"PHYSICIAN HEAL YOURSELF"

The Paradox of IT Educators and Educational Technology Tools

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ABSTRACT

In this paper, we investigate the paradoxical situation that appears to exist between IT Educators and their apparent lack of use of Educational Technology tools at university IT departments in South Africa.

In previous research (Blewett & Singh, 2003) it was found that only 16% of IT academics, at universities, were making significant use of Educational Technology tools. It was also noted that 32% of the IT academics surveyed felt that the use of technology was not more effective than traditional methods of teaching.

This paper now presents the results of further research that was conducted, in an attempt to investigate this paradoxical situation. The survey reveals that there are 5 key factors hindering the usage of Educational Technology tools by University IT departments in South Africa.

1. Resistance to changing traditional teaching practices,
2. Increased time commitment (workload) for academic staff,
3. Academic staff have not been taught how to apply technology in teaching,
4. Inadequate infrastructure for access, support and training to sustain technology, and
5. Lack of coordinated planning for technology at departmental, institutional and systems levels.

Although identifying these key inhibitors, the paradox deepens further when Resistance to Change is considered as the number 1 inhibitor. Further to this is the apparent belief by IT academics that their limited use of basic Educational Technology Tools (Type 1 Tools) constitutes the use and application of Educational Technology.

Keywords: Educational Technology, Educational Technology Tools, IT Tools, teaching, learning, education.

Categories: K3.2 Computer and Information Science Education

1. INTRODUCTION

Academic IT departments at universities teach how technology can be used to support most functions in business and society. Yet research conducted among academic IT departments at Universities in South Africa (Blewett & Singh, 2003; Brown & Czerniewick, 2004) has revealed a surprisingly low use of Educational Technology to support teaching.

In this paper we will attempt to explore this paradox, and try and determine some of the reasons for the lack of use of Educational Technology by IT departments. We will consider;
- the differences in usage that have occurred over the past 2 years,
- the misconception regarding the perceived use of the tools.
- the factors that appear to be hindering the adoption of the tools, and

Firstly we will examine some of the reasons that have been identified in other studies as affecting the usage of Educational Technology tools, then we will briefly outline our research approach, and finally present the results of our findings from a survey of all the major universities in South Africa.

2. BACKGROUND REVIEW

Before undertaking this investigation it is necessary to consider the other attempts that have been made to determine the inhibiting factors to the adoption of Educational Technology tools. While most of the previous research has not been on identifying these barriers for IT departments *per se*, it still nonetheless provides useful indicators of the key issues.

Zammit (1992) and others (Russell and Bradley, 1997, Schofield, 1995) found one of the primary barriers to be a lack of confidence and skills with computers, which threatens the educators' sense of competence and authority. Schofield (1995) further identified the issue that educators believe that Educational Technology will add little value to current practice.

According to Davis et al (1992) "Productivity gains offered by the introduction/usage of new technology are often unrealized due to poor acceptance by users" thus "perceived usefulness has been strongly linked to usage". He further stated that users will be willing to use new technology if they perceive the technology to be easy to use, *i.e.* Perceived ease of use. Davis (1989) defines Perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort".

Conversely, where good information technology practice has been found, and this is the exception rather than the norm, this has been attributed to instances of individual educators who are excited by the potential of information technology (Glennan and Melmed, 1996).

Integrating information technology into educational settings requires change. It requires change in the way educators think about teaching and in their teaching practices. Poole (1995, p.198) says, "The task of making the transition from traditional teaching to teaching with technology is much tougher than it seems. This is because the transition is as much a cultural one as one of mere methodologies. It involves a shift in teaching paradigms, a shift in the way of thinking about teaching."

Byrom (2002) has observed that the effective use of technology requires improvements in teaching. Improvements in learning result from combining effective teaching and pedagogically sound technologies. Both professional development and technical assistance should focus on developing a particular teaching or learning strategy that the educators believe will benefit their students, then educators will be eager to try both the new instructional strategy and the technology. However, basic technological equipment and facilities (buildings, infrastructure, security, and electrical infrastructure), have to be provided, otherwise it is difficult to focus on integrating technology to support learning.

So the main inhibitors to using Educational Technology tools, according to the literature are:
1. lack of confidence and skills with computers,
2. educators believe Educational Technology will add little value to current practice,
3. perceive the technology not to be easy to use,
4. educators reluctant to make the shift in teaching paradigms, and
5. lack of professional development and technical assistance.

3. RESEARCH APPROACH

Having considered the main barriers identified by other research efforts, we will now briefly outline our research approach before going on to consider our findings in the light of this previous work.

The theory developed in this paper has emerged using a typical Grounded Theory Approach (Smit, 1999). The generation and development of concepts, categories and propositions (key elements in grounded theory) is an iterative process. A grounded theory is not generated *a priori* and then subsequently tested. Rather, it is, "inductively derived from the study of the phenomenon it represents" (Strauss and Corbin, 1990, p. 23). The theory is discovered and developed through the process of data collection and analysis. "One does not begin with a theory, and then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge." (Strauss and Corbin, 1990, p. 23).

As such, an iterative process has been followed, with data being collected and analyzed, resulting in initial theories leading to further data collection, analysis and further theory generation. Having identified a significant lack of use of Educational Tools in the first iteration, the second iteration explores two additional aspects;

1. the change, if any, in the usage of Educational Technology tools, over the last year, and
2. the factors that affect the use of Educational Technology tools specifically in South Africa

Questionnaires were mailed, individually as well as through the SACLA (South African Computer Lecturers Association) Mailing List, to academic staff within Academic IT departments at Tertiary Institutions in South Africa. Of the 69 surveys mailed, 20 responses were received, representing 67% of universities in South Africa. A summary of the responses received from the universities is depicted in Figure 1 below.
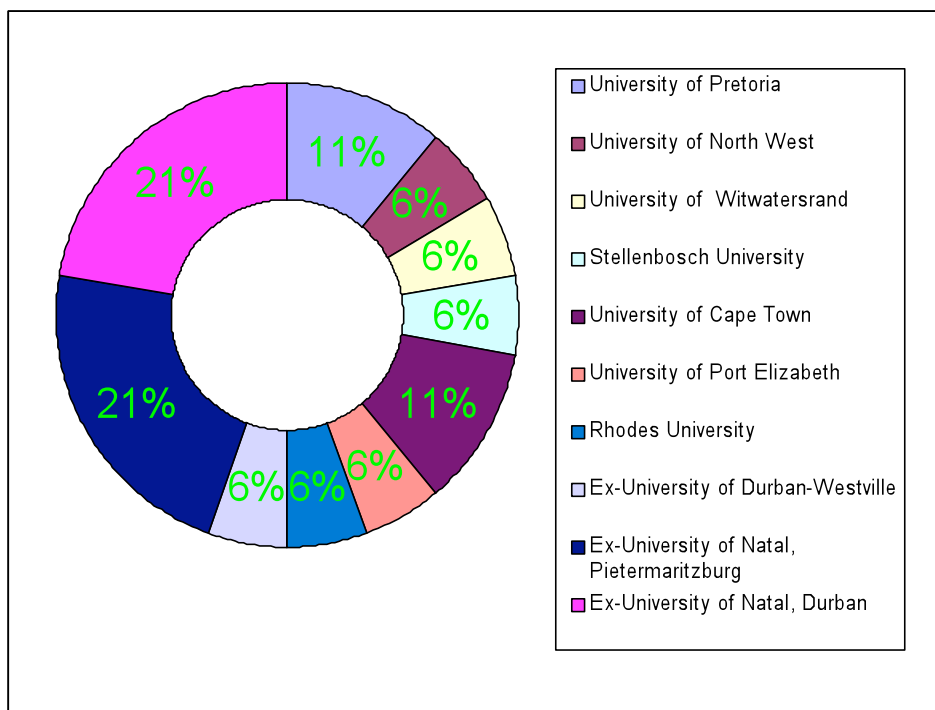
Figure 1- Distribution of Responses by University

4. DISCUSSION OF FINDINGS

Why is it that IT departments, although apparently being enthusiastic about the use of Educational Technology tools, and being teachers and proponents of IT solutions, have not adopted these very same solutions in their teaching? In this section we now present our findings and the theories that have emerged in our attempt to explore this paradoxical situation that appears to exist within IT academic departments

Firstly we will consider the changes in the usage of Educational Technology over the past two years, and then investigate the factors hindering the usage of Educational Technology tools in South Africa.

4.1 Differences in Usage of Educational Technology Tools over past 2 years

Educational Technology tools can be used in a wide range of ways to support teaching and learning. In its simplest form the technology can simply be used as a means to facilitate the efficient dissemination of information (course notes, slides etc). However, as is inherent in the definition of Educational Technology (Educational Technology, 2003), the use of Educational Technology tools to support the *education* process should involve the use of these tools for communication, evaluation, instruction, self-assessment, etc.

As such, Educational Technology tools can be divided into 4 types;

1. The use of technology to support delivery (posting of notes/slides, subject website, etc)
2. Communication tools such as Email, Discussion Groups, Chat facilities;
3. Evaluation Tools – Online Quiz/Tests, Self Tests;
4. Online Instructional Software Tools – Computer Based Interactive Applications, Interactive Learning Environments and Tools for Extending Knowledge.

Type 1 tools typically, while giving the appearance of using Educational Technology, simply are another means of distributing notes and other course material. "On-line resources that provide information only appear to provide benefit to learners" (Amory & Naicker, 2002, p.3). Whereas Type 2, 3 and 4 tools allow for a richer learning environment through the use of "small interrelated knowledge blocks and …..cognitive development tools" (Amory & Naicker, 2002, p.3). As such these types represent a more significant use of educational technology to support the teaching and learning process.

As is seen in Table 1, the results of the 2004 survey depict only small changes in the usage of the richer types of Educational Technology tools (Types 2,3 and 4) as compared to the 2003 survey. However there is a marked increase in usage of the Type 1 tools.

Tools	2002/3 Usage	2003/4 Usage
1. Tools to support delivery	12%	61%
2. Communication tools	19%	22%
3. Evaluation Tools	17%	28%
4. Online Instructional Software Tools	23%	28%

Table 1 - Tools employed in the delivery of campus-based teaching

Typical of first time adopters of technology (Educational Technology, 2003), the simpler forms of technology like Hosting of material on the Institutions Intranet and the Web have significantly increased in usage in 2004.

4.2 Misconception in Perceived Usage

While there is a relatively large increase in the usage of Type 1 tools (from 12% to 61%), this should not be construed as a positive indicator of an increase in the future use of Type 2, 3 and 4 tools. In the 2003 survey, where only 12% used Type 1 tools, 90% of those respondents believed they were making significant use of Educational Technology tools to enhance the education process (Blewett & Singh, 2003). While slightly improved in the 2004 survey, the trend nonetheless continues. In the 2004 survey, 61% now believe they are making significant use of educational technology tools to support teaching and learning.

So while there is an increase in first time adopters, especially of Type 1 tools, there still remains no significant or meaningful usage of Educational Technology tools (Educational Technology, 2002), within IT courses at universities in South Africa. The problem is not only that a most IT academics are not using the tools to support their teaching, but that many are unaware of how to use these tools to significantly impact the teaching and learning process.

4.3 The Unfolding Paradox

We now consider the reasons that have been identified as hindering the usage of these Educational Technology tools by IT academics.

The five most important factors (see Figure 2) identified by the academics surveyed (Singh & Blewett, 2004), as hindering the usage of Educational Technology tools by University IT departments in South Africa are:

1. Resistance to changing traditional teaching practices
2. Increased time commitment (workload) for academic staff
3. Academic staff have not been taught how to apply technology in teaching
4. Inadequate infrastructure for access, support and training to sustain technology
5. Lack of coordinated planning for technology at departmental, institutional and systems levels
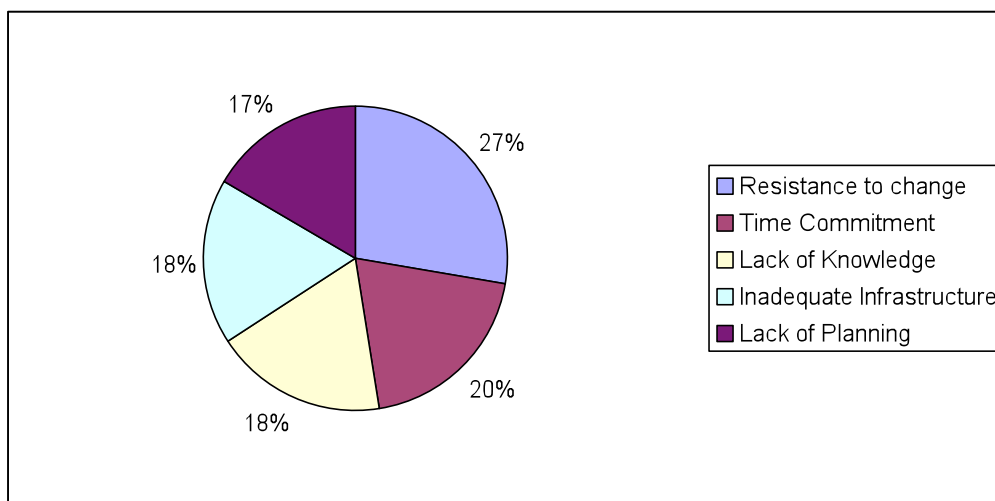
Figure 2 – Factors hindering the usage of technology in teaching

Table 2, below compares the key inhibitors to the usage of Educational Technology tools of the IT academic departments and those identified from the literature.

Key inhibitors to ET Tools in South Africa	Key inhibitors to ET tools (Literature)
Resistance to changing traditional teaching practices	Educators reluctant to make the shift in teaching paradigms
Increased time commitment (workload) for academic staff	
Academic staff have not been taught how to apply technology in teaching	Perceive the technology not to be easy to use
Inadequate infrastructure for access, support and training to sustain technology	Lack of professional development and technical assistance.
Lack of coordinated planning for technology at departmental, institutional and systems levels	
	Lack of confidence and skills with computers,
	Educators believe Educational Technology will add little value to current practice

Table 2 – Comparison of Key Inhibitors

Three inhibitors that are common are the resistance to change, the perceived difficulty of using the tools and the lack of adequate support structures. The two items unique to our situation of concern are the increase time commitment and lack of coordinated planning. These two items are not

surprising considering many South African universities are currently grappling with large student enrolments, and staff resource issues. It is also not surprising that the two items identified from the literature as inhibitors, *viz.* Lack of confidence with computers and a belief that technology adds little value, are not listed as key inhibitors for IT academics.

However, what is surprising is that Resistance to change is the biggest single inhibitor of using Educational Technology. As Poole (1995) stated "Integrating information technology into educational settings requires a change in the way educators think about teaching and in their teaching practices." It is rather paradoxical that IT educators, teachers of Change Management, and proponents of embracing technological change, are unable to embrace this same technological change.

The second factor hindering the adoption of the tools is the increased time commitment (workload) for academic staff. Often one of the biggest problems for educators is that "time, effort and money – essentials on staff development are overlooked" (Watson, 1999). Education is one of the few professions where it is expected that educators undertake professional development on their own time and often at their own expense. As a result the time investment required to mount an Educational Technology supported course has caused many academics to rather continue with current teaching approaches.

The third factor hindering the adoption of Educational Technology tools is a lack of training. Chen (2002) suggests that the main reasons educators are not using technology in their teaching are lack of knowledge and insufficient training. As with the resistance to change issue, here too IT academics are subject to the same hurdles and issues facing their colleagues in non-IT educational areas. Hence Chen (2002) adds that it is important to first "increase educators' knowledge of technology use in education in order to help them use technology in the classroom."

The fourth inhibitor is inadequate infrastructure. Respondents stated "Lack of explicit support for technology based teaching in terms of availability and funding for training programs makes it almost impossible to integrate technology into our teaching". Byrom (2002) concurs saying that "it is difficult to focus on integrating technology to support learning if you cannot overcome basic technological equipment and facilities issues, *i.e.* buildings, infrastructure, lack of security, impact of weather and electrical infrastructure" .

The final factor hindering usage of educational technology is the lack of coordinated planning for technology at departmental, institutional and systems levels. Although, as one responded stated, "departments are learning as time passes", another added "there is most certainly a lack of planning with regards to infrastructure and support for staff." According to Byrom (2002), "Leadership is the single most important factor affecting the successful integration of technology into teaching".

Therefore it is imperative, that academic leadership also get involved in the technology planning process.

5. CONCLUSION

Around the world, and even within non-IT disciplines at universities, there is evidence of enthusiastic adoption and usage of Educational Technology tools to support the teaching process. Yet within South African academic IT departments, while verbally supported, there is currently little evidence of significant adoption of Educational Technology tools to support the teaching process.

In investigating this paradox, a survey of the major universities in South has revealed that there are 5 key reasons for this.

1. Resistance to changing traditional teaching practices
2. Increased time commitment (workload) for academic staff
3. Academic staff have not been taught how to apply technology in teaching
4. Inadequate infrastructure for access, support and training to sustain technology
5. Lack of coordinated planning for technology at departmental, institutional and systems levels

Further to this is the added concern that most of the IT academics surveyed are under the impression that they are making use of Educational Technology tools to support their courses, whereas they are simply using the technology as a disseminator of content.

These identified inhibitors are similar to those that have been identified by other authors as factors hindering the usage of Educational Technology tools by non-IT educators. We are therefore left with the reality that IT academics are subject to the same fears and issues, when faced with the use of IT tools, as their colleagues in other disciplines are. Yet, while this in a sense addresses the paradox that we sought to consider, the number one reason identified – resistance to change – leaves us with a sobering question.

Why is it that IT educators, teachers of change management, proponents of embracing technological change, list "resistance to change" as their number one reason for not using Educational Technology tools? Is this a case of "Physician, heal yourself." (Luke 4:23)?

6. ACKNOWLEDGEMENTS

overcome, to enable education and training in South Africa to fully realize the benefits from emerging technologies.

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