Online Professional Development: A Literature Analysis of Teacher Competency

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Abstract

Findings from research indicate that teachers participating in online professional development (OPD) activities and programmes have gained, in some way or another, a great deal of teacher competency. In spite of this, no research has been undertaken to systematically identify and acknowledge the types of teacher competencies that are frequently associated with and attributed to OPD. This paper, based on findings from other studies and literature reviews, attempts to initiate and explore the above vacuum. A literature analysis, using a simple tool based on the coding strategies, is used to categorise the types or aspects of teacher competencies that were evident. The results indicate five major aspects: (1) motivation; (2) skills, knowledge and ideas; (3) self-directed learning; (4) interactive competence; and (5) computer technology awareness and skills.

In terms of proliferation of advantages, online professional development (OPD) is viewed as having a bright future compared to the traditional mode of professional development programmes (McNaught, 2002), mainly because of its features that transcend geographical and time factors. In fact, of late, many economically inclined sectors such as corporate and business have invested substantially in OPD to provide their professionals and semi-skilled workers the requisite knowledge and skills so that the quality of their services and products could be improved significantly (see Bothams & Fordyce 2002; Bothams, 2002), while cutting costs at the same time (Strother, 2002). As far as the educational sector is concerned, the efforts are varied, depending on the type of OPD the teachers are involved in-whether they are structured and organised, or self-initiated.

In structured and organised OPD, the likely scenarios are, as an example, teachers enrolled in online conferences and Internet-based courses leading to certificates and degrees. In such programmes, a substantial amount of money for fees and other related expenses is involved. These programmes seriously demand the elements of teachers' time and participation. In the other type of OPD, the teachers initiate their own OPD programmes, which are specifically but loosely based on their needs and interests. Teachers' discretion and preference play salient roles in determining the amount of time spent and the extent of seriousness in the participation of OPD. In these type of OPD, the activities include exchanging ideas and experiences with other teachers through e-mails and chat rooms, reading online journals, and researching and finding materials for lessons (Kabilan, 2003).

Regardless of the type of OPD teachers are involved in, what should interest teachers and researchers alike are the nature of experiences when participating in OPD activities-how they contributed to the teachers' professional development, an issue identified by Rudd (2001) as one of the substantive strands of the literature on ICT and education-and what competencies teachers gained and how from OPD activities they participated in. It is imperative to have these questions answered, as they would indicate teachers' perceptions and views of OPD activities, which would then give some picture of their relevance to the enhancement of teachers' overall professional development.

This article depicts how teachers' participation and experiences in OPD contribute to their competencies through a thorough literature analysis of research on OPD of teachers. However, readers should bear in mind that much of the evidence that has formed the basis of this article is founded on the perceived benefits/advantages of using the Internet and its tools for OPD. Also, the focus and attention of the analysis streamlines into the benefits of participating in OPD activities and programmes. The underpinning aim of this paper is to categorise the identified competencies into groups or categories, in which the competencies with similar elements and features are grouped together. These categorisations would enable better understandings of how OPD contributes to teachers' competencies.

Apart from focusing on the individual teacher as the primary unit of change, this article will also give due attention to OPD programmes carried out at the school level. Such an approach is quite necessary, as the literature of professional development and school change suggests that professional development is most effective when it is part of school-level planning and reform (see Fullan, 2003; also Bell, 1991; Darling-Hammond & McLaughlin, 1995; Fullan, 2001; Lieberman, 1995).

For the purpose of this paper, OPD is defined as activities, programmes, opportunities, or experiences, undertaken using the Internet (and its tools) by teachers, leading to the achievement and, later, the enhancement of the preset objectives of individuals or groups in a learning context that may be identified by themselves or their institutions.

Method

The literature analysis was carried out using a simple tool, which was based on the mechanism of coding strategies. Coding strategies are the means of sorting the descriptive data collected so that the material bearing on a given topics can be physically separated from other data. The coding was based on "situation codes" and "activity codes." The aim of using situation codes was to place units of data that tell the researcher how teachers define the OPD settings. The questions that framed the situation codes were "What did the teachers accomplish in OPD, and how did they accomplish them?," "How did the teachers define what they accomplished or benefited in OPD?," "How did the teachers view their world in terms of OPD?," "How did the teachers see themselves in relation to the OPD settings?," and "What was important to the teachers in terms of OPD?" As for activity codes, they were directed at regularly occurring kinds of teacher behaviour in OPD. Both of these codes could be informal or formal in nature (Bogdan & Biklen, 1992).

A schema (Table 1) was used to code, arrange, and organise the analyses. This type of schema was originally utilised by Riding (2001) to

study the use of e-mail discussion groups to create online communities of teachers and to enhance their professional training. There are three columns in the schema. The first column identifies the aspects of teacher competency, while the second is the "criterion" column that defines the aspects of teacher competency. The final column is the "example" column, whereby findings are referred to the specific and exact responses provided by teachers, while conclusions are the syntheses of the responses.

The type of data examined was primarily secondary data, i.e., findings from literature, mainly research based. The literature that was analysed embodied various aspects and types of OPD of teachers. This literature particularly included research published in the conventional journals and books, research published in online journals, and research published on Web sites. Both quantitative and qualitative data were looked at and reported. The quantitative and qualitative data were summarised and narrated in terms of their general conclusions and significance of overall findings. The qualitative data were also utilised and made more meaningful by including and citing the actual responses and reactions of the teachers, with the sole aim of strengthening the cases and arguments put forward.

Findings

The analysis yielded five aspects of teacher competencies that benefited teachers: (1) motivation; (2) skills, knowledge, and ideas; (3) self-directed learning; (4) interactive competence; and (5) computer technology awareness and skills. It has to be stressed here that these categories are certainly not the only categories. There may be others unintentionally overlooked by the researcher because of the intense and rapid progress, and the vast amount of research undertaken these days to explore OPD of teachers. This is mainly because OPD is a relatively new area of research, and also because the Internet and World Wide Web have only emerged "as a prominent new technology" for public use since the early 1990s (Singhal, 1997, p. 1). Furthermore, in the field of education, only recently have educators been aware of the advanced potentials of the Internet (Charp, 1999; Singhal, 1997), and its positive effects and impacts on teachers' professional development. As this article is being written, new areas of OPD of teachers are being explored and investigated in almost every part of the world.

Teacher Motivation

Motivation is the key factor to teachers' "survival and sustainability" in their profession, preventing premature or total teacher burnouts. The absence of even a peripheral sense of motivation (within teachers) would equate to the perilous collapse of any reification process of teacher competency in progress. Numerous studies and research provided evidence that OPD activities contributed to teacher motivation in many ways. In one such study, preservice teachers who logged into TAPPED IN (http://www.tappedin.org/)-an online workplace for international community-and had online discussions with experienced teachers found online activities to be motivating. The very experience of online discussions made them aware of the current situations in school and of teachers, and they were ready to anticipate the future by making preparations now. The following two quotes encapsulated the preservice teachers' comments:

> I learned the most from conversing with [Teacher 3] and my classmates...her discussion of the stages a first year teacher goes through (e.g., anticipation, disillusionment, survival) has made me more prepared...I now feel like I know a little bit of what to expect and am prepared for what it will be like.
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> With TAPPED IN, I saw how there are teachers who are dedicated to the professions. We often hear of teachers who are sick and tired, who get burnt out, and those who quit. It is often hard to hear stories of the teachers who spend extra hours at places like TAPPED IN to increase their classroom knowledge. That was definitely a reaffirmation to study the field of education. (Schlager, Fusco, & Schank, 1998, p. 5)

Further evidence of teachers motivated by participating in OPD was retrieved from The Ontario Women Educators' Computer Conferencing Network (TOWECCN), in which the participants who experienced difficulties found solace in other participants. One participant admitted how online activity motivated her:

> I didn't understand the terminology and felt like giving up. When I admitted this online one morning at 6 a.m., I was overwhelmed by the response I received. The number of people who reached out with words of support and encouragement surprised me and helped me to get back on my feet (Harasim et al., 1995, p. 72)

Studies have also described how OPD contributed to various components of teacher motivation such as enthusiasm, determination, and a sense of ownership (Bennett, Priest, & Macpherson, 1999; Bowman et al., 2000; Ellis & Phelps, 2000; Selinger, 1997; Watabe, Hamalainen, & Whinston, 1995). This can be attributed to the amount of interaction that teachers are exposed to on the Internet-both synchronous (chat rooms, internet relay chat) and asynchronous interactions (e-mail, bulletin boards, forums). These features enabled teachers, for instance, to seek and give advice, support, and

Table 1. Teacher Competency Analysis Criteria

Teacher Competency	Criterion (Quantitative/Qualitative data)	Example (*=Findings/**=Conclusions)
Motivation	Findings and conclusions that indicate, and/or relate to teachers' motivation, determination, confidence, encouragement, support, etc.	"The number of people who reached out with words of support and encouragement surprised me and helped me to get back on my feet."* Teachers found online activities to be motivating.**
Skills, Knowledge, and Ideas	Findings and conclusions that indicate, and/or relate to the enhancement of teachers' skills, knowledge, and ideas, thinking abilities, etc.	"...a body of subject matter knowledge and a bank of teaching resources to help teachers to develop their knowledge and skills"* The Internet is regarded as an alternative means of seeking new teaching ideas for both the preservice teachers and in-service teachers.**
Self-Directed Learning (SDL)	Findings and conclusions that indicate, and/or relate to self-directed learning, self-management of learning, self-negation of learning, etc.	"In the group I had the opportunity to improve my skills and abilities as a Self-Directed Learner"* It provides teachers with a rich, safe, and self-sustaining environment for implementing changes in instructional practice.**
Interactive Competence	Findings and conclusions that indicate, and/or relate to the gaining or enhancement of personal, collaborative, and social interactions, sharing, reflective, communicative skills, etc.	"I realised that the exchange of opinions was very useful for me in order to better reflect on some issues, to reach common agreements, and to develop new positions"* The participants shared their expertise and experiences with each other. Teachers also shared their frustrations in OPD and reflections on their classroom practices with others.**
Computer Technology Awareness and Skills	Findings and conclusions that indicate, and/or relate to the awareness of computer technology and gaining skills associated with computer technology/Internet	Teachers have less anxiety towards working with computers and have a more positive attitude towards the rise in productivity the use of computer can bring.**

motivation at any time, virtually with anyone-colleagues, peers, friends, and strangers. At school level, similar patterns seem to exist. For instance, in an action research, Alexiou-Ray et al. (2003) found that technology integration in instructional practices at the school level increased meaningful professional support to school personnel, especially the teachers involved. In the same study, it was also established that the students, as a result of the technology integration, were excited to be engaged in new types of learning experiences.

Skills, Knowledge, and Ideas

Findings from research support the notion that one of the most common benefits of OPD for teachers is the ability to improve teaching, and thus the learning of the students (Ellis & Phelps, 2000). OPD activities were also found to shape and formulate teachers' perceptions and understandings of the Internet as a teaching resource (Bennett, Priest, & Macpherson, 1999), and were regarded as an alternative means of seeking new teaching ideas for both the preservice teachers (Selinger, 1997) and inservice teachers (Spratt, Palmer, & Coldwell, 2000). OPD also actively supported and facilitated the empowerment of knowledge among teachers. For instance, TeleNex-a computer network for English language teachers in Hong Kong-provided the teachers, through its grammar and teaching idea database, "a body of subject matter knowledge and a bank of teaching resources to help teachers to develop their knowledge and skills" (Tsui, Wu, & Sengupta, 1996, p. 1). These are possible simply because the Internet is an extremely huge virtual "oasis of knowledge," as one teacher analogised of the amount of information in the Internet available to her,

> I feel like a person who has been in the desert and suddenly I can have as much water as I want (Schrum, 1995, p. 225)

Beyond databases, research findings also concluded that sustained dialogue-driven collaboration using Internet tools also built and contributed to teachers' knowledge (Hawkes, 2000). In an online reflective project by Bowman et al. (2000), teachers helped each other to clarify their thoughts on many aspects of teaching, and this helped them to grow as a teacher. The teachers gained "a rich treasury of teaching ideas through the responses of group members to (their) own and others' questions" and assisted them to solve problems in their teaching (Bowman, 2000, p. 18). In addition, it also stimulated the teachers intellectually, and challenged them professionally. Intellectual stimulation, especially critical thinking skills, also seemed to be an integral interest of this area of research, whereby teachers were able to integrate high-order thinking skills in their online teaching-learning environment (Feldman, 2001; Kizlik, 1996; Taylor & Stuhlmann, 1998).

In the respect of reflective thinking and conveying critical ideas, findings from research elucidated how OPD promoted reflective thinking, and how it helped to shape teachers' mind to be critical of their professional practices, as teachers use more time to construct their thoughts, and then convey them in written forms. One example was from Galanouli & Collins (2000):

> I think for me just seeing other people's responses, for example, classroom management or homework, this just made me think about my practice more than if I had not been reading them. It just triggered off ideas and helped me form opinions...I think it encourages you to reflect upon your own practices.
>
> I think it would be interesting if you were having problems and you could see that someone else is trying a different idea....Bring it in the next time you are in the classroom, try their ideas to see if they work and maybe sometimes it works better than what I would have done myself. So in terms of that I think it is beneficial, it is just like brainstorming of ideas. Have three or four different ideas and just try them, you know each situation is different. (Galanouli & Collins, 2000, p. 243)

Research also illuminated how teachers gained various new skills from the OPD activities. For example,

1. Planning skills (Bennett, Priest & Macpherson, 1999);
2. Technical skills (Brown, 1999);
3. Pedagogical skills (Spratt, Palmer, & Coldwell, 2000; Steel & Hudson, 2001);
4. Teaching skills of continuous writing for English as a second language (Sengupta, 1996);
5. Developing new ideas (Spratt, Palmer, & Coldwell, 2000);
6. Discussing ideas about curricular and instructional matters (Markee, 1994) and;
7. Understanding what being a teacher is all about (for beginning teachers) (Selinger, 1997).

The above reported findings manifest the importance of the Internet as a vital resource centre for teachers in terms of providing new knowledge, ideas, and skills. New ideas and knowledge are put into the Internet all the time. Flynn (1996) estimated that at least one million Web pages are added to the World Wide Web (WWW) each month. A brief search by the researcher for the entire phrase "Online Professional Development" using the Yahoo.com search engine returned 3.16 million Web matches, signifying the Internet's role as a beneficial knowledge centre-cum-provider for teachers.

At the school level, OPD programmes initiated and planned with objectives suited to the school could also extend and change teachers' pedagogical practices. For instance, Harris, Kington, & Lee (2001) discovered through case studies how such OPD programmes benefited two schools that utilised existing ICT resources to provide new learning opportunities and approaches for their pupils. Nevertheless, they concluded that it is not necessarily the technology that has to be innovative, but the approach to teaching and learning, as one of the course coordinators emphasised,

> I certainly think it would work for other subjects if someone produced the materials-if you have a good set of materials covering the curriculum then lots of departments and schools would jump at the chance, as it's another way of dealing with learning and catches different types of learners. The only downside is the cost of IT, access to the equipment, and whether the teachers feel they want to change their role to facilitating the learning. Here, they've been very keen, but some might not like the idea. Anyone can do it, you don't need IT skilled staff, but you do need teaching skills. (Harris, Kington & Lee, 2001, p. 11)

Self-Directed Learning

Self-directed learning (SDL) is "a process in which individuals take the initiative without the help of others in diagnosing their learning needs, formulating goals, identifying human and material resources, and evaluating learning outcomes" (Knowles, 1975, p. 18). Self-directed learners tend to learn autonomously and independently, and learn the things of most interest to them, in ways that they find most beneficial (Clardy, 1998). The Internet is an example of a self-directed learning instrument made of several tools that promote self-managed and self-directed learning, encouraging learners to be independent while supporting their learning. The Internet, and specifically OPD, is known to encourage teachers' SDL, mainly because it provides teachers with "a rich, safe, and self-sustaining environment for implementing changes in instructional practice" (Shotsberger et al., 1997, p. 2).

Studies by Hughes (2001), Shotsberger et al. (1997), and Rodes et al. (2000) strongly suggested the richness of SDL that was gained by

teachers involved in OPD. Rodes et al. concluded from their study that "careful, gradual introduction of Web-based technologies can guide and enhance learners (teachers)'s transition from a traditional model of pedagogy in which their role is passive, to a model in which they take a full, active role in directing and achieving their own learning" (p. 7). OPD also successfully built the confidence of its participants, thus developing them into "autonomous learners," as found by Tsui, Wu & Sengupta (1996) in their study of TeleNex. The above observations exactly fit the description of the process of being self-directors of own learning that was promulgated by Knowles (1975).

Crosta's (2002) personal experiences and account of her involvement in OPD are an excellent example how SDL values, characters, and norms materialise into a teachers' professional practices:

> In the group I had the opportunity to improve my skills and abilities as a Self-Directed Learner: the tutor had the role of Facilitator and we had a maximum flexibility and control on our works in receiving and giving feedback and for self-assessment. I do think that this "Common" experience taught me the great value that group collaboration and discussion in respect to self-grown both as a learner and as an individual. (Crosta, 2002, p. 367)

Again, the ubiquitous features of the Internet greatly assisted and improved teachers' abilities not only to learn independently and autonomously, but also to work simultaneously in a collaborative environment with fellow teachers, who may originate from different educational backgrounds and settings. Asynchronous interactions (e-mail, bulletin boards, notice boards, etc) enabled teachers to map their thoughts and ideas carefully, and reflect on others' ideas before responding to the concerning issues. The responses were then available for others (and the teacher) to see, to digest, to formulate, and to evaluate in relation to the teachers' needs and learning outcomes. The teachers would be then able to self-direct and manage their consequent process or course of action, depending (and based) on the outcomes and analyses of their initial evaluation.

Interactive Competence

According to Chun (1994), computer-mediated communication and learning networks, which are essential aspects of OPD, facilitate the development of the participants' interactive competence. Research findings described participants of OPD as displaying certain personality traits that encouraged collaboration and interaction among the participants. One of the most important traits was providing "mutual support" to other teachers (Ellis & Phelps, 2000). Hughes (2001) recounted that participants of an online action research took the initiative to make appropriate personal disclosure, and provided emotional support to other participants. Taylor & Stuhlmann's (1998) examination of a cross-curricular telecommunications project that provided authentic experiences for elementary students and teacher education interns resulted in similar findings—"they learned and rely on and support each other and gained confidence their own collaborative projects. They have seen that technology can enhance learning rather than add to their bulging workloads..." (p. 360). There was also the presence of mutual encouragement and recognition among teachers, which took the form of positive feedback on ideas, materials, and classroom practices that teachers contributed to the network (Tsui, Wu, & Sengupta, 1996).

Sharing was another vital trait. Selinger (1997) found that preservice teachers, during OPD activities, shared peer-produced resources, while in Rogers' (2000) study, which examined an online workshop that was conducted over the Web, the participants shared their expertise and experiences with each other. Teachers also shared their frustrations with OPD and reflections of their classroom practices with others. One of the participants of TeleNex shared her classroom practices, being simultaneously reflective and critical of her professional practices:

> Why not? 'Cos I always worry about not being able to finish what I am supposed to teach (not what students are supposed to learn-Oh dear! What kind of a teacher I am becoming?!!) by the end of the term. Actually, I'm always all the way behind the teaching schedule. So I seldom have time left in the class. The other reason is that I think it's no fun to tell them jokes that they don't understand. I probably will lose interest if I have to explain every joke to them in Cantonese. I am using too much Cantonese in class...another confession! (Tsui, Wu, & Sengupta 1996, p. 473)

The concept of sharing was also evident in many other related studies (e.g., Bragg, 1999; Ellis & Phelps, 2000; Rogers, 2000; Sgouropoulou et al., 2000; Spratt, Palmer, & Coldwell, 2000). Crosta (2002), for instance, exemplified how OPD (through online collaborative efforts) had envisioned herself with new senses and comprehension of the concepts "collaborative" and "working together":

> I found it particularly difficult to participate in "Common Discussions" with peers whom I really did not know. I had to share thoughts and ideas that I always used to keep for myself. What was more, I felt a bit uncomfortable and shy, knowing that my written messages might be read and criticised by the whole class....However, starting on working in the small group discussion with other students, I realised that the exchange of opinions was very useful for me in order to better reflect on some issues, to reach common agreements and to develop new positions. The "Openess" of this environment certainly helped me a lot. Indeed, I was stimulated by the behaviour of other people who were willing to share their personal points of view in the online class. The "Informality," as the way as participants talked about topics not related to the learning settings, helped me to be more open and friendly during the collaboration and the discussion. The paradox was that at the end, I participated more actively in online discussion than in my face-to-face one (Crosta, 2002, p. 365)

At the school level, comparable patterns of interactivity among teachers were palpable. Strickland (2003), for example, experimented with the effects of using a listserv discussion group to sustain the professional development of teachers in a rural school district. She discovered that at the institutional level, the listserv was used for various purposes that included receiving assistance, interacting with colleagues, and collaborating. The teachers involved provided some rather straightforward responses, indicating how much the listserv has addressed some of their professional concerns:

> (I) enjoyed interacting and looking up all the addresses that everyone sent and finding new information because it gave me new ideas and new things I could use in my classroom.
>
> It gives me access to more sites and it is interesting to see what everyone else is doing and what they find interesting.
>
> I guess I really like hearing from all the teachers.
>
> I think probably having connection with you and being able to ask questions and knowing that you knew what you were talking about and could answer my questions. (Strickland, 2003, p. 10)

Another facet of interactive competence was communication. Research suggested that the communication among and between teachers involved in inservice training activities increased when they had the opportunity to communicate electronically (Markee, 1994; Wepner & Seminoff, 1997). This is achieved because teachers' feelings of isolation are dramatically diminished, or at least minimised, and the interactions among teachers are greatly elevated by interactions using the Internet, especially e-mail, IRC-based tools, listservs, and bulletin boards (Bow-

man et al., 2000; Gray, 1998; Kearsley & Shneiderman, 1999; Levin & Thurston, 1996; Strickland, 2003; Tannehill, Berkowitz, & LaMaster, 1995). Teachers also perceived that the interaction using computers and networks enhanced their communication with students, thus making teaching easier (Quilter & Chester, 2001; Schmitt & Christianson, 1998, Steel & Hudson, 2001). A university teacher explained the situation:

> If somebody wants to come and see me, they could always knock on my door, which might be a daunting experience. If you do it through e-mail, then you have a chance to work out exactly what you want to say, you don't have to think on the fly. So it could be that form of contact, if it is well managed, actually provides a more useful form of contact with students than previously. (Steel & Hudson, 2001, p. 105)

Another aspect of interactive competence was the social behaviours of the participants. Bragg (1999)'s study of peer-to-peer online communication and interaction of graduate students and K-12 teachers highlighted the manners, politeness, empathy, emotions, encouragement and peer support that were adopted by the participants, teachers and graduate students. Bragg (1999) summarised this OPD as "a highly interactive educational experience that stimulated social-dialogical interaction that was scholastic and professional, yet lively, friendly and very social. It seemed to facilitate personally relevant learning, professional development, and collegiality, as well as a fair amount of fun".

The literature analysis showed that teachers did gain interactive competence skills as a result of their involvement in OPD activities. Undoubtedly, this was again due to the features of the tools of the Internet, which allowed the teachers to reflect constructively, and then react appropriately in a given situation, or when faced with an immediate task or problems. The Internet provided every opportunity for teachers to embark social or academic interactions, which were not at all restricted in any way or any form.

Computer Technology Awareness and Skills

Based on her research, Yu-mei (2000) summarised that teachers were actually receptive to changes, especially the use of educational technology, and "were aware of the fact that technology is here to stay and had a deep concern of somehow 'missing out'" (p. 7), and that computer related training is advantageous to teachers. Teachers were also aware of the fast rate of the technological innovations that were taking place (Steel & Hudson, 2001), and increased use of Information and Technology (IT) in teaching and learning (Wishart & Blease, 1999). It provided teachers with a knowledge base for using telecommunications (Taylor & Stuhlmann, 1998).

A study by Bennett, Priest, & Macpherson (1999) disclosed how the teachers developed greater familiarity with the Web, particularly with the use of search engines and the possibilities of Web-based communication, and online teaching and learning. In other words, the teachers were aware of the technologies and issues that surrounded the OPD and they were better informed of the technologies that were involved. Another example. "The Enlaces Project" in Chile, which fostered local, national, and international electronic communications in order to improve school performance and the development of new models of teacher education, proved that the participant teachers gained "positive attitude toward computers despite their need for considerably more practice in the use of the computers" (Moon, 1997, p. 26).

Moonen & Voogt (2000) also discovered, in their study of teacher networks as a strategy of inservice training and professional development, that "teachers have less anxiety towards working with computers and have a more positive attitude towards the rise in productivity the use of computer can bring" (p. 5). Other studies, such as Spratt, Palmer, and Coldwell (2000) and Steel and Hudson (2001) yielded similar results. The positive attitudes of teachers were in the shape of the emphasis in classrooms, which was more focused on the student-centred approach to learning. A couple of university teachers clarified:

> I guide them through a body of material, taking them through the basic concepts. I am spending more time working with them and less time just standing in front of them.
>
> I think what they seek now is, is different. I won't be standing up and doing what was a very traditional role, you know, writing out the equation on the blackboard. I'll be doing the facilitating, guiding and hopefully enabling an understanding. (Steel & Hudson, 2001, p. 106)

The literature provided evidence that OPD helped teachers enormously in the attempt to gain invaluable awareness, knowledge, and skills related to technology in general, and the use of Internet for professional development purposes, specifically. This indeed has, in many of the presented cases, broken down the barrier between teachers, and their ignorance and "sensitivity" toward using technology for educational purposes.

Conclusion

The abundance of research and studies of OPD that have been carried out, or are being carried out at the moment, have charted the change of directions and perspectives of teachers' professional development. The shift seems to divert the trend of research into a more self-managed and self-directed process of enhancing professional development, which previously-without the aid of the Internet-were constantly halted by various boundaries and problems. So far, research has more consistently indicated the advantages of OPD for teachers, assisting them in gaining valuable competencies to a certain extent. No doubt some research has reported problems regarding OPD and its structures and practices, but the advantages of OPD reported in literature far outweigh those problems or disadvantages.

However, to be meaningful and conclusive, further research in the area of OPD ought to be carried out extensively-above all, in providing alternatives and solutions as to how teachers' OPD would contribute to students' experiences and learning in classrooms. At a macro level, an aspect of research that should be critically and seriously pondered is the degree to which OPD of teachers leads to teachers embracing and seeing through their schools' reform agendas. Also, in the domain of planning and management of OPD, not many significant studies have been conducted on schools' and administrators' roles in planning and providing the platform for OPD programmes to be implemented at the school level. These areas of research are seriously lacking in the current literature concerning OPD and ought to be further investigated. Such research should address these important questions: "Under what conditions would the OPD programmes be effective?", "For whom and when would it be effective?", and "What are the issues and concerns that teachers may have in mind when participating in those OPD programmes?"

The conclusion of this paper also has distinctive implications for teachers, school administrators, and teacher educators who venture into OPD. It appears that OPD programmes could be planned and implemented with the aims of motivating teachers, enhancing teachers' skills, knowledge, and ideas, facilitating teachers' SDL, improving teachers' interactive competence, and increasing teachers' awareness of and skills in computer technology. To put the above programmes in place, I steadfastly believe OPD programmes should be specific in nature, meaning that they should have specific objectives and systematic-yet flexible-arrangements in the structures and the execution processes of the programmes. The specific objectives should only define and encompass one aspect, or two at the most, of the teacher competencies. Trying to include and integrate more than two aspects into the programme would

be an enormous task to achieve, as it may distract teachers' attention and capabilities, and thus deflect away from the intended objectives. Systematic arrangements of the structures and implementation of the OPD programmes ought to be simple and flexible for the teachers to understand and participate in. It has to be pragmatically flowing, and more important, it must be unhindered by thematic or spontaneously occurring problems.

Nonetheless, there can be no guarantees that all the cited competency, improvement, or achievement both at the school level and individually can be attained all the time. Rudd (2001) had earlier warned that "the use of ICT in schools is not a simple panacea for solving problems of underachievement, nor is it a straightforward way of raising standards of student performance" (p. 219). Rudd (2001) went on to highlight several reports in the literature that implicated possible negative aspects of the use of ICT in schools, and also asserted the methodological problems that may arise in the research process of establishing a link between ICT and improved school or student performance. He reasoned,

> It is very difficult to establish any kind of causal link between an "input variable" such as levels of ICT provision or ICT literacy, and "outputs" such as performance outcomes, whether these are at the institutional or the individual level. The essential problem here is, of course, one that affects all areas of educational research: the complex and multivariate nature of processes of teaching, learning, and assessment. (Rudd, 2001, p. 219)

Further research on OPD, as suggested earlier in this section, if carried out, would offer better understanding and insights into a logical and effective way of structuring an OPD programme, setting the objectives and implementing the programme institutionally. Individually, the research would present the teachers with varied options of empowering themselves with professional skills and knowledge, and more important, the awareness of an OPD programme's prospects and promises. Such research would also certainly yield vital information that strengthens or weakens the notion of OPD enhancing individual teachers' competencies, and its contribution to overall school improvement or effectiveness, specifically in terms of students' performance and achievement.

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