

## **Transforming pedagogical practices in African higher education with blended learning: considering Telepresence in university teaching**

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### **Abstract**

This study, which took place at the University of Botswana focuses on how blended learning can be used to motivate student by enhancing their conceptualizing ability. The purpose was to investigate the pedagogical significance of telepresence teaching at the university level. The problem addressed in this study was the lack of student motivation due to the complexity of the subject taught. An experimental research design was used to examine the impact of telepresence teaching method on students' motivation to learn psychology. Two groups were randomly assigned to experimental group and control group. For one school term the groups were taught the same content by the same lecturer with face to face interaction for control group and telepresence for the experimental group. Two instruments were used to profile students' motivation before and after the experiment. Using the *t* – test for paired samples pre-test and post-test scores from the experiment were compared. Results showed significant difference between the means of the pre-test and post – test scores. It is concluded from this study that blended learning at university level can benefit from the integration of telepresence teaching method.

Keywords: telepresence method enhanced experiential learning, interactivity, and subject comprehension.

### **Introduction**

Since the late nineties instructional technology has provided educators with a number of effective teaching methods, (Anderson, Bates, Hopkins & Kratcoski, (2012). It could be useful to explore the unknown about the effectiveness of different technologies in learning and taching. In this study the method of telepresence teaching is examined for impact on the students desire to learn. Specifically, the study seeks to find out whether the students' desire to learn will change when taught with this method. The method of telepresence involves how end users of a particular technology experience feelings of presence as they use the technology. Telepresence teaching has been reported to make learning more individualized as well as contributing to making conceptualization easier. Telepresence teaching is one approach that presents messages in terms of the receivers' experiences. It is characterized by bringing in feelings of the presence of the communicator and the receiver in the same space.

This author conducted several studies on telepresence teaching and observed that the engagement on task and general interaction with learning materials, make more sense to the learner resulting in enjoyment of the lesson when this method is used, (Author,2010, 2006, 2003).The impact of telepresence teaching is reported to depend on the design of instruction, especially subject presentation.(Author,2010; Dillon & Gabbard, 1998; Edmondson, 2005; Fletcher,2006)One of the leading technologies that allows for the creation of telepresence is the SMART board. Advances in E-learning technologies have brought to the teaching process an exciting array of methods for motivating learners, reinforcing learning and automated student teacher interactions with instant feedback. Technology impact studies have revealed the importance of learners' technology usage patterns and the correlation between these patterns and the different technologies. The studies also delineate learning gains describing how the learner's experience of technology related to achievement (Dillon & Gabbard, 1998) hence this study

investigates learning gains from using telepresence method. The study describes these gains in terms of motivation and achievement.

### **Statement of the problem**

The problem addressed in this research study was the lack of motivation to study psychology. Students enrolled in educational foundations department course in educational psychology did not show the desire to learn the content. These students were in pre – service teacher training meeting psychology for the first time at the university and they found the subject challenging. The study investigated, the extent to which telepresence method will increase students' scores from pre – test to posted as measured by the advanced educational psychology exam and to what extent will the telepresence method increase the students motivation

### **Significance of the study,**

Significant amount of money is used to purchase e – learning technology with the objective of improving learning and teaching. It is important to come up with innovative ways of integrating such technology in the teaching of all subjects.

### **Conceptual framework**

Many learning theories call for experience-based instruction. For example, constructivism by Piaget (1963), social cognition by Bandura (1977), experiential learning by Kolb, (1984) and ecological theory by Bronfenbrenner (1979) demonstrate the importance of the learners' experience in the creation of meaning as they interact with the environment. The theories also explain how the dynamic capacities for thought, feelings, and actions relate to the characteristics of the settings in which the learners are situated. The learners' background, prior knowledge, and experience influence the understanding of content (Gagne, 1985). One way of enhancing students' experiences is by threading blue prints for specific experiential outcomes through the message design. The ecological theory by Bronfenbrenner (1979 explains the intricate impact of context on learning. Telepresence method manipulates learning environments to create presence. One way of enhancing students' experiences is by threading blue prints for specific experiential outcomes through the message design(Minor, Author, 2013)

Telepresence teaching is one approach that presents messages in terms of the receivers' experiences. The approach explains how end users of a particular technology experience feelings of presence as they use the technology. Studies related to telepresence have shown that systems such as multimedia, hypermedia, television, and videoconferencing have the potential to present messages based on receivers' contextual experiences in a way that course the receiver to feel present in the displayed message (Biocca, 1997; Broadbent, 2002; Windelborn, 2002).In E – Learning several technologies have features tat can facilitate the integration of telepresence in teaching methods.

### **The theory guiding the study**

Rogers (year) distinguished two types of learning: (a) cognitive (meaningless), and (b) experiential (significant). The former corresponds to academic knowledge such as learning vocabulary or multiplication tables, and the latter refers to applied knowledge such as learning about engines in order to repair a car. Experiential learning allows the learner to discover knowledge, give it meaning, and relevance according to his needs and wants. Rogers described

the following qualities as basic to experiential learning: (a) personal involvement, (b) self-initiation, (c) evaluation by the learner, and (d) pervasive effects on the learner. To Rogers, experiential learning is equivalent to personal change and growth. Rogers felt that all human beings have a natural propensity to learn, and that the role of the teacher is to facilitate learning. The facilitation was stated to include (a) setting a positive climate for learning, (b) clarifying the purposes for the learners, (c) organizing and making learning resources available, (d) balancing intellectual and emotional components of learning, and (e) sharing feelings and thoughts with learners without dominating. Rogers' website)

According to Rogers, learning is facilitated when (a) the student participates completely in the learning process and has control over the learning's nature and direction; (b) it is primarily based upon direct confrontation with practical, social, personal or research problems; and (c) self-evaluation is the principal method of assessing progress or success. Rogers also emphasized the importance of learning to learn and an openness to change. Instruction can be designed to follow these various views of learning. Intrinsic to each design would be merits and weaknesses inherent in the approach used. Telepresence instructional approach aims at learning, which is continuous and is grounded in learners' experiences. The approach advocates special effects for a lesson delivery that gives different individuals a true to live unique experience

In a classroom setting, perception of environmental stimuli may determine how students take in content and understand it. There is no single explanation about how students perceive and process information. In a study conducted at the University of Botswana, the researcher defined telepresence as a simultaneous presence of both the communicator and the communicant created by variations in the depth and scope of the message in visuals and interactivity (Author, 2003). The message's visuals and interactivity was believed to cause the feelings of presence. Other researchers described telepresence as a method of telecommunicating, which has an inherent quality of organizing information in the receivers' head in a special code system that creates a twist in the perceived reality (Coyle, 1997). Telepresence has also been reported to arouse motivation to learn (Rosenberg, 1994)

### **Research on Telepresence teaching**

As a concept, telepresence teaching promises to bring a paradigm shift in pedagogy Buxton (1999) described telepresence as a social interaction between humans over distance and time, mediated by technology. An example of such an interaction could be an e-mail sent from professor to student or vice versa. As a term in communication, telepresence is used broadly to refer to teleporting and virtual environments (Draper, 1998). The idea of simultaneous presence of both the sender and the receiver of information in the communication process is emphasized. Telepresence is an important component of understanding how people experience mediated communication. Most importantly, it expands the conceptualization of communication in virtual reality environments as it relates to the physical environments (Lombard & Ditton, 1997). The stimuli in the mediated communication can be made more powerful or persuasive in order to overwhelm the stimuli in the physical environment. Symbols representing the message could be arranged in alignment with the receivers' prior knowledge and senses (Kim & Biocca, 1997). In addition, telepresence can be viewed as a perceptual process of how the learners perceive the message

### **Methodology**

A pre-test and post – test experimental design was used. The possible impact of teaching method was hypothesized. and tested, There was randomized allocation to treatment and control

groups. Telepresence method was used over 15 weeks in the experiment class. While face to face method was applied over 15 weeks for the control group Achievement pre -test and posttest and Motivation pre -test and posttest were measured

### **Population and Sample Selection**

From a population of 140 third year students enrolled in advanced education psychology course. Seventy students were selected randomly to participate in the study. The seventy were further allocated to either experiment or control group randomly. Next thirty five students were randomly assigned to the two group.

The research setting is the University of Botswana in the department of educational foundations in the faculty of Education where teachers are trained.

### **Research Questions**

Two research questions guided the study.

1. To what extent does the telepresence method increase students' scores from pre – test to posted as measured by the Advanced educational psychology exam
2. To what extent does the telepresence increase the student's motivation?

### **Instruments**

An educational psychology examination paper for advanced educational psychology was used to measure achievement. The exam had an established reality coefficient of .89. The motivation survey was a self-report instrument based on the theory Motivation created by the researcher with a test retest reliability coefficient of .91. The demographic information collected included (a) social background, (b) academic background, and (c) computer usage. Social background included (a) gender, (b) age, (c) ethnicity, and (d) languages spoken. The academic background included (a) highest education acquired, (b) major,(c) subject to be taught, and (d) the intended teaching level. Computer usage included (a) access, (b) place of access activities conducted with the computer, and (c) the name of the courses taken with the assistance of a computer. The researcher developed the survey from the work of previous researchers (Gay & Airasian, 2000). The survey information was used to develop a baseline indicator of participants' prior knowledge of computers, experience with computers, and level of understanding mediated communication. Participants were also asked to record the computer classes they had taken or were enrolled in. The motivation survey was a 5-point Likert scale questionnaire adopted from different sources in the literature. It had 15 items.

### **Procedure**

After attaining the IRB certificate and permission to use psychology classes from the university, students consented. The necessary explanations of volunteering were done. After participants consented, they were instructed on how to complete the motivation survey and the difficult words were explained to them. When the students completed the next instrument they completed was the demographic survey. Using identity numbers obtained from the demographic survey, participants were randomly assigned to treatment and control groups. Then the educational psychology achievement test and motivation survey were administered. After a period of 15 weeks, the same test and survey were given again.

## Data collection.

Participants completed the demographic survey. Next, they were randomly assigned to the treatment and control groups. While in the 2 groups, participants completed the achievement and motivation pre-measures. Participants in the experimental group were exposed to telepresence treatment over a 5-week period. The control group received similar content through traditional face to face interaction for the same time of fifteen weeks. At the end of the 15-week period, both groups completed the achievement and motivation post measures.

## Data analysis

### Descriptive statistics

The data was analyzed using SPSS. The descriptive statistics were calculated, specifically the pre- test means and the posttest means. The standard deviations and effect size were calculated and interpreted as follows; mean of treatment group – mean of control group divided by standard deviation of control group. The effect size description was guided by Cohen’s description of effect size if, < 0.1 = trivial effect 0.1- 0.3 = small effect, 0.3 - 0.5 = moderate effect and > 0.5 = large difference

### Inferential statistics

The inferential statistics model used was the *t* – test for paired samples. The test provided the *t* – value, probability value and degrees of freedom.

## Findings

### Achievement results

**Table 1**

*Means and Standard Deviations of the experimental group and the control group pre – test and posttest scores*

Group	N	Pre-test		Posttest	
		M	SD	M	SD
Experiment Group	35	43.0	(7.8)	85.0	(8.9)
Control group	35	41 .0	(5.7)	60.0	(6.39)

The telepresence teaching method group had a higher posttest achievement mean ( $M = 85.00$ ,  $SD = 8.9$ ) and the pretest achievement mean was ( $M = 43$ ,  $SD = 7.8$ ) the posttest mean was greater than the pre-test mean by 42%. The control group pre –test mean was ( $M = 41$   $SD = 5.7$ ) and posttest mean was ( $M = 60$ ,  $SD = 6.39$ ) making the mean difference of 17. The effect size was 0.40 indicating that the strength of the difference between the group posttest means was moderate. In the *t*- test procedure, the *t* -test for paired samples calculation showed *p* value of .000 which was less than the set alpha value of (0.5). The difference of 25 between the groups’ posttest scores’ means was statistically significant.

### Motivation

The table below displays the results of the motivation scores. Each question in the survey was scored for individual respondents. Next the means for all items were calculated for both groups’ pre and post measures.

Table 2

*Means and Standard Deviations for post scores for the Likert survey given to both experiment and control group.*

Question	Experiment		Control	
	Mean	SD	Mean	SD
1. I prefer learning with technology in this course	4.59	.97	1.75	0.8
2. I want to use communication tools all the time	4.45	.96	1.23	0.7
3. I like using the discussion forums	4.7	.55	2.250	.43
4. I want to watch 3D videos and simulations all the time	4.89	.90	1.901	.10
5. By using Technology I will understand subject content better	4.40	.78	1.86	0.86
6. I will not remember what I learned because I hate computers	1.90	.96	2.21	1.12
7. I prefer to learn by face to face method only	1.27	.66	4.79	1.19
8. Learning with technology will be easy	3.69	.55	1.22	.40
9. It is more meaningful to learn from technology	4.73	.83	1.45	0.55
10. Technology would be engaging and fun	4.64	.54	1.21	0.44

The table 2 results show that the experiment group had higher means in all the items that support the use of technology and scored low on items that did not support it. The control group scored high on the method that they were taught with and low on technology enhanced learning, The results for the experiment group makes good sense. The results for the control group show scores for technology. This means both groups preferred the method they were taught with, but experiment group were more motivated to learn than the control group. In response to the research question 2 “To what extent does the telepresence method increase the students’ motivation” It appears the method has increased the motivation for the experiment group only.

## **Discussion**

The findings showed that telepresence method increased the achievement mean score for the experiment group by 42%. And that the difference between the posttest means of the experiment and the control group was of moderate effect. In the case of increasing motivation, the impact of technology is not very high. But it is on the positive side as it agrees with previous studies that recorded that technology motivates learners.( Broadbent, (2002;Bronfenbrenner, 1979;Burger,1985; Buxton, 1999). Using technology to simply support the lecture method in class falls far short of elevating students motivation to learn. Simple PowerPoint presentations remains the chalk and talk mode except that the writing is pre-chalked by the computer. Technology integration in this case the telepresence teaching method, has a potential to transform the traditional method of talk and chalk otherwise called the lecture method.

## **Implications**

Technology integration in this case the telepresence teaching method, has a potential to transform the traditional method of talk and chalk otherwise called the lecture method. Most Education institutions are connected to the internet (Central statistics office, 2011), given the connectivity student learning experience what Rogers (1983) as: a) personal involvement, b) self-initiation, c) evaluation by the learner, and d) pervasive effects on the learner. Special effect can be used to create telepresence as explained by the following, (Draper's (1998) idea of simultaneous presence of both the sender and the receiver of information in the communication process is can be used to create Telepresence to help learners to experience mediated communication. (Lombard & Dittons', 1997) finding of expanding the conceptualization of communication in virtual reality and learning environments can be integrated in blended learning.

The authors explain that stimuli in the mediated communication can be made more powerful or persuasive in order to overwhelm the stimuli in the physical environment. Symbols representing the message could be arranged in alignment with the receivers' prior knowledge and senses (Kim & Biocca, 1997). In addition, telepresence can be created using many authoring tools in e-learning technologies. In teacher training institutions remote students anywhere in the world can be reached. Distance need not cost trainers any more. In this study the telepresence teaching method shifted the students' motivation and achievement scores from low to high. This could be an indicator for a useful innovation in teaching methods. The results also imply that teachers must be adequately trained in instruction technology to meet demands of new technological rapid changes.

## **Recommendations for future research**

More studies with larger sample and varied methods of investigating are needed to fish out the likely potential of turning university teaching around by using technology. One area that needs more investigation is the teaching of social sciences and humanities subjects. There seems to be a wide variety of ways through which researchers can empower student to learn and also to be aligned with the after university life.

The study concludes that telepresence influence achievement, and motivates learners. It also concludes that message design, student communication, interactivity and instruction design were responsible for the difference between the experiment group and the control group

## **Conclusion**

The study concludes that telepresence influence achievement, and motivates learners. It also concludes that message design, student communication, interactivity and instruction design were responsible for the difference between the experiment group and the control group. This is inferred from the experiment was set up. The impact of telepresence teaching has been reported to depend on the design of instruction, especially subject presentation. (Author, 2010; Dillon & Gabbard, 1998; Edmondson, 2005; Fletcher.. Technology impact studies have shown the importance of learners' technology usage patterns and the correlation between these patterns and

the Learner achievement. The studies also delineate learning gains describing how the learner's experience of technology related to achievement and motivation (Dillon & Gabbard, 1998) hence this study investigated learning gains from using telepresence method. The study describes these gains in terms of motivation and achievement, how the learners handled the subject and experienced it, The experiment group liked the technology worked with it (technology) enthusiastically and finally got marks on motivation and achievement. They solved problems in groups effectively. The mean difference between the experiment group on achievement was significant at a *p* value of 000. *There were acts and signs of autonomy and motivation. For instance this group reported that Technology would be engaging and fun* ( $M = 4.64, SD = .54$  for the experimental group as compared to ( $M = 1.21, SD = 0.44$ ) for the control group. Another observed behavior was discipline

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