Models and Best Practices in Teacher Professional Development

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Objective:

This document presents examples of models and best practices in Teacher Professional Development (TPD) for ICT in Education. To be effective and successful teacher professional development should be of high quality and relevant to teachers' needs.

Introduction:

Education changes, in particular those changes associated with the rhetoric of the global information society, require staff development activities. In order for changes to be affected in the classroom, additional technical and pedagogical support is necessary. Professional Development programmes should include all 'staff' who are to contribute to the implementation of the intended changes – school principals, teachers, and technical and administrative support personnel. In this section the focus will be on teachers. Apart from the students themselves, teachers and school leadership are the main agents of change at the school level.

Information and communication technologies have brought new possibilities to the education sector, but at the same time, they have placed more demands on teachers. They now have to learn how to cope with computers in their classrooms, how to compete with students in accessing the enormous body of information – particularly via the internet and how to use the hardware and software to enhance the teaching/learning process. Bhatta (2008) would contend that unless teachers are fully comfortable with new approaches to teaching inherent in ICT integration, providing students with computers and educational content alone will have limited impact on the teaching and learning process. It is also essential that teachers understand that ICT-based education only changes their role, rather than minimizing or eliminating their role altogether. Butler and Leahy (2003) would argue that there is a need to develop teachers' thinking to that of 'critical judgment' (Papert, 1990) to ensure that teachers are not limited by their current understandings and experiences of digital technologies as a somewhat intimidating new dimension to their classroom practices. They add that there is a need

for teachers to be provided with opportunities to reflect on their practice as they make use of the technologies so that they can become *active generators* rather than *passive consumers* of knowledge. Teachers they believe must be empowered as transformative agents who through professional development should cultivate "*knowledge of practice*" (ibid: 2).

A New Paradigm for Teacher Education

Swarts (2008:10) notes the need for teachers "to be adequately and appropriately trained through pre-service and in-service teacher education programmes to teach ICT Literacy". She considers that access to ongoing and appropriate ICT professional development is a prerequisite for *all* teachers, if they are to improve their confidence and competence in using ICT to meet the needs of *all* their students. Pelgrum and Law (2003) believe that teacher education, and in particular initial teacher education needs to undergo changes to prepare teachers for the challenges of the information age. Bhatta (2008) considers that effective teacher preparation in ICT-based education requires adequate training in three areas:

- Information technology literacy
- Child-centric interactive teaching
- Integration of ICT-based instruction in child-centric interactive teaching.

She notes that the most straightforward task is making teachers IT literate with the greatest challenge lying in the third area of ICT integration. Pelgrum and Law (op.cit.) point to empirical data from cross national surveys suggesting a lack of ICT training opportunities in pre and in-service programmes generally. Furthermore the courses available predominately focus on the basic technical skills to the detriment of courses related to the gap areas of pedagogical/ didactical principles. Loveless (2000 cited in Butler and Leahy 2003) also notes the tendency in current international models of professional development to focus on evidence of *teaching competence* rather than *confidence in change*. Such approaches can leave teaching and learning largely unaffected in schools and can greatly hinder the potential of digital technologies to radically alter the manner in which teaching and learning are constructed. They also inhibit the opportunity for critically examining education systems and for questioning, "the very nature of what we understand by learning" (GoI, 2002: 141 cited in Butler and Leahy, ibid). Hadad (UNESCO, Online) contends that a new paradigm for teacher

education must emerge that replaces one-shot training with lifelong professional preparedness and development of teachers along a continuum of a) initial preparation, b) structured opportunities for retraining, upgrading and acquisition of new knowledge and skills and c) continuous support.

Models for Teacher Professional Development

TPD (also know as "in-service" or "teacher education") is the instruction provided to teachers to promote their development in a certain area. It is the tool by which policymakers' *visions for change* are disseminated and conveyed to teachers. Though the recipient of TPD is the teacher, the ultimate beneficiary is the student. Thus, *teacher professional development is often the most critical component of any ICT project.*

According to Gaible and Burns (2005:25) TPD can be divided into three broad categories:

- **Standardized TPD**

  The most centralized approach, best used to disseminate information and skills among large teacher populations
- **Site-based TPD**

  Intensive learning by groups of teachers in a school or region, promoting profound and long-term changes in instructional methods
- **Self-directed TPD**

  Independent learning, sometimes initiated at the learner's discretion, using available resources that may include computers and the Internet.

The three models are described in more detail below.

1. Standardized TPD

Standardized TPD typically represents a centralized approach, involving workshops, training sessions and in many cases the cascade model of scaled delivery. Standardized, training-based approaches generally focus on the exploration of new concepts and the demonstration and modeling of skills. When employed in accordance with best practices standardized approaches can effectively:

- Expose teachers to new ideas, new ways of doing things and new colleagues

- Disseminate knowledge and instructional methods to teachers throughout a country or region
- Visibly demonstrate the commitment of a nation or vendor or project to a particular course of action

Pros:

- Standardized TPD can be very effective in building awareness about computers, learner-centred instruction and/or new curricula.
- In the cascade model (training the trainer), a small group of teachers are selected to receive intensive training before returning to their own institutions to provide ICT training for their peers – serving as 'champion teachers" or a "vanguard team".
- The cascade model has tremendous potential particularly with regard to support provision at school level.

Cons:

- The model tends towards a technical rationalist approach (Schön, 1983 cited in Butler and Leahy 2003).
- The approach hovers on a 'one fit for all' principle for upgrading teachers' knowledge base that is independent of context.
- Teachers are constructed as *knowledge consumers* with the responsibility to bring what they have learned back to their classrooms and put it into practice
- Workshops taking place at one time and in one location without on-going support rarely result in effective changes for teaching and learning.
- Weaknesses in the cascade approach are linked with a tendency to develop the vanguard team's *user* skills as opposed to their *provider* skills.
- Cascade training flows down through levels of less experienced trainers until it reaches the target group; in the process, complex information tends to be lost.
- Without incentives to motivate teachers to participate, collaborate and experiment with new strategies, teachers may be unwilling to 'take advantage' of their 'more knowledgeable' colleagues in the TPD 'vanguard teams'.

To bring about change will take more than the exchange of information typical of "make and take" top-down centralized models for professional development programmes (Dede, 1999 cited in Butler and Leahy, 2003). Research findings indicate

that informal contact and communication between teachers is the most prevalent form of transferring ICT knowledge.

2. Site-based TPD

Site based TPD often takes place in schools, resource centres or teachers colleges. Teachers work with local ("in house") facilitators or master teachers to engage in more gradual processes of learning, building master of pedagogy, content and technology skills. Site based TPD often focuses on the specific, situational problems that individual teachers encounter as they try to implement new techniques in their classroom practices.

Site-based models tend to:

- Bring people together to address local issues and needs over a period of time
- Encourage individual initiative and collaborative approaches to problems
- Allow more flexible, sustained and intensive TPD
- Provide ongoing opportunities for professional learning among a single set of teachers

(Gaible and Burns, 2006)

Pros:

- Many studies have pointed to the importance of site-based TPD programmes which can be linked to change and innovation at the classroom and school level (e.g. Anderson, 1996; Somekh and Davis, 1997; Potter and Mellar, 200; cited in Pelgrum and Law, 2003).
- Study findings also suggest that site-based TPD can be most effective when delivered *"in connection with a school development plan"* (ibid).
- The tendency in site-based TPD is to support the establishment of teacher communities as communities of practice in order to foster the development of the new learning culture desired (Wenger, 2000 cited in ibid.).
- The focus is on aiding the project participants to not only implement new approaches but to *"unlearn the beliefs, values, assumptions and culture underlying their practice"*(Dede, 1999:1 cited in Butler and Leahy, 2003).

Butler and Leahy point to value of incremental learning associated with site-based communities of practice - where every participant has their own perspectives, values

and assumptions that become part of the process of constructing new understandings, as in "forming and reforming frameworks for understanding practice: how students and teachers construct the curriculum…" (Cochran-Smith and Lytle, 1999:65 cited in ibid.).

Cons:

- Site-based approaches are time- and labour intensive requiring locally-based TPD providers skilled in facilitation, instruction, content, curriculum, assessment and technology – as well as in mentoring teachers to find solutions in low-resource environments appropriate to their needs and contexts.
- The establishment and maintenance of a network of facilitators to meet the needs of large-scale TPD programmes would be a challenge for any educational system. In the teacher-poor education systems of the LDCs, the challenge is magnified (Gaible and Burns, 2005).

Self-directed TPD

In self-directed TPD, teachers are involved in initiating and designing their own professional development and would share materials and ideas as well as discuss challenges and solutions.

Pros:

- This approach to professional development helps teachers to become models of lifelong learners.
- Informal versions of self-directed TPD find teachers seeking out experienced colleagues for advice or searching for lesson plans on the Internet.
- The emergence of on-line communities of teachers to provide support in professional development across a range of subject areas and themes (Pelgrum and Law, 2003)

Gaible and Burns (2005) consider that while teachers should certainly be encouraged to participate in ongoing, self-motivated learning, self-directed activities should *not* be used as the *primary* means of providing TPD. Instead, they should be used to complement and extend standardized and/ or site-based TPD.

Teacher Competency Standards

Teacher professional programmes wheter initial or in-service will consitute an important component of educational improvement only if the professional development is focused on *specific changes in teacher classroom behaviors* and particularly if it is aligned with other changes in the educational system. The goal of the UNESCO (Online) "ICT Competency Standards for Teachers" (CST) project is to combine a focus on ICT skills development with emergent views in pedagogy, curriculum, and school organization. The Standards are designed for the professional development of teachers who want to use ICT skills and resources to improve their teaching, collaborate with colleagues, and perhaps ultimately become innovation leaders in their institutions.

Conclusion

A change agenda "in which the technology is fully integrated into the learning process" constitutes a complex pedagogical scenario according to Noss and Pachler (1999: 210) where "the teacher's role will be altered fundamentally". Tinker et al (2007:4) in their paper on recommendations for large scale 1:1 implementations, concur that TPD programmes should not be planned as singular interventions where teachers are simply exposed to opportunities for tinkering with the new technology. Instead, there needs to be a continuous cycle of exploration, reflection, discussion, application, and knowledge building, through which teachers grow professionally and their students gain deeper knowledge. The authors caution that TPD can constitute the largest cost in implementing effective ICT projects, while indicating strategies for reducing cost by concentrating on teaching and avoiding overemphasizing the technology. In an analysis of policies and practices which can address the challenge of promoting change in school cultures where habits are deeply ingrained, Elmore (2000 cited in Farrell 2007:284) makes this key observation:

> People can make fundamental transitions by having *many* opportunities to be exposed to the ideas, to argue them into their own normative belief systems, to practice the behaviours that go with those values, to observe other practicing those values, and, most importantly, to be successful at practicing in the presence of others (that is, to be seen to be successful)...the most powerful incentives reside in the face-to-face relationships among people in the organization, not in external systems.

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Appendix 1 provides an overview of a blend of site-based TPD strategies that have proved effective in maximizing opportunities for teacher exposure, practice and reflection within the new cultural paradigms of teacher education as lifelong professional preparedness.

Appendix 2 provides an overview of a range of ICT resources which can leveraged to enhance TPD interventions.

Appendix 1: Schools as Learning Organizations

> *As teachers work more and more with people beyond their own schools, a whole gamut of new skills, relationships, and orientations will fundamentally change the essence of their profession. This new professionalism is collaborative, not autonomous; open rather than focused; outward looking rather than insular; and authoritative but not controlling. Teachers of today and tomorrow need to do much more learning on the job, or in parallel with it – where they constantly can test out, refine, and get feedback on the improvements they make.*
>
> Fullan (2007:297)

Plomb *et al.* (1996 in Pelgrum and Law, 2003) highlight the need for the change programme to not be exclusively aimed at realizing the future, but also to take care of existing practice.

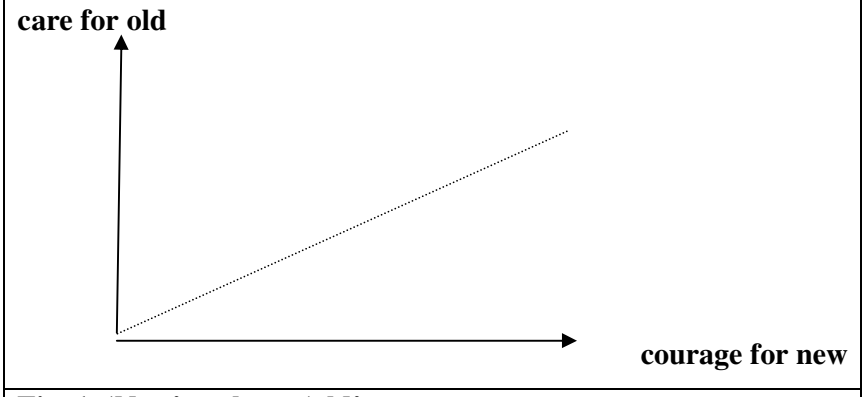

Fig. 1. 'New' replaces 'old'
Source: Plomp *et al.* 1996:32 cited in Pelgrum and Law, 2003

Implementation strategies to encourage the use of ICT in ***traditionally important teaching practices*** **(as 'care')** would include:

- the provision of training on baseline technology skills for teachers and students;
- the provision of a good technology infrastructure, including computer access and network connectivity, to teachers and students;
- challenging the teacher education institutions to systematically integrate ICT into the teacher education programmes, as well as to become actively involved in supporting the change process; and
- the establishment of centres for learning technology in teacher education institutions to support the systematic integration of ICT for educational purposes within these institutions as well as in the school affiliated to them

Implementation strategies to support the development and **widespread adoption of emergent teaching practices (as 'courage')** would include:

- the stimulation, solicitation and funding of project proposals that aim to create examples of desired future arrangements of an education that integrates the use of ICT in ways that would develop students' lifelong learning abilities and move schools in the direction of a learning organization;
- the establishment of experimental teacher education programmes to develop new approaches to teacher education with the aim to transfer knowledge and experiences to regular training programmes; and
- to engage universities and research centres in research integrated with programmes of action on the use of technology in education to develop an adequate knowledge base to guide school efforts.

Models of Site-based TPD at a Glance[1]

Depending on the particular instructional needs, site-based teacher professional development may assume a variety of approaches, some of which are listed below. These approaches may be used individually and together and may be part of both formal professional development and follow-up assistance.

Observation/Assessment

In the **Observation/Assessment** model, the TPD provider—perhaps a master teacher in a school, perhaps a specialist working district-wide—observes teachers in their classrooms, assessing their instructional practices and providing structured feedback. Observation/Assessment may be used as a support measure following workshops or periodically throughout the school year as a peer coaching form of TPD. The reare numerous variations on the Observation/Assessment model, from entire class clinical observations, to 10-minute "snapshots," to "learning walk" approaches

(See *http://www.instituteforlearning.org/howwk.html* for more information on "learning walks.")

Observation/ Assessment at a Glance		
Strengths	**Limitations**	**Costs considerations**
▪ Mutually beneficial for observer and teacher ▪ Observer gains new knowledge ▪ of and exposure to ways of teaching ▪ Teacher being observed receives structured feedback which can improve practice ▪ Overcomes isolation inherent in teaching ▪ Builds local support for innovation and change	▪ Adds to teachers' time burdens ▪ Teachers may identify needs or problems that cannot be addressed by local facilitator ▪ Depends on expertise of local facilitator ▪ Observer must distinguish between assessment (diagnosing lesson and providing feedback to improve instruction) and evaluation (making a judgment about performance)	▪ Costs involve personnel, training, supplies ▪ May be additional costs if laptops are used for observations ▪ If conducted by school-based peers or leaders during the school day, personnel cost is low
Fig. 2: Observation/assessment Model Source: Gaible and Burns, 2005		

Consider using Observation/Assessment to…

- Improve teachers' instructional skills
- Assess or guide teacher implementation of computers or a new instructional approach

How can ICT Strengthen Observation/Assessment?

- Record and display observation data using spreadsheets
- Videotape teachers in action and guide teachers in viewing these videos as a form self-assessment to improve practice.

[1] Source: Gaible and Burns, 2005

Open Lessons

In an **Open Lesson** model, teachers create lessons and invite colleagues (and in some cases, parents and teachers from other schools) to observe the lesson and provide feedback in a post-observation session. In contrast to Lesson Study (see the next model), the focus of Open Lessons is on *teacher* behavior. Open Lessons have a long tradition in Russia and Azerbaijan and are used informally throughout the globe.

In Guinea, for example, the FQEL's *Cercles de Renforcement*1 (a form of TPD where inspectors meet with teachers) used a modified open lesson approach with radio as part of TPD, where teachers listened to radio broadcast of a simulated lesson or observed an actual lesson and provided feedback. Where there is structured feedback, time for discussion, and teacher incorporation of feedback into future lessons, Open Lessons can help teachers develop *basic, intermediate, and advanced* skills.

Open Lessons at a Glance

Strengths	**Limitations**	**Costs considerations**
▪ Builds on-site expertise ▪ Teachers become more comfortable sharing and helping one another to improve practice ▪ Teaching becomes a "public" versus private activity ▪ Can be used successfully in low resource environments ▪ Organized by teachers, for teachers	▪ Requires at least some relatively skilled teachers to serve as models ▪ Participants may not understand how best to benefit from lessons ▪ Only works if teachers share critical feedback (both positive and negative) ▪ Without skilled teachers and discussion sessions managed by a skilled facilitator ▪ An Open Lesson model can reinforce mediocre practices	▪ Conducted by school-based peers or leaders, so cost is low ▪ Addition of technology (podcasting,video, audio recordings, digital images, etc.) increases the scope but adds to cost ▪ Low cost

Fig. 3: Open Lesson Model
Source: Gaible and Burns, 2005

Consider using Open Lessons to…

- Help teachers with instructional design issues
- Focus on assessment and instruction

How can ICT Strengthen Open Lessons?

- Internet-based video teaching episodes allow teachers to participate in an Open Lesson if unable to do so at their own school
- Video-based lessons can expose teachers to activities that they ordinarily do not have the opportunity to view
- Actual or simulated radio broadcasts can also provide an "audio" version of an Open Lesson
- Open Lessons can be recorded via audio and video and placed on the World Wide Web for downloads as podcasts and compressed video

Lesson Study

In **Lesson Study**, teachers collaboratively plan, develop, or improve a lesson; field test the lesson; observe it; make changes; and collect data to see the impact of the lesson on student learning. In contrast to Open Lessons, where the focus is on teacher action, the Lesson Study approach focuses on *student* actions.

Relief International/SchoolsOnline projects in Jordan, Tajikistan and Azerbaijan employ a blended and abbreviated Lesson Study/Open Lesson approach. During workshops, teachers spend the middle two days of the workshop creating and modifying a learner-centered activity that uses ICT. They pilot it with colleagues on the final two days of the workshop. They receive feedback from peers, are provided time to refine the lesson based on this feedback, and implement this refined lesson upon return to their schools. The best and fullest examples of Lesson Study are found in Japan and China, and increasingly in the United States, Canada, Australia and Europe.

Lesson Study at a Glance		
Strengths ▪ Focuses on student learning ▪ Process of pilot testing, observing and refining helps teachers better understand the curriculum-design process ▪ Collaborative—teachers learn from and with one another ▪ Helps build communities of learning and practice ▪ Community-based, collaborative model of ongoing professional development—a strategy for sustaining teacher skills	**Limitations** ▪ Time and labor intensive. ▪ Not a short-term professional development strategy ▪ Demands a certain level of expertise in curriculum, content, instruction and assessment be available in schools ▪ May be diffi cult to coordinate and sustain ▪ Tends to be restricted to cohorts of teachers within a school, as opposed to the whole teaching staff ▪ Involves multiple iterations of a lesson before it attains high quality	**Costs considerations** ▪ Generally low cost ▪ Cost is associated with time, materials and personnel involved ▪ Involves costs of providing an outside facilitator to help instruct and facilitate lesson study
Fig. 4: Lesson Study Model Source: Gaible and Burns, 2005		

Consider using Lesson Study to…

- Help teachers with instructional design issues and instruction
- Shift teachers' focus from what is being taught to how students learn
- Promote whole school collaboration, peer-based learning and communities of practice
- Lesson Study is probably best geared toward teachers with advanced skills looking to further enhance them or toward helping teachers at an intermediate level attain *advanced* skills.

How can ICT Strengthen Lesson Study?

- ICT can be thoughtfully integrated into the lesson, not as an add on (technology for technology's sake) but as a tool to promote higher order learning (learning with technology)
- Videotaping the lesson study process, and sharing it via the Internet, can be useful for others eager to learn about lesson study

Study Groups

Within **Study Groups** teachers collaborate, as a single large group or in smaller teams, to solve a common problem or create and implement a plan to attain a common goal. During the collaboration process they may use print-based resources, classroom materials (such as work created by students) and their experiences, as part of their approach to the problem.

Variations of the Study Group approach occur in TPD workshops, in which teachers must plan an activity to take back to their school or create an action plan to address a particular school-based problem. If teachers are provided the time, support and facilitation for Study Groups and if they see the fruits of their labor, Study Groups can help teachers move toward *intermediate* and *advanced* skills.

Study Groups at a Glance		
Strengths ▪ Goal oriented ▪ Can bring a sense of purpose, school-based learning and collaboration to teaching ▪ Builds on what teachers already informally do	**Limitations** ▪ Time consuming ▪ May be difficult to coordinate, implement and sustain ▪ If not managed well, meeting diligently, doing assigned work, and following through, they can easily disintegrate ▪ Can be accomplished without a facilitator, but it is better to have a trained facilitator to mediate teacher learning and group dynamics	**Costs considerations** ▪ Low cost ▪ Cost is associated with time and personnel involved ▪ May involve costs of providing an external, ongoing facilitator to help instruct and facilitate Study Groups
Fig. 5: Study Group Model Source: Gaible and Burns, 2005		

Consider using Study Groups to…

- Address school-based issues that are not only instructional in nature, but that may affect school operations or broader issues (e.g., teacher absenteeism, equitable education for girls)
- Promote whole-school collaboration, peer-based learning, and communities of practice
- Deepen teachers' knowledge of core areas of teaching (content, curriculum, instruction and assessment)

How can ICT Strengthen Study Groups?

- Enable teachers to find information (teacher portals and web sites), create information (Office software, multimedia programs, web editors), and communicate within and across schools (bulletin boards, Instant Messaging, email, list servers, blogs, wikis, and cell phones)
- Using productivity tools, such as word processing, spreadsheet and electronic presentation software, help teachers to create reports, action plans, balance sheets and presentations which may be needed to support teacher study

Inquiry/Action Research

In an **Inquiry/Action Researc**h approach, teachers form teams based upon a common interest (helping students with reading difficulties, addressing needs of female students, etc.). They *select* an issue, *investigate* and *research* it, *plan* possible actions to remedy it, *take action, observe* and document results, *reflect* on outcomes, and *create* an action plan to address this issue. While Study Groups are broad in their focus, Inquiry/Action Research tends to be more focused on issues related to instruction. Inquiry/Action Research involves the use of higher order skills (researching, synthesis), a more surgical instructional approach (targeting areas of instructional difficulty), a good deal of teacher time, and if ICT is used, more advanced computer applications (spreadsheets, databases, and possibly statistical software packages). It is most likely a useful TPD choice for teachers who already have *advanced* skills.

Inquiry/Action Research at a Glance		
Strengths	**Limitations**	**Costs considerations**
▪ Helps teachers become more thoughtful practitioners ▪ Empowers teachers to take action, search for questions and solve problems ▪ Helps teachers begin to create, gather, and use data—rather than anecdotal evidence—to make empirical and informed decisions about instruction	▪ Teachers should only address problems or questions within their area of influence ▪ Can be complex and demand higher level of teacher skill and competencies ▪ Can be difficult to implement and sustain, particularly in small schools and environments with a low knowledge base	▪ Cost for outside facilitator, travel to school site, follow up ▪ Possible stipends for additional time after school ▪ Main cost is associated with time
Fig. 6. Inquiry/Action Research Model Source: Gaible and Burns, 2005		

Consider using Inquiry/Action Research to…

- Assist teachers in identifying and in solving problems and issues related to instruction
- Build site-based communities of practice
- Empower and strengthen the capacity of teachers to provide mutual assistance, support and instruction

How can ICT Strengthen Inquiry/Action Research?

- Enable teachers to find information, share it, and communicate in their area of interest within their school and across schools
- Help teachers create reports, action plans, balance sheets and presentations needed to support teacher study, using data analysis tools (spreadsheets and databases) and display tools (word processing, electronic presentation, web editing tools) and communication tools (email, bulletin boards, blogs)
- Communicate with colleagues in other sites who may have expertise or prior experience around this same issue

Case Studies

In a **Case Study** approach, teacher teams examine components of classroom instruction and apply what has been learned to their own classrooms. This approach uses print, the Internet, and/or video Case Studies of classroom episodes. Case Studies differ from Open Lessons in that they involve more in-depth analysis of all elements of instruction.

Video Case Studies have been used in Egypt's New Schools Program, though the degree to which this has been done is unclear. Video Case Studies are an attractive TPD option since they allow teachers to "see" one another's classes. As digital recorders fall in price, computers (on which video can be edited) become more common, and video editing becomes easier, educational organizations may begin to build their own "libraries" of video Case Studies for teacher training purposes. Where Case Studies offer opportunities for observation, discussion, reflection and transfer of learning to one's own classroom, they are helpful for developing teachers' *intermediate and advanced skills*.

Case Studies at a Glance		
Strengths ▪ Video examples could be downloaded and burned to CD/DVDs ▪ Video examples can be created locally with handheld video camera or mobile phones	**Limitations** ▪ Use of video is powerful but assumes Internet connection with good band-with or at least CD/DVD player ▪ Need skilled facilitator to structure conversations	**Costs considerations** Involves technology: computer, Internet, good band-with, or video camera with TV/VCR or CD/DVD player
Fig. 7. Case Study Model Source: Gaible and Burns, 2005		

Consider using Case Studies to…

- Help teachers begin to identify essential elements of good instruction
- Build a repertoire of shared practice among teaching staff
- Assist teachers in understanding how to implement, organize and manage any new classroom innovation (e.g., the use of one computer as part of a learning station activity)

How can ICT Strengthen Case Studies?

- Video clips of classrooms may be used for Case Studies in schools or settings where no "suitable" Case
- Studies exist
- The Internet can provide additional information and examples to support teacher Case Study analysis
- And Teachers can use the Internet to gather curricular and content resources so they can begin to approach the level of instruction observed in the Case Study

Mentoring

In a **Mentoring** model, older or more experienced teachers guide and assist younger or novice teachers in all areas of teaching. Mentoring can be structured as a one-to-one approach, or as a many-to-many approach in which several mentors and less-experienced teachers work together as a team. Research and interviews with Delphi panel participants for this Handbook point to mentoring as one of the most important

elements in successful TPD. Mentoring is also popular among teachers because it provides recognition for and builds on their experiences and aspirations, and it helps promote confidence. Research with teachers serving in post-conflict areas of Afghanistan and Ethiopia demonstrates that acknowledgement of teachers' experiences and the development of confidence as a part of TPD has positive effects for teachers and students.2 Many online TPD programs, such as Harvard's *WIDE World*, used by teachers in Namibia and Uganda, and Namibia's Online Distance Learning program involve short-term mentoring that lasts the several weeks required for completion of a course.

Mentoring helps reduce the anxiety and sense of isolation that can keep teachers from trying new approaches in their classrooms. Mentoring also serves as a non-formal or semi-formal method of ensuring accountability: teachers can complete TPD, demonstrating mastery of the targeted knowledge and skills that they never import into their classrooms. Once an effective mentor-mentee relationship is established, however, novice teachers are both better supported in and more accountable for those fi rst steps toward implementing something new. Face-to-face mentoring, when focused on instructional issues, can help teachers develop *basic, intermediate* and *advanced* skills. Telementoring, because it generally involves the use of computers and requires literacy and typing skills, is more useful among teachers with *intermediate* and *advanced* skills.

Mentoring at a Glance		
Strengths ▪ Provides access to information, role modeling, good instructional practice, assistance as needed, and personal support ▪ Can allow new teachers to collaborate and form relationships with colleagues within and across schools ▪ Where Mentoring programs are in place, teacher attrition rates drop and teachers report greater job satisfaction	**Limitations** ▪ Requires participation of knowledgeable teachers with good teaching and personal skills ▪ Labor intensive ▪ Mentor and "mentee" (the teacher being mentored) may not get along ▪ May reinforce teacher's isolation unless Mentoring supports team-based or collaborative activities ▪ Needs incentives to function (e.g., paying mentor increases accountability) ▪ Mentor teacher must feel he/she is getting something from relationship, so any Mentoring program must build in strategies for mutual learning ▪ Harder to maintain a relationship if mentor and mentee do not have opportunities to meet ▪ Telementoring is highly dependent on functioning technology. If technology fails, communication will most likely cease. ▪ Telementoring involves degree of literacy and facility with computers (composing and sending an email, using chat)	**Costs considerations** ▪ Stipend for mentor to assure continued participation ▪ Cost of computers, Internet , or other communication tools (cell phones, two-way radio) ▪ Training costs—training on computers, Internet, email and chat Face-to-face Mentoring: low cost
Fig. 8. Mentoring Model Source: Gaible and Burns, 2005		

Consider using mentoring to…

- Support gains made in trainings, Open Lessons, and other models of professional development
- Provide new teachers with ongoing feedback, guidance and support
- Lessen the personal and professional isolation of teachers who are new, reside in remote geographic areas, and/or teach in one-room or small schools
- Improve the teaching practices of para-teachers and uncertified teachers

How can ICT support mentoring?

- Enable teachers to use email, online chat, cell phones, or telephones to communicate with mentors outside their immediate areas (telementoring)
- Provide access to online resources, experts, coaches and learning communities through educational Web sites and portals
- Offer teachers learning spaces, bulletin boards, *Web logs* (blogs), teacher *wikis*, and e-mail discussion groups (listservs)
- Provide support at a time and location convenient to teachers
- The solitary act of writing to a mentor can often prompt reflection and self-assessment among teachers— which are critical factors in professional growth.

Professional Development Schools

Professional Development Schools often take the form of a partnership between a school and a local teachers college. A cluster of teachers is identified within the school as "master teachers." Teachers are chosen for their overall skills but receive additional instruction in Mentoring and collaborative approaches at the teachers college or through another means (e.g., an online course). Student teachers at the teachers college enroll in practical courses (or internships) with the master teachers, gain hands on experience implementing specific classroom techniques, return to the teachers college for more instruction, and upon graduation are placed in this same school where a master teacher becomes their mentor for the year. Over time, cohorts of highly trained younger teachers are created at the Professional Development Schools. As they gain experience, these younger experts can become mentors in other schools or can help extend the program of Professional Development Schools to other teachers colleges. (Note that this model for the expansion of Professional Development Schools is yet another variation of the cascade approach, but one in which entire cohorts of teachers are deployed in ways that enable them to provide mutual support for advanced teaching and learning.) Professional Development Schools can help meet the needs of *in-service* teachers as well. Teachers from schools in the region visit the Professional Development School for a week's stay, observe classes, engage in study—of content areas, teaching practices, or ICTs—and develop lesson plans that they then test in a class at the Professional Development School. In this approach, a classroom of students who have already experienced active-learning or other pedagogies becomes an instrument supporting the

visiting teacher as she or he experiments with similar techniques. Professional Development Schools exist primarily in the United States, Canada and Europe. Chile's highly successful ICT-in-education program, *Enlaces*, uses components of the Professional Development School model in teacher training. Professional Development Schools can exist in areas where schools and teachers colleges are nearby. However, for a Professional Development School to be successful, there must be core groups of effective teachers at both the teachers college and at the partner school.

Professional Development Schools can also take the form of partnerships between high performing and low performing primary or secondary schools. As part of a project that began in January 2006, four teachers at the American School in Mexico City, in conjunction with Mexico's Secretaria de Educación Publica (SEP), provide professional development inICT integration to several local public secondary schools. This professional development involves workshops, reciprocal classroom observations and resource sharing, and follow-up assistance to targeted secondary school teachers. Professional Development Schools can help teachers who have *basic* skills develop *intermediate* and *advanced* skills.

Professional Development Schools at a Glance		
Strengths	**Limitations**	**Costs considerations**
▪ Works where teachers colleges have a relationship with nearby primary school ▪ Collaborative approach that involves teacher colleges and schools working together to improve teacher quality (or high resource schools such as private or international schools and local national or public schools) ▪ Connects teacher's "school" learning with professional learning ▪ Provides several supports for the new teacher—teacher college as well as a school-based mentor	▪ Can only occur in areas where teacher colleges are near primary schools with cohorts of good teachers ▪ Requires structured management of student- and master-teacher postings to ensure continuity ▪ Only works where course of study for prospective teachers is more than one year in length ▪ Issues of logistics and coordination between two organizations (school and Teachers' College)	▪ Costs of training school-based teacher cohorts ▪ May involve travel costs between teachers college and school ▪ Possible costs of additional courses (online and face-to-face)
Fig. 6. Professional Development School Model Source: Gaible and Burns, 2005		

Consider using Professional Development Schools to…

- Strengthen the relationship between teachers colleges and schools
- Serve as a form of *new teacher induction*: PDSs can help smooth the transition from Teachers college to primary school because each new teacher has previously completed a practicum at this school
- Leverage resources (e.g., primary school teachers can use the computers at the teachers college to practice ICT skills)

- Create a community of practice among teachers colleges and schools
- Improve teachers' conceptual and instructional skills by providing continuous access to teachers college–based instructors and school-based master teachers
- Develop a core of highly qualified "master teachers" at various schools

How can ICT support Professional Development Schools?

- Teachers can use email, online chat, cell phones, or telephones to communicate with colleagues in other schools
- Create "centers of excellence" in technology integration that provide hands-on practice for teachers from all schools
- Establish communities of practice between master teachers at the Professional Development School and faculty at the partnering teachers college to tighten the link between pre-service TPD and student practica
- Enable student and master teachers to communicate via email, chat or mobile phone when student teachers return to teachers colleges or are posted to other schools

Dual Audience, Direct Instruction

The model typically involves the use of interactive radio, interactive television or virtual schools to deliver instruction directly to classrooms.* Programs support student learning and at the same time guide the teacher through the step-by-step conduct of the lesson. The classroom teacher and the radio or television "teacher" co-teach students but the classroom teacher and students are also co-learners. This model benefits both of its intended audiences: students receive higher-quality instruction; teachers gain hands-on experience of classroom practices. Dual Audience Direct Instruction can help teachers explore active-learning pedagogies, manage discussions, and other unfamiliar or under-utilized techniques. Successful examples of the Dual Audience Direct Instruction approach include interactive radio instruction (IRI) as it has been implemented in many countries; Mexico's *Telesecundaria* program, involving interactive television-supported instruction; and Louisiana's (USA) Algebra I project, involving in-class, Internet supported instruction. The Dual Audience Direct Instruction model can be strengthened by creating teacher training programs that complement the use of radio, television or the Internet in the classroom. IRI has been used to upgrade instructional quality in Guinea and Nigeria and to upgrade teachers' skills in Mali and Guinea. Radio, because of its cost, reach, simplicity and ease of integration is the most popular of these dual audience instruction tools. With over 200 million children out of school, half of whom live in countries recovering from conflict, radio offers access to education in a way that no other tool can approach. Dual Audience Direct Instruction can help teachers develop *basic* and *intermediate* skills. Because it is so highly directive and structured, it leaves little room for teacher improvisation or adaptation and is less effective for developing advanced skills.

Dual Audience Direct Instruction at a Glance		
Strengths ▪ Structure is useful for teachers with minimal or no content and instructional skills ▪ Except for virtual school model, the technology is easy to learn ▪ Fits into the existing classroom structure	**Limitations** ▪ Model is highly structured, with little room for improvisation ▪ Need Internet connectivity for Web-based programs (virtual school) ▪ Must be reasonable bandwidth to permit online exchanges between in-class student and teacher and online teacher ▪ Virtual schools model demands literacy and some degree of technical skills on the part of the teacher ▪ Technology dependent. If there is a problem with technology or broadcast signal, learning does not occur. This can be mitigated somewhat by including teachers' guides for all programs. ▪ Involves technology: radio, television and Internet ▪ Intensive instructional design process is time and cost-intensive	**Costs considerations** ▪ High capital costs ▪ Cost of and access to Internet if Web-based virtual school model is used. ▪ High production costs and content and curriculum development costs ▪ Television is especially costly ▪ Costs of paying online teacher salary for virtual school model
Fig. 7. Dual Audience Direct Instruction Model Source: Gaible and Burns, 2005		

Consider using Dual Audience Direct Instruction to…

- Increase access to education in rural and other isolated environments
- Increase the quality of instruction in those environments
- Develop teachers' skills in specific classroom techniques and pedagogies
- Gain specific benefits of ICTs (e.g., scale, low cost, access to content) through the use of radio or
- television in situations in which computers cannot be used as a result of inadequate capacity (on the part of teachers, technical support, project managers, et al)
- Introduce education in areas of conflict where students are denied access to the formal education system

Appendix 2: Supports and resources to enhance TPD

Infrastructural Support for TPD[2]

Infrastructural support for TPD includes items such as classroom space and electrical power, as well as the "educational infrastructure" of knowledge resources, curricula, and assessment.

Critical infrastructural supports include:

Physical infrastructure

Tables, desks, writing materials, and classroom space; computer facilities with electrical outlets and burglar bars

Technical infrastructure

Electrical power, Internet connectivity, radios, batteries, computer hardware and software as appropriate

Manuals, guides and teaching aids

Print-based guides to hardware and software, instructional materials, etc.

Educational infrastructure

Modifications to curricula, educational standards, teachers guides, and student assessments needed to support TPD

In many instances, revision of student assessment (including tests, national exams, portfolios, teacher reports, and requirements for advancement) may be the single most challenging *and* the most important step toward educational reform—and toward supporting TPD. But the most successful TPD programs are those that are integrated into comprehensive approaches to educational improvement.

[2] Source: Gaible and Burns, 2005

ICT Resources[3]

There are a variety of ICT resources that can be leveraged to enhance TPD interventions. Among them are:

Videos for Training

Videos can serve an important role in microteaching, demonstration of special instructional techniques, on-demand training, and expert instruction.

Teacher Development Portal

The portal can provide the resources, tools, and platform for all three phases of the teacher development continuum: initial training at teacher training colleges, in-service training opportunities, and continuous teacher support. Resources and tools can include:

Computer simulations and demonstrations of good practice:

- Mini- and micro-lessons that can be watched, manipulated, and tested.
- Demonstrations of real teachers in real classroom settings, representing different subjects, approaches, and methodologies
- Good practices can be dissected, analyzed, watched again, and assessed over time without disrupting an actual class.

Multimedia modules: Teaching/learning activities related to specific pedagogical skills.

Resource materials:

- solutions to common teaching problems
- innovations in teaching specific concepts
- lesson plans
- links to other portals developed by centers of excellence and professional organizations.

Moderated and unmoderated chat room, bulletin boards, discussion forums, and virtual conferences, synchronous and asynchronous online seminars on specific topics, f*ree e-mail, personalized Web space and educational software for downloading.*

Resource teachers assigned full-time or part-time

- providing advice to classroom teachers about problems and best practices
- helping design lesson plans and curriculum when textbooks and other traditional sources are unavailable
- available by e-mail, portal chat rooms, and bulletin boards.

[3] Source: Haddad (UNESCO, Online)

Internet Resources for Teachers

There are thousands of Websites for educators which provide assistance to teachers in a wide range of needs, including lesson plans, instructional tools, student activities, and professional development opportunities. Two examples are:

BECTA Schools Sector Toolkit

This online toolkit helps to support the recruitment, training and retention of ICT technicians for schools. Among the toolkit's features are: ICT skills for teachers; "ask an expert" features on integrating ICTs into the classroom; and a series of self-evaluation and planning tools for ICT. Though the site is directed at UK schools, most of the content is valuable from an informational perspective and much of it much of it can be adapted to non-UK settings.

http://www.becta.org.uk/schools

Global Learning Portal

The Global Learning Portal connects teachers, administrators and education policymakers around the world. It offers educators—particularly those in developing countries—online discussions, professional development and a library full of materials on teaching, learning and research.

http://www.glp.net/home