

IMPACT OF PRE-SERVICE TEACHERS' PRIOR KNOWLEDGE OF INFORMATION TECHNOLOGIES ON PERCEPTIONS AND BELIEFS ON COMPUTERS IN EDUCATION MODULES

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ABSTRACT – Pre-service student teachers' prior knowledge and skills in Information and Communication Technologies (ICTs) affect their perceptions and beliefs on how Computer Technology modules should be taught and the core skills being addressed. Such perceptions and beliefs impact negatively on both learning and how lecturers should structure and deliver the learning material. The gap that exists between what pre-service teachers expect and what is being taught creates a number of challenges that may stifle the attainment of the desired learning outcomes. Biggs' 3P model on how students in tertiary education learn, was used as theoretical framework. A quantitative cross-sectional survey was used collected and analysed data on first year pre-service teachers' prior knowledge and skills on common ICTs. Descriptive statistics was used to present and analyse results. The findings indicated that first year pre-service teachers had basic ICT prior knowledge and skills. First year pre-service teachers also expected to be taught conventional computer materials and skills such computer hardware, operations and programming rather than knowledge and skills in integrating computer technology in educational context.

Key words: Beliefs; Perceptions; Pre-Service Teachers; Prior Knowledge.

1. INTRODUCTION

First year pre-service teachers bring with them a variety of prior knowledge and skills in ICT to teacher training institutions. Prior knowledge and skills tend to affect perceptions and beliefs on the manner in which certain subjects should be taught and the core skills that should be addressed (Todorova & Mills, 2011). This complicates efforts of imparting computer technology integration knowledge and skills to first year pre-service teachers who have a variety of prior knowledge and skills in different newer technologies.

Prior knowledge and skills in computer technology have since become an integral requirement for individual student's knowledge construction, skills acquisition and learning outcome (Shapiro, 2004). With the changing classroom teaching and learning environments compelling teachers to integrate computer technology in their practice, it is increasingly becoming an essential requirement that pre-service teachers acquire such computer technology knowledge and skills during their in-service training. Therefore, the introduction of various computer technology modules for pre-service teachers by universities is justified. This is also reinforced by the belief that computer technology has the potential to improve the learning environment from a passive to an active one whereby learners are in control (Davies, Lavin, & Korte, 2014). Courses for computer technology in education always create problems of how to deal with possible changes in curriculum content, instructional processes and assessment procedures that lead to students getting a better education (Moursund, 2005). Moreover, computer technology in education creates the problem of deciding what students should learn about computer technology (Moursund, 2005) and how the learning materials should be delivered to students with a wide range of prior knowledge and skills (Davies et al., 2014).

Although pre-service teachers may have prior knowledge on computer technology, it is important to look at how such knowledge shapes their perceptions and beliefs on what constitutes a good

curriculum for computer technology integration and how it should be taught. This cross-sectional survey collected and analysed empirical quantitative data from first year pre-service teachers in the Further Education and Training (FET) Department in one of the universities of technology in South Africa. The data was used to determine the influence of pre-service teachers' prior knowledge on their perceptions and beliefs about core skills to be addressed by the Computers in Education module and how the module should be taught.

2. LITERATURE REVIEW

According to the United Nations Educational Scientific and Cultural Organization (UNESCO, 2004), the first aspect of getting to know students is learning about their prior knowledge, experiences and skills in the field one teaches. Hailikari, Katajavuori and Lindblom-Ylänne (2008) regard prior knowledge as one of the most important factors that influence learning and student achievement. Prior knowledge can be viewed as multidimensional and hierarchical entity that is dynamic in nature and consists of different types of knowledge and skills (Hailikari et al., 2008). Prior knowledge plays a significant role on the learning of students as it can promote or hinder the learning process. Correct and structured prior knowledge of computer technology and appropriate skills provide key scaffold upon which new ideas and understanding of technology integration can be build. However, wrong perceptions and beliefs on what constitute core skills in computer technology and how they should be taught can be impediments to learning among pre-service teachers who have stronger prior knowledge than those with little prior knowledge. Correct and well-structured prior knowledge positively influences both knowledge acquisition and the capacity to apply higher-order cognitive problem-solving skills while unstructured prior knowledge produces negative results (Hailikari, Nevgi, & Lindblom-Ylänne, 2007).

Lecturers usually pay more attention to subject matter or skills they want students to learn than students' prior knowledge or skills in the subject. Research also shows that learners' prior knowledge usually confounds an lecturer's best efforts to deliver ideas accurately because learning builds mainly from prior knowledge and then secondarily from the subject matter presented (Hailikari et al., 2007). With regard to universities, (Lawson, 2011) purports that university lecturers appreciate the importance of a constructive alignment between teaching approaches and intended learning outcomes but it would seem that most of the teaching in the university is not constructively aligned with students' higher level expectations, intentions, or their learning needs. In the context of pre-service teachers, their prior knowledge in computer technology raises their expectations of what should be taught and how it should be taught so that they get the desired outcomes of what they want to be. In the event that students' prior knowledge does not match with presented subject matter, students distort presented subject matter. Worse still, when a lecturer overlooks students' prior knowledge, students may learn undesired skills to what the lecturer intends to develop regardless of how best the desired intentions are executed in an exhibit, book or lecture (Hailikari et al., 2007).

Research studies focus much on how teachers utilise learners' prior knowledge to help them learn new subject material. There is scarce literature on how students' prior knowledge and skills affects their perceptions and beliefs on what constitutes the core skills and how they expect to be taught so that these could be utilised in designing coursework or modules. In many cases the assumed knowledge used in a new module is based on the lecturers' notion rather than the intended students'. This therefore results in the creation of a module that may not meet the current needs of students to function effectively in their practises. Ignoring prior knowledge when designing new modules, for computer technology avid students, may consequently lead to a mismatch between what learners expect to learn and what is being taught and how it is taught.

Pre-service teachers hold certain expectations and beliefs of knowledge constructs and skills to be addressed by any module they study and this also shapes how they think the module should be taught. Such expectations and beliefs determine how pre-service teachers will respond to the course material in computer technology modules. Literature indicates that naive mental models and reasons which students initially build in order to make meaning of the world can highly be entrenched making it

difficult for them to learn new things (Roschelle, 1995). This might apply to pre-service teachers with computer technology knowledge and skills from their previous educational experiences that might make them believe that the computer technology module is a duplicate of what they were previously exposed to. Any slight deviation from expectations and beliefs is likely to be met with resentment or passive resistance making it difficult to prepare them for future technology integration. Hailikari et al.(2007) purports that students have a tendency of simply layering new ideas onto old and subsequently discard new knowledge whenever they are faced with new challenges they find difficult to solve or different from what they know.

3. THEORETICAL FRAMEWORK

Biggs (1998)'s 3P model, refined in 1999 and then in 2003 has been used as a framework in many research studies as a theoretical foundation on how students in tertiary education learn. According to Biggs (1998) in students' approaches to learning are dependent upon their intentions and motives, and are associated with their prior knowledge and experiences. This study builds on Biggs (1998)'s 3P model to conceptualise how pre-service teachers' prior knowledge and skills on how computer technology modules they undertake could be used to improve the teaching and learning of the Computers in Education module. Biggs (1998)'s 3P model conceptualises the learning process as an interacting system of three sets of variables namely presage, process and product (Biggs, 2003; Biggs & Tang, 2007; Hamilton & Tee, 2009; Tew, 2015). In this model, presage refers to factors that exist prior to the time of learning and these can be classified as student based and teaching context based (Lizzio, Wilson & Simons, 2002; Tew, 2015). Firstly, student based factors are important because they deal with the two basic requirements for learning namely: 1) relevant prior knowledge that students are likely to have in the topic/module to be taught; and 2) students' ability and commitment to the university they are enrolled at (Lizzio et al., 2002; Tew, 2015). Secondly, teaching context-based factors are concerned with subject matter/content taught, methods of teaching and assessment, teacher's expertise, ethos of the classroom and the institution itself (Biggs, 1998, 2003; Biggs & Tang, 2007; Tew, 2015).

The manner in which students approach their learning is provided for by process factors (Lizzio et al., 2002; Meyers & Nultym, 2008). This aspect of the framework is affected by a number of factors in the presage and product phases. Students' knowledge and abilities influence the development of perceptions and beliefs on the topic being taught and how it is taught.

Lastly, product factors describe the learning outcomes (*cognitive, affective or behavioural*) which students derive or expect to derive from the learning process (Biggs, 2003; Lizzio et al., 2002). The affective and the behavioural learning outcomes play a significant role in the student's evaluation of course or curriculum they undergo (Biggs, 2003; Hamilton & Tee, 2009; Tew, 2015).

Prior knowledge in computer technology can influence students to adopt either deep approach or surface approaches to learning. Students who adopt a deep approach to learning have an intrinsic curiosity and seek to understand the underlying ideas of the course content and transform these by relating to previous knowledge and experience (Biggs, 2003; Biggs & Tang, 2007; Teo, 2009; Tew, 2015). A surface approach to learning often involves non-academic priorities, misunderstanding of course requirements and ideas presented, or requirements to take a course perceived as irrelevant to the student's program (Biggs & Tang, 2007). Certain measures need to be put in place to maximise the quality of student learning outcomes so that pre-service teachers attain what they intend to be. One way to achieve this feat is to involve pre-service teachers' feedback in improving the module while taking into account the principles of module design. Meyers and Nultym (2008) encourages lecturers to develop modules that provide students with teaching and learning materials, tasks and experiences which:

- are genuine, real-life and relevant;
- are constructive, sequential and inter-linked;
- require students to use and engage with progressively higher-order cognitive processes;

- are all aligned with each other and the desired learning outcomes; and
- provide challenge, interest and motivation to learn.

These principles can be best applied by deploying the learning system in ways that require students to adopt a deep learning approach in order to meet the course's assessment requirements which, in turn, meets the desired course learning outcomes (Meyers & Nultym, 2008; Moursund, 2005; Roschelle, 1995).

4. PURPOSE OF THE STUDY

The purpose of this study was to determine the impact of pre-service student teachers' prior knowledge and skills on their perceptions and on Computer Technology modules they undertook. This was done by addressing the question:

How does prior knowledge and skills impact pre-service teachers' perceptions and beliefs of the content and core skills in computers technology modules and how they should be taught?

The following are the sub-questions that the study focused on in order to address the main research question:

- What computer technologies did pre-service teachers perceive they were knowledgeable with?
- What did pre-service teachers think their level of competency in computer technologies was?
- What were the perceptions of pre-service teachers regarding the content and skills addressed by the Computers in Education module?
- What knowledge and skills did pre-service teachers expect to be equipped with by the current Computers in Education module?
- How did pre-service teachers prefer to be taught in the Computers in Education module in order to attain the perceived knowledge constructs and skills?

5. RESEARCH DESIGN

This study utilised a descriptive cross-sectional survey design where data were collected with a closed-ended questionnaire. According to Babbie (2007), cross-sectional surveys provide quantitative descriptions of trends, attitudes, perceptions or beliefs of a population by studying a sample of that population. A survey questionnaire collected data on pre-service teachers' prior knowledge and skills in computer technology. The questionnaire was content validated and, in terms of internal consistency, it produced Cronbach's coefficient of 0.7. A pilot study was also conducted with ten second year pre-service teachers. A simple random sampling technique was used to identify participants for the study and this ascertained that each member of the population had an equal chance for selection and the sample was representative of the population (Cohen, Manion, & Morrison, 2011; Creswell, 2009; Denzin & Lincoln, 2008) of first year pre-service teachers. Degu and Yigzaw (2006) argue that random sampling can be used if the purpose of the research study is to measure variables distributed in a population as well as to generalise the findings. The sample size was 180.

The study was conducted during the first month of the participants' exposure to the computer technology module called Computers in Education. Of the 170 completed questionnaires received, 10 were rejected on the basis of the high number of blank answers they had. The Statistical Package for Social Science (SPSS) Version 23 was to process data.

6. RESULTS AND DISCUSSIONS

The demographic distribution of the sample showed 103 (64.4%) female and 57 (35.6%) male respondents. By age range, 65 (40.6%) respondents were aged below 20 years, 84 (52.5%) were aged 20 to 25 and 11 (7.9%) were above 25 years. Figure 1 shows results with competence in computer technology usage, 34 (21%) respondents rated themselves as poor in computer technology use, 118 (74%) good and 8 (5%) excellent.

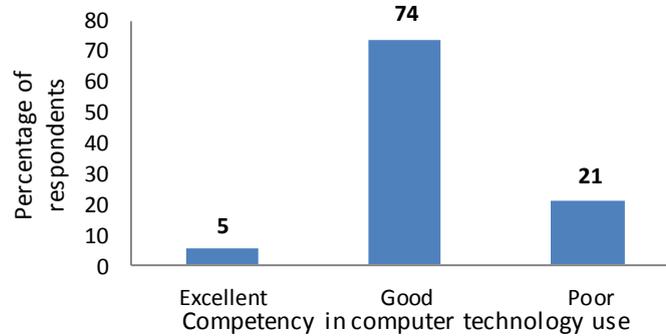


Figure 17: Competency in computer technologies

The results confirm that the majority of the pre-service teachers have prior skills and knowledge in computer technology they bring to Universities. However, only 72 (45%) had undergone formal training and 88 (55%) did not have formal training. Chi-square results show no significant association between competency and formal training in computer technology, Pearson co-efficient $r = 2.936$, at $p = 0.23$. This confirms that pre-service teachers acquired functional computer technology knowledge and skills through different means other than formal training. This complicates how learning experiences for students should be structured in classes where there are great disparities in terms of computer technology knowledge and skills among pre-service teachers. Regardless of this fact, Moses (2009) emphasises that students with prior knowledge of content tend to learn more effectively if concepts in that area mean something to them and to their particular background or culture. Student's prior knowledge and skills in computer technology can be used to decide the entry content of a module in order to activate student interest and curiosity to learn the module.

Question 1: What computer technologies did pre-service teachers perceive they were knowledgeable with?

Pre-service teachers' ratings of own knowledge and competencies in the use of common computer technologies found in South African schools are depicted in Table 1. The results show that prior to joining the university, pre-service teachers perceived their level of knowledge in most computer technologies to be generally good except for interactive boards, 97(60.6%); LMS, 80(50%); data projector, spreadsheet and Skype, all 76(47.5%). The computer technologies which respondents perceived that their knowledge was good or excellent were: instant messaging, excellent 103(54.4%) or good 57(35.6%); smartphones 95(59.4%) excellent, 53(33.1%) good and 12(6.9%); Tablets, 53(33.1%) excellent, 80(50%) good; YouTube 69(43.1%), 65(40.6%); Social websites, 88(55.0%) excellent, 50(31.3%) good; email 61(38.1%) excellent, 72(45.0%) good; Desktop computers and laptops, 12(7.5%) excellent and 118(73.8%) good.

Table 1: Rating on level of knowledge, skills and competencies in use of computer technology of prior to enrolling as pre-service teacher (n =160)

Various common computer technologies pre-service teachers are expected to use	Level of prior knowledge in a computer technology			Competency in the use of computer technology		
	Excellent	Good	Poor	Excellent	Good	Poor
Desktop computers	12(7.5)	118(73.8)	30(18.8)	8(5.0)	110(68.8)	42(26.2)

Lap top	12(7.5)	118(73.8)	30(18.8)	15(9.4)	107(66.9)	38(23.8)
Tablets	53(33.1)	80(50.0)	27(16.9)	42(26.3)	80(50)	38(23.8)
Smart phones	95(59.4)	53(33.1)	12(6.9)	84(52.5)	50(31.3)	27(16.7)
Data projector	15(9.4)	69(43.1)	76(47.5)	15(9.4)	53(33.1)	91(57.1)
Interactive boards	19(11.9)	44(27.5)	97(60.6)	11(6.9)	34(21.3)	114(71.4)
E-mail	61(38.1)	72(45.0)	27(16.9)	46(28.8)	69(43.1)	46(28.6)
Instant Messaging	103(64.4)	57(35.6)	0(0.0)	57(35.6)	65(40.6)	38(23.8)
Social Websites	88(55.0)	50(31.3)	22(14.4)	53(33.1)	57(35.6)	50(31)
Open Web Sites	50(31.3)	61(38.1)	50(31.3)	34(21.3)	46(28.8)	80(50.0)
Learning management systems (LMS)	19(11.9)	61(38.1)	80(50.0)	11(6.9)	45(28.1)	104(65.2)
Word processors	34(21.3)	65(40.6)	61(38.1)	7(4.4)	43(26.9)	110(68.6)
Spreadsheet	19(11.9)	65(40.6)	76(47.5)	3(1.9)	53(33.1)	104(65.2)
Presentation packages	19(11.9)	80(50)	61(38.1)	8(5.0)	61(38.1)	91(57.1)
Skype	15(9.4)	69(43.1)	76(47.5)	8(5.0)	69(43.1)	84(52.4)
YouTube	69(43.1)	65(40.6)	27(16.9)	42(26.3)	38(23.8)	80(50)

Based on these results it could seem that most of the first year pre-service teachers have sufficient knowledge on most of the computer technologies they may need to know and use during the course of the training. Moses (2009) warns that students may confuse familiarity of content with knowledge (in-depth understanding) of what is expected to be learnt in a module. Lecturers are encouraged to constantly evaluate the module and instructions to ensure that they are built on what their students know and needs (Edgar, 2012; Teo, 2009). The challenge faced by the lecturers in this case is how to deal with students with high expectations in this module while teaching what they are already familiar with. In such circumstances students may not use or engage with progressively higher order cognitive process as expected (Meyers & Nultym, 2008). Although, from the lecturer's point of view, the desired learning outcome may be achieved, but on the pre-service teachers side, these will not be their expected and desired outcomes of the module as there are no challenges provided to arouse the interest and motivation to learn (Biggs & Tang, 2007; Tew, 2015)

Question 2: What did pre-service teachers think their level of competency in computer technologies was?

Although pre-service teachers perceived to have good knowledge in many computer technologies, they also perceived that their competency in the use of some of the computer technology as being generally poor. Results on Table 1 show that respondents perceived their competency as being poor in interactive boards 114(71.4%); word processors 110(68.6%); LMS and spreadsheet 104(65.2% apiece); data projector and presentation packages 91(57.1% apiece) and Skype 84(52.4%); and open web and YouTube 80(50% apiece). In all cases of computer technologies on Table 1, respondents perceived to have higher level of knowledge than their competencies in the use of each technology, showing that knowing a technology does not translate into good skills of using it. Edgar (2012) views transfer of learning as an essential component of understanding usually overlooked in understanding the depth of knowledge that one possess when designing new learning experience. Computer technology lecturers should restructure content and pedagogical knowledge to suit the level of the students. Bransford, Brown and Cocking (2000) argue that universities should create student-centred environments that focus on the knowledge, skills, attitudes and beliefs that students bring to these educational settings. This implies that lecturers in computer technology should also link expected module learning outcomes with the experiences the students bring to the educational environment.

Question 3: What were the perceptions of pre-service teachers regarding the content and skills addressed by the Computers in Education module?

Respondents express their perceptions on the content to show what they preferred to be taught in this module. Results on Table 2 show how respondents rated the content which was to be taught in Computers in Education.

Table 2: Perceptions on the current content and skills taught in computers in Education (n=160)

Statement	Agree	Not sure	Disagree
Match what I expect to be taught in this module	34(21.2)	4(2.5)	122(76.3)
Address my functional knowledge and skills in basic computer technology usage	62(38.8)	2(1.2)	96(60.0)
Challenge me to learn more about computer technology in education	48(30.0)	4(2.5)	108(67.5)
Expose me to new avenues of computer technology use in teaching and learning	49(30.6)	11(6.9)	100(62.5)
Prepare me to integrate computer technology in my professional work	130(81.2)	8(5.0)	22(13.8)
Make me think positively about computer technology use in my university work	84(52.5)	8(5.0)	68(42.5)

The majority of the respondents 122(76.3%), indicated that the content taught in Computer in Education did not match their expectations, 34(21.4%) thought it addressed their expectations as teachers, 4(2.5%) were not sure. On functional knowledge and skills in computer technology, 62(38.8%) of the respondents indicated that the course content was sufficient enough to address these needs, 96(60.0%) disagreed and 2(1.2%) was not sure. The majority of the respondents 108(67.5%) indicated that the course content did not challenged them to learn more about computer technology in education, only 48(30.0%) affirmed this while 4(2.5%) was not sure. A few respondents, 49(30.6%) expressed that the course content exposed them to new avenues of teaching using technology in their various subject area compared to 100(62.3%) who disagreed and 11(6.9%) who were not sure. The majority of the respondents 130(81.2%) affirmed that the course content was preparing them to integrate computer technology in their professional work a development which the course sought to foster, 22(13.8%) thought otherwise and 8(5.0%) was not sure.

Finally, 84(52.5%) of the respondents affirmed that the course content influenced them to think positively about computer technology in their university work, 68(42.5%) disagreed and 5(5%) were not sure. These results indicate that in most cases pre-service teachers were skeptical about the course content of the module Computer in Education. The impression is that the module was likely not to address some of the expectations of pre-service teachers.

The results confirm that effects of continuous changes in the societal needs require pre-service teachers to possess high-level processing abilities that will make them self-directed in processing information for their need to meet their daily practise (Edgar, 2012). Pre-service teachers' prior knowledge can be instrumental in module review and curriculum design and implementation (Moses, 2009). Lee (1992) and Peshkin (1992) emphasise the importance of incorporating students' prior knowledge at the module design. An understating of students prior knowledge in computer technology helps lecturers to design a module that enable first year pre-service teachers to start from different entry levels. In this case, different learning paths could be made available depending on the pre-service teachers' differences in their levels of prior knowledge, background and needs. In this way, it will be possible for universities to prepare pre-service teachers to be flexible and be able to adapt to new problems and settings in which they have to apply computer technology and skills they would have acquired (Edgar, 2012).

Question 4: What knowledge and skills did pre-service teachers expect to be equipped with by the current Computers in Education module?

The results show pre-service teachers' perceptions on what Computers in Education module should mainly focus on.

Table 3: Perceptions on what should be taught in Computers in Education (n=160)

Statement	Agree	Not sure	Disagree
Computer technology integration knowledge and skills own learning	145(90.6)	15(9.4)	0(0.0)
Traditional computer skills such as computer operations and applications such as typing and hardware use	133(83.1)	19(11.9)	8(5.0)
Skills in web browsing	126(78.8)	11(6.8)	23(14.4)
Skills and knowledge in using social media technologies	88(55.0)	53(33.1)	19(11.9)
Knowledge in computer technology concepts	80(50.0)	65(40.6)	15(9.4)

Respondents tended to agree with each of the statements on the focus of Computers in Education module. The majority of the respondents, 145(90.6%) expressed that Computers in Education module should focus on improving knowledge and skills in the integration of computer technology in their own learning. 133(83.1%) felt that improving traditional skills and knowledge in computer operations and applications such as typing and hardware use should be the main focus of Computers in Education, 19(11.9%) were not sure and 8(5.0%) disagreed. 126(78.8%) of the respondents expected the module to improve skills in web browsing while 23(14.4%) disagreed altogether. As low as 88(55.0%) respondents were of the view that improving skills and knowledge in using social media technologies should be the main area that should be focused on by the module, 19(11.9%) disagreed. Only 80(50.0%) of the respondents expressed that the module should concentrate on improving the knowledge of pre-service teachers, 65(40.6%) were not sure and 15(9.4%) disagreed. These results show that pre-service teachers had prior knowledge and skills in some of the content to be taught in Computers in Education which influences how they filter and interpret what they are expected to learn. Students whose prior knowledge is robust develop a sound foundation for building new knowledge while those with inert and insufficient knowledge tend to cling to old modes of knowledge which always interferes with or impede new learning (Sarfo & Anson-Gyimah, 2010). While the majority of the pre-service teachers may envisage the module to address computer technology integration knowledge and skills own learning, it is the way they expect it to be achieved that would defeat the purpose of the new module. The majority of pre-service teachers expect to be taught traditional computer skills such as computer operations and applications (typing and hardware use) as a means to achieve these new attributes. This is in contradiction to principles of effective instruction which require computer technology to be part of a more extensive pedagogical innovation in classroom teaching and learning (Castillo, 2007; Merrill, 2002; Teo, 2009). In view of these results, computer technology modules should be designed to achieve modern aims of education by focusing more attention on the training of teachers to acquire quality knowledge and skills in instructional design related to the principles of effective instruction (Sarfo & Anson-Gyimah, 2010).

Question 5: How did pre-service teachers prefer to be taught the Computers in Education module attain the perceived knowledge constructs and skills?

Pre-service teachers perceived that certain strategies were more suitable for the teaching of the module Computers in Education than others. Table 4 depicts teaching strategies for Computers in Education module arranged according to respondents' preferences in descending order. Respondents perceive traditional methods as the most appropriate for teaching Computers in Education module to pre-service teachers. Results show that 143(89.4%) respondents perceived conventional methods of teaching IT courses as the most appropriate one for teaching Computers in Education and bottom the list is self-tutoring electronic material outside university laboratories, 40(25%) agreeing and 114(71.2%) perceiving it otherwise.

Table 4: Pre-service teachers' perceptions on how Computers in Education should be taught (n=160)

Statement	Agree	Not sure	Disagree
Conventional methods of teaching information technology (IT) courses	143(89.4)	4(2.5)	13(8.1)
Hands on-classes on hardware and application packages conducted by lecturers	127(79.3)	15(9.4)	18(11.3)
Collaborative groups organised by lecturers on social media	125(78.1)	15(9.4)	20(12.5)
Computer assisted/based learning	118(73.8)	7(4.4)	35(21.8)
On-line through learning management systems	86(53.8)	23(14.3)	51(31.9)
Collaborative groups organised by students on social media	49(30.6)	3(1.9)	108(67.5)
Self-tutoring electronic material outside university laboratories	40(25.0)	5(3.1)	114(71.2)

Based on these results, it is evident that pre-service teachers prefer teaching strategies that promote surface learning (Biggs, 2003) enabling them to reproduce information with little attempt to integrate it in their real-life situations. The finding was consistent with that of Meyers and Nultym (2008) which reports a strong association between students' perceptions of a heavy academic workload and their adoption of a reproducing or surface approach to study. Conventional strategies involve a heavy workload of information on the students enabling them to pass examinations. Students who prefer this style of learning are more likely to avoid the use of computer technology for study purposes. Pre-service teachers use the surface approach to learning because they perceive computer technology module as emphasising formal achievement rather than being for supportive teaching, independent learning and self-development. Biggs (2003) argues that students adopting a deep approach to learning would characteristically exhibit an explicit intent to develop their own understanding of material as opposed to those who adopt the surface approach. Research findings also show that the manner in which computer technology is used in many university classrooms seem to take precedence over the training of teachers to acquire adequate knowledge in effective instructional principles for quality learning (Sarfo & Anson-Gyimah, 2010). This setup and pre-service teachers' perceptions and beliefs in computer technology are likely to stifle meaningful integration of new knowledge and skills acquired in Computers in Education modules into their everyday life.

7. CONCLUSION

Pre-service teacher's prior knowledge is essential as it influences their perceptions and beliefs about the content to be taught and how it should be taught in a computer technology module. This study concludes that computer technology modules should be designed with a view to activate students' prior knowledge and skills rather than repeating what students already know, as suggested by Biggs (1998)'s 3P model. There is also a conflict on the content that students are familiar with and the knowledge and skills which the module seeks to instil in them. Where pre-service teachers exhibit strong prior knowledge and skills in computer technology, the lecturers need to reconsider elevating the entry level and provide for different paths by which student will attain the desired learning outcomes. In the context of Computers in Education, first year pre-service teachers' perceptions could be justifiable to some extent and also clouded with misconception on what they consider to be content and how it should be addressed.

This data cannot be generalised because the focus is on pre-service teachers at a particular university of technology. The result might be different given a different set of students with different technology experiences. As a recommendation for further study, research is needed on how computer technologies affect pre-service teachers' perceptions in multicultural and multiracial university settings.

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