Transformative Personal Development: Helping Teachers to Thrive on Discontinuous Change

Maureen Haldane

Manchester Metropolitan University, UK, m.j.haldane@mmu.ac.uk

Abstract. Many professional development opportunities offered to serving teachers address potential performance improvements or responses to change that are essentially incremental in nature. However, some challenges and opportunities particularly those relating to new technologies, involve addressing a more discontinuous change process. The Transformative Personal Development (TPD) model is derived from in-depth evaluations of one such change process, the introduction of digital interactive whiteboards in schools. This provided an opportunity to examine in some detail how teachers who had successfully adopted the technology, had acquired the capability so to do. The paper also refers to work in progress that will assess the applicability of the TPD model to other contexts where the change process also has a significant element of discontinuity, such as the introduction of hand-held devices in the classroom, the design and implementation of new learning spaces and the possible uses of "Second Life" in Higher Education.

Keywords: Professional development, pedagogy, ICT, interactive whiteboards, communities of practice.

1. Introduction

1.1 Responding to Continuous Change

Most Continuous Professional Development interventions are essentially a constructivist process; a considerable depth of existing expertise is usually available within the group providing a resource to draw upon when introducing certain new ideas and perspectives directly applicable to the participants' employment context. In these circumstances a "wiser other" [1] may adopt an essentially instructivist approach to conveying the relevant new knowledge, but the individual and shared reflections of participants can be harnessed to capture its relevance and applicability to the context of each participant. Thus, on completion of the training participants would typically be fully equipped to deploy the new learning in their workplace. However, there are some current and imminent change processes that go beyond taking new ideas and applying them to our existing context.

Some change processes are more discontinuous in nature in that some aspect(s) of the context itself, such as the technology deployed, or the physical or virtual learning environment, also change significantly with consequential opportunities to change the teaching and learning paradigm.

The first wave of learning technologies represented a significant challenge in that the acquisition of the levels of ICT literacy necessary to deploy them effectively was quite demanding, particularly in the days before teachers were able to acquire the necessary skills through computers available for personal use or as part of their own education. Within an ICT laboratory or workshop the pedagogic and classroom management techniques necessary to make effective use of the technology are, in essence, an extrapolation of those used in familiar contexts such as science laboratories or design technology workshops, in that tasks and problems are set for an individual or small group to resolve. The technology deployed within a typical classroom did not however change in any revolutionary manner.

Imagine for a moment if it were possible to transport people from the workplaces of the late 19th century into the present day. Most of those for whom comparable job functions still existed would be totally bewildered and likely to find the technologies in use today totally incomprehensible. However, there are many classrooms in our schools today that would look very familiar to any 19th-century teacher. It would only take a few minutes to explain that in the 21st century, pens come filled with their own ink and do not need to be dipped in ink wells, or that paper is sufficiently affordable to obviate the necessity of using slates for our rough work. For such a visitor, the difference between a whiteboard marker and a piece of chalk could be explained in a matter of seconds; it would be the curriculum content and the pedagogy rather than the technology that would seem as though it had come from a different planet.

1.2 Responding to Discontinuous Change

Once ICT escapes the confines of the computer lab and impinges directly on whole group teaching then the context within which learning takes place begins to change more radically. For example, when equipped with hand-held devices, students reticent about making a verbal interruption can text a query to the teacher who can choose whether to respond immediately or later when summarising. Without such devices attempting to gauge how much learning is actually happening, either from spontaneous questions or from those posed by the teacher to whoever volunteers to respond, is a very hit and miss process. A whole class response via a handheld device with the results automatically totalised and analysed provides instant feedback that can transform teachers' understanding of how best to communicate specific ideas and concepts and the extent to which all or part of the group is actually learning. Similar scope for transforming interactivity within a whole class teaching situation is also one of the many affordances of the Interactive Whiteboard (IWB) [2].

Changes of this type can be considered discontinuous in that teachers need to rethink pedagogy and deploy skills as reflexive practitioners over a period of time in order optimally to utilise the technology and adjust their teaching style accordingly.

2. The Transformative Personal Development (TPD) Model

During work on case studies of successful IWB implementations, [3], [4], the author observed the emergence of a process for developing new skills and a new pedagogy which does not appear to follow an "undertake training then apply it" model. Successful IWB deployment appears to rely to a significant extent on incremental

episodes of experiential learning over a period of time beyond initial induction; a situated learning model of provision [5].

While recognising that there is a rich and diverse range of learning and teaching strategies deployed within what is commonly referred to as Continuous Professional Development (CPD) the term "Transformative Personal Development"(TPD) was coined to differentiate this model of knowledge and skills acquisition.

2.1 Distinguishing characteristics of TPD

It is recognised that provision as diverse as the Continuous Professional Development that is available to serving teachers is not easily compartmentalised,

Therefore, in order to help differentiate the TPD model and clarify circumstances where it may be appropriate, its key distinguishing features have been summarised in Table 1 as follows:

Table 1, Distinguishing characteristics of the Transformative Personal Development model

CPD		TPD
Emphasis on enhancing capability within an essentially stable or incrementally modified context	**Context** (Technology, Learning Environment[physical or virtual], Learning Management)	Emphasis on developing the capability to take full advantage of a distinctively changing context
New knowledge input plus sharing of current experiences and shared reflection is largely confined within the defined training programme.	**Knowledge Construction**	Post induction, substantial experiential learning subsequently takes place at the workplace, over a period, involving significant collaborative learning alongside colleagues
New Knowledge is acquired which is directly applicable on completion of training	**Application of New Knowledge**	The construction and application of knowledge occurs simultaneously at the workplace
Continuous Change; Intended Performance Improvements are directed toward excellence as defined by current best practice and/or preparation for new roles and responsibilities	**Change Process**	Discontinuous Change; Learning is directed toward excellence in new practice. Discovering/understanding the "art of the possible" may be part of the learning process

2.2 Transforming Teaching and Learning via the Interactive Whiteboard

Hooper and Reiber [6], observed that teachers may progress through a number of reasonably well defined stages in their use of technology rather than following a two step "learn then apply" model. In two IWB evaluation projects[7],[3], the first at secondary school level, the second in primary schools, the experiential learning curve

described by teachers tended to follow a pattern of in-tandem development of skills and pedagogy that appears consistent with the TPD model above.

This progressive development of capability, over a period of experiential learning was illustrated by the typology of IWB expertise development set out in Figure 1 below [7]:

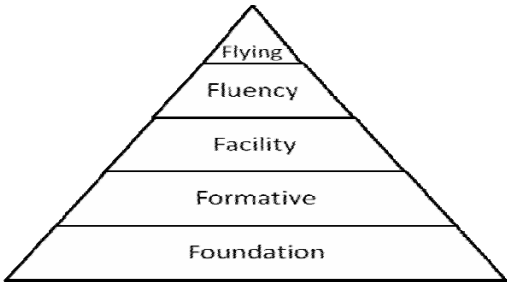

Fig. 1 A Typology of IWB skills and pedagogy development

Descriptors for each of the five levels of IWB skills and pedagogy development illustrated in Figure 1 are set out below:

2.2.1 Foundation (Level 1)

At this level teachers are using the interactive whiteboard primarily as a presentation/projection tool for PowerPoints, videos etc. They are most frequently positioned next to the computer itself, using the mouse and keystrokes to manipulate what is seen. They may make forays to the board to write with the electronic pen but if an old whiteboard is still in situ, or a flip chart is available, they are likely to utilise these.

2.2.2 Formative (Level 2)

At this level, teachers are working predominantly from the board, operating the computer functions via the board and beginning to make more use of the simpler IWB functionalities such as the electronic pen and erasing tool. With growing confidence, they are beginning to have interactions with students based around board-specific functions and, if useful and appropriate, inviting students to utilise the board directly. They are likely to progress to and beyond this level more quickly if no old board or flipchart is available.

2.2.3 Facility (Level 3)

At this level teachers have mastered all the additional functionalities available via the interactive whiteboard and are beginning to use them with greater frequency and facility. They have begun the process of adapting/creating resources and content that utilise and take specific advantage of the unique characteristics of the whiteboard. This would include using software tools specifically created for this purpose such as

ACTIVstudio for Promethean boards. They are confident with the technology and tools. They feel pleased with how they have creatively adapted and extrapolated their established pedagogy and may feel that they have reached the highest level of IWB capability.

2.2.4 Fluency (Level 4)

At this level teachers find that there are still some new horizons to explore. They continue to broaden their repertoire of tools and techniques and experiment with the unique pedagogic potential of the IWB using high levels of creativity. They are making significant use of functionality such as hyperlinks. They are becoming hunter-gathers, actively seeking out and harvesting new ideas, new content, new useful Internet sites etc.

2.2.5 Flying (Level 5)

At this level teachers are true virtuoso performers with a wide repertoire of tools techniques and student interactions. Their lessons are characterised by the variety of techniques deployed, the fluency with which they move between them and high levels of interaction with students. Within well-planned and well structured sessions they also demonstrate the confidence and ability to adapt and improvise in response to students' signs of interest or difficulty.

3. Collaborative Experiential Learning – The "Nuclear" Community of Practice (CoP)

While the above example of the TPD process places emphasis on developing expertise at the workplace over a period this should not be taken as implying that initial preparatory training is worthless in such circumstances.

Induction training can be particularly useful in helping teachers to understand the art of the possible. However, watching what one teacher described as a magician working through a box of tricks can prove either daunting or inspirational. The negative outcome is more likely if the magician in question is focusing on complex ICT functionality rather than emphasising the scope for transforming teaching and learning. It is also useful to avoid any assumption that the expected outcome is for participants to leave the room as competent magicians in their own right. Since such mastery is achieved over a period of time, and through practice, frequent and regular access to the technology is an essential prerequisite.

However, in successful implementations observed [3],[4],[7], teachers did not practice and experiment in isolation, but typically followed a collaborative experiential learning process. The process observed exhibited many of the features of a Community of Practice [8], in particular the informal self-organised nature of the collaboration and the shared sense of purpose in pursuit of common goals.

However, while there was some sharing of know-how within and beyond institutional boundaries, most of the collaboration took place within small and more cohesive groups. If a community of practice could be thought of as analogous to an

extended family then much of the learning was taking place within what might be likened to a smaller nuclear family. Within these "Nuclear CoPs" colleagues would practice together and demonstrate to each other specific functionalities and their pedagogic value, thus building a repertoire of "magic tricks" firmly directed toward improving the student experience. While the whole repertoire, once assembled, might prove transformative each individual "trick" was invariably an adaptation or extrapolation of a pedagogic device used in traditional face-to-face teaching. For example, various functions of the software that "conceal and reveal" words, pictures, or the whole or part of a graphic, can provide a number of ways and means of teasing out an answer from the group, offering an engaging alternative to repetitive verbal questioning. This grounding of new and emergent pedagogy in existing practice, ("Pedagogic Exchange") is seen as a providing a rationale for the transferability of the TPD model to other similar contexts.

3.1 Evolving a New Pedagogy within a Nuclear CoP

Teachers' experiences of mastering some limited sub-set of the affordances of the technology, and then gaining some experience of applying it in the classroom before moving on, appeared to follow a four-stage "IDEA" [4]

Inquire: "How can I do this?" A need for skill acquisition and investigation of IWB affordances;

Discover: often some useful functionality over and above the simple answer also emerges.

Explore: considerations and trials of how the newly discovered skills or functionalities of the board can be integrated into existing pedagogy.

Acquire: new ways of working; synthesising and embedding IWB skills with an emerging IWB pedagogy.

Dialogue with colleagues was common at each stage, often leading to shared experimentation with the same functionalities of the technology. Thus teachers did not tend to move from novice to expert as a consequence of formal induction training, but, stimulated by awareness of the possibilities, progressed step by step, through work-based learning, over a period of time.

Being able to tackle the acquisition of technical skills in a series of manageable steps, exploring the pedagogic possibilities of each step is far less daunting than the sense that one needs to become a fully competent "magician" first in order to begin to leverage improvements in teaching and learning. The "just in time" learning that is provided through technology providers' online help facilities often enables the "How do I...?" question to be addressed as and when it arises.

3.2 Key Success Factors

Three success factors were commonly observed in successful implementations and helped to maintain the motivation to progress:

- Regular timetabling to IWB-equipped teaching rooms.
- Mutual support from colleagues.

- The satisfaction derived from an incremental improvement in learners' engagement and interactivity that can arise from a realistic input of effort in mastering some sub-set of the affordances of the technology.

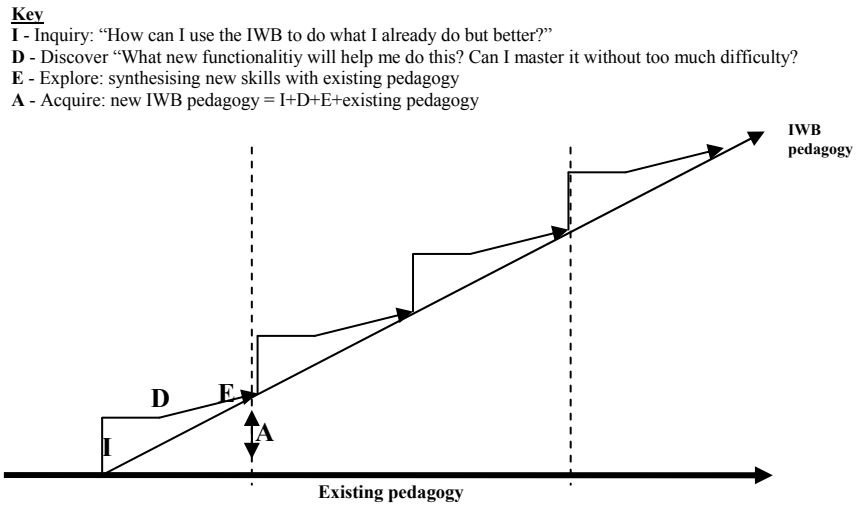

Fig. 2 Incremental steps toward mastery of IWB functionality; the "IDEA" model

The importance of the first of these factors cannot be overstated. Lack of opportunity to practice newly acquired technical capabilities means that advances are easily reversed .The intense frustration of taking some trouble to prepare a session on a particular topic only to find that you cannot re-use the material next time you teach it because you are allocated a room with no IWB can easily result in abandonment of any effort to progress. Indeed anticipation of such a contingency may lead some not to make the effort in the first place.

The mutual support of colleagues (the "nuclear" Community of Practice) tended to occur spontaneously most often within the smaller more cohesive teams found in Primary Schools. It has been suggested [9] that this factor, together with the more regular access to the technology that is often enjoyed by primary school teachers when compared to the more fragmented access to IWBs that may be experienced in partially equipped secondary schools, may provide a possible explanation for some less successful implementations at secondary level have been described by other researchers [10]. The added advantage of being easily able to "nip into my room" at break or lunch time alone or, very often, with colleague(s), to work something out, experiment or demonstrate is also more easily accomplished in a Primary School. An additional success factor at secondary level, which helped to address the more peripatetic classroom allocations of staff typical of secondary education, was the allocation of laptops to all teaching staff. [7] This enables them to transport their personal archive of lesson plans and resources with them, and to undertake their preparation wherever they happen to be. High capacity portable memory devices may provide an alternative solution if providing all teachers with laptops is not practicable.

Above the primary education level, where 'nuclear CoPs' may be less likely to form spontaneously, the formation of action learning sets to support the work-based learning process through which a new pedagogy can emerge may be advisable. Assessment of professional learning outcomes arising from such a process would typically be based upon reflective accounts and tangible learning outcomes, such as lesson plans and accompanying prepared or acquired learning resources.

Where team leaders are actively promoting more effective use of IWBs, the establishment of a team repository of such resources (and a requirement for some measure of equity in terms of input to such a repository) might be considered. Although many academic staff have strong preferences for their own particular approach to presenting a topic the adaptation and augmentation of a colleague's inputs is likely to take far less time than starting from scratch and should serve as a stimulus to continuous improvement of the team's repository.

4. The Scope for Wider Application of the TPD Model

For the purpose of reflecting on the TPD model and its potential for wider application two key foci are proposed:

i. The model was not developed by education researchers or teacher training providers but emerged spontaneously within the schools themselves.
ii. The context within which it emerged was one where the new "art of the possible" lay, to a significant extent, outside the day to day experience of the teachers required to exploit it.

Consider first the circumstances in which a new and unfamiliar "art of the possible" may emerge. In the case of the interactive whiteboard early adopting purchasers could recognise the logic of fusing together the functionalities of a video projector, a video-recorder, an overhead projector, a computer and a static whiteboard. What was less obvious at the time was the additional added value that can be achieved through a seamless switching between the functionalities of the then more familiar devices, and that which can be realised by utilising software specifically designed to exploit the affordances of this new multifunctional medium, the IWB. Those teachers who have become adept in the new pedagogy that these affordances can help realise typically experienced some unveiling of the art of the possible during induction but learned subsequently, through a process of discovery, usually in collaboration with colleagues, how to master the technology and exploit it for the purpose of improving the learning experience.

This poses the question as to whether, in the case of forthcoming educational innovation, we have no need of external expert intervention but can rely on practitioners with a sense of common purpose to coalesce as a Community of Practice [8] and share a journey of discovery together. Before designating education researchers and teacher training providers as superfluous to requirements when implementing innovation it may be worth recalling the particular circumstances in which the TPD model emerged. The term "nuclear" CoP was chosen advisedly. These were existing close colleagues with a sufficient professional bond that they were prepared to expose to each other their initially limited competences and share mistakes, thinking of these as learning opportunities. Where the motivation to learn and the potential for sharing a common purpose is dissipated by fragmentary and

infrequent access to the technology and/or where the opportunity for frequent social and professional interaction such as that provided by a school staff room is absent then a more structured and active facilitation may be required. Higher Education Institutions or other providers supporting the TPD process can use work-based learning outcomes such as lesson plans that exploit the potential of a technology, evaluations, learning resources and reflective assignments as a means of recording achievement for assessment purposes.

4.1 Work in Progress utilising the TPD Model

The writer is actively engaged in a number of collaborations between technology providers, researchers and practitioners in situations where the "art the possible" is being actively explored and validated as a first step in the TPD process. These include exploration of the scope for using Second Life as a virtual learning environment, current and prototype hand-held devices and a platform for student use of moving images as a collaborative learning tool. Colleagues involved in the preparatory phase are designated as "lead practitioners" who can serve as the focus of a nuclear CoP for those innovations that may be rolled more widely within the University. Those directly involved in teacher training also represent a source of academic leadership should the technology be adopted by partner schools. A similar cascade model would be envisaged within partner schools where, during any pilot phase lead practitioners should be given the frequent access to the technology necessary for developing mastery and can later serve a mentoring role within a nuclear CoP.

4.2 Using TPD as Preparation for New-Build Campuses

New build or extensively renovated schools or university campuses are likely not just to lead to discontinuous change, in terms of the nature and extent of the technology available, but also raise issues as to the potential for incorporating unconventional layouts and learning spaces. For example, the author visited a recently opened new build school which has a very large Learning Space that includes individual study carrels, both with and without PCs, an IWB and an area of informal comfortable seating. At present most of these affordances are rarely utilised to the full and this space is timetabled and used primarily as a conventional classroom. No doubt the teachers with access to this space will together discover and evaluate a variety of new ways of using such a facility.

In the meantime, such experiences raise issues as to how designs for new learning spaces might evolve. Architects are not teachers and teachers with many years experience of conventional learning spaces may find it difficult to imagine the possible alternatives and their potential contribution to the learning experience. Opportunities for an informed consultation as to a new "art of the possible" using both real and virtual simulations of learning spaces, together with showcasing of emerging learning technologies potentially provide an opportunity to address this. The commencement of the TPD process (for all, including non-teaching staff) at the early planning stage could serve the dual purpose of both informing and preparing for innovation. It could also help to avoid some more basic and practical design issues. Examples include environmentally-friendly classrooms with large windows intended

to make optimum use of daylight where the positioning of the interactive whiteboard in relation to the windows is such that blinds need to be almost permanently closed if the latter is to be visible.

5. Conclusion

Transformative Personal Development is an essentially work-based learning process intended to be applied to situations of discontinuous change such as those encountered when a significant advance in learning technology is to be implemented. In such situations the structured training interventions appropriate to more continuous improvement contexts are seen as an initial induction that provides some insight into the "art of the possible", in terms of impact on learning and pedagogy. These new opportunities for enhancing the learning experience are then fully explored and applied through an action learning/action research process undertaken at the workplace. Collaborative experiential learning, within a small "Nuclear" Community of Practice, is seen as making a significant contribution to the effectiveness of the process. Originally identified within case studies of successful implementations of digital interactive whiteboard technology, the model is seen as offering scope for active support and intervention by teacher training providers in a range of situations where significant innovation is being adopted.

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