Developing creativity in science classrooms through a capacity building model of continuing professional development (CPD)

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Introduction

Countries across the world are

• attempting to make a pedagogical paradigm shift
• teacher-centred to student-centred (sage-on-the-stage to meddler-in-the-middle)
• to develop desired scientific capabilities, including creative thinking and creativity
Requirement

- Ownership of change
- Active participation of all
- Country wide capacity building
- In-service training
- Development of curriculum materials
ATLAS

Active Teaching and Learning Approaches in Science (ATLAS)
Pilot and National programmes

- Thailand
- Malaysia
- Azerbaijan
- Sri Lanka
- UAE
- Gambia
- Caribbean
- Slovakia

Linked programmes

- Singapore
- Brazil
- Poland
Aims

To introduce science teachers, curriculum developers and educators to a range of effective teaching and learning approaches, designed to

- raise the motivation and achievement
- encourage collaborative learning
- be more student-centred
- implement contextualised learning
- equip students with the
  - knowledge and understanding
  - investigative
  - problem-solving
  - ICT
  - critical and creative thinking
  - communication skills
  - and creativity

to meet the challenge of the 21st century
Aims (cont’d)

To develop the participants
- confidence, experience, expertise and capability in using the approaches
- ability to write curriculum materials adopting the approaches
- ability to train other teachers in the approaches and thus create a sustainable model of development

To establish
- an in-country ATLAS Unit a sustainable network of Teacher/Training Associates
Capacity Building CPD Model

Five 5-day workshops for science teachers, officers, educators and curriculum developers

- active teaching and learning
- experimental, investigative and problem solving approaches
- use of ICT in the teaching and learning of science
- writing workshop
- train as trainers
- gap of 3-4 months between each workshop for trialling, reflecting and reporting
Active teaching and learning

Introduction to a wide range of approaches for developing creative thinking in science

• active reading
• active writing
• group discussion techniques
• games
• simulation
• role play and drama
• supported by
  – coaching/mentoring
  – action research
Experimental, Investigative and Problem Solving Approaches

- Using practical work
- Scientific enquiry
- Developing skills
- Facilitating through the investigation and problem solving processes
- Integrating investigative work
- Developing “whole brain” thinking and creativity
Using ICT in the teaching and learning of science

- Collecting information
- Datalogging
- Data handling
- Simulation
- Modelling
- ICT for supporting creative thinking and creativity
Writing workshop

- Developing skills in writing curriculum materials
- Selecting a topic
- Identifying the key concepts and skills
- Putting into conceptual progression
- Identifying appropriate teaching and learning approaches
- Writing a unit that incorporates a range of approaches and experiences for developing creative thinking and creativity
Training as trainers

• “Working as a teacher of students” and “working as a trainer of teachers”
• Overcoming anxieties or apprehensions of participants
• Developing a session
• The role of the trainer
• Developing their own training pack
• Training teams action plan
Thailand

- 1999 Education Reform Act
- 2 pilots
- programme involving all 36 Rajabhat Universities
- exemplar curriculum materials published by MoE for all schools
- training DVD developed by Nation Channel
- ATLAS Thailand Unit (NSTDA)
• World Bank funded national programme
• 1 school from every province
• School director training
• Master teacher support role
• Annual budget from MoE for dissemination training and support
Outcomes (teachers)

• gone through the paradigm shift
• embraced student-centred teaching and learning
• put more time into preparation of very creative learning experiences, active reading, active writing, games, simulations, role plays, drama, science projects and valued the benefits
• developed their critical and creative thinking and creativity
• become role models of creativity
• created creative learning environments
• embedded into their learning programmes
• started to work in teams to plan curriculum programmes and develop their curriculum materials
• developed their capability, experience and expertise to train other teachers and already trained other teachers
Outcomes (students)

- enjoyed science more
- enjoyed learning through the new approaches
- had greater conceptual understanding
- worked more cooperatively and developed team working skills
- enjoyed learning themselves, developing and sharing ideas
- developed their critical and creative thinking skills
- could solve problems
- could plan and carry out their own science projects
- achieved higher levels of attainment
Key Elements

- Piloting
- School Leadership Training
- Education Officer Training
- Capacity Building CPD Model
- Staged implementation
- Integrated evaluation
- Action research
- Mentoring/reflective partners
- Phased reporting
- Curriculum materials and training DVD
- ATLAS Unit
Session structure

- Educational philosophy
- Hands-on experience (exemplar activities)
- Reflection
- Feedback
- Consolidation
- Presentation
- Developing teachers creativity
Development of curriculum materials

- Developed during pilot
- Ongoing as part of ATLAS Unit activity
- Support dissemination training
- Support implementation
School Leadership Training

- Managing curriculum development and change
- Leadership and team building
- Strategic planning and implementation
- Action plan regional dissemination
Education Officer Training

- Strategies and frameworks for supporting, monitoring and evaluating curriculum and pedagogical change
- Enhancing ability to play effective role in supporting, monitoring and evaluating progress
- Develop the tools for supporting, monitoring and evaluating the implementation
- Action plan the supporting, monitoring and evaluation of the project
Integrated evaluation

- Base line
- Reflective diaries
- Questionnaires
- Interviews
- Reflective partners
- Action research
- Reports
- On-site visits
Staged implementation

- Progressive implementation
- Sensitive to the needs of all
- Target setting
- Part of strategic plans
- Support
- Mentoring
- Monitoring
- Structured reflection
- Review
Action research

- Student diaries
- Teacher reflective diaries
- Questionnaires
- Pre and post tests
- Observation schedules
- Interviews
- Provided with basic tools
Mentoring/reflective partners

- Paired up
- Every month
- Lesson observation
- Paired reflection
- Provided with proforma
Phased reporting and accreditation

- Reports written before following workshop
- During dissemination training
- Based on action research
- Reflective partners
- Staged accreditation (e.g. Pg Cert., Diploma, M.Ed)
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