

Article 3  
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# Computer Literacy Learning Emotions of ODL Teacher-Students

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**Abstract:** This paper addresses the affective human experiences in terms of the emotions of South African teacher-students while attaining computer competencies for teaching and learning, and for ODL. The full mixed method study investigated how computers contribute towards affective experiences of disadvantaged teacher-students. The purposive sample related to a criterion-based selection of N=339 teacher students attending supplementary computer literacy training which not only entailed the attainment of pedagogical knowledge and skills, but also of basic computer literacy skills for teaching and learning. Affective coding methods investigated subjective qualities of human experience. Qualitative emotion coding identified n = 31 emotion codes that categorized n = 1235 instances of computer literacy learning emotions. Quantitized qualitative data were used to quantitatively prove the validity of n = 29 emotion codes, before trustworthy qualitative discussion of findings were reported. A two dimensional *Model for Computer Literacy Learning Emotions* was developed from the cumulative results.

## Introduction

Affective computing may solve emotion deficiency issues of novice and developing students in Open Distance Learning environments while they engage with new technologies for the first time. Affective computing relates to the role of affective experiences and the emotional expressions of people during their learning of skills essential for using computers and other electronic devices. In some cases, applications are taught to mimic human emotions in order to establish computer-human interaction (MIT Media Lab, s.a.), while others interact with information of facial expression in order to adjust teaching strategies to provide personalized learning environment (Chen & Luo, 2006). This paper does not relate to the computing strategies of affective communication, but with the affective experiences of developing learners about to experience their first e-learning environment.

Affective communication is communicated to someone (or something) either with or about affect. People communicate their affective experiences daily. Affective communication involving computers represents a vast, but largely untapped research area (MIT Media Lab, s.a.). It is not clear how computers contribute towards affective experiences of previous disadvantaged communities.

Teaching and learning use modern educational technologies to create an “ideal” learning environment by integrating information and communication technology into curricula. Learning environments not only embody the learning styles of students, but also reform traditional teaching structures and the essence of education. Affective experiences of learning environments can cause affiliation or separation among teachers and students, or students and students (Chen & Luo, 2006).

## Literature Review

From the late 1950s into the 1970s, Krathwohl *et al.* (1973) have classified the domains of human learning. Bloom’s well-known taxonomy of learning comprises cognitive learning (knowing), affective learning (feeling) and psychomotor learning (doing). The affective domain deals with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. Learning is enhanced through high self-esteem and low anxiety, having a positive attitude towards learning, it is shared through emotions, values and beliefs in a group where learning takes place from one another through active engagement. Learning with and from computers is greatly influenced by learners’ perceptions on the usefulness of computers (Ingleton, 1999).

Affect includes aspects like emotion, mood, attitude and value (Jones, 2010). Interface design, the relationship between the user's attitude and emotions which could influence the user's motivation, should be taken into account (Chang, 2005). Failure to succeed in getting things right disheartens students. They should be made aware that emotions are a normal part of learning. Accurate identification of students' emotional and cognitive state is pivotal in support for successful learning (Kort *et al.*, 2001). Agyei and Voogt (2011) found that low teacher anxiety was the most important dimension of attitudes, and for teachers, competence is the strongest predictor of classroom integration of technology. Anderson (1996) developed a Computer Anxiety Rating Scale and found that previous computer experience is an important element of success in undergraduate courses in information systems. Computer anxiety is also implicated in performance, as is perceived ease of use and language ability (Conti-Ramsden *et al.*, 2010).

Introducing a computer literacy course enhanced students' computer and Internet self-efficacy. Computer literacy training also contributed towards positive attitudes towards computers and the Internet, while reducing students' computer anxiety. It produced positive responses regardless of students' prior ICT experience, though it enhanced computer self-efficacy, Internet self-efficacy and computer attitudes in the case of students with low prior ICT experience (Papastergiou, 2010). Moolman and Blignaut (2008) emphasize that e-learning for the individual user requires access to technology, computer literacy, self-discipline, the drive to develop and the confidence to use technology to achieve objectives. The digital divide is especially apparent in developing communities. Amidst calls to bridge this divide by introducing information technology to such communities, it could be rightly asked whether they have the discipline, motivation, and skills to learn by means of such a complex learning strategy. Variables such as gender, age and experience directly influence the intention to use technologies, as well as self-efficacy, anxiety and attitude (Verhoeven *et al.*, 2010). Studies indicate that younger teachers tend to feel more positive with regard to teaching with technology and most probably would use it in instruction. Teachers just out of college display a higher level of confidence than their older peers (Christensen & Knezek, 2008).

## **Design and Methods**

### **Study Context**

The School of Continuing Teacher Education (SCTE) at the Potchefstroom Campus, North-West University (NWU), enrolls about 24 000 in-service teacher-students for *inter alia* the Advanced Certificate in Education (ACE) or the National Professional Diploma in Education (NPDE). The SCTE follows an open distance learning (ODL) model that aims to increasingly adopt learning technology for effective delivery of education to large numbers of unqualified and under-qualified teachers across the diverse population of South Africa. The concern is whether students from mostly disadvantaged communities are ready to engage with digital learning technologies. These qualification programs include basic computer-literacy components to prepare teacher-students for using computers as part of their teaching and learning. SITES 2006 (Second Information Technology in Education Study), a large scale international comparative study that focused on teachers' pedagogical use of computers in classrooms, indicated that less than 40% of South African schools were ready to use computers in teaching and learning, and that about a quarter of the teachers were able to use computers and other electronic devices in their classes. These figures indicate that teachers in general are not ready to engage with e-learning, in spite of the call from the e-Education White Paper that by 2013 all teachers and learners should be prepared to effectively use computers for pedagogical and administrative practices (South Africa, 2004).

### **Method**

This study followed a *Fully Mixed Sequential Equal Status* research design (Leech & Onwuegbuzie, 2009) with a two-phase qualitative analysis, followed by quantizing of the qualitative data (Saldāna, 2009) in order to quantitatively validate the emotion codes that the researchers identified from the qualitative data. This design would enable researchers to construct a visual bi-directional model to readily depict the phenomenon of computer literacy learning emotions at a glance (Saldāna, 2009). The dataset contains the research participants' verbal responses to five open-ended items from a survey, based on Morris and de Nahlik's (2009) *Technology Acceptance Model (TAM)*. The instrument was designed for novice computer users from rural and disadvantaged communities in South Africa. The five-item dataset relates to (i) the challenges the participants experienced during computer literacy training; (ii) the influence of their background on their computer acceptance; (iii) their perceptions on the value of computer-literacy training they received; and (iv) the personal advantages of becoming computer literate.

The participants comprised N=339 teacher students, enrolled for either an ACE or NPDE qualification through ODL at the SCTE of the NWU during 2010. They have all previously been unsuccessful in completing a computer literacy module, and have presented themselves for computer-literacy training at learning centers across South Africa in order to improve their skills and pass the module. They all gave consent for the research and acknowledged that their participation was voluntary. The survey was completed during these computer-literacy training workshops. This purposive sample related to criterion-based selection of participants (Merriam, 1998) to create attributes essential to the purpose of the study, i.e. determining the *emotions* that teacher-students experience while *learning* with and about technology.

### ***Qualitative Methods***

Affective coding methods investigate subjective qualities of human experience (e.g., emotions, values, conflicts, judgments) by directly acknowledging and naming the experiences. *Emotion coding*, as a method of affective coding, taps into the inner cognitive systems of research participants by inferring to the feelings they experience. Emotion coding focuses on the analysis that judge the merit and worth of programs (Saldāna, 2009). This study accepts the definition of emotion as “an affective state of consciousness in which joy, sorrow, fear, hate, or the like, is experienced, as distinguished from cognitive and volitional states of consciousness” (Dictionary.com, 2011). Emotion cannot be separated from action as they are integrated in the same flow of events and the one leads into the other. Emotion coding provides insight into participants’ perspectives, worldviews, life conditions, and it also influences learning (Saldāna, 2009).

Emotion coding is appropriate for qualitative studies that explore intrapersonal and interpersonal participant experiences and actions. A first cycle comprises emotion coding (Saldāna, 2009), and labels the feelings participants may experience and taps into the inner cognitive systems of participants: “[Emotion] is a feeling and its distinctive thoughts, psychological and biological states, and range from propensities to act” (Goleman, 1995, p. 289). The verbal responses of the teacher-students to the five open-ended items constituted the integrated qualitative dataset on interpersonal and intrapersonal experiences and *emotions* while *learning* with and about the use of computers. Hundreds of words exist to describe human emotions—the repertoire of potential codes is therefore vast. The researchers used categorized lists of emotion to select descriptive words for creating appropriate codes for the analysis (Buddhamind.com, s.a.; Psychpage.com, 2010; Saldāna, 2009; Walter Hottinga.com, 2011).

To ascertain how the novice learners perceived their learning of new skills, a second cycle of coding followed according to the Jungian-inspired (Jung, 1990), *Conscious Competent Model*, outlining the four levels a person goes through when learning new skills and knowledge. They are (i) unconscious incompetent, (ii) conscious incompetent, (iii) conscious competent, and (iv) unconscious competent (Businessballs.com, 2010). The progression is from stage 1 through 2 and 3 to 4 and it is not possible to jump stages. For some skills, especially advanced ones, people can regress to a previous stage if they fail to practice and exercise their new skills.

The researchers used Atlas.ti™, a computer-based qualitative data analysis program, to analyze the qualitative sections of the data according to an open thematic approach (Anderson *et al.*, 2001). The analysis encompassed coding according to (i) a first phase emotion coding methodology, and (ii) a second phase coding relating to the four levels of the conscious competent learning model (Saldāna, 2009).

### ***Quantitative Methods***

The instances of qualitative understanding in terms of the two-cycle approach were exported to a spreadsheet and the data were checked for integrity. The spreadsheet listed 1235 instances of coding consisting of four variables for learning (conscious competent coding), and 31 emotion coding variables. Each instance contained two values: one for conscious competent coding, and one for the emotion coding. Three additional variables columns reflected a summary of the two-cycle coding: a single value representing conscious competent learning as a four-point scale, as well as a two-point scale value, each representing technophilia and technophobia calculated according to the conceptual analysis of the qualitative data. Validity, by means of factor analysis, was calculated on the data. A two-way cross-tabulation (contingency table) (Cramer & Howitt, 2004) displayed the interrelationship between emotion coding (technophilia and technophobia) and the stages of conscious competent learning.

## **Findings and Discussion of Findings**

## Quantitative Findings

Quantitative factor analyses were performed to calculate the validity of the 31 emotion codes (scales) that were identified from the qualitative analysis. Twenty seven scales (*successful, confident, reproach, powerless, expectant, appreciated, stimulated, uneasy, irked, encouraged, inferiority, apprehension, confused, lacking, fascination, involved, frustration, thankful, ashamed, optimistic, sharing, enthusiasm, pleased, dismay, touched, moved, acknowledge*) indicated a 1-factor loading, while two emotion scales (*enjoyment* and *despair*) indicated a two-factors loading. Validity was assumed for these emotion scales. The 1-factor loading of items (tags) on the majority of emotion scales (codes) indicated items load on single variables (1-factor loading), similar to the emotion code items (tags) identified by the researchers in the qualitative analysis, which therefore reflects the trustworthiness of the qualitative coding. The scale *idealized* indicated a three-factor loading. On closer examination of the scale *idealized*, it loaded with *despair* and *enjoy* as Factor 1; with *lacking* and *yearning* as Factor 2; and with *enjoy, despair, thankful* and *yearning* as Factor 3 (Table 1). The validity and findings pertaining to the scale *idealized* were interpreted with confidence despite its 3-factors loading, as they are valid in the specific mostly rural and disadvantaged context of the research participants who unconsciously enjoy acquiring benefits from the subsidized course, and the additional time and effort from lecturers and facilitators. As a result of their hopeless situation and previously disadvantaged background, they idealize technology as the answer to creating a better future. The scale *yearning* indicated a 5-factors loading. On closer examination, *yearning* loaded with *idealized* and *lacking* as Factor 2, with *enjoyment, despair, idealized* and *thankful* as Factor 3; with *reproach* as Factor 4; with *stimulated* as Factor 5; and with *fascination* as Factor 6 (Table 1). Because of its 5-factors loading, the findings regarding the scale *yearning* were interpreted with caution.

**Table 1: Factor analysis of the Emotion Codes ( $\geq 2$ -factor loading)**

Scales	F1	F2	F3	F4	F5	F6	F7	F8
Enjoyment	0.579		-0.435					
Despair	0.797		0.237					
Idealized	-0.224	0.203	-0.205					
Lacking		0.854						
Thankful			-0.803					
Yearning		-0.491	0.274	0.215	-0.249	0.300		
Reproach				-0.997				
Stimulated					0.980			
Fascination						-0.930		
Uneasy							0.790	
Irked							0.620	
Inferiority								0.719
Apprehension								0.699

As reported in Table 1, the initial scales *uneasy* and *irked* resulted in a combined 1-factor loading on factor seven (F7); as well as the initial scales *inferiority* and *apprehension* that resulted in a combined 1-factor loading on factor eight (F8). These findings were not surprising as during qualitative revision, a close resemblance was established between the data for *uneasy* and *irked*, and the data for *inferiority* and *apprehension*. The authors decided to group the initial scales *uneasy* and *irked* into the single scale *irked*, and *inferiority* and *apprehension* into a single scale *apprehension*.

**Table 2: Cross tabulation between learning and Emotion Coding Variables**

	Technophobia	Technophilia	Total
Unconscious and Conscious Incompetent	42.5%	35.1%	77.6%
Conscious and Unconscious Competent	2.2%	20.2%	22.4%
<b>Total</b>	<b>44.7%</b>	<b>53.3%</b>	

Variables for learning (*conscious competent coding*) and emotion coding (*technophobia* and *technophilia*) were correlated using cross tabulation (Table 2). Significant correlations were determined between variables using Cramer's effect size (V) (Ellis & Steyn, 2003). An effect size  $V \leq 0.2$  is considered a small statistical effect with little or no practical significance. An effect size  $0.3 \leq V \leq 0.4$  is considered a medium effect which tends towards a

practically significant correlation, while affect size  $V \geq 0.5$  is considered a large effect which indicates a practically significant correlation.

Table 2 indicates that of the total instances of *learning* and *emotion* variables, approximately the same proportion of respondents were technophobic and technophilic, while 90% of the conscious and unconscious competent respondents were technophilic. A medium effect ( $V = 0.378$ ,  $p < 0.01$ ) which tends towards a practically significant correlation, was found between these learning and emotion variables. These findings indicate instances of incompetence related to comparable numbers of technophilia and technophobia. However, with increased competence, technophobia almost disappears and technophilia increases. Surprisingly enough, more incompetence than competence relates to technophilia. This seemingly contradictory finding could possibly be ascribed to the so called Dunning-Kruger (1999) effect in psychology—a cognitive bias in which unskilled people make poor decisions and reach erroneous conclusions, but their incompetence denies them the metacognitive ability to appreciate their mistakes. The unskilled consequently suffer from illusory superiority, while the highly skilled underrate their abilities, suffering from illusory inferiority.

No practically significant correlations were found between the  $n = 29$  emotion codes in the quantitative dataset. However, as reported in Table 3, a medium effect size ( $V = 0.39$ ,  $p < 0.01$ ) which tends toward a practically significant correlation, was calculated between the emotion code successful and competence in respondents who were technophilic (Table 3), whereas 27.2% of the competent group experienced the emotion of feeling successful versus 1.6% of the incompetent group.

**Table 3: Cross-tabulation between the emotion code successful and competent for technophilic respondents**

	Successful		Totals
	Unsuccessful	Successful	
Incompetent	62.4%	1.0%	63.4%
Competent	26.6%	10.0%	36.6%
Totals	89.0%	11.0%	100.0%

Table 4 shows cross-tabulation between different levels of competence and technophobia and technophilia. The findings of this table are used in the conclusion and recommendation section to develop a *Model for Computer Literacy Learning Emotions* ( $V=0.484$ ,  $p < 0.01$ ).

**Table 4: Cross-tabulation between different levels of competence and technophobia and technophilia**

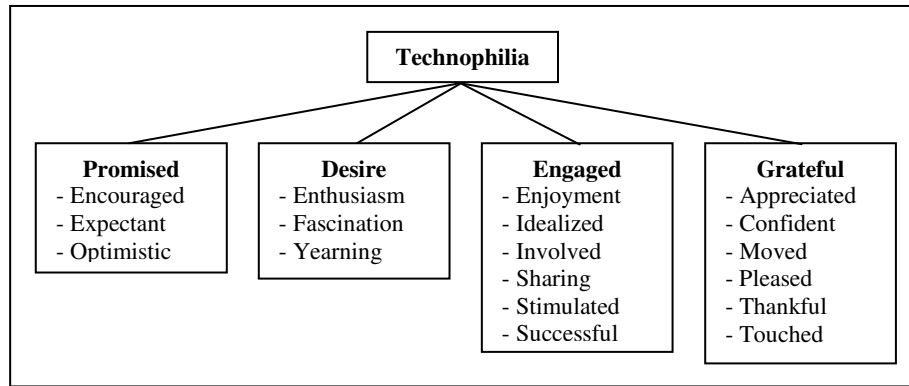
	Unconscious Incompetent	Conscious Incompetent	Conscious Competent	Unconscious Competent	Totals
Technophobia	27.0%	15.7%	1.8%	0.2%	44.7%
Technophilia	10.2%	26.0%	9.6%	9.5%	55.3%
Totals	37.2%	41.7%	11.4%	9.7%	100%

## Qualitative Findings

The quantitative analyses validated 29 qualitative codes (Table 5). Two themes emerged from the emotion coding of the teacher-students' experiences with personal computers, the Internet, mobile phones, or other new mobile learning devices: (i) *technophilia*: teacher-students experiencing a strong enthusiasm for advanced technology (Figure 1); and (ii) *technophobia*: teacher-students suffering from an irrational fear or dislike for advanced technology (Figure 2). These themes included categories of codes relating to the affective experiences of developing learners communicated with or about affect in response to the open ended questions about using computers.

### *Technophilia*

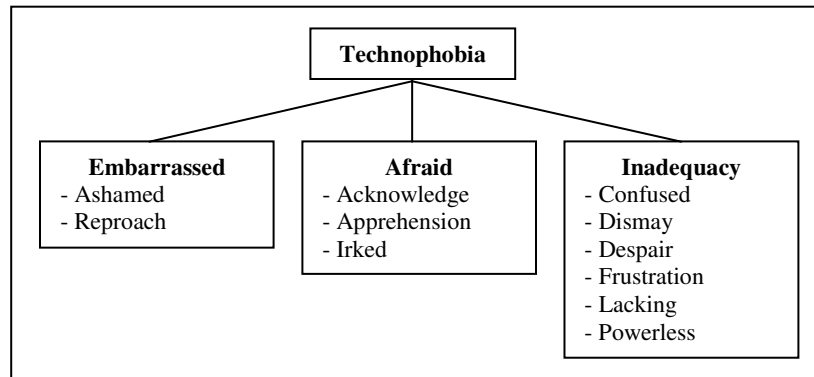
The teacher-students' affinity for learning with, and learning from technology presented four categories ranging from the *promised* they expressed on what technology could bring to them, *desire* to learn with technology, the ability to *engaged* with technology, and finally being *grateful* for the advances of technology. The teacher-students expressed strong positive desires and intentions to master new competencies once their limitations of access to technology dissipated (Figure 1).



**Figure 1: Emotion Coding Themes and Codes Structured as Technophilia**

**Technophobia**

The theme technophobia related to the teacher-students’ expressed feelings of dependence on being assisted due to their anxiety while using new technologies. From the analysis, three categories emerged capturing the technophobic experiences of the teacher-students: *embarrassed*, *afraid* and *inadequacy* (Figure 2).



**Figure 2: Emoting Coding Themes and Codes Structured as Technophobia**

**Table 5: Emotion Codes, Learning Codes, Descriptions and Typical Quotations**

Code and Description	Quote
<b>Emotion Codes</b>	
<b>Acknowledge</b> Accept or admit the existence or truth	<i>It was difficult for me to hold the mouse as I was shaking ... But I made it and passed</i>
<b>Appreciated</b> Recognizing the full worth	<i>From the start I had difficulties in holding my mouse and starting my computer. After assistance I totally enjoyed it because my teachers assisted me well. Thanks</i>
<b>Apprehension</b> Anxious or fearful that something bad or unpleasant will happen	<i>In the beginning before I enrolled I was computer illiterate. After enrolling I can use computers though I am still struggling with some aspects</i>
<b>Confident</b> Feeling or showing certainty about something	<i>I started to read the study guide for end-user computing for educators. That is where I get more information about computers. I learned the parts of the computer</i>

<b>Code and Description</b>	<b>Quote</b>
<b>Confused</b> Unable to think clearly or act with understanding	<i>With the information that I now have I'm more than motivated to come closer to computers</i>
<b>Despair</b> Feeling of complete loss of hope	<i>The problem I experienced in passing my computer literacy is I don't have computer skills. I also don't have a computer to practice</i>
<b>Dismay</b> Losing enthusiasm and becoming disillusioned	<i>I was sometimes slow to complete the task because it was the first time for me to use a computer</i>
<b>Encouraged</b> Promoted, advanced, or fostered	<i>Because I have realized the importance of using a computer in my classroom for many task e.g. set question papers, making class tests and recording marks for assessment</i>
<b>Enjoyment</b> Receive pleasure and satisfaction	<i>I like to use a computer; it makes my work to be very neat and beautiful. I will encourage my children and the community to use computers to make their life easier</i>
<b>Enthusiasm</b> Excitement or interest	<i>I can walk tall and people were amazed that we have been given a chance to do this</i>
<b>Expectant</b> The prospect of overcoming barriers	<i>We are living in a technological world, so computer knowledge is a must to all, especially educators Being computer literate will help us to gain access to more information from all over the world</i>
<b>Fascination</b> An intense interest	<i>I have changed my mind, I am very interested in computer, in so much that I want to buy it and use it at my home</i>
<b>Frustration</b> Feeling of being upset or annoyed, especially because of inability to change or achieve something	<i>In my opinion I think this is the simplest module of them all, since its practices are for daily life or experience. The problems might be studying the module without having a computer, or practicing it</i>
<b>Idealizing</b> Regard as perfect or better than in reality	<i>I have never experienced any problem in passing the module on computer literacy but I teach at a farm school where there are no computers. Using a computer for the first time may be a problem but I am interested in knowing the basics of the computer</i>
<b>Involved</b> Becoming interested and enjoy	<i>I used computers during my studying with the NWU and became very interested. As from now, I will never look back I am going to use a computer in everything that needs to be done</i>
<b>Irked</b> Irritated; annoyed	<i>The main problem is that we, most people, do not have access to computers. If we all have computers just like televisions at home or school, the module would have been no problem. I would have been better skilled. Having no clear idea of the way the computer functions was the other main problem</i>
<b>Lacking</b> Be without or deficient in	<i>I enjoy using a computer, it is only that I don't own one. So I have limited time to spend on it</i>
<b>Moved</b> Characterized by intense feeling	<i>I am getting more experienced in using the computer. I knew a little bit about computers when I came here, but since I started practicing using computers, I am gaining a lot. As a person who lives in a rural area I am now the same as the person who lives in an urban area. Thank you for your support</i>
<b>Optimistic</b> The belief that good will triumph and virtue will be rewarded	<i>It was difficult for me in the beginning but I managed to do the work that was allocated to me. Now I have gained computer skills; I'm computer literate!</i>
<b>Pleased</b> Feelings of pleasure and satisfaction	<i>They gave the opportunity and a good teacher who is flexible and effective</i>
<b>Powerless</b> Without ability, influence, or power	<i>I don't have access to computers at my working place, neither do my learners, so this makes me afraid to buy myself a computer</i>
<b>Reproach</b> Expressing disapproval or disappointment	<i>Because computers were for those who had money. In my school there were no computers. I did not have the privilege to even see what it is</i>

<b>Code and Description</b>	<b>Quote</b>
<b>Ashamed</b> Worthy of or causing shame or disgrace	<i>There were no computers at the time when I grew up</i>
<b>Sharing</b> Spontaneous sharing of information	<i>I want to improve; using a computer in my everyday life. My sister works in Saudi Arabia, so I want to communicate with her through e-mails on the computer</i>
<b>Stimulated</b> Excited and invigorated, anxious to put to practice	<i>I want to be better skilled. Computer study is a skill just like driving. If one does not drive for a long time, the skill will fade away or be easily forgotten. I also want to buy my own so that I can practice every day, and even do my unfinished tasks at home</i>
<b>Successful</b> Obtaining a favorable outcome	<i>Before coming to class, somebody did try to introduce us to computer literacy but he was not well informed, so it became confusing to understand, but now with this course, I can see the light and computer literacy is all about practice. There were no problems in passing the module</i>
<b>Thankful</b> Pleased and relieved	<i>Computer literacy training is a good course: It helped me a lot in using a computer. I benefited a lot and thanks to Potchefstroom for introducing this course</i>
<b>Touched</b> Affected or provoked	<i>Because North-West University has provided us with a kind lady. A teacher who did not shout at us but helped us; as I am the one who has no picture of how to use a computer</i>
<b>Yearning</b> A longing, almost wistful desire	<i>If I had access to using a computer I would be good and this will have helped in getting information to be used for personal and teaching purposes</i>
<b>Conscious Competent Model</b>	
<b>Unconscious incompetent</b> The person is not aware of the existence or relevance of the skill	<i>As from now, I am going to buy my own cellphone because now I know something about computers Because computers are everything in life and is helpful</i>
<b>Conscious incompetent</b> The person becomes aware of the existence and relevance of the skill	<i>The statements will make me improve my skills because I am blank If I can give myself time to study computers, I will be able to use it for every activity. I need someone to assist me</i>
<b>Conscious competent</b> The person achieves 'conscious competence' in a skill when they can perform it reliably at will	<i>The course went very well and I hope to improve and work harder from what I have learnt. I believe practice makes perfect I can now work on my own. I was afraid before being exposed to computers</i>
<b>Unconscious competent</b> The skill becomes so practiced that it enters the unconscious parts of the brain—it becomes 'second nature'	<i>In high school I studied computers from grade 8 to 12. I grew up with a computer in the house. Working on a computer was second nature to me</i>

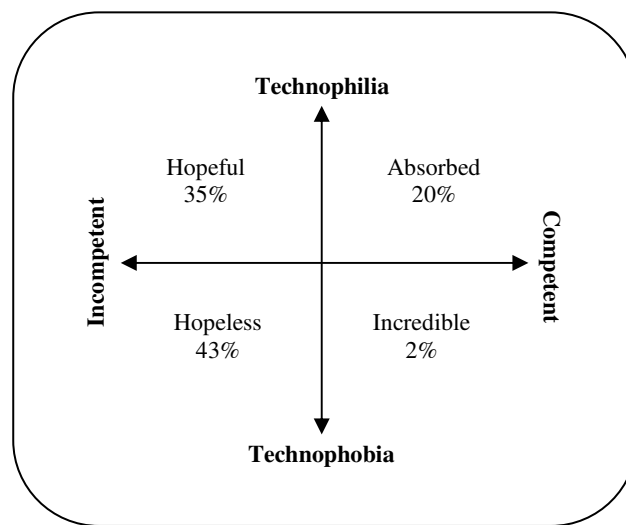
## Conclusions and Recommendations

The researchers developed the following *Model for Computer Literacy Learning* (Figure 3) from the cumulative results of this research (Table 2). The model consists of two continuums, namely (i) the Technophobia—Technophilia continuum, and (ii) the Incompetent—Competent continuum. Two continuums divide the model into four quadrants, (i) *incredible*, (ii) *absorbed*, (iii) *hopeless*, and (iv) *hopeful*.

The current investigation yielded a make-up of 2% of the total group of participants who were competent were also technophobic (*incredible*); 43% of the total group who were incompetent were also technophobic (*hopeless*); 20% of the total group who were competent were also technophilic (*absorbed*); while 35% of the total group of participants who were incompetent were also technophilic (*hopeful*). This model could be useful to other researchers who are interested in computer literacy learning emotions, not only as a theoretical model, but also as a conceptual research framework.

During the systematic investigation of developing a Social Transformational Learning Technology Implementation Framework to address the needs of the SCTE, the needs of the learners, faculty members, and the

constraints of the organization all need to be considered. In compiling such a framework, the current study has identified themes that will assist in establishing relevance while extracting meaning from the lived experiences of research participants.



**Figure 3: Model for Computer Literacy Learning Emotions**

Pro-active interventions focus on initial assessment of computer literacy, followed by custom made ICT training for meaningful implementation of ODL to alleviate technophobia and promote engagement in utilizing computers and appropriate learning technologies. Consequential interventions could include introducing teacher students to learner management systems, online libraries, electronic information searching, applicable online study methods, as well as basic academic reading and writing competencies. Once an acceptable level of computer literacy has been established, technological acceptance should enable some online and other interactive media alternatives such as mobile learning. Progressive integration of technology into teaching and learning could develop together with e-readiness for the older generation of teacher students. Young teacher students may require less custom made intervention relating to digital literacy.

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