshops have been completed, and planning for regional workshops is underway.

Quick overview of workshops held up to 31st March 2017. Detailed report for the above is as follows:

Level	Location	Date	Number of participants	
Level 1	IISER Mohali	22 nd to 25 th Jan 2017	77	320
Level 1	Tezpur University	27 th Jan to 1 st Feb 2017	76	
Level 1	IISER Pune	26 th Feb to 1 st Mar 2017	167	
Level 2	IISER Pune	1 st Mar to 4 th Mar 2017	44	
Total			364	

Level 1 Workshops

A total of 3 Level 1 workshops, with a total of 320 participants were held at IISER Mohali, Tezpur University and IISER Pune.

Trainers:

A team of 5 experts from Sheffield Hallam University, UK provided training on all three days. The team consisted of two trainers from Biology and one each from Physics, Chemistry and Mathematics respectively. The Sheffield Hallam University is well known for providing solutions to improve the quality of STEM Education. It conducts several activities including running national and international STEM Education programmes; initial teacher education courses; courses for Continuous Professional Development of STEM teachers; curriculum projects; public engagement in STEM activities; and research. Problem-based teaching and learning to engage students in developing ideas, deep understanding and skill development to solve real world problems through scientific inquiry is another area of the University's work. Detailed profiles of experts are attached.

Selection:

Applications were invited from college Science teachers through advertisements on the IISER Pune, British Council websites and also the websites of the host Universities (IISER Mohali and Tezpur University). Undergraduate/postgraduate science teachers in government or government-aided colleges/universities in any part of India with a masters' degree in any branch of science with 10 years of teaching experience or PhD in any branch of science with 5 years of teaching experience were considered. Highly motivated/exceptional candidates with lesser experience were considered if seats remained. The applicants were required to submit a statement of purpose (SoP) about why they wished

to enrol in the workshop. Participants were screened by a joint committee consisting of representatives of IISER Pune and Newton Bhabha Fund and the local organisers.

Participants:

A total of 320 participants from all over the country, representing various organisations participated in the workshops. About 166 participants were from various branches of the Life Sciences, while others were from Physics (75), Chemistry (69), Mathematics (50) and earth Science (4).

Subject wise breakup of Participants

Subject	Number of participants			
	IISER, Mohali	Tezpur University	IISER, Pune	Total
Physics	25	9	33	75
Chemistry	8	14	39	69
Mathematics	13	12	20	50
Life Sciences	31	37	75	166
Earth Science	0	4	0	4

Pre workshop tasks:

As preparation for the workshop, participants were asked to fill a pre-workshop survey to assess their current level of understanding of inquiry-based pedagogy and their needs. They were also given some pre-workshop reading materials and were asked to prepare a poster in teams of two on their understanding of Research Based Pedagogical Tools (RBPT), before coming for the workshop.

Workshop:

The workshop was conducted over three and a half days from 9.00 am to 5.30 pm. It consisted of common sessions on general aspects of RBPTs as well as discipline specific sessions. The sessions were designed to train participants in designing and deploying RBPTs and also to develop strategies to assess the learning outcomes amongst students. They employed a combination of theory and activity based methods to explain various principles of RBPTs.

On the First day, a formal inaugural session, consisting of remarks by representatives of IISER Pune, British Council and the host Institute regarding the nature of the workshops was conducted. This was followed by a keynote talk introducing RBPTs and their need in science education by Mr Gareth Price, from the Sheffield Hallam University. Dr Suman Govil, Scientific Officer in the Department of Biotechnology addressed the participants of the first workshop of this series, in IISER Mohali.

Day One was spent on various activities that explained the ground principles of Research Based Pedagogical Tools through activities such as “the ideal student” and “the ideal teacher” and the characteristics of a good RBPT. These activities were implemented in mixed groups consisting of delegates from various disciplines and locations.

Day 2 had more discipline-specific sessions. Characteristics of RBPTs were drawn out and sample RBPTs were analysed in subject-wise break-out groups. The day saw the participants starting to develop RBPTs relevant for their classrooms in groups of five. This display grew over the course of the day with the guidance of the experts. The posters made by participants were put up for display and participants received feedback from their peers and the experts.

Day 3 was devoted to participants finalising their RBPTs based on the review feedback and learning from the first two days, followed by an exhibition displaying the finished resources. Collaborative groups of participants from the same regions were also created to ensure continuity in the efforts. In the concluding session, potential impediments in implementing RBPTs in the class and ways to overcome these were discussed. Points like large number of students in classrooms, limited time for covering wide ranging syllabi, additional duties assigned to teachers, came up in the discourse.

Each of the workshops also had additional talks by Prof. L.S. Shashidhara, who heads the Centre of Excellence in Science and Mathematics Education, (COESME, IISER Pune), on leadership and funding opportunities for teachers. There was also an information session by Dr Apurva Barve, Centre Coordinator (COESME) explaining the larger vision of the RBPT workshops.

On one evening of the workshop at IISER Mohali, there was also special a panel discussion with faculty from IISER Mohali, Dr Arvind, Dr N G Prasad, Dr Ramaswamy, Dr Amit Kulashreshta, Dr Vinayak Sinha on the topic “What do practicing scientists expect from students”. A cultural program, by IISER Mohali students was organized.

The British Council was represented by Ms. Shruti Jain and Ms. Manjula Rao at IISER Mohali, Ms. Mousumi Mondal and Ms. Manjula Rao the Tezpur workshop, and Ms. Kajari Mitra and Ms. Shruti Jain at Pune workshop respectively.

All participants who successfully completed the workshops were given certificates. The workshops were well received and participants responded enthusiastically in preparing RBPT posters, many of whom expressed interest in attending the Level two workshops.

Facilities:

Boarding and lodging were provided free of cost to the participants, on campus of the host institute. Travel Allowance, as per actuals, was also paid to participants.

Follow Up for Participants:

All resource materials, including the presentations and handouts, which contained sample RBPTs were shared with the participants. The list of participants of each workshop with contact details was also

shared with the intention of enabling the participants to share their RBPTs as well as to get support from their peer group while implementing RBPTs in the class room. Participants are also encouraged to keep in touch with COESME at IISER Pune to share their reflections regarding using RBPTs in the class room. Selected participants from the Pune RBPT workshop will be invited for further training in the Level 2 workshops. A database of RBPTs created through the workshops is also being planned, in order to provide participants with a larger pool of ready RBPTs to choose from for use in the classroom.

Level 2 Workshop

The level 2 workshop aimed to build on the principles of RBPTs already laid down in the Level 1 workshop. It was also designed to provide the participants with the skills necessary to become trainers for the regional workshops planned across the country.

Selection

Participants for the level 2 workshop were selected from the pool of participants from the pilot workshop in Pune (2016) as well as from Level 1 workshops held in Tezpur and Mohali (Jan 2017). Expressions of interest were invited from the participants. Selections were made by a joint committee of representatives from IISER Pune and Newton Bhabha Fund.

Selection was based on criteria such as participants' understanding of the concept of RBPTs; the willingness to act as trainers for regional workshops and in their respective colleges; recommendations of the trainers from Sheffield Hallam University; leadership and communication skills.

For the March 2016 Pune group, we also considered whether the participants had used RBPTs in classroom subsequent to the workshop or had contributed in spreading this concept at regional level.

Participants

45 participants from all over India covering all 4 core subjects of physics, chemistry, mathematics and biology participated in the workshop.

Workshop

This workshop extended over 4 days. The first day of the Level 2 workshop was designed to coincide with the last day of the level 1 workshop. This served to refresh the basics of RBPTs among the participants. The participants reviewed RBPTs prepared by Level 1 participants and drew learnings from a bird's eye perspective.

On the second day, the participants got together to identify the successes and areas of development from the Level 1 workshops, in their capacity as observers. They also arrived at the definition of ideal professional development in the Indian context.

There were also discussions on workshop experience from the perspective of the trainers and the participants. Skills, such as offering inputs without being patronizing or critical were also developed. The day also included an activity to model the flight of the pteranodon, a type of flying dinosaur to demonstrate the key features of scientific enquiry.

On the third day, participants were asked to work in groups to create presentations that would involve planning activities to simulate real life situations, such as preparing a schedule for a full three day RBPT workshop. There were also sessions on impact assessment, potential opportunities and obstacles in planning and organising.

On the fourth day, the teams then made their presentations to the entire group, to receive feedback and inputs. This also provided the opportunity for the entire group to learn from each other's insights. Participants were given detailed information on how to organise regional RBPT workshops in their states / regions and invited to submit a detailed proposal.

All participants who successfully completed the workshops were given certificates making them eligible to be chosen as trainers for the regional rounds.

Trainers

A team of 5 experts from Sheffield Hallam University, UK provided training on all four days. The team consisted of two trainers from Biology and one each from Physics, Chemistry and Mathematics respectively.

Facilities:

Boarding and lodging were provided free of cost to the participants, on campus of the host institute. Travel Allowance, as per actuals, was also paid to participants.

Project evaluation and course correction

At the end of each workshop, a session wise review of the workshop was conducted jointly by the trainers, representatives of the Newton-Bhabha program and COESME, IISER Pune. The effectiveness of various activities, was evaluated, lacunae were identified and the appropriate course corrections were implemented during the next workshop of the series. For example, an activity to model the flight of the pteranodon, a type of flying dinosaur, was added after it was observed that elements of scientific enquiry, and investigative projects needed to be added to the workshop curriculum. Written feedback received from participants was also considered.

Acknowledgement:

COESME, IISER Pune wishes to acknowledge Prof Arvind, Dr N.G. Prasad, and team from IISER Mohali and Prof Mihir Kanti Choudhuri, Vice Chancellor, Tezpur University and Professor Prasanta Kumar Das and his team from Teaching Learning Centre at Tezpur University for their support and cooperation in the organising of the workshops.

Annexures:

1. Representative photographs, Level 1 workshops at Mohali, Tezpur and Pune
2. Biographies of experts - level 1 Workshop on Research Based pedagogical tools (Tezpur and Mohali, Pune respectively)
3. Copies of Schedule Level 1 workshop at Pune
4. Representative set of Feedback forms – Level 1
5. Representative photographs, Level 2 workshop at Pune
6. Biographies of experts - level 2 Workshop on Research Based pedagogical tools
7. Copies of Schedule Level 2 workshop at Pune
8. Full List of participants (Level 1 and Level 2 workshops)

Representative photographs from Level 1 workshops

1. IISER Mohali:



Group photo (top) and sessions at Mohali Level 1 workshop

2. Tezpur University:



Group Photo (bottom) and sessions at Level 1 workshop in Tezpur

3. IISER Pune

Group Photo (top) and sessions at Level 1 Workshop in Pune



**STEM Teacher Training Workshops to develop Research Pedagogical Tools
(For Level 1 workshop at Tezpur University and IISER Mohali)**

Overview of Sheffield Hallam University

Sheffield Hallam University has been established for more than 30 years ago. The University has an outstanding track record in providing solutions to improve the quality of science and STEM Education. Its work includes running national and international STEM Education programmes; initial teacher education courses; the continuous professional Development of STEM teachers, curriculum projects; public engagement in STEM activities; and research. University runs large innovative national STEM Education projects in the UK that have included the development of research-based teaching units at all levels, including Problem Solving with, Pupil Researcher Initiative etc. They also conduct workshops to build capacity of teachers and educators to enable them to write teaching resources effectively and put that in practice. Problem-based teaching and learning to engage students in developing ideas, deep understanding and skill to solve real world problems through scientific inquiry and problem solving processes is the another area of University's work.

Subject Expert	Profile
 <p align="center">Gareth Price</p>	<p>Gareth is a Senior Lecturer and Publisher at the Centre for Science Education (CSE) in Sheffield Hallam University where he conducts research and develops teaching and learning materials with a particular focus on inquiry. He is currently engaged in completing a PhD looking at the place of creativity in science, has published papers on the nature of inquiry and presented on this topic at conferences both in the UK and internationally.</p> <p>Gareth has been involved as a writer, editor, CPD provider, writing workshop lead and publisher on the following research and inquiry-based learning projects carried out by the CSE: How Science Works; STEM Subject choice and Careers; Inquiry Based Science Education (IBSE) Brunei; and Inspiring Science (Thailand). Gareth led the EU Make the Link project in which CSE was a partner. This project looked at the links between STEM and global development.</p>
 <p align="center">Julie Jordan</p>	<p>Julie is Professional Development Lead and Principal Lecturer in Science Education at Sheffield Hallam University. She supports the academic and strategic business planning for the Centre for Science Education and the development of related professional learning programmes. In addition, Julie leads the Sheffield Institute of Education's (SIOE) Special Interest Group in Science Education Research and is a professional development consultant and advisor for a number of national organizations. In relation to research and knowledge exchange, Julie has expertise in the design of research based models of professional development, including the use of Japanese Lesson Study in English Schools and Higher Education, the design of professional learning frameworks to implement Inquiry Based Science Education approaches, building capacity in professional development leadership, education project design, development and evaluation.</p>

 <p>John Walker</p>	<p>John Walker has over twenty five years of experience in science education, as a teacher, senior leader in school, trainer and consultant. He currently co-leads Sheffield Hallam University's science provision for Teach First, one of the top ten graduate recruiters in the UK. John also runs a training and consultancy business through which he works with a wide range of educational organisations in the UK and abroad. Before joining Sheffield Hallam University John spent several years as a Professional Development Leader at the UK's National Science Learning Centre, based at the University of York. John's areas of expertise are principally in the teaching of chemistry, educational leadership and management, practical work in science, and the use of digital technology to support teaching and learning. He is a fellow of the Royal Society of John is also a Chartered Science Teacher and co-editor of Croner's Manual for Heads of Science.</p>
 <p>Christopher Olley</p>	<p>Chris Olley has a first degree in Pure Mathematics from Warwick and masters degree from Institute of Education in mathematics education. He was a teacher of mathematics in various non-selective state comprehensive schools including Holland Park School as second in department and Deptford Green School as head of the mathematics department. Chris PGCE course director (post graduate certificate in education) in secondary mathematics teaching for Goldsmiths, University of London and until last year at King's College London for 12 years. He has wide ranging overseas experience, teaching in Tanzania for two years, teacher training in Uganda, teacher development in Nigeria, South Africa, curriculum development in Kenya, etc. He is currently working on curriculum development projects in Ghana, teacher development in India and the UK and directing a London wide schools tournament in problem and puzzle solving in mathematics. Chris is co-author Text Book of series for Ugandan secondary schools now in its 4th Edition (2012). Before taking up his post at Sheffield Hallam University Gareth worked for Collins Educational Publishers as Publishing Manager for e-Publishing (2000 - July 2003), Commissioning and developing electronic titles, working with other subject-specific publishers as appropriate, across the curriculum; Publishing Manager for Science Maths and Technology (1998 – 2000); Commissioning Editor for Science (1993 – 1998); Project Leader for Science (1989 – 1992).</p>
 <p>Diana Bracewell</p>	<p>Diana has been a Physics teacher for 13 years and is a Master's graduate in Teaching and Learning. She is driven by a love of learning, and the desire to pass the joy it brings, on to others. Her work in schools and her research with the Science Learning Centres and Huddersfield University, have given her a deep understanding and extensive knowledge of current practice and pedagogy. She has delivered continuing professional development (CPD) on: diversity/anti-oppression, wellbeing, mediation, restorative justice, teaching Gifted and Talented learners, engaging girls in STEM subjects, social media for learning, BYOD (Bring Your Own Device) for learning, Inquiry-based Learning, and HOTs (Higher Order Thinking skills).</p>

STEM Teacher Training Workshop on Research Based Pedagogical Tools, 26th Feb – 1st Mar, 2017 at Indian Institute of Science Education and Research (IISER Pune).

Workshop Schedule

This Workshop is designed to support lecturers as they move towards a greater involvement of research-based pedagogies in their day-to-day practice. It seeks to identify practices that are most likely to encourage the development of an active, reflective student and clarify how these will fit into the situation in Indian colleges.

The Workshop begins with a welcome and introduction to the Workshop and a keynote talk looking at the the nature and potential of Research-Based Pedagogical Tools.

Day Two continues by exploring our hopes and concerns about the coming Workshop and seeks to identify the characteristics we want to develop in our students. It then looks at what we can do, or stop doing, to make this development more assured.

With a clear view of where we want to go we can then reflect on existing practice, draw out activities and approaches that are promising from the Indian experience and supplement these with insights from RBPTs from around the world. By the end of this day we will have created a set of criteria we can use to inform the development of novel RBPTs for Indian colleges.

Days Three and Four will be devoted to creating first drafts of teaching and learning approaches based on the identified best practice. By the end of the Workshop delegates should have an initial draft of projects they are going to work on and have made contacts with supportive colleagues who are developing complementary resources.

Day 1: Sunday 26th February 2017

Time	Activity	Format	Venue
5:00	Registration		Lecture Hall Complex ground floor
6:00	Opening Remarks by Prof. L S Shashidhara, Professor and Principal Coordinator, Center of Excellence in Science and Mathematics Education, (COESME, IISER Pune)	Talk	CV Raman Auditorium (Lecture Hall Complex)
6:15	Remarks by Representatives from the Department of Biotechnology (DBT); Govt. of India (TBC)	Talk	CV Raman Auditorium (Lecture Hall Complex)

Time	Activity	Format	Venue
6.30	Remarks by British Council Welcome by Kajari Mitra, Senior Manager, British Council Pune		CV Raman Auditorium (Lecture Hall Complex)
6:45	Research Based Pedagogical Tools An introductory talk showcasing the characteristics and applications of Research Based Pedagogical Tools by Gareth Price , Senior Research Fellow - Sheffield Institute of Education / Science Education Team, Sheffield Hallam University	Presentation	CV Raman Auditorium (Lecture Hall Complex)
7:30	Dinner		Dining Hall Complex 1 st Floor

Day 2: Monday 27th February 2017

This day will look at where we are trying to go: the characteristics of students that we wish to develop. With this end in mind we will reflect on existing practice in our own colleges and others across India and draw in insights from RBPT approaches used around the world. This will allow us to develop criteria to inform the development of RBPTs suitable for our own contexts.

Time	Activity	Format	Venue
9:00	Introduction and 'three in three'. Why are we here? A review of what we all hope to get out of this workshop. Creating our 'top three' ambitions for the next three days.	Discussion	Guest House Complex
9:45	The perfect student In groups, prepare a poster to showcase the perfect student - their interests, attitudes, work habits and ambitions. What are we, as teachers, working towards?	Workshop	Guest House Complex
10:30	Poster review and plenary Delegates review the posters of the perfect student to agree the key characteristics and suggest the things teachers can do to help this person develop - or restrict their development. What are the common issues?	Discussion and poster review	Guest House Complex
11:00	Coffee		Ground Floor Guest House Complex
11:30	Pteranodon flight inquiry Pteranodons were large flying reptiles of the Cretaceous period. The genus survived for about 4 million years but all were extinct by about 80 million years ago. This inquiry looks at the mechanics of pteranodon flight to illustrate the key features of scientific research.	Practical activity	Guest House Complex
1:00	Lunch		Dining Hall Complex 1 st Floor

Time	Activity	Format	Venue
2:00	Introduction Review of the insights about the nature of research from the morning and introducing of the exemplar RBPTs.	Discussion	Guest House Complex
2:30	Existing resource review (1) Reviewing a range of RBPTs from different countries and disciplines to gather ideas and approaches that contribute to effective RBPTs.	Workshop.	Guest House Complex
3:30	Tea		Ground Floor Guest House Complex
4:00	Existing resource review (2) Reviewing a range of RBPTs from different countries and disciplines to gather ideas and approaches that contribute to effective RBPTs.	Workshop.	Guest House Complex
4:45	Plenary Drawing together insights to create success criteria from the day and setting up the tasks for Day Two.	Plenary	Guest House Complex

Day 3: Tuesday 28th February 2017

This day will require delegates to develop RBPTs that are appropriate for their particular needs. The activity will be supported by short inputs during the day that target particular aspects of the RBPT-creation process.

Time	Activity	Format	Venue
9:00	Introduction A brief review of issues and insights arising from Day One. A structure to develop new RBPTs presented. Delegates put into groups for the RBPT writing task.	Presentation	Guest House Complex
9:30	RBPT workshop (1) Delegates work in groups to produce RBPTs suitable for their particular circumstances. These will be produced as a display which grows throughout the day. INPUT: What makes a convincing context?	Workshop and display creation.	Guest House Complex
10:30	Coffee		Ground Floor Guest House Complex
11:00	RBPT workshop (2) Delegates work in groups to produce RBPTs suitable for their particular circumstances. These will be produced as a display which grows throughout the day. INPUT: Codifying problems - what works (and doesn't)?	Workshop and display development.	Guest House Complex
12:30	Lunch		Dining Hall

Time	Activity	Format	Venue
			Complex Ground Floor
1:30	RBPT workshop (3) Delegates work in groups to produce RBPTs suitable for their particular circumstances. These will be produced as a display which grows throughout the day. INPUT: Teaching, learning and panda bears!	Workshop and display development.	Guest House Complex
3:00	Tea		Ground Floor Guest House Complex
3:30	RBPT review Delegates critique work from all the groups and collate any good ideas and approaches while offering feedback to others. INPUT: Assessment - which approaches are suitable for RBPTs?	Discussion.	Guest House Complex
4:45	Plenary Drawing together insights from Day Two and setting up the tasks for Day Three.	Plenary	Guest House Complex
5:15	Talk Dr Apurva Barve, Coordinator, Center of Excellence in Science and Mathematics Education, COESME IISER Pune.	Presentation and Talk	To be confirmed

Day 4: Wednesday 1st March 2017

This day will require delegates to complete and share their RBPTs and provide feedback.

Time	Activity	Format	Venue
9:00	Introduction Drawing together insights from Day Two and presenting the tasks for Day Three.	Presentation	Guest House Complex
9:45	RBPT workshop (4) Delegates work in groups too finalise their RBPTs drawing in insights from the previous day's feedback. INPUT: Considerations when implementing change - how can you embed these proposals in your situation?	Discussion and poster creation.	Guest House Complex
10:30	Coffee		Guest House Complex
11:00	Exhibition Delegates present their finished resources to ensure all participants benefit from the work.	Presentation and discussion	Ground Floor Din ing Hall Complex

Time	Activity	Format	Venue
12:30	Lunch		First floor Dining Hall Complex
1:30	Interaction with Prof. L.S.Shashidhara Professor and Coordinator, Center of Excellence in Science and Mathematics Education, (COESME, IISER Pune), on Leadership and funding opportunities for teachers.	Presentation and talk	CV Raman Auditorium
2.30	Action planning Delegates consider how the RBPTs will be developed and deployed in their own situation. Collaborative groups created for future development as appropriate.	Workshop.	CV Raman Auditorium
4:00	Tea		CV Raman Auditorium
4:30	Closing session Summary of key insights from the workshop. An opportunity for delegates to ask questions of the trainers and peers.	Workshop.	CV Raman Auditorium
5:00	Finish	Plenary	CV Raman Auditorium

Breakfast: 1st floor Dining Hall Complex 7:30 am – 8.45 am

Dinner: 1st floor Dining Hall complex 7:30 pm – 9.00 pm

Bus timings (For Participants staying at IITM Only)

Morning (IITM to IISER Dining Hall Complex) – 8.15 am

Evening (IISER Dining Hall Complex to IITM) – 8.15 pm

In case of queries/emergencies please contact –

IITM - 020 2590 4450 (Contact Persons – Mr. Deepak / Mr. Bhushan / Mr. Rahul / Mr. Ganesh)

IISER - 020 25908101 (Guesthouse reception)



MHRD

Pandit Madan Mohan Malaviya National Mission for Teachers and Training

Centre of Excellence in Science and Mathematics Education (COESME), Indian Institute of Science Education (IISER) Pune



STEM Teacher Training Workshop on Research Based Pedagogical Tools, IISER Mohali, 23-25 Jan 2017

Name:

DR. J.S. Sehrawat

Contact Number:

9988031199

Email ID:

JAGMINDER@PU.AC.IN

Name of Department, Institute/College:

ANTHROPOLOGY Deptt, Punjab University Chandigarh.

Qualifications and Subject of specialisation:

PhD, PGDPS, BED, Forensic Anthropology

1. Where did you hear about this workshop (Tick the appropriate one)

IISER Pune website/email

British council website/email

IISER Mohali website/email

Any other (please specify)

Email from Vice-Chancellor, Punjab University Chandigarh.

2. Your achievements from this workshop:

Was this workshop useful for your professional development? (Circle the appropriate one)

to a great extent

to some extent

partially

not at all

Your comments:

Learned new skills of research-based pedagogical tools to make teaching-learning process more informative & interactive in the classroom. Knowledge gained will help promote research potential/strength of student.

3. Quality of workshop:

a. Delivery of the workshop (Tick the appropriate one)

	Strongly Agree	Agree	Disagree	Strongly disagree
The content of the workshop was appropriate	✓			
The trainers were responsive to people's needs	✓			
The workshop was well organised and planned	✓			
The workshop was inspirational	✓			
The content was relevant and useful	✓			

b. Which session did you find most useful and why?

RBPT Workshop + Panel Discussion (24.1.17)

4. How would you rate the overall quality of the workshop? (Circle the appropriate one)

Excellent

Good

Poor

Very poor

5. Suggestions for improvement:

- Increase duration of workshop for 2-3 more days
- Engage eminent scientists + educators for effective implementation of RBPT.
- Interaction among participants should be more
- Students (UG/PG) should be involved

6. Administration/Accommodation/Resources

	Excellent	Good	Average	Below average	Very poor
Facilities at the venue	✓				
Overall organisation	✓				

Please add comments:

Excellent arrangements at all levels.

7. In your opinion, what are the advantages of using RBPTs? The students will be able to:

- ✓ 1. Understand concepts better
- ✓ 2. Learn research methodology
- ✓ 3. Learn to work in groups
- ✓ 4. Memorise definitions
5. Any other: interactive + demonstrative learning.

8. Will you use RBPT in your classrooms following this workshop?:

a. What will you do?

Yes, I will definitely apply the gained skills/knowledge. I will present a difficult problem to the student & they will be asked to write questions to answer/solve the given problem. Available resources/instruments/expertise will be used by them to respond.

b. How will you know that students have understood the content?

- content information of students will be assessed by interactive discussions about the used RBPT and its outcome.

c. When do you plan to start doing the above?

: From my next practical class of UG students next Friday (27.1.17)

d. Do you expect to face any difficulties/problems in implementing this method in your classroom?

- Administrative + financial constraints will be the initial hurdles which will be sought out in co-operation with the chairman of the department, students, support staff etc. Non-cooperative students will be involved by meeting their interests in RBPT learning.

e. Any other comments / suggestions / additions for future training:

- suggestion given above (5) point

9. Would you be interested in spreading this pedagogical innovation among your peers? If yes, in what way?

Yes, I will share the information & skills learnt in this workshop with my fellow faculty members in the department as well as the university during BOS or staff meetings. The seminar I can...

Signature

**STEM Teacher Training Workshop on Research Based Pedagogical Tools,
IISER Mohali, 23-25 Jan 2017**

Name: JOHN J. BINZE

Contact Number: 09845778878

Email ID: johubinze64@gmail.com

Name of Department, Institute/College: Dept. of Maths, St. Joseph's College

Qualifications and Subject of specialisation: MSc, MPhil, BEd Functional Analysis

1. Where did you hear about this workshop (Tick the appropriate one)

IISER Pune website/email British council website/email IISER Mohali website/email

Any other (please specify)

2. Your achievements from this workshop:

Was this workshop useful for your professional development? (Circle the appropriate one)

to a great extent to some extent partially not at all

Your comments:

3. Quality of workshop:

a. Delivery of the workshop (Tick the appropriate one)

	Strongly Agree	Agree	Disagree	Strongly disagree
The content of the workshop was appropriate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The trainers were responsive to people's needs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The workshop was well organised and planned	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The workshop was inspirational	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content was relevant and useful	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b. Which session did you find most useful and why? Subject Session
Very interactive and very good resource persons

4. How would you rate the overall quality of the workshop? (Circle the appropriate one)

Excellent Good Poor Very poor

5. Suggestions for improvement:

6. Administration/Accommodation/Resources

	Excellent	Good	Average	Below average	Very poor
Facilities at the venue	✓				
Overall organisation	✓				

Please add comments:

7. In your opinion, what are the advantages of using RBPTs? The students will be able to:

- ✓ 1. Understand concepts better
- ✓ 2. Learn research methodology
- ✓ 3. Learn to work in groups
4. Memorise definitions
5. Any other: _____

8. Will you use RBPT in your classrooms following this workshop?:

- a. What will you do? Ask them analysis the qns and problems
find out the research content
Groups discussion, Presentation, Poster Presentation
- b. How will you know that students have understood the content?
By their explanation, chart preparation
- c. When do you plan to start doing the above? By next term
- d. Do you expect to face any difficulties/problems in implementing this method in your classroom?
Yes, we have lot of weak students
- e. Any other comments / suggestions / additions for future training:

9. Would you be interested in spreading this pedagogical innovation among your peers? If yes, in what way?

Yes
Tell others to attend this kind of workshops

**STEM Teacher Training Workshop on Research Based Pedagogical Tools,
 IISER Mohali, 23-25 Jan 2017**

Name: *Dr. Jayanti Dutta*

Contact Number: *9988721401*

Email ID: *jayantiduttaray@yahoo.co.in*

Name of Department, Institute/College: *UGC-Human Resource Development Centre*

Qualifications and Subject of specialisation: *PhD (Cytogenetics/Zoology)*

1. Where did you hear about this workshop (Tick the appropriate one)

IISER Pune website/email
 British council website/email
 IISER Mohali website/email

Any other (please specify) *from Panjab University Communication*

2. Your achievements from this workshop:

Was this workshop useful for your professional development? (Circle the appropriate one)

to a great extent
 to some extent
 partially
 not at all

Your comments: *I learnt training skills, understood how research can be used to enhanced learning.*

3. Quality of workshop:

a. Delivery of the workshop (Tick the appropriate one)

	Strongly Agree	Agree	Disagree	Strongly disagree
The content of the workshop was appropriate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The trainers were responsive to people's needs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The workshop was well organised and planned	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The workshop was inspirational	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content was relevant and useful	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b. Which session did you find most useful and why?

All sessions. Since they were linked to and based upon one another

4. How would you rate the overall quality of the workshop? (Circle the appropriate one)

Excellent
 Good
 Poor
 Very poor

5. Suggestions for improvement:

- If you are conducting a programme on RBPT, please do not force IISER movie or panel discussion on the participants. It distracts from the main agenda.*
- It is not necessary to...*

6. Administration/Accommodation/Resources

	Excellent	Good	Average	Below average	Very poor
Facilities at the venue	✓				
Overall organisation	✓				

Please add comments:

7. In your opinion, what are the advantages of using RBPTs? The students will be able to:

1. Understand concepts better ✓
2. Learn research methodology ✓
3. Learn to work in groups ✓
4. Memorise definitions
5. Any other: Develop Scientific temper

8. Will you use RBPT in your classrooms following this workshop?:

a. What will you do? Yes,
 As I am conducting Faculty training in higher education, I'll incorporate one exercise on creating RBPTs for the participants. I'll prepare training modules on the Pattern of RBPTs

b. How will you know that students have understood the content?
 When they submit the research output, we can know their understanding through the assessment of parameters. During the course of the research by the student we can gauge it by their progress, design, queries

c. When do you plan to start doing the above? In my next training programme which I'll coordinate in February, 2017.

d. Do you expect to face any difficulties/problems in implementing this method in your classroom?
Yes,

e. Any other comments / suggestions / additions for future training:
 Please conduct training on more 'Pedagogical Skills' There is a dearth of such platforms. {Questioning skills, Evaluation skills}

9. Would you be interested in spreading this pedagogical innovation among your peers? If yes, in what way?
Yes, I'll recommend this to all my colleagues, participants of previous programmes.

STEM Teacher Training Workshop on Research Based Pedagogical Tools, Tezpur University, 27th-30th Jan 2017

Name: NUKSHIMOA

Contact Number: +91-9436438276

Email ID: moa_sempo@rediffmail.com

Name of Department, Institute/College: PHYSICS Dept., Fazl Ali college - Mokokchung (Nagaland)

Qualifications and Subject of specialisation: M.Sc., M.Tech.

1. Where did you hear about this workshop (Tick the appropriate one)

IISER Pune website/email

British council website/email

Tezpur University/email

Any other (please specify) Through a colleague

2. Your achievements from this workshop:

Was this workshop useful for your professional development? (Circle the appropriate one)

to a great extent

to some extent

partially

not at all

Your comments: will be difficult to implement considering the present curriculum of our college, but will be able to applied on certain topic at certain semester.

3. Quality of workshop:

a. Delivery of the workshop (Tick the appropriate one)

	Strongly Agree	Agree	Disagree	Strongly disagree
The content of the workshop was appropriate	✓			
The trainers were responsive to people's needs	✓			
The workshop was well organised and planned	✓			
The workshop was inspirational		✓		
The content was relevant and useful		✓		

b. Which session did you find most useful and why?

Workshop and display development was useful, as it makes us to think and come up with new ideas using existing science/technology.

4. How would you rate the overall quality of the workshop? (Circle the appropriate one)

Excellent

Good

Poor

Very poor

5. Suggestions for improvement:

LCD Projector set-up needs to be done before the session starts to avoid interruption during presentation.

6. Administration/Accommodation/Resources

	Excellent	Good	Average	Below average	Very poor
Facilities at the venue	✓				
Overall organisation	✓				

Please add comments:

7. In your opinion, what are the advantages of using RBPTs? The students will be able to:

1. ✓ Understand concepts better
2. Learn research methodology
3. ✓ Learn to work in groups
4. Memorise definitions
5. Any other: _____

8. Will you use RBPT in your classrooms following this workshop?:

a. What will you do?

Introduce RBPT to the students and will work on that in certain selected topic as it will be difficult to use it in the whole of syllabus.

b. How will you know that students have understood the content?

If they can link the requirement with justification and identify it, then it can be assumed that the content have been understood.

c. When do you plan to start doing the above?

Right after the workshop as soon as i join my college.

d. Do you expect to face any difficulties/problems in implementing this method in your classroom? If yes, please outline.

Maybe yes, particularly in obtaining the equipments required.

e. Any other comments / suggestions / additions for future training:

If possible, it would be very helpful if it can be held in some more NE-states of India in future.

9) Would you be interested in spreading this pedagogical innovation among your peers? If yes, in what way?

Yes, by introducing them to the RBPT & interact with them during off periods.

STEM Teacher Training Workshop on Research Based Pedagogical Tools, Tezpur University, 27th-30th Jan 2017

Name: Dr. P. RAJA

Contact Number: 9436250901

Email ID: prajachf@gmail.com

Name of Department, Institute/College: Department of Plant Protection
 College of Horticulture and Forestry,

Qualifications and Subject of specialisation: Ph D, Plant Pathology Pasighat - 791102

1. Where did you hear about this workshop (Tick the appropriate one)

IISER Pune website/email British council website/email Tezpur University/email

Any other (please specify) through J.N. college whatsapp

2. Your achievements from this workshop: learned what is RBPT's, developed tools

Was this workshop useful for your professional development? (Circle the appropriate one) Yes.

to a great extent to some extent partially not at all

Your comments:

continue to train other teachers and help us to organize
 to our college faculty

3. Quality of workshop:

a. Delivery of the workshop (Tick the appropriate one)

	Strongly Agree	Agree	Disagree	Strongly disagree
The content of the workshop was appropriate	<input checked="" type="checkbox"/>			
The trainers were responsive to people's needs	<input checked="" type="checkbox"/>			
The workshop was well organised and planned		<input checked="" type="checkbox"/>		
The workshop was inspirational		<input checked="" type="checkbox"/>		
The content was relevant and useful	<input checked="" type="checkbox"/>			

b. Which session did you find most useful and why? Development of RBPT's and tools
 and posters preparation.

4. How would you rate the overall quality of the workshop? (Circle the appropriate one)

Excellent Good Poor Very poor

5. Suggestions for improvement:

Accommodation facilities may be improved by providing all
 basic needs and ~~the~~ comfort, for hot water, good blanket
 etc...

6. Administration/Accommodation/Resources

	Excellent	Good	Average	Below average	Very poor
Facilities at the venue		Good	✓		
Overall organisation	✓				

Please add comments:

7. In your opinion, what are the advantages of using RBPTs? The students will be able to:

1. Understand concepts better
2. Learn research methodology
3. Learn to work in groups
4. Memorise definitions
5. Any other: _____

8. Will you use RBPT in your classrooms following this workshop?: YES.

a. What will you do? Look into important story / problem identified by the student of the region. Help them to write their own context, problem, Activity, Assessment and resources and output.

b. How will you know that students have understood the content?

- By asking them questions

c. When do you plan to start doing the above? Immediately after returning from the workshop. I will provide the RBPT tools to do research based education.

d. Do you expect to face any difficulties/problems in implementing this method in your classroom? If yes, please outline. I will not be facing any trouble

e. Any other comments / suggestions / additions for future training:

- Teachers and facilitators are good,
- management of event and classes are excellent
- only problem in accommodation.
- food is excellent

9) Would you be interested in spreading this pedagogical innovation among your peers? If yes, in what way?

I wish to do? but problem of funding

STEM Teacher Training Workshop on Research Based Pedagogical Tools, Tezpur University, 27th-30th Jan 2017

Name: DR. BIDYUT DEKA

Contact Number: (+91) 94 35286618

Email ID: deka.bidyut@gmail.com

Name of Department, Institute/College: Department of Physics, Girijananda Chowdhury
 Institute of Management & Technology - Tezpur

Qualifications and Subject of specialisation: M.Sc., Ph.D. ; Physics (Electronics & Photonics)

1. Where did you hear about this workshop (Tick the appropriate one)

IISER Pune website/email British council website/email Tezpur University/email

Any other (please specify)

2. Your achievements from this workshop:

Was this workshop useful for your professional development? (Circle the appropriate one)

to a great extent to some extent partially not at all

Your comments: It's a nice course content. and for not a single moment during the workshop feels sleepy or bore. Thank you for giving me the opportunity to be part of it.

3. Quality of workshop:

a. Delivery of the workshop (Tick the appropriate one)

	Strongly Agree	Agree	Disagree	Strongly disagree
The content of the workshop was appropriate	<input checked="" type="checkbox"/>			
The trainers were responsive to people's needs	<input checked="" type="checkbox"/>			
The workshop was well organised and planned	<input checked="" type="checkbox"/>			
The workshop was inspirational	<input checked="" type="checkbox"/>			
The content was relevant and useful	<input checked="" type="checkbox"/>			

b. Which session did you find most useful and why?

Mostly all the session.

4. How would you rate the overall quality of the workshop? (Circle the appropriate one)

Excellent Good Poor Very poor

5. Suggestions for improvement:

Hope to more workshop like this in near future and more details discussion/time in concern subject.

6. Administration/Accommodation/Resources

	Excellent	Good	Average	Below average	Very poor
Facilities at the venue	✓				
Overall organisation	✓				

Please add comments:

7. In your opinion, what are the advantages of using RBPTs? The students will be able to:

- ✓ Understand concepts better
2. Learn research methodology
- ✓ 3. Learn to work in groups
4. Memorise definitions
5. Any other: _____

8. Will you use RBPT in your classrooms following this workshop?:

a. What will you do?

Introduce RBPT to the students and will work on that in certain selected topic as it will be difficult to use it in the whole of syllabus.

b. How will you know that students have understood the content?

If they can link the requirement with justification and identify it, then it can be assumed that the content have been understood.

c. When do you plan to start doing the above?

Right after the workshop as soon as i join my college.

d. Do you expect to face any difficulties/problems in implementing this method in your classroom? If yes, please outline.

May be yes, particularly in obtaining the equipments required.

e. Any other comments / suggestions / additions for future training:

If possible, it would be very helpful if it can be held in some more NE-states of India in future.

9) Would you be interested in spreading this pedagogical innovation among your peers? If yes, in what way?

Yes, by introducing them to the RBPT & interact with them during off periods.

Representative photographs from Level 2 workshop at IISER Pune



Brief Overview of Sheffield Hallam University

Sheffield Hallam University has been established for more than 30 years ago. The University has an outstanding track record in providing solutions to improve the quality of science and STEM Education. Its work includes running national and international STEM Education programmes; initial teacher education courses; the Continuous Professional Development of STEM teachers, curriculum projects; public engagement in STEM activities; and research.

University runs large innovative national STEM Education projects in the UK that have included the development of research-based teaching units at all levels, including Problem Solving with, Pupil Researcher Initiative etc. They also conduct workshops to build capacity of teachers and educators to enable them to write teaching resources effectively and put that in practice. Problem-based teaching and learning to engage students in developing ideas, deep understanding and skill to solve real world problems through scientific inquiry and problem solving processes is the another area of University's work.

Brief Bios of Subject experts (For Level 1 and Level 2 workshop at IISER Pune)**Gareth Price**

Gareth is a Senior Lecturer and Publisher at the Centre for Science Education (CSE) in Sheffield Hallam University where he conducts research and develops teaching and learning materials with a particular focus on inquiry. He is currently engaged in completing a PhD looking at the place of creativity in science, has published papers on the nature of inquiry and presented on this topic at conferences both in the UK and internationally.

Gareth has been involved as a writer, editor, CPD provider, writing workshop lead and publisher on the following research and inquiry-based learning projects carried out by the CSE: How Science Works; STEM Subject choice and Careers; Inquiry Based Science Education (IBSE) Brunei; and Inspiring Science (Thailand).

Gareth led the EU Make the Link project in which CSE was a partner. This project looked at the links between STEM and global development. He also led the Common Ground Curriculum project on which he led the development of the science component of the CGC curriculum which is being taken up by International Schools across the world. The curriculum covered all years. He has also written science modules based on the CGC specifications for the International School of Brussels who are currently implementing the scheme.

Before taking up his post at Sheffield Hallam University Gareth worked for Collins Educational Publishers as Publishing Manager for ePublishing (2000 - July 2003),

Commissioning and developing electronic titles, working with other subject-specific publishers as appropriate, across the curriculum; Publishing Manager for Science Maths and Technology (1998 – 2000); Commissioning Editor for Science (1993 – 1998); Project Leader for Science (1989 – 1992).



George Forster

George has more than thirty years' experience in science education and science communication. Following his PhD and teaching qualification, George was a senior lecturer in Biomedical Science at Stevenson College and Napier University in Edinburgh and then Head of Information at the Agricultural Research Council. George joined the National Health Service in 1987 and became a Regional Director and Health Authority Chief Executive. He left the Service in 1996 and established Boost Education, which develops education programmes and the science content of science centres. Recent projects include the Hong Kong Space Centre, Oman Botanic Garden, Putian Science and Technology Centre, Singapore Science Centre, Courses for Gifted and Talented students in Malaysia, a tool kit for Senior High School teachers in the Philippines and a project involving more than 25,000 students



Dr Dorothy Warren

Dorothy Warren is a freelance science education consultant, working with teachers and school senior leaders in Yorkshire and the North East of England. She has a broad experience of science education but her real specialism and area of expertise is chemistry.

Having started her career as a research chemist, Dorothy took up teaching in the '90s and worked in schools in comprehensive schools in York and the North East as a teacher and Head of Science. Dorothy has been involved in curriculum development projects since 1999 when she was a Royal Society of Chemistry, Teacher Fellow. She left teaching in 2005 to become a science education consultant for North Yorkshire County Council.

More recently Dorothy has been involved in a number of projects with the Royal Society of chemistry including the development and delivery of the 'Developing Expertise in Teaching' face to face and online CPD courses. Since September 2013, Dorothy has been involved with the Yusuf Hamied Inspirational Chemistry Programme which aims to develop active learning in Indian schools.

Dorothy also works for STEM Learning, where she acts as a Regional development leader for two Science Learning Partnerships; Carmel College in Darlington and The North Tyneside Learning Trust.

**Christopher Olley**

Chris Olley has a first degree in Pure Mathematics from Warwick and masters degree from Institute of Education in mathematics education. He was a teacher of mathematics in various non-selective state comprehensive schools including Holland Park School as second in department and Deptford Green School as head of the mathematics department. Chris PGCE course director (post graduate certificate in education) in secondary mathematics teaching for Goldsmiths, University of London and until last year at King's College London for 12 years. He has wide ranging overseas experience, teaching in Tanzania for two years, teacher training in Uganda, teacher development in Nigeria, South Africa, curriculum development in Kenya, etc. He is currently working on curriculum development projects in Ghana, teacher development in India and the UK and directing a London wide schools tournament in problem and puzzle solving in mathematics. Chris is co-author Text Book of series for Ugandan secondary schools now in its 4th Edition (2012)

**Diana Bracewell**

Diana has been a Physics teacher for 13 years and is a Master's graduate in Teaching and Learning. She is driven by a love of learning, and the desire to pass the joy it brings, on to others.

Her work in schools and her research with the Science Learning Centres and Huddersfield University, have given her a deep understanding and extensive knowledge of current practice and pedagogy.

She has delivered continuing professional development (CPD) on: diversity/anti-oppression, wellbeing, mediation, restorative justice, teaching Gifted and Talented learners, engaging girls in STEM subjects, social media for learning, BYOD (Bring Your Own Device) for learning, Inquiry-based Learning, and HOTs (Higher Order Thinking skills).



Mark Windale

Mark Windale was Principal Lecturer and International Lead in CSE and is now, following his retirement, director of Vector STEM Partnerships an international consulting body and training provider specialising in education. In a long career at CSE, he ran over 35 national and international CPD and curriculum development projects. He was involved as a project director or manager, writer, and CPD provider for numerous projects that have capacity built teams of teachers and educators to develop RBPT resources including: Problem Solving, Pupil Researcher Initiative, How Science Works, Engineering a better world, Inspiring Science, IBSE Brunei, and HEBAT Sains. For many years Mark led all CSE's projects in South and South East Asia and now live in Thailand.

**STEM Teacher Training Workshop on Research Based Pedagogical Tools,
1st Mar- 4th Mar, 2017 at Indian Institute of Science Education and Research (IISER Pune).**

The Level 2 Workshop Programme

This Workshop is designed to help teachers as they prepare to lead their own Workshops with colleagues and more widely across their regions. It is assumed that everyone who attends this workshop will have successfully completed the Level 1 RBPT Workshop.

Day 1: Wednesday 1st March 2017

Time	Activity	Format	Venue
9:00	Introductory task Welcome and introduction to the day's task as observers and mentors for Level 1 delegates.	Talk and discussion	Guest House Complex

From 9:30 onwards the L2 delegates will be working alongside the Level 1 delegates. The introductory session will ensure that the L2 delegates are familiar with the data they need to collect so that they can share their reflections on Day 2. (Below is the schedule for Level 1 for 1st March)

9:45	RBPT workshop (4) Delegates work in groups to finalise their RBPTs drawing in insights from the previous day's feedback. INPUT: Considerations when implementing change - how can you embed these proposals in your situation?	Discussion and poster creation.	Guest House Complex
10:30	Coffee		Guest house complex
11:00	Exhibition Delegates present their finished resources to ensure all participants benefit from the work.	Presentation and discussion	Guest House Complex
12:30	Lunch		First floor Dining Hall complex
1:30	Interaction with Prof. L.S.Shashidhara Professor and Coordinator, Center of Excellence in Science and Mathematics Education, (COESME, IISER Pune), on Leadership and funding opportunities for teachers.	Presentation and talk	CV Raman Auditorium
2.30	Action planning Delegates consider how the RBPTs will be developed and deployed in their own situation. Collaborative groups created for future development	Workshop.	CV Raman Auditorium

	as appropriate.		
4:00	Tea		CV Raman Auditorium
4:30	Closing session for Level 1 Summary of key insights from the workshop. An opportunity for delegates to ask questions of the trainers and peers.	Workshop.	CV Raman Auditorium
5:00	Session	Plenary	CV Raman Auditorium

Day 2: Thursday 2nd March 2017

This day will provide inputs on a range of theoretical issues and give delegates chance to demonstrate skills they will find useful while running their own workshops.

Time	Activity	Format	Venue
9:00	Keynote: Effective professional development A review of the characteristics of effective professional development as revealed by the research base.	Talk	Guest House Complex
9:45	Level 1 feedback Identify the successes of the Level 1 Workshops and identify areas for improvement or development. Contribute insights to a group-wide feedback. To what extent did the delegates have a high-quality and appropriate Workshop experience? What was it like to be present as an observer/mentor during the process?	Workshop	Guest House Complex
10:30	This is the PD you are looking for ... In groups, agree the key features and characteristics of PD that will be useful, compelling and practical in the Indian context.	Discussion and plenary	Guest House Complex
11:00	Coffee		Guest House Complex
11:30	The Workshop experience Activity and discussion looking at the experience of participants at a Workshop. What do the trainers experience? What do the trainees experience?	Discussion and plenary	Guest House Complex
12:15	Working with adults How to offer advice and guidance without being patronising or critical. A workshop looking at mechanisms to offer feedback that is respectful, appropriate and useful	Practical activity	Guest House Complex

1:00	Lunch		Dining hall, Ground floor Guest house Complex
2:00	Pteranodon flight inquiry Pteranodons were large flying reptiles of the Cretaceous period. The genus survived for about 4 million years but all were extinct by about 80 million years ago. This inquiry looks at the mechanics of pteranodon flight to illustrate the key features of scientific research.	Practical activity	Guest House Complex
3:30	Tea		Guest House Complex
4:00	Lessons from the Cretaceous... Discussion about the research activity showcased by the pteranodon experiment. Was it really research? How can we support development of inquiry skills? Open, guided, structured inquiry models.	Workshop.	Guest House Complex
4:45	Plenary Drawing together insights to create success criteria from the day and setting up the tasks for Day Three.	Plenary	Guest House Complex

Day 3: Friday 3rd March 2017

This day will require delegates to develop a programme for a Workshop that they could facilitate with their colleagues or more widely in their local areas. There will be opportunities in the smaller groups to practise presentations and seminar management to prepare for the final day conference.

Time	Activity	Format	Venue
9:00	Introduction A brief review of issues and insights arising from Day Two. Tasks for the remainder of the Workshop are distributed. Working in groups, delegates will produce a 3-day L1 Workshop, a 1-day 'taster' session, an event for local schools and a presentation about the initiative to their management group.	Presentation	Guest House Complex
9:30	Workshop authoring (1) Delegates work in groups to produce their selected output suitable for their particular circumstances. These will be showcased in the final Conference. INPUT: Measuring impact - how can we evaluate our work?	Workshop	Guest House Complex
10:30	Coffee		Guest House Complex

Time	Activity	Format	Venue
11:00	Workshop authoring (2) Delegates work in groups to produce their selected output suitable for their particular circumstances. These will be showcased in the final Conference. OUTPUT 1: Presentation opportunities for delegates	Workshop	Guest House Complex
12:30	Lunch		Dining hall, Ground floor Guest house Complex
1:30	Workshop authoring (3) Delegates work in groups to produce their selected output suitable for their particular circumstances. These will be showcased in the final Conference. INPUT: Stakeholders - who will help and hinder?	Workshop	Guest House Complex
3:00	Tea		Guest House Complex
3:30	Workshop authoring (4) Delegates work in groups to produce their selected output suitable for their particular circumstances. These will be showcased in the final Conference. OUTPUT 2: Presentation opportunities for delegates	Workshop	Guest House Complex
4:45	Plenary Drawing together insights from Day Two and setting up the tasks for Day Three.	Plenary	Guest House Complex

Day 4: Saturday 4th March 2017

This day will require delegates to complete and share their Workshop programmes through a structured conference program. There are six 30 minute slots available and delegates can choose which slots to attend based on their interest or need.

Time	Activity	Format	Venue
9:00	Introduction Drawing together insights from Day Two and presenting the tasks for Day Three.	Presentation	Guest House Complex
9:45	Workshop authoring (5) Delegates work in groups to produce their selected output suitable for their particular circumstances. These will be showcased in the final Conference.	Workshop	Guest House Complex

Time	Activity	Format	Venue
	OUTPUT 3: Presentation opportunities for delegates		
10:30	Coffee		Guest House Complex
11:00	Delegates attend a conference with presentations, posters and seminars about their proposed Workshops. These will be organised around 4 sessions as below. Session 1	Conference	Guest House Complex
11:30	Session 2		
12:00	Session 3		
12:30	Lunch		Guest House, Dining Hall
1:30	Session 4	Conference	Guest House Complex
2:00	Plenary What did we learn from the conference sessions? Building good ideas into our proposed programs.	Workshop.	Guest House Complex
3:00	Tea		Guest House Complex
3:30	Closing session Summary of key insights from the workshop. An opportunity for delegates to ask questions of the trainers and peers.	Plenary	Guest House Complex
4:00	Finish		Guest House Complex

1st March:

Breakfast: 7:30 am – 8.45 am, 1st floor, Dining Hall complex

Dinner: 7:30 pm – 9.00 pm, 1st floor, Dining Hall complex

2nd, 3rd and 4th March

Breakfast: 7:30 am – 8.45 am, Dining Hall, Guest house complex.

Dinner: 7:30 pm – 9.00 pm, Dining Hall, Guest house complex.

In case of queries/emergencies please contact –IISER – 020 25908101 (Guesthouse reception)

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Participants list for RBPT Workshop

Sr No	Name	Department/Institute	Subject	Email
LEVEL 1- MOHALI				
1	Dr. Satish Kumar	Dept. Applied Sci. Mathematics, Panjab Univ. SSG Regional Centre, Hoshiarpur	Mathematics	satsdma@gmail.com
2	Dr. Punita Jain	Dept. Applied Science, Ludhiana College of Engineering and Technology, Ludhiana – Punjab	Mathematics	punita0369@gmail.com
3	John J Binze(Assos. Prof.)	Dept. of Mathematics, St. Joseph’s College, Bangalore	Mathematics	Johnbinze64@gmail.com
4	Dr. Stephen Titus (Assos. Prof.)	Dept. of Mathematics, St. Joseph College, Bangalore	Mathematics	titusteve@gmail.com
5	Simrandeep Singh (Assis. Prof.)	Dept. of Applied Science, Mathematics, Ludhiana College of Engineering & Technology, Katani Kalan – Ludhiana – Punjab	Mathematics	singh_simran84@yahoo.com
6	Mr. Kapil Kumar (Assis. Prof.)	Dept. of Mathematics, Atma Ram Sanatan Dharma College, University of Delhi – New Delhi	Mathematics	kapilkumarmaths@gmail.com
7	Dr. Sunaina Bhasin	Dept. Applied Science, CGC Technical Campus, Jhanjeri Mohali. Punjab	Mathematics	hodappscjhanjeri@cgc.ac.in
8	Asha Rani	Surya World College, Baplor, Punjab	Mathematics	-
9	Dr. Azad Ahmed Ahanger	Shere Kashmir Univ. Of Agricultural Sci. And Tech. Srinagar	Life Sciences	azadpharm@rediffmail.com deanvety@skuastkashmir.ac.in
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