An examination of Locally and Externally Initiated Teacher Professional Development Programmes for Science and Mathematics Teachers in Ugandan Secondary Schools

Charles Kyasanku
Makerere University, Uganda
Visiting Professor, Center for the Study of International Cooperation in Education – Cice, Hiroshima University- Japan.
Presented on 15/12/2016 In Cice Seminar Room

Presentation outline

- Background to the study
- Problem statement
- Objectives
- Conceptual framework
- Methodology
- Findings
- Challenges
- Suggestions
- Conclusion

Background to the study

- Uganda introduced Universal Primary education (UPE) in 1996, by 2004, a bulge of primary school leavers started putting pressure on the Secondary Education (SE) sub-sector in terms of access.
- Other factors that contributed to the huge demand for Secondary education included especially lower secondary education included; abolition of school fees, change in legal framework, rising rate of primary school completion, slow growth of publicly provided SE and the Dakar Framework for Action 2000.
- This increasing demand for SE resulted into the Universal Post-Primary Education and Training (UPPET) policy in 2007. This was preceded by the science policy introduced earlier on in 2005 which made all science subjects (biology, chemistry, and physics in addition to mathematics) compulsory at Ordinary (lower secondary) Level (O-Level).
- However, performance in Science subjects and Mathematics has been unsatisfactory. For example, between 2000-2004, grade attainment in Science subjects and Mathematics was appallingly low (about 45% of the students failed) (Ministry of Education & Sports, 2007b)
- In 2009, 50% of the students sitting the Ordinary Level examinations failed to obtain the lowest grade of a pass 8. (Daily Monitor, February 2010)

Problem statement

- Therefore, the need for CPD among Science and Mathematics teachers has become crucial. In fact, several attempts have been made at policy, school, and individual levels as well as through other agencies to improve on the knowledge, skills, attitudes and competences of teachers in teaching of science and Mathematics. However, little research has been done on the complementary benefits of both locally-initiated and externally-initiated CPD programmes.
- It is on that basis that this exploratory case study was carried out to assess the contribution of various initiatives of CPD in the improvement of science and mathematics teaching in secondary schools in Uganda.

Objectives

1. To examine the arrangements that are in place at national level to continuously develop science and mathematics teachers.
2. To find out what externally donor-initiated programmes are available for continuously developing science teachers' proficiency
3. To find out how practicing science and mathematics teachers continually enhance their professional practices
4. To establish the various strategies that secondary schools employ to continually develop their science and mathematics teachers
5. To analyse the perceptions of individual teachers towards the contribution of the various forms of teacher professional development to their professional practice.
6. To assess the ways in which the donor-initiated professional development programmes complement local initiatives (at personal, school and national level)

Conceptual framework

(Mulkeen *et al*, 2007)

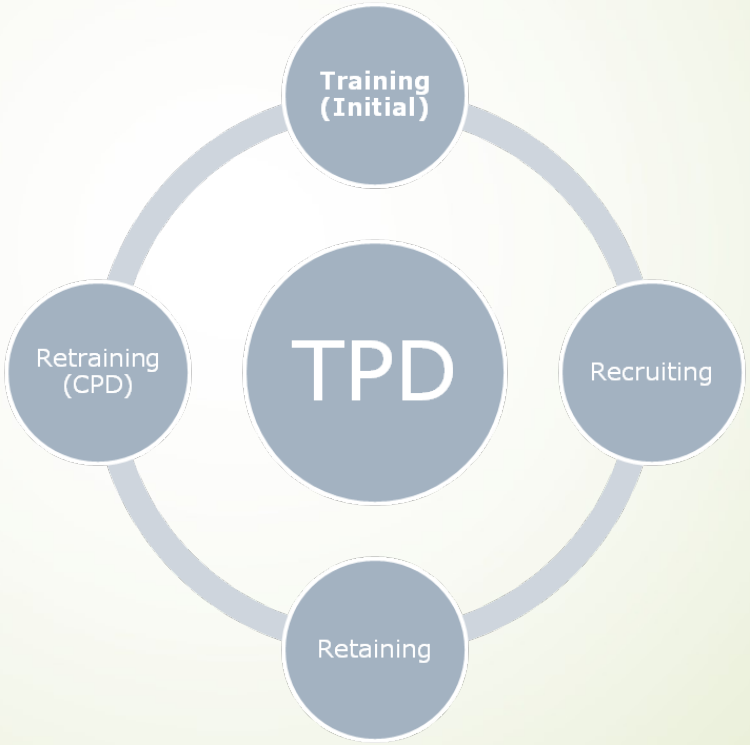

Figure 1: Levels of Teacher Professional Development

Retraining or Continuing Professional Development (CPD) is the main focus of this study

- Previous research (Mulkeen *et al*, 2007) shows that In-service professional development (INSET) programs have served ***three*** different purposes:

  (a) upgrading untrained teachers' qualifications;

  (b) providing postgraduate degree-level programs for qualified teachers; and

  (c) offering short-term training related to subject and pedagogy areas

CPD is necessary for supporting teachers so that they can:

- Extend and deepen subject matter knowledge for teaching
- Extend and refine knowledge and skills in curriculum, instruction and assessment
- Strengthen skills and dispositions to study and improve teaching
- Expand responsibilities and develop leadership skills
- Develop a professional identity.

(Conway *et al*. 2009: 51).

- Nevertheless, it has to be noted that CPD is yet to be appreciated as a crucial component of teacher development (in the context of Uganda etc)

Methodology

- This was an exploratory case study on the attributes of CPD.
- This was done through qualitative semi-structured interviews with: policy makers from the Ministry of Education and Sports (MoE&S), DES and the NCDC, school administrators, and science and mathematics teachers.
- The interviews complemented policy documents (GWPE, ESSP, policy instruments on compulsory teaching of science subjects, Education policies, Reports)
- For verification, Questionnaires were administered among students in the participating schools(3 students per school)
- Data analysis was by thematic content analysis.

Findings

Factors that create the need for CPD

- The dynamic nature of Maths and science
- Policy and curriculum change
- Changing nature of students and their needs
- Need for new ways of adapting to the changes
- General low performance in Maths and science
- General negative attitude towards Maths and science
- Personal development and need to refresh self
- To develop teacher confidence and interest as they grow in the profession
- Need to interact with others in the same profession

Voices from the field

"In the past sciences were for exceptional students, and the mode of delivery was ok. CPD provides a simpler approach of teaching sciences". (ATal-04-11)

"Most science teachers join teaching not because they love the profession but because of circumstances. Hence CPD is important in order to make them learn to love teaching of science (attitude), get more practical skills to enable them teach well because the majority lack interest, and also to be able to handle large classes and improvise". (ALub-04-11)

Existing CPD programmes

Initiated by Schools	Initiated by teachers	Gov't agencies and donors	Initiated by other agencies
Workshops	Teacher associations	UNEB workshops & sharing exam findings	Mak subject workshops and other projects
Seminars	Further /additional studies	SESEMAT workshops	Africa Development Bank workshops
Departmental meetings	Research and publishing	NCDC workshops and partnering with teachers	World Vision workshops
Team teaching	Peer-teaching & assessment	Cyber (ICT) programme	Lottery International lab training
Science clubs	Consult peers & other schools (locally/abroad)	MoE&S Technology shows	Kampala Pharmaceutical Industries (technical)
Support teachers upgrading	Science exhibitions	UNCST workshops	Other NGOs e.g. Revolution Walk Pure
Expert teachers from other schools	Outreach activities e.g. UNEB marking		
Science exhibitions	Joining student discussion groups		
Collaboration with overseas schools			

Delivery of CPDs (organised / conducted)

	School-initiated	Teacher-initiated	Govt & donors	Other agencies
Organised	Departmental meetings SWOT analysis 1 day seminar/workshop focussed on an identified need Local expertise and guest speakers Team planning and teaching	One-on-one consultation Peer teaching Individual research Evening or holiday study	1-2 weeks workshops (mainly during holidays or weekend) by selection & invitation Area of focus chosen by agency Sharing evaluation reports	Short-term workshops & training

Knowledge/skills targeted by the CPDs

Initiated by Schools	Initiated by teachers	Gov't agencies and donors	Initiated by other agencies
Pedagogy/methodology		Pedagogy/methodology	
Assessment /examination skills	Assessment /examination skills	Assessment /examination skills	
Instructional materials design (creativity)		Instructional materials design (creativity)	
Professional conduct			
Practical & science application		Practical & science application	Practical & science application
Technical e.g. equipment handling		Technical	Technical
	ICT	ICT	ICT
	Science concepts & content	Science concepts & content	Science concepts & content
	General		General
		Curriculum issues	

Perceived knowledge/ skills gained from across the various CPD programmes & impact on teaching and learning

Perceived gains & impact	Attributes/Evidence
Enhanced professionalism and teacher identity	Relationship building with fellow teachers More self esteem and confidence, more ethical… Teacher approach to science is positive
Improved knowledge	All CPDs involve sharing knowledge Improved research skills, improvement in theory teaching, ICT knowledge…
Improved pedagogy/methodology and assessment skills	Teaching is more practical now (innovativeness) Ability to demonstrate e.g. in physics Ability to involve learners Activity-based learning Ability to set examinations and marking guides with confidence
Improved student understanding & better performance	Students understand concepts better More students getting distinctions in science subjects “last year the best student in our school was a science student”
Improved teacher-student relationship	Gap between teacher and learner closed Students seen as clients Better guidance and counseling skills
Enhanced student attitudes towards sciences	Students more confident Students enjoy learning More science students at A-level
Enhanced professional esteem and increased personal benefits	Some teachers have become consultants for UNEB as examination officers or for NCDC as subject coordinators Research skills: Teachers have published books and pamphlets Increased salary due to improved student performance or higher credentials

Voices from the field

"By scoring 10 for 8, it is evidence that CPD programmes are working . The best candidate for UCE scored D1 for all science subjects. Therefore, there is improvement in the performance of students at both "O" and "A" levels. (ATal-04-11)

There has been an improvement in performance at S4 and S6 science. In the past we couldn't access "A" in Maths and Physics, today we have "A" and "B". For O – Level, performance has improved particularly in Maths and Physics. (ASum-04-11)

Challenges in provision of CPD in general and for science teachers specifically

- Discrepancy between CPD ideals and reality on the ground (e.g. Resource constraints)
- Heavy workloads /large classes/lack of time for CPD
- Overcrowded syllabus/curriculum
- Exam-driven system
- Deep-rooted negative attitudes towards science
- Lack of harmonisation between UNEB & NCDC syllabus
- Lack of a mandatory institutionalised CPD programme means some teachers miss opportunities (e.g. SESEMAT requires subscription fees)
- Feeling that CPD participation is not synonymous with personal gains e.g. promotion, increased pay…

Suggestions for improving CPD

- CPD should be part of the national school calendar & ensure that every teacher benefits
- Curriculum review with a focus on meaningful and relevant content
- Harmonise the teaching syllabus (NCDC), the examination syllabus (UNEB) and CPD activities
- CPD gains would be greater if it goes hand in hand with a supportive/conducive environment on the ground.

  Schools and teachers need to be provided with resources for any effective change at the classroom level to take place (Hall 2000).
- Strengthening the interface between schools and Universities (ITE & CPD)

  "*Everything should go back to colleges of training to emphasise hands-on skills e.g. use of computers in teaching". (Thil-04-11)*
- Down-size or further decentralize clusters from regional-district to school-based clusters in a given locality

Voices from the field

For SESEMAT, although they do regional training/facilitation, It is high time they came down on ground. The practicality in workshops is simple but a follow-up at the bottom is needed (TKcb-04-11).

Monitoring and evaluation: to generate solid evidence that CPD interventions work

Institute a reward system for teachers who develop through CPD

Conclusion

- There are several factors that account for the need for CPD. All are necessary and important for holistically developing science education
- Gains from CPD cannot be overemphasised
- Different actors in CPD provision (sometimes duplicating efforts): need for a more coherent approach
- Possible to have a mandatory institutionalised CPD model benefitting all teachers? How could it look like?
- CPD should be viewed as an essential component of Teacher Education & Development (see Mulkeen model)
- CPD could be deliberately & systematically organised to cater for core professional attributes (Deepen subject matter knowledge for teaching, extend and refine knowledge and skills in curriculum, instruction and assessment, strengthen skills for improved teaching (methodology), develop leadership skills, develop a professional identity(Conway *et al*. 2009: 51).

References

- Conway, FP, Murphy, R, Rath, A and Hall, K (2009). *Learning to teach and its implications for the continuum of teacher education: A nine-country cross-national study.* Dublin: The Teaching Council.
- Daily Monitor, 4 February 2010. Retrieved from www.monitor.co.ug
- Hall, K (2000) A Conceptual Evaluation of Primary Assessment Policy and the Education Policy Process in the Republic of Ireland. *Compare,* Vol. 30, No 1.
- Mulkeen, A, Chapman, DW, DeJaeghere, JG, and Leu, E (2007). *Recruiting, retaining, and retraining secondary school teachers and principals in Sub-Saharan Africa.* World Bank Working Paper No. 99. African Human Development Series. Washington DC: The World Bank.
- MoE&S (2007a) Project proposal for the expansion of the Secondary Science Education and Mathematics Teachers' (SESEMAT) pilot project. Support towards implementation of Universal Post-Primary Education and Training (UPPET). Kampala: Ministry of Education and Sports.
- MoE&S (2007b) *Statistical Abstracts.* Kampala: Ministry of Education & Sports
- MoE&S (2010) *Statistical Abstracts.* Kampala: Ministry of Education & Sports

I thank you for your attention