Postgraduate studies: Human-based technology

E. Kritzinger*
e-mail: kritze@unisa.ac.za

M. Loock*
e-mail: loockm@unisa.ac.za
*School of Computing
University of South Africa
Pretoria, South Africa

Abstract

Currently the graduation rate of postgraduate students within the Open and Distance Learning (ODL) environment in South Africa is of great concern to academia, government and industry. Both Masters and Doctoral graduation rates are below expected national and international levels. This low rate has a direct effect on subsidies calculated on the basis of the education funding formula, research deliverables, as well as the students' personal and professional situation. The research discussed in this article focuses primarily on the human aspect of postgraduate study and how technology and communication can be applied to increase the postgraduate success rate within an ODL environment. This human aspect is investigated by means of a qualitative and quantitative study to determine the impact of technology and communication methods on more effective postgraduate supervision. The present research attempts to increase the success rate at ODL institutions by examining the relationship between the effective use of technologies and communication methods and by demonstrating the impact on, and importance of human-related aspects of successful postgraduate supervision.

INTRODUCTION

The supervision of postgraduate students is one of the many important aspects that all academic institutions must address to ensure success (Edwards 2002; Lee 2009, 641; Lee and Green 2005, 2). One academic environment where this vital area is currently lacking is that of Open and Distance Learning (ODL) institutions. 'ODL is a multi dimensional concept aimed at bridging the time, geographical, economic, social, educational and communication distance between student and the institution. The main advantage of ODL is that it focuses on removing barriers to access learning' (Unisa 2008). The main focus of ODL involves striving to ensure that learning is accessible to all students across the globe (Galush 1997, 4--5; Rowntree 1992). Postgraduate students in an ODL

environment encounter more and different kinds of challenges compared to their counterparts at traditional (residential) educational institutions. For example, ODL students are geographically situated across the globe with little or no contact with their supervisors. A number of challenges currently hamper postgraduate supervision at ODL institutions; such as the fact that in some cases study material is stopped at customs and even held up for months (if allowed through at all) before gaining entry into the foreign country. This situation is not much better at a national level, as study material is often lost or stolen before it reaches the student (Raheena and Allsop 2006, 67). Supervisors (as well as the institution) must therefore understand the challenges that students face and take these difficulties into consideration during their supervision.

It is up to every teaching institution to ensure that students receive the support they need to complete their studies (Gorra et al. 2010). In the case of an ODL institution it is vital that the supporting structures (for example, the use of technology) are identified, understood and implemented properly. Hence research must be conducted to find and improve alternative methods for supporting supervisors with postgraduate supervision. It is also important to educate supervisors (Kritzinger and Loock 2011, 9) regarding the use of these alternatives while taking ODL components into account. Supervisors are made aware of all possible difficulties involving ODL and are assisted to adapt their supervision to fit an ODL environment. Ultimately, supervisors must help students to resolve the problems associated with studying in this unique environment, to ensure that students complete their studies within a shorter period, thereby increasing the overall graduation rate of postgraduate students.

This present research investigates different alternatives that can be used to improve postgraduate supervision. This article will use the findings of two case studies to propose a possible model for improving graduation rates on postgraduate level in an ODL environment. The research and proposed model are based on three dimensions: technology, communication and human interaction.

BACKGROUND

One important aspect of research on postgraduate supervision with ODL involves the graduation rate of students. Outcomes of ODL programmes are evaluated in terms of graduation rates, in other words the actual number of successful students that obtained a qualification (Raheena and Allsop 2006, 37). It is therefore, vital for all educational institutions to ensure that their students complete their studies within an acceptable time frame (Mlambo 2010, 1; Wingfield 2010, 1), as graduation rates and the possibility to increase them are directly linked to the funding that institutions receive (Davis and Venter 2010, 82--83).

To illustrate the need for effective postgraduate supervision in an ODL environment, this research firstly investigates the graduation rate of postgraduate distance students over the four-year period (2006 —2009). We specifically investigated statistics of the graduation rate of postgraduate students within the School of Computing (College of Science Engineering and Technology, UNISA). UNISA is the largest distance-based tertiary institution in South Africa. Our study identified postgraduate students as students that enrolled for a full thesis in the field of Information Systems and Computer Science. The statistics of the graduation rate in the postgraduate modules for the period 2006--2009 are depicted in Figures 1 and 2 (Kritzinger and Loock 2011, 6--7). Statistics for 2010 and 2011 are not yet available.

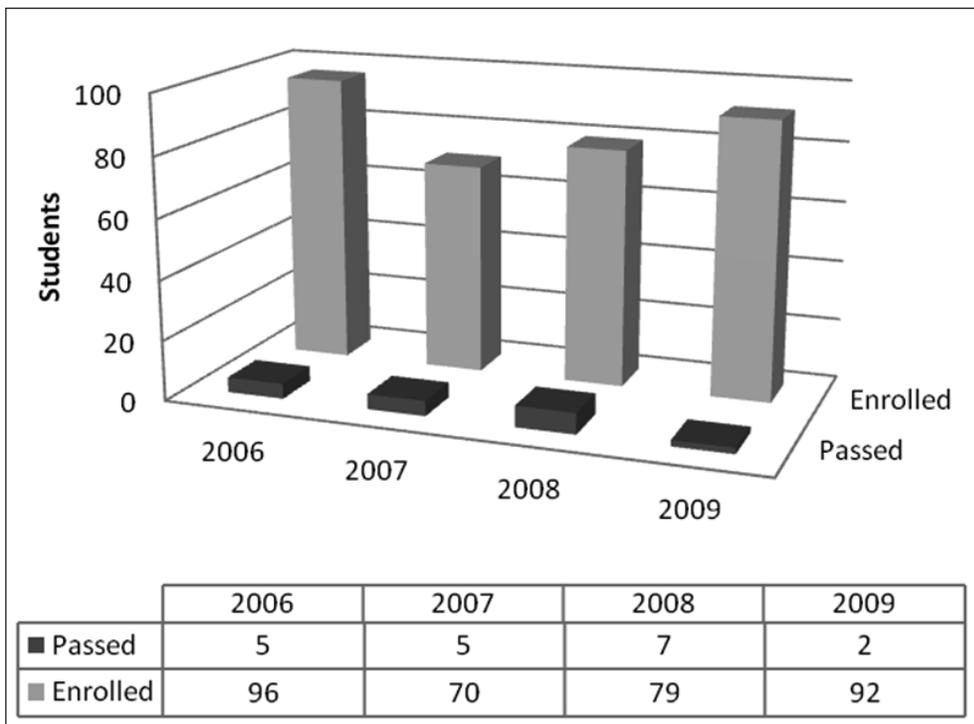|	2006	2007	2008	2009
■ Passed	5	5	7	2
■ Enrolled	96	70	79	92

Figure 1: Comparing enrolment and graduation rates for MSc students

Figure 1 illustrates the grim picture of the graduation rate of Masters students in the School of Computing. The statistics about the enrolment and graduation rates for Doctoral students are depicted in Figure 2.

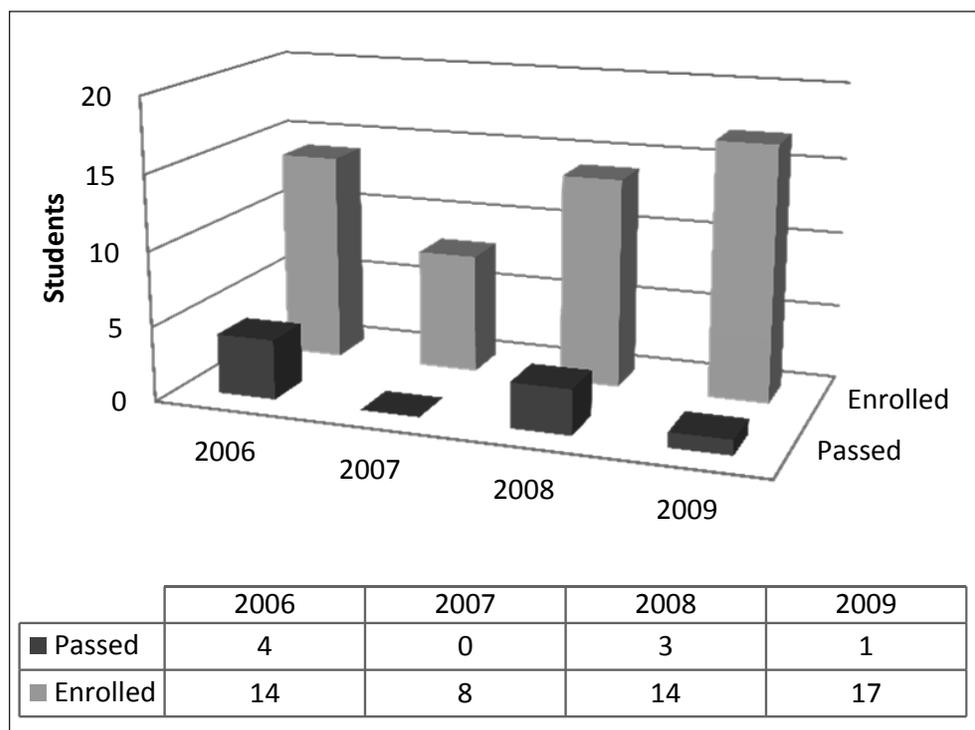|	2006	2007	2008	2009
■ Passed	4	0	3	1
■ Enrolled	14	8	14	17

Figure 2: Comparing enrolment and graduation rates for PhD students

From the statistics depicted in Figures 1 and 2 it is clear that between 2006 and 2009 the average graduation rate for postgraduate students was lower than 15 per cent. These results clearly indicate that postgraduate supervision within UNISA as an ODL institution should receive more attention, as the actual graduation rate is far below the minimum target of 25 per cent set for 2015 (UNISA 2008). As stated earlier, this article investigates and discusses different alternative technologies that can be implemented by supervisors to increase the overall graduation rate. We acknowledge that different factors influence the success rate of postgraduate students, but will focus our research on one factor; namely technology, the use thereof (communication), and its impact on postgraduate student performance. The human factor (interaction) is essential for survival and success in postgraduate studies in an ODL environment.

Human-based technology is defined as technology that assists with human interaction (Long, 1991). In the case of postgraduate students this will involve communication and interaction between the student and the supervisor or among students themselves. Face-to-face interaction is always preferred in any supervisor/student relationship, but in ODL situations where this is not possible, one needs to utilise technology that can 'mimic' face-to-face interaction. This

article identifies three types of human technologies that supervisors can utilise in their supervision:

Low impact human technologies (e-mails)

This kind of technology opens up the communication channel with students, but incorporates little to no human aspects. E-mail communication is often one way with a time delay on the response.

Medium-impact human technologies

This kind of technology involves interactive communication and technology that provide students with the opportunity of human interaction in a group context. An example of this type of communication is the discussion forums.

High-impact human technologies

These technologies involve highly interactive communication between participants; for example, skype and video conferencing. These technologies are high-tech in nature and provide real-time feedback and interaction between participants.

Each of these technologies will be investigated to determine if they are beneficial to postgraduate supervision.

PROBLEM STATEMENT

This article is based on research that investigates the possible alternative methods that can be used in supervision within an ODL environment so as to assist students in completing their studies and thus increasing the overall graduation rate. It therefore, aims at determining the factors that can assist academics and students at ODL institutions in the successful completion of their studies.

METHODOLOGY

The research is based on two independent case studies. The first case study involved data collection and analysis by means of a survey. In Case Study I the participants were supervisors (Section 1) and postgraduate students (Section 2) at the University of South Africa's School of Computing. The findings obtained in respect of Case Study I are discussed in Section 3.

Case Study II involved data collection by means of one-to-one feedback from students regarding their personal feelings about their studies. The three open-ended questions that were put to seven postgraduate students are introduced and discussed in detail, followed by an analysis of the students' responses.

CASE STUDY I

Section 1: Supervisors

Case study I used a survey to investigate the different technologies and communication methods used by supervisors to communicate with their students. The first part of this survey was conducted with 35 supervisors in the School of Computing (UNISA). They were requested to answer a number of questions and a total of 19 supervisors responded, resulting in a 66.5 per cent response contribution. An e-mail was sent out requesting the participation of supervisors and SurveyMonkey was used to gather the requested information.

For the purposes of this article only the questions relating to technology, communication and human interaction are dealt with (Kritzinger, Loock and Mwim 2011):

Question 1: *Please indicate which of the following technologies you are using for your postgraduate supervision. (MyUnisa, video conferencing, SMSs, discussion classes, pod casts and satellite broadcasts.)*

Question 2: *If you are aware of the above technologies but not using them -- why?*

As can be deduced from the list of technologies mentioned in Question 1, UNISA utilises different technologies to assist students and supervisors, all of which are supported by training that is made available to all supervisors. The findings discussed below were extracted from the information obtained.

The first question requested the supervisors to identify which of the technologies indicated in the list they are currently utilising as part of their supervision. Figure 3 depicts the feedback received from supervisors and their actual use of the different technologies offered by UNISA.
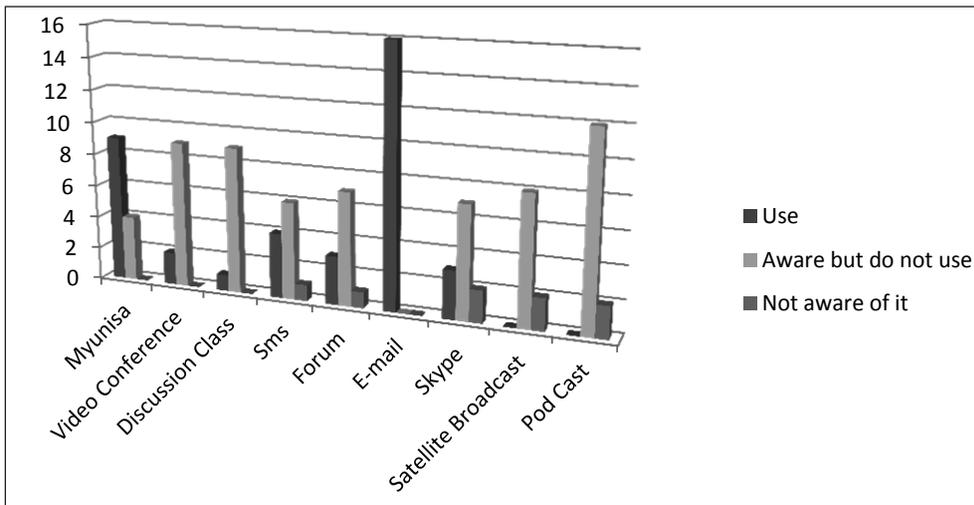
Figure 3: Technologies used by supervisors

The results depicted in Figure 3 indicate that even when technologies are available (for example video conferencing), supervisors do not use them effectively to support postgraduate students in their studies. For example, the responses showed that only two supervisors used video conferences while nine were aware of the technology but did not use it. To further understand these results, a follow-up question was asked as to *why* supervisors did not use the specific technologies even if they were available and training was provided. The results of this 'why' question are depicted in Figure 4.
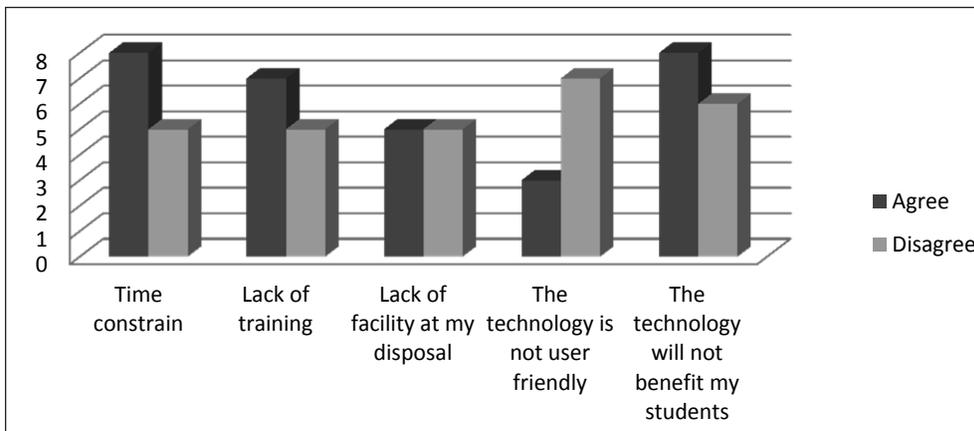

Figure 4: Reasons for not using specific technologies>

Figure 4 indicates a number of reasons why supervisors were not using

technologies to advance their students' performance. Our study focuses on the answers received from eight supervisors, who indicated that the technology 'would not benefit their students'. This finding is discussed in more detail later on.

Section 2: Postgraduate students

The second part of this case study involved postgraduate students in UNISA's School of Computing. Participants in this survey therefore included students enrolled for a PhD or MSc. Of the 128 students enrolled at the time, 34 students actually participated, which represents a 43.5 per cent response rate.

As in the case of Section 1 (supervisors), only the questions relating to technology, communication and human interaction as put to the postgraduate students are dealt with in this article (Kritzinger, Loock and Mwim 2011, 23):

Question 1:   *Which of the following technologies does your supervisor use? (MyUnisa, video conferencing, SMSs, discussion classes, pod casts and satellite broadcasts).*
Question 2:   *Which of the above-listed technologies would you have liked to use?*

The findings regarding supervisors' use of technology as indicated by their students are depicted in Figure 5.
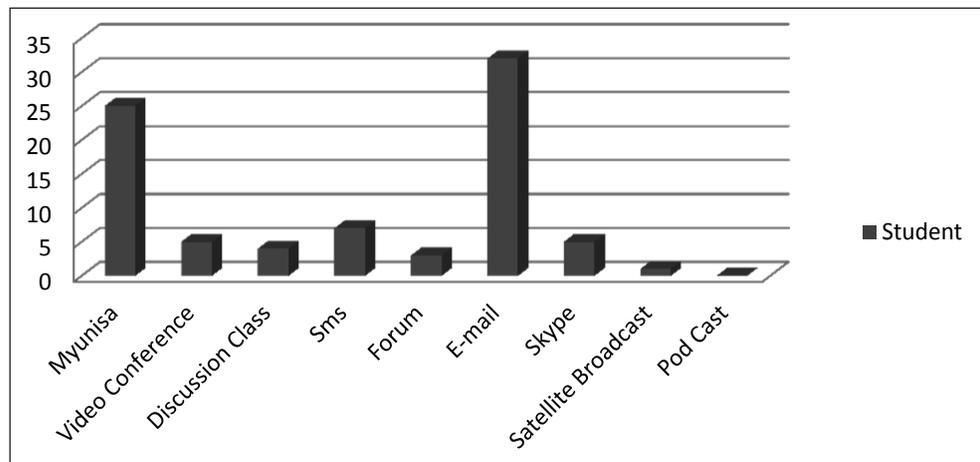

Figure 5: Technologies that students indicate supervisors are using

According to Figure 5 the two technologies mostly used at UNISA (School of Computing) are e-mails and *myUNISA*. It is of great concern to the researchers

that the other technologies (which are all available at UNISA) are not used by supervisors. The initial question was followed up by a second question that required postgraduate students to indicate what other technologies they would have preferred. Their answer is depicted in Figure 6.
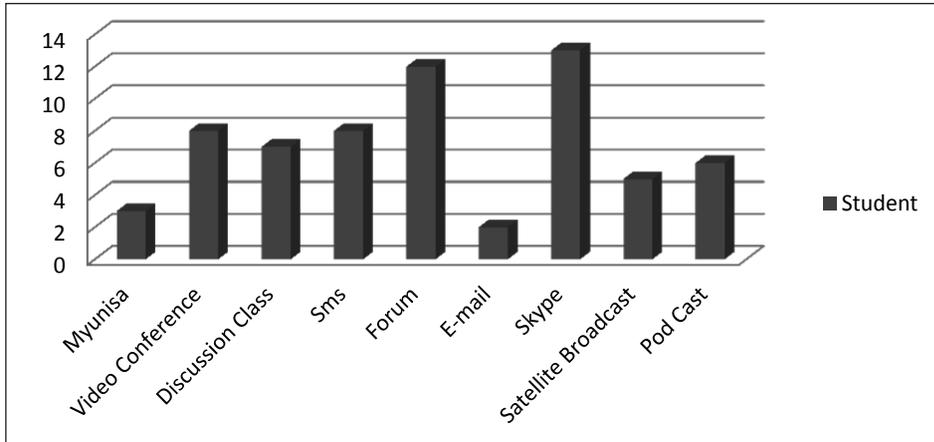

Figure 6: Technologies students would have liked to use

Figure 6 clearly indicates that a number of postgraduate students wanted to use other technologies to assist them with their studies. Eight students indicated that they would prefer video conferencing; twelve students preferred the use of discussion forums and six indicated that pod casts would be of assistance to them. The basic concern about these findings is once again, the fact that all of the above technologies are currently available at UNISA, and that training and support on how to use them are offered freely -- yet they are not used.

Section 3: Discussion of the survey results

The results of Case Study I indicate that supervisors must start using more technologies to improve communication with their students in an attempt to increase the postgraduate graduation rate. From the findings above it also appears that the technologies preferred by the students are in many cases *human contact technologies,* for example video conferencing. The following questions can be asked based on these findings:

• Is technology merely a vehicle to increase the human aspect of postgraduate supervision?

• Will the postgraduate graduation rate improve if more human contact is included on a postgraduate leave?

191

• In an ODL environment, human contact is not part of the teaching method, but are the students attempting to obtain this human contact through human-based technologies?

The responses to these questions are addressed in Table 1. The views of supervisors and students regarding the different technologies that are actually used are contrasted with the technologies that students want to use as part of postgraduate supervision.

Table 1:   Used technologies vs. wanted technologies

| | Technologies used in postgraduate supervision | | Technologies students want to use |
	Supervisors' response	Students' response	
1	E-mail	E-mail	Skype
2	MyUnisa	MyUnisa	Forum
3	SMS	SMS	Video conferencing
4	Forum	Skype	SMS
5	Skype	Video conferencing	Discussion classes
6	Video conference	Discussion class	Pod cast
7	Discussion class	Forum	Satellite broadcasts
8	Satellite broadcasts	Satellite broadcast	MyUNISA
9	Pod Cast	Pod Cast	E-mail

According to Table 1 the two technologies that are widely used by supervisors are e-mails and *MyUnisa*. Both these technologies are seen as *low-impact human-based technologies*. Our findings were verified by asking the students to indicate the technologies their supervisors are actually using. The results were the same, except in one instance. Supervisors indicated that they used Forums in the number four spot, whereas students indicated that their supervisors only used Forums in the number seven spot. This finding will be discussed in a while.

The problem with e-mails and *MyUnisa,* being the dominant technologies that are actually being used, is the fact that the students listed them as the very last two options when they were asked which technology they would prefer. This confirms our finding that students expect *high-impact human-based technologies* from an ODL environment, especially at postgraduate level. This however, does not mean that email is not an important and good communication method. But

the results show that low impact human- related technologies must be used in conjunction with high impact technologies. This is to provide the students with a feel of human interaction.

The results of this survey lead to another question: *Do students think human interaction and technologies is important for postgraduate studies.* This question was investigated by requesting an electronic feedback report from a group of postgraduate students that is part of group supervision study (Case Study II).

CASE STUDY II

The primary aim of this case study was to investigate the human aspect regarding postgraduate supervision. Seven postgraduate students (numbered P1--P7) were asked to participate and provide feedback on the human interaction and the impact thereof on their studies. Three questions were asked with open ended answers. These seven students are part of a group supervision project and seven students have the same focus area and started within 2010 and 2011. This group of students also have the same two supervisors. These students were requested to answer the questions with their own experience within this group supervision project. The main aim of these questions was to investigate if the human technology used in their studies by their supervisors provided extra assistance and support to the students. In general, the students should have openly expressed if they thought that the use of human technologies increases the possibility of completing their studies within the set amount of time.

Below are some of the answers provided by the different postgraduate students on the three questions:

Question 1: **How important is *human interaction* for postgraduate study at an Open and Distance Learning institution such as Unisa?**

Response P1: "Very important. At key milestones in the process, face-to-face communication must take place. There is something about having to face someone and discuss what you have been doing that prompts you into action."

Response P2: "Although there are other means of communication, human interaction is still very important because it helps in building relationships. Although they don't have to occur too frequently, human interaction sessions tend to be more fruitful and if any item is not clear, the issue is dealt with there and then."

193

Response P3:   "You learn/gain through other people's ideas or experiences."

Question 2:   How important was/is the extra human aspect that your supervisors included in your student/supervisor relationship?

Response P2:   "Reassurance received in person is much more powerful than reassurance received in an e-mail."

Response P4:   "The personal attention I received from my study leaders helps in motivating me to worker even harder. It makes me feel valued, and talking to my study leaders always brings another light/angle to my work allowing me to think critically."

Response P5:   "It is comforting to know that you are not alone in this challenge. It also feels good when you can help a fellow student with any difficulties in the process, especially offer them lessons learnt from your own experiences."

Response P6:   "It is good to know that you are being supervised, someone is checking your work and you have deadlines to meet. It pushes you to work."

Question 3:   Do you think this human aspect decreases the isolation factor that postgraduate students experience while studying at Unisa? Why?

Response P1:   "Yes. Often when experiencing difficulties in the research process, we choose to ignore them rather than tackle them alone. The human aspect means we tackle the difficulties as a team, which, for many, is a much favoured approach."

Response P4:   "Yes. Because at the end of the day it makes me understand that there is actually another human being on the other side who understands my work and situation. This is crucial because it prevents one from giving up easily."

Response P7:   "Yes it does, video conferencing and contacts with lecturers are as good as being in class."

ANALYSIS OF THE RESPONSES OBTAINED IN CASE STUDY II

It is clear from the comments made by postgraduate students that the human aspect of postgraduate supervision is very important and that it can actually assist and encourage students in an isolated ODL environment to complete their studies. This human aspect, for which postgraduate students are making an appeal, is directly linked to the need for using human-based technology. The question therefore is: *If this need is addressed by the use of human-based technology, will the graduation rate of postgraduate students in an ODL environment increase?*

This article proposes the concept of a human-based technology model that can be used to improve the graduation rate.

PROPOSED MODEL

The findings of our research indicate that technology and human contact are not stand-alone components of postgraduate study, but that they should rather be seen as two sides of the same coin. The one is needed to be able to implement the other. If technology and human contact are implemented together, the graduation rate of postgraduate students may well improve in an ODL environment. This notion is based on postgraduate students' feedback regarding their experience of, and need for human interaction and communication with their supervisors. So, the assumption may be made that if students are provided with more human-based communication, this will have a positive influence on their studies and motivate them to complete their degree in the shortest time possible.

The model proposed in this article involves the three dimensions investigated in this article, namely technology, communication and human interaction. Our model depicts the interaction between these three dimensions, as well as the need for implementing and linking all three so as to benefit students (Kritzinger and Loock 2011). The proposed model is depicted in Figure 7.
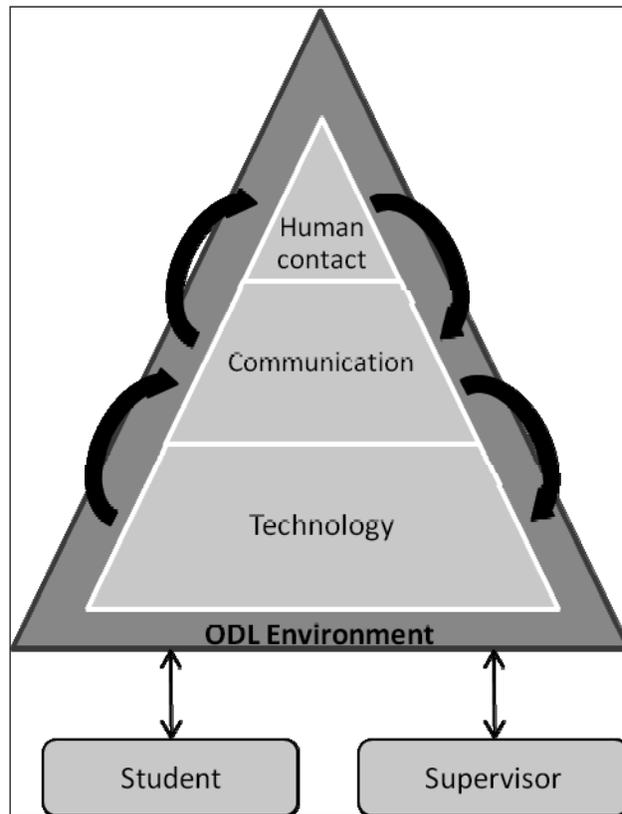
Figure 7: Interaction between Technology, Communication and Human contact

Figure 7 proposes a model that incorporates the above three aspects that are expected to enhance postgraduate supervision in an ODL environment. Students and supervisors will take the route of using technology to establish communication. Communication (especially with human-based technology),

will establish a human connection between the student and his/her supervisor. On the other hand, the supervisor will incorporate human contact with students in his/her supervision by identifying the best communication tools and following that up with human-friendly technology to assist students with their studies. This movement towards the use of technology and combining it with a human contact approach assists an ODL environment in providing a more humanlike face to supervision, as is depicted in Figure 8.
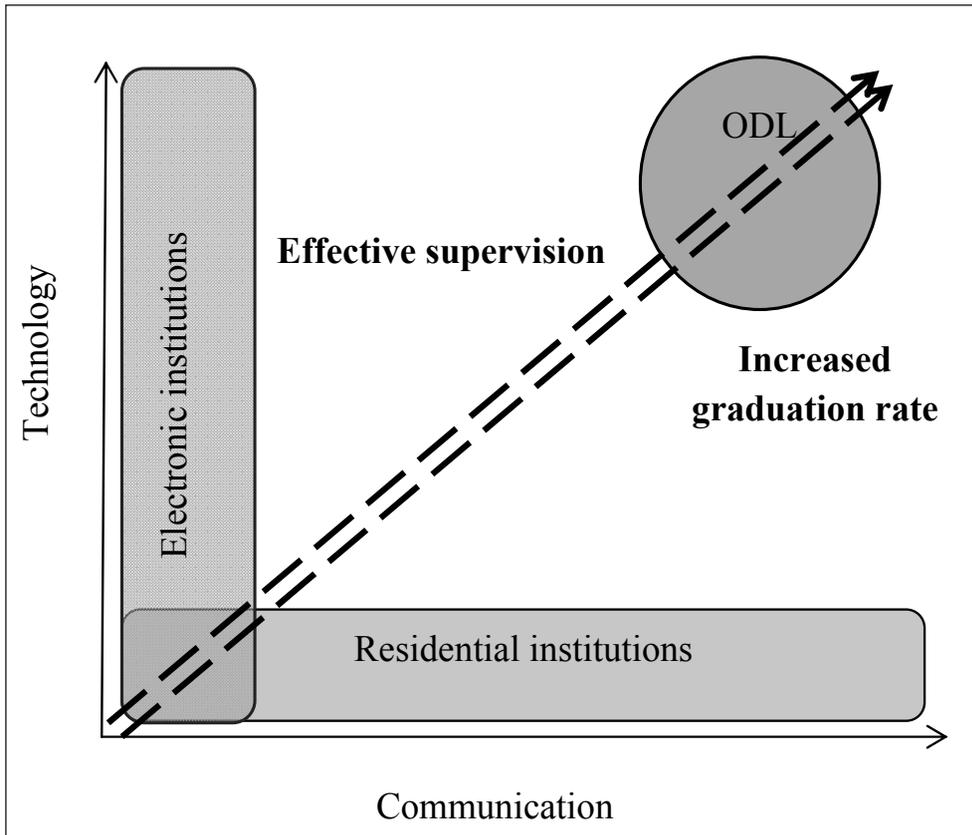

Figure 8: Effective postgraduate supervision in ODL

Figure 8 depicts different kinds of education environments. Residential institutions mostly use low technology and high communication (i.e. attending classes and group meetings), while electronic institutions mostly use high technology and low communication (i.e. e-mails and online learning environments). In an ODL environment, the optimum situation should be characterised by high communication as well as high technology. This will result in an ODL environment with high human-based technology that will give ODL students the

benefit of the technology of online learning environments and the communication of residential universities.

The aim of the proposed model is to ensure that supervision in the ODL environment uses more high- and medium-impact human-based technologies (in conjunction with low human-based technologies) as requested by students (see column 3 of Table 1). This approach will ensure that distance students have more human contact with their supervisors, which will decrease the isolation factor experienced by these students during their postgraduate studies. The model aims to increase not only the use of technology, communication and human contact, but also the graduation rate of Masters and Doctoral students. It is currently being implemented in UNISA's School of Computing and the results of this experiment will be published as future research work.

CONCLUSION

The research presented in this article indicates that the current graduation rate of Masters and Doctoral students at ODL institutions is below the accepted level. We therefore, identified and investigated different human-based technologies that supervisors are using as part of their supervision. The technologies were compared to the 'wish list' of technologies that students would want to use in their studies. The results obtained indicate that students expected more high-impact and medium-impact human-based technologies to assist them (which was currently not the case). Such human-friendly technologies would reduce the isolation factor associated with studying through an ODL institution and lead to a more human-based supervision approach. The current article proposes a human-based/technology-based model that should help ODL institutions to assist supervisors, and (in turn) help supervisors to assist their postgraduate students. Through directly increasing technology, communication and human interaction, it is hoped that the graduation rate will be augmented indirectly.

REFERENCES

Cambridge Dictionary online. 2011. Pass rate. Available at: http://dictionary. cambridge.org/dictionary/british/pass-rate (accessed 20 April 2010).

Davis, A. and P. Venter. 2010. The long walk to success: Drivers of student performance in a Postgraduate ODL Business Course. *Proceedings of the 5th International Conference on e-learning*, 82--91. Malaysia.

Edwards, B. 2002. *Postgraduate supervision: Is having a Ph.D. enough?* Paper presented at the Australian Association for Research in Education Conference, Brisbane, Australia.

Galusha, J.M. 1997. Barriers to learning in distance education. *Interpersonal Computing and Technology* (5):6--14.

Gorra, A., J. Finlay, M. Devlin, J. Lavery, R. Neagle, J. Sheridan-Ross, T. Charlton and R. Boyle. 2010. Learning with technology: What do students want? *Proceedings of the 5th International conference on e-learning*. Malaysia.

Lee, A. and B. Green. 1995. Introduction: Postgraduate studies/postgraduate pedagogy? *The Australian Universities' Review,* NTEU 38(2): 2--5.

Lee, N.J. 2009. Professional doctorate supervision: Exploring student and supervisor experiences. *Nurse Education Today* 29(6): 641--648.

Long, J. 1991. Theory in human-computer interaction? *Proceedings of Theory in Human Computer Interaction (HCI)*: 2/1--2/6.

Kritzinger, E. and M. Loock. 2011. A multidimensional framework for postgraduate supervision in an ODL environment. Postgraduate Supervision Conference, held at Spier in Stellenbosch, April 2011**.** Available at: http://osprey.unisa.ac.za/TechnicalReports/ (accessed on 11 April 2011).

Kritzinger, E., M. Loock. and E. Mwim. 2011. Incorporating the human dimension into ODL -- a postgraduate perspective. Presentation at ODL conference, Mount Grace. Available at: http://osprey.unisa.ac.za/TechnicalReports/ (accessed 11 April 2011).

Mlambo, M.C. 2010. Concerted intervention needed to escalate PhD numbers: A comment. *South African Journal of Science* 106(11/12), Art. #498: 1--2.

Raheena, R. and T. Allsop. 2006. Using distance education for skills development. Knowledge and research. Department for International Development (DFID). *Researching the issue* Volume 62.

Rowntree, D. 1992. Exploring open and distance learning. *Open and Distance Learning Series*. ISBN 0749408138.

UNISA. 2008. Open and Distance Learning Policy. Available at: http://cm.unisa.ac.za/contents/departments/tuition_policies/docs/OpenDistanceLearning_Council3Oct08.pdf (accessed 20 April 2010).

Wingfield, B. 2010. How long does it take to get a PhD. *South African Journal of Science* 106(11/12), Art #469: 1.