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An industry-sponsored, school-focused model for continuing professional development of technology teachers

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Traditionally a divide has existed between faculties of education at higher education institutions (HEIs) and trade and industry, but the business sector is increasingly buying into community development with corporate social investment, especially regarding technology education. We report on a continuing professional teacher development (CPTD) model, which entails trade and industry sponsoring learning and teacher support material (LTSM) for technology education in under-resourced schools, paying for LTSM through their corporate social investment funds, and sponsoring CPTD of technology teachers where they are trained to use LTSM more efficiently. Trade and industry, together with HEIs and Departments of Education (DoE), could change the traditional concept that CPTD is the responsibility of DoEs into a new model where the business sector shares some of the responsibility for equipping teachers so that they can provide quality education. We argue that custom-made and sponsored LTSM and CPTD play an important role in the training and empowerment of technology teachers.

Keywords: *continuing professional development; learning and teacher support material; technology education*

Introduction

Technology education was implemented for the first time as part of the new national Outcomes-Based Education (OBE) curriculum in 1998. Because of the limited time frame in which the new curriculum had to be implemented, there was very little time to adequately educate or train technology teachers in the learning area (Khulisa, 2001). Teachers were expected to implement technology in schools without being adequately trained in content and/or instructional methodology. Because of the discontinuation of traditional technical subjects, qualified and competent teachers in subjects, such as Home Economics, Woodwork, Metalwork, and Industrial Arts, were generally assigned the responsibility of implementing and teaching technology. These teachers were confused by the introduction of technology education, as they had been accustomed to traditional instructional methodology in the manipulation of materials and the use of technology within the context of their traditional subjects. They were unsure of how to approach lesson planning in the new learning area, what to teach learners in class, and how to facilitate the learning area. Consequently, they taught content and skills related to their technical subjects by simply using a different approach, thereby neglecting the procedural knowledge (technological process) as an essential feature of technology education (Ankiewicz, 2003).

Another challenge for teachers of technical subjects was that they were

used to focusing on only one discipline, while technology education requires a teacher to be well versed in various themes of technology. This implies a shift from the traditional individualistic approach, where each teacher was responsible for his/her own subject, to a situation where a teacher may not be an expert on all the subject matter to be facilitated in the curriculum. This shift results in teachers having to teach certain themes without the necessary assurance and self-confidence: "Nobody would be able to grasp all of it [technological knowledge]" (Ropohl, 1997:71). In some schools this problem is being addressed by following a rotation programme where technology is taught by means of a team approach. Each teacher is responsible for one theme and the learners rotate among teachers. This method in turn gives rise to new problems. Where teachers have been accustomed to an individual approach in the past, they are now expected to function as part of a team. This team-work approach is not always done justice (Ankiewicz, 2003:16).

Teachers were simply given the new policy documents for technology and told that they replaced the old syllabus. These documents are very confusing to most teachers and very difficult to interpret if one is faced with a very unfamiliar learning area (Ankiewicz & De Swardt, 2002). Because teachers are ill-equipped, to implement a new learning area in which they have inadequate background or experience, they must be trained, and this can be done by means of continuing professional teacher development (CPTD) (also sometimes referred to as INSET) to adapt to their new environment. Therefore, CPTD is a necessary response to a continuously changing education environment. It stands to reason that teachers must be equipped with the necessary skills and knowledge to make the paradigm shift from their old subjects to technology education by means of CPTD (Potgieter, 2004:216; Ankiewicz & De Swardt, 2002:76).

In the South African context the National Department of Education is responsible for formulating policy, also for CPTD, whilst the nine Provincial Departments of Education are responsible for the execution of national policy. Initially a cascade model was used for providing CPTD in order to equip teachers to implement the new curriculum. In the South African context centralised CPTD implies training in which trainers from each province are trained by a service provider. These provincial officials then cascade the knowledge and understanding to district officials who in turn cascade the information to teachers in their district. The enormity of this need for CPTD and a lack of capacity within the Provincial Department of Education to act as service providers have forced them to outsource these large-scale CPTD projects to other service providers in South Africa. Traditionally the Departments of Education (DOE) used their own infrastructures, namely, the Colleges of Education, for delivering CPTD programmes to teachers. Since the Colleges of Education have been amalgamated with Higher Education Institutions (HEIs) the Departments of Education have lost this capacity (Potgieter, 2004:217).

The DOE's recent strategy is to outsource CPTD to HEIs that have not

previously been involved in such large-scale CPTD projects (Potgieter, 2004: 17). HEIs suddenly became involved in CPTD without having any substantial experience and, in some cases, without the required infrastructure. The Chisholm and Khulisa reports expressed concern that the Higher Education (HE) sector, colleges and non-government organisations (NGOs) were not adequately involved in the training process. Furthermore, CPTD had to take place within a very unrealistic time frame. These aspects have contributed to the fact that teachers are generally not sufficiently trained. Where some involvement has existed, it seems that contradicting information has been conveyed by different NGOs. These varied interpretations raise issues of quality assurance (Chisholm, 2000:6; Khulisa Management Services, 2001).

Most companies in trade and industry are, to some extent, concerned with technology. These companies are becoming increasingly willing to channel funds from their CSI funds into programmes that promote and develop technology. As a result of the nature and essence of technology education, the involvement of HEIs with CPTD provided the opportunity of establishing partnerships with trade and industry (Potgieter, 2004:217). This is in itself a remarkable shift within an education faculty where the focus is primarily on social and human sciences. However, the nature of the partnership between HEIs and trade and industry with regard to CPTD still needs to be established/determined. The purpose in this article is to explain/describe two CPTD models for such a partnership which have been employed by TechnEd (formerly RAUTEC a university/school-based technology centre).

The research questions addressed are:

1. Which CPTD models exist for the training of teachers?;
2. What are the training needs of technology teachers in South Africa?
3. What is the impact of appropriate CPTD models on fulfilling the training needs of technology teachers?

Continuing Professional Teacher Development (CPTD)

Introduction

In the literature the terms 'continuing professional development (CPD)' and 'in-service education and training (INSET)' are often used interchangeably. At the University of Johannesburg the term 'continuing professional teacher development (CPTD)' is also used. Craft (1996:6) states that

> ... both terms are used to cover a broad range of activities designed to contribute to the learning of teachers who have completed their initial training ... In practice, therefore, it is possible for the distinction between professional development and INSET to break down.

For the purposes of this article, the term 'continuing professional teacher development (CPTD)' will be used.

CPTD can be defined as ongoing education and training for practising teachers, with a view to assisting them to keep up to date with the rapid and numerous changes taking place in the school milieu (Collins, 1991; Leclercq, 1996). It assists mainly with re-establishment of contact with theory and

methodology in order to maintain the 'extended professional' (Collins, 1991: 69). CPTD assists in shaping teachers who are not only skilled in the classroom, but who have a grasp of wider thinking about the learning area and about educational issues in general (Steyl, 1998:112). In many CPTD programmes the emphasis therefore falls on upgrading the qualifications of already serving teachers, rather than providing newly trained staff (Steyl, 1998:94). CPTD is also necessary in response to a continuously changing education environment. New curricula, different ways of evaluation and assessment of learners' progress, and challenges from the political and social environment dominate the changes within the educational environment (Steyl, 1998:117).

The aim of CPTD is the extension of content knowledge, instructional methodology and skills (Hunsaker & Johnston, 1992; Leask, 1995; Steyl, 1998:92) and, most importantly, CPTD endeavours to develop knowledge, skills and attitudes (Steyl, 1998:117). CPTD may serve mainly two purposes, namely, empowerment of unqualified teachers in order to assist them to survive in a profession for which they are not yet qualified, and further development of qualified teachers within a specific content area (Steyl, 1998:114). CPTD is aimed at the development of all educational staff at all levels in the educational service, including classroom teachers, senior administrators, and school principals.

CPTD activities consist of formal and less formal processes. Formal processes are designed to enable development in specific target areas. Curriculum-based courses, as well as CPTD on instructional methodology, and training in response to change, are regarded as rather formal CPTD activities. Formal CPTD activities are believed to provide a concentrated focus on the specifics of change. The negative aspect of formal CPTD processes is that it implies the investment of time and money, as well as the possible disruption for the learners concerned. Less formal CPTD processes are those activities that happen during the normal life of a school. Mentoring, coaching, delegating, team-teaching and rotation of responsibilities are regarded as less formal types of CPTD (Steyl, 1998:113). The following aspects are usually addressed in CPTD programmes:

- Equalisation of teachers through upgrading academic and professional qualifications, as well as classroom skills and teaching strategies;
- Efficiency of classrooms and schools as microcosms through proper management training;
- Classroom competence through effective input on subject knowledge, theory, subject methodology and educational philosophy;
- Change brought on through curriculum development, social awareness programmes and CPTD for new roles such as multicultural teaching or religious and sex education; and
- Empowerment through action research and teacher-led initiatives (Steyl, 1998:125).

Although there may be quite a number of prerequisites for successful CPTD,

Steyl (1998:123) identifies the following four important prerequisites for any intended CPTD to be successful:

- A careful selection of appropriate participants, that is those that have the biggest need of this particular training and who are motivated to use it to full advantage;
- Efficient organisation that is the right environment to enable effective learning to take place, the right time of the day/school year and smooth administration. These aspects are frequently overlooked and may have disastrous effects on the quality of the CPTD provided;
- Effective delivery of the content of a CPTD programme. Good trainers who are knowledgeable, credible and skilful at enabling learning should be used in CPTD activities. A common weakness in CPTD delivery is to invite trainers who are experts in their field but who cannot communicate effectively with their audience. They need to be able to involve and motivate the audience into full participation; and
- It is also important to review the success of a CPTD intervention with a view to improving the quality of activities and learning for the next time (Steyl, 1998:123).

Models for CPTD

Several CPTD models exist (Gettly, 2002:26). It is suggested that both centralised and decentralised structures are needed for effective CPTD (Steyl, 1998:126). The models most commonly used are a centralised CPTD model, a school-based CPTD model, a school-focused CPTD model, and the cascade CPTD model (Edwards, 1991:38; Conzemius in Burke, 1990:180-190; Craft, 1996:12; Conner, 1991; Groenewald, 1995:32; Gettly, 2002:26).

The centralised CPTD model

Craft (1996:13-14) refers to centralised CPTD as training where teachers from different schools gather at a central venue for courses/workshops of a day or longer. The training personnel at centralised CPTD are normally associated with a higher education institute. Although the original notion was that centralised training should be managed by competent personnel of the HEIs who would ensure that the planning, presentation and training material are of high quality, during the evaluation the training model was found lacking in many respects (Gettly, 2002:26). "Although teachers do find such courses stimulating (acquiring new ideas and exchanging experiences with teachers from other schools), the (centralised) model has some disadvantages, namely, gaps between theory and practice" (Craft, 1996:13-14). Gettly (2002:29) and Craft (1996:8-14) describe the gaps in this model as follows:

> inappropriate aims on macro level do not comply with the true needs and expectations of the teachers; inapplicable activities where no regard for the outcomes has been shown, are planned and teachers lack motivation because they are unwilling to attend training as they are not adequately reimbursed for further qualifications. Finally it is not very popular as

> teachers' private lives are disrupted and single parents struggle to fit it in. Some of these gaps identified [are] not as much an indication of the model itself being flawed but rather of the delivery of CPTD programmes through this model typically being ill-conceived.

The school-based CPTD model

According to Edwards (1991:42) a school-based CPTD model has as basic point of departure that training occurs within the normal working milieu and is managed mainly, but not completely, by the school's own personnel in order to fulfil the immediate and specific needs of the school (Gettly, 2002:31). The school-based CPTD model was developed in an effort to overcome the problems of the centralised CPTD model (Craft, 1996:14; Gettly, 2002:31). According to Craft (1996:14) the purpose of school-based CPTD is "… achieving a better match of a CPTD course to the need and culture of a particular group of professionals'. Craft (1996:14) is of the opinion that all CPTD should be school based. In the words of Edwards (1991:42):

> The most effective efforts for change to take place close to the action, are concrete, teacher-specific, are focused on practical problems, involve teachers in project decisions, include classroom assistance, and have regular meetings that focus on practical problems.

From the above description, Gettly (2002:31-33) concludes the following:

- Training should be aimed at the needs and expectations of the teachers;
- Training should be practical;
- Training should occur continuously;
- Training should give teachers the opportunity for professional development and growth;
- Although the education authorities are not involved in the training, which could result in training becoming isolated, the HEIs' quality control of this training model will prevent this isolation; and
- The school management team must be informed and supportive.

According to this model aspects like a lack of financial support and continuity may, however, be problematic because of continuous change of personnel (Leckstein, 1994:41).

The school-focused CPTD model

The term 'school-focused CPTD' refers to training which occurs outside the normal working milieu and is presented by agencies like higher education institutions, educationalists, or the school itself (McBride, 1989:41). The roles and functions of role players in the compilation, planning and implementation to comply with the needs of an individual school and personnel, receive attention here. School-focused CPTD therefore complies with the needs of the school as organisation, including the needs and expectations of each teacher as individual (Gettly, 2002:36).

According to Conner (1991:54) school-focused CPTD should be based on needs identified by the teachers. In England Day (1999:4) refers to 'profes-

sional development' as

> ... all natural learning experiences and those conscious and planned activities which are intended to be of direct benefit to the individual, group or school and which contribute, through these, to the quality of education in the classroom. It is a process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purpose of teaching ...

From the literature Gettly (2002:37-39) deduces the following advantages:

- School-focused CPTD contributes directly to the improvement of the quality of education of the teacher and school;
- Collaboration between colleagues, principal and school management team and support for the training contribute to the professional growth of the teacher and promote transformation;
- The principal/school management team should have the ability to motivate teachers to become actively involved in this training;
- Teachers are given the opportunity to be trained in the development of learning programmes (curriculum development); and
- When 'external agencies' are not involved in the presentation of the training, it is because it is expensive and schools cannot always afford it.

The 'cascade' CPTD model

The 'cascade' model is an effort to combine centralised CPTD and school-based CPTD. It is a training programme in which large numbers of teachers from different schools are involved and trained during centralised CPTD (Craft, 1996:17). This approach differs from centralised CPTD as the message is 'cascaded' from top to bottom. This implies that dissemination of a central message is built into the training (Craft, 1996:17; Gettly, 2002:33).

The cascade model was initially used as an advocacy strategy by the DOE to provide CPTD to teachers to enable them to implement the new national curriculum. This training was a bold attempt to popularise OBE and demystify the new national curriculum at a time when there was much confusion and anxiety. This training was implemented by training 20 officials from each province through a service provider commissioned by the national DOE. These 'master trainers' then cascaded the information to district officials, who cascaded the information to teachers in their districts. Large numbers of teachers gathered at central venues for this training and were supposed to 'cascade' the message down to colleagues. Each time the information was cascaded, the message became more diluted and distorted. The cascade model has been widely criticised as an inadequate model for delivering effective training (Khulisa, 1999; CEPD, 2000; HSRC, 2000; University of Pretoria and NAPTOSA submissions). It failed to prepare either officials or school-based teachers for the complexity of the implementation of the new national curriculum. In the first instance the 'cascading' of information resulted in the 'watering down' and/or misinterpretation of crucial information. Secondly, trainers lacked confidence, knowledge and understanding to manage the training process (Khulisa, 2001).

District officials who conducted training were criticised for not understanding the terminology themselves and for using teaching methodologies that were not in line with OBE (Bryanston Primary School, COUNT, Free State Department of Education, Gauteng District Training Team, Gauteng Education and Training Council, Heine, Waja submissions) and too many of those who facilitated the training had been out of the classroom for too long. The training also created misconceptions that textbooks and content knowledge were no longer necessary in the new paradigm (Chisholm, 2000:3). Teachers trained through this model also did not have time to train other teachers due to a full timetable and/or extramural activities (Mouton, Tapp, Luthuli & Rogan, 1999).

Current training needs of the technology teachers

The National Teacher Education Audit in 1995 showed that a third of the teaching force at that time was engaged in qualifications-driven CPTD and that, in many instances, such qualifications had little or no impact on classroom practice (DoE, 2005). Despite a huge effort and the commitment of resources by schools, provincial teachers' unions, Education departments, universities, NGOs, community-based organizations and charity organizations that have been applied to CPTD, current provision remains fragmented and unco-ordinated and therefore makes a rather limited impact according to the evidence of poor learner performance.

To meet the challenges of continuing professional development the policy framework states that CPTD must focus substantially on a learning area or subject knowledge, especially in scarce skills, but not to the exclusion of pedagogical knowledge and skills in a variety of social contexts. The requirements in all programmes developed as a result of this policy must emphasize the integrated development of learning area or subject content knowledge and pedagogical skills, together with a thorough understanding of the changing social character of schools and the skills required to manage learning in diverse classrooms (DoE, 2005).

From experience with postgraduate students, Advanced Certificate in Education (ACE) students, as well as teachers encountered in CPTD workshops, observations were made with regard to the competency of technology teachers. Teachers have not been given sufficient CPTD through the cascade effort of the DoE to help them cope with OBE in general and specifically with technology education. Technology teachers are ill-equipped to function within an OBE education system and lack the necessary knowledge (conceptual and procedural) regarding the different themes or content areas within technology namely, processing, structures and systems and control (Ankiewicz, 2003:17; Reddy, Ankiewicz, De Swardt & Gross, 2003:29; Potgieter, 2004). These observations are supported by the findings of the Khulisa report on the evaluation of OBE in the Gauteng province, submitted to the Gauteng Institute for Curriculum Development (Khulisa, 2001).

Teachers experience the typical CPTD they are exposed to as too generic and have expressed a need for more subject specific content to be covered by

CPTD programmes (Chisholm, 2000; Engelbrecht, Ankiewicz & De Swardt, 2005; Potgieter, 2004; Ziqubu, 2006) and request more training and on-going support in teaching Technology (Mouton, Tapp, Luthuli & Rogan, 1999).

Teachers of other learning areas have the advantage that their learning areas are based on familiar 'subject matter', in other words the content is roughly the same as it was in the old subject they used to teach, whereas Technology is a whole new learning area, with unique content which is foreign to most teachers. Technology does not have an established academic discipline on which it is based — its academic discipline must still be determined. Rather it is a poly-discipline with content from various other disciplines (Ankiewicz, 2003:15).

Technology education is supposed to cover as many as possible of the themes of technology, namely, Structures, Systems and Control, Materials and Processing, as well as Communication. Many teachers have a lack of experience in the various themes of technology in their frame of reference (Potgieter, 2004:210-211; Ankiewicz & De Swardt, 2002:79). Systems and Control is divided into mechanical systems, electric and electronic systems, and pneumatic and hydraulic systems. Materials and Processing is divided into the processing of food, textiles, and resistant materials. Many teachers do not have the necessary competence (knowledge and skills and instructional methodology) to facilitate technology properly. They do not know how electrical and mechanical systems work or how they are controlled. Very few teachers know what orthographic projection is, or what the difference between tension and compressive forces in a structure are (Potgieter, 2004:212). If teachers are not familiar with the learning area content that needs to be facilitated to learners, their learners cannot be expected to excel in their class.

A common misconception among management, teachers, and even parents, is that teachers who used to teach technical subjects such as woodwork, technical drawing and home economics are ideally suited to teach technology education. The problem with this notion is that any technical subject focuses on only one specific aspect or theme of technology. Technological procedural knowledge differs from that of technical subjects in the sense that it is based on the technological process. Ankiewicz, De Swardt and De Vries (2006:120-121) state that "procedural knowledge is frequently referred to as tacit, personal or implicit knowledge". In contrast with conceptual knowledge, procedural knowledge cannot be taught but can only be developed through thorough practice. Technical subjects typically focus on the knowledge and skills required to process a specific kind of material (e.g. Woodwork, Metalwork, Fitting and Turning, Home Economics, Technica Civil, etc.), or making, manipulating and maintaining certain systems (e.g. Electrical work, Motor mechanics, Electronics, etc.). Technical subjects also do not take the subject philosophy of technology education (Ankiewicz, 2003:2) into account. Therefore some technical teachers tend not to facilitate technology education in the manner it should be done. Teachers from technical subjects often tend to focus on the making of some kind of product, neglecting most of the technological process and the vital procedural knowledge component. This is

mainly due to the fact that they are not familiar with the philosophy of technology (Van Niekerk, 2003:8-9; Ankiewicz, 2003:16). These teachers need intensive CPTD for them to make the 'mind shift' necessary to become competent technology teachers.

Some technology teachers do not know what is expected of them with regard to assessment, or how to manage and record assessment in class. They have limited experience with regard to the design and use of assessment instruments. Teachers receive guidelines and lists of minimum requirements for portfolios from the Department of Education (Gauteng Department of Education, 2003), without sufficient guidance on how to assess and manage the assessment of the work required for the portfolios. In order to do worthwhile assessment in technology education, the teacher needs to assess more than just the final product, otherwise only summative assessment takes place, which does not comply with the prerequisites for OBE. Teachers lack a clear framework for assessment (Van Niekerk, 2003) to help them assess learners' work according to the formative and summative assessment aspects of the technological process with its stages and thinking sub-processes (Van Niekerk, Ankiewicz & De Swardt, 2005).

Content (knowledge, skills, and attitudes) is the vehicle needed for achieving the outcomes of technology. In learning programmes the content of technology cannot include only conceptual knowledge of technology as artefacts, but should also contain procedural knowledge on the design and making of such artefacts, and vice versa: "… it is the possession of conceptual knowledge that makes possible the effective use of procedural knowledge of problem solving" (Glaser, 1984; in McCormick, 1997:149). "As the complexity of devices increases so does the importance of the interaction of device knowledge and procedural knowledge' (Gott, 1988; in McCormick, 1997:149). Teachers must facilitate the technological process because learners need to practise the procedural knowledge of technology education (in other words learners need to identify a problem, investigate possible solutions to the problem, design a suitable solution to the problem, produce the designed solution and then evaluate the solution themselves), focusing on the different themes of technology within different contexts in order to make them fluent in the use and application of the technological process (Ankiewicz, 2003:18; McCormick, 1997:151; Mawson, 2003:119). If teachers do not possess this 'vehicle', they cannot effectively teach or facilitate it to learners, and the learners cannot be expected to attain the outcomes. If the teacher of a technology class lacks knowledge or skills with regard to the learning area content, it has a direct impact on his/her learners (Ankiewicz, 2003:17; Reddy *et al.*, 2003:29).

Integration of (conceptual) knowledge from other learning areas is important for technology education. Knowledge, skills, and attitudes needed to solve technological problems can be sourced from other learning areas such as Science, Mathematics, Arts and Culture, etc. But this does not happen by itself, and learners need intensive guidance from teachers for successful knowledge transfer (Ankiewicz, 2003:16; Johnson, 1997:165-167).

To present technology education in a meaningful way at school — to also expose learners to the real technological world — it would be beneficial for the education sector to enter into partnerships with trade and industry. Although learning and teacher support material (LTSM) is available, schools do not have sufficient funds to supply learners with the material. Partnership with trade and industry provides a solution for this problem, by providing funds for LTSM (school-based CPTD) and school-focused CPTD from their Corporate Social Investment budgets. TechnEd is following two CPTD models based, *inter alia*, on the prerequisites of CPTD (Steyl, 1998; Gettly, 2002). For the purposes of this article only the school-focused model will be discussed.

A school-focused CPTD initiative

As an extension of the school-based model, Anglo Platinum sponsored the training of 120 technology teachers in 2004 and 260 technology teachers in 2005 in the Bojanala West region of the North-West Department of Education.

In this model teachers attend workshops at a central location outside of the classroom situation. This can therefore be described as formal, school-focused CPTD. The purpose of this CPTD is to upgrade teachers' classroom skills and teaching strategies and to provide teachers with subject knowledge, theory, and instructional methodology. These workshops are organised in conjunction with the regional office of the provincial department of education and presented by TechnEd lecturers.

The Department of Education notifies teachers to attend these workshops — they must be consulted when dates and themes for these workshops are chosen. The provincial DoE is also responsible for providing venues at central locations. The teachers who are invited to these workshops are typically from rural schools with limited resources. Every effort is made to keep the materials they process and the tools they use as accessible as possible, so that they can replicate the workshop in their classrooms with minimum financial implications, using basic tools and, as far as possible, recycled material.

All the tools and materials needed for the workshops are prepared beforehand and transported to the venues where the workshops are facilitated. The workshops focus on typical learner activities that the teachers will have to physically facilitate in the classroom.

In order to establish the impact of the workshops, teachers completed questionnaires after each workshop. The purpose of these questionnaires was to determine the impact of the school-focused CPTD. Half of the teachers who attended the workshops were chosen randomly to complete the questionnaires and the other half completed the DoE's questionnaires. For only five different workshops 286 participants completed the questionnaires in total. Initially the following open-ended questions regarding the perceived quality of the content and the presentation thereof were answered anonymously in order to establish the teachers' experience of the intervention:

Did the workshop meet your needs and expectations?

Provide reasons for your attendance of the workshop.

How did you experience the organisational aspects of the workshop?

What is your experience of the competence of the workshop facilitator? Which other information with regard to the workshop would you like to convey to us?

After taking the data obtained from these questions into account the questions will be adapted for subsequent workshops in order to obtain richer data. Preliminary research findings (the research project is still in progress) regarding the teachers' experience of TechnEd's school-focused CPTD initiative are discussed here.

(a) The LTSM as part of TechnEd's school-focused CPTD initiative fulfilled the technology teachers' needs and expectations

The workshop activities are based on LTSM to assist teachers who have never been exposed to technology education, be it the implementation or instruction thereof. Teachers experienced the workshops as fulfilling their great need for this particular training. They felt that the workshops equipped them with knowledge and skills that contributed to better instruction practices and helped to improve the quality of education that they provided.

We found that teachers generally experienced the accompanying LTSM as informative and helpful, and many of them travelled a distance to attend the sessions. Where specific teachers from a certain school could not attend a follow-up session, they sent a colleague to attend the sessions so that they would have access to the information. This collaboration between colleagues and the expectation of benefiting from the workshops illustrated a will to grow professionally and promote transformation. Teachers also expressed the need for their superiors to be involved in their CPTD. Quite often heads of department did attend the workshops, and in one case a principal attended a workshop with a new technology teacher. Their quotes indicated that participants had a need for CPTD:

"*Wishing to have more of these workshops in future.*"
"*I hope for the workshop to continue as it gave me a green light especially on this learning area ... This is a plea to train us on the modules we missed. I missed* [the] *structures workshop and it is also very important to me to complete the course.*"
"*The content of the course was very relevant and fruitful to us as educators.*"
"*I think this type of workshops should continue to empower educators more on technology.*"
"*Heads of department and principals should be invited to these courses so that when they moderate us they know what is expected of us.*"
"*Course content is excellent as well as the handouts.*"
"*It was an eye opener course for me as most of the technology problems I encountered are now solved.*"

(b) Effective learning resulted from efficient organisation by the facilitators involved in TechnEd's school-focused CPTD initiative

The efficient organisation of the workshops takes a lot of planning and preparation on the part of the facilitators (TechnEd lecturers). Tools and materials

have to be sourced and prepared in advance. LTSM and additional handouts need to be prepared and duplicated. Materials, tools, and LTSM need to be transported to the sites where the workshops take place. Great effort is made to ensure that the workshops start and end on time. The workshops are not scheduled over weekends or holidays, but rather during work hours in an attempt to keep teachers positive, and are facilitated in venues that are centrally located so as to be accessible to as many teachers in the district as possible. Both venues used to facilitate the workshops are situated in rural areas. No direct comments were made with regard to the appropriateness of the environment in which the workshops were facilitated or the efficiency of the organisation thereof, but the fact that teachers were satisfied with the workshop facilitation indicated that the environment was conducive to the effective delivery of the CPTD content. The following comments were evidence of the appreciation of the teachers:

"*The lessons were well presented with very good examples*."
"*Excellently presented. I understood everything.*"
"*Good presentation, especially ... practical sessions, it promoted class participation*."

(c) Competent facilitators contributed to effective delivery of TechnEd's school-focused CPTD initiative

Workshops are not delegated to secondary service providers, but are prepared and facilitated by knowledgeable and competent HEI staff who are also co-authors of the LTSM, experienced in teacher training and facilitating practical activity-based workshops. Teachers made the following written comments on the presentation of the workshop:

"*Presentation was good. The presenter knew his work*."
"[presentation was] *wonderfully done by a knowledgeable person, makes lesson very interesting ...*"
"*... please don't change the facilitator because he is good in facilitating all the modules*.'

The workshop activities are based on the LTSM which is incorporated where applicable. This provides some resources for facilitating the TechnEd modules with confidence, focusing on aspects such as classroom/workshop management with regard to tools and materials, safety precautions, assessment of learners' work and the administration thereof. Teachers are also given some practical pointers on preparing activities in their classroom, managing group work, etc. They are also made aware of the aspects that need to be taken into account when designing their own learning programmes (curriculum development).

According to the evidence provided, teachers experienced the workshops as rewarding and fruitful. The impact of the intervention on the actual classroom practice of the teachers involved, however, will have to be investigated. Suffice it to say that the teachers' experience of the school-focused CPTD as being rewarding and fruitful is a good start on the road to good technology education teaching and classroom practice.

The LTSMs are written in collaboration with postgraduate students who are technology teachers themselves. The learning programmes that the LTSMs are based on were first facilitated in a classroom by those experienced teachers.

The school-focused CPTD is well organised and prepared. Punctual arrival for and time management during the workshops are strictly adhered to. Every effort is made to make the experience as hands-on as possible, as well as to keep the presentation as exciting and energetic as possible. During these presentations teachers make artefacts that they can take home to be used with great effect in their own classrooms. This gives the teachers a sense of ownership and they feel that they have actually made something worthwhile. The deduction can be made that technology is demystified to a great extent.

A strong feature of the school-focused CPTD model is the fact that the same lecturers facilitate the training throughout. In our experience this has helped to establish a growing relationship between trainers and teachers and contributes to a positive learning environment.

The continued involvement of both sponsors for the school-based and school-focused CPTD models indicates that the interventions are of an acceptable quality. This is also evident in the fact that Anglo Platinum increased and extended their sponsorship to 2005, 2006, and 2007!

Conclusion

Aspects usually addressed by CPTD, as well as important prerequisites for effective CPTD, were discussed by referring to the literature. The following popular models for CPTD from the literature were discussed: the off-site or centralised model and the cascade method in which we endeavoured to link off-site and school-based CPTD, the school-based model and the school-focused model. The off-site-cascade model combination was found to be problematic.

According to observation and feedback from teachers it would seem that the school-based and school-focused models for CPTD are appropriate where technology teachers need to be trained by HEIs, and where training is sponsored by trade and industry.

Judging by the feedback received from teachers involved, they experienced the outlined school-focused CPTD intervention, sponsored by trade and industry, as successful in providing training that addressed their needs and problems. They experienced the LTSM as informative and helpful and felt that effective learning resulted from efficient organisation by the facilitators of the CPTD. Teachers also felt that the facilitators were competent and that this fact contributed to effective delivery of the CPTD initiative.

In the feedback a certain change in mindset has become evident, and as mentioned before the teachers' experience of the CPTD as being rewarding and fruitful is conducive to good classroom practice. The fact that trade and industry sponsor these CPTD interventions makes it very accessible to a wide audience without finance being a limiting factor.

Admittedly this research is still in its infant stage and more research is

necessary to determine the full impact of the project. The preliminary findings discussed do however give an indication of what can be further researched.

The emerging model of trade and industry becoming involved in CPTD by forming partnerships with HEIs to provide teachers with much needed training, in the region where the industry is based, signals an important and valuable acknowledgement of the responsibility that trade and industry have to the community in which they operate. The benefit that such a company can give back to the community in the form of having more competent teachers in front of their children in the classroom is invaluable to the future of such a community and to the company concerned.

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