

TEACHING USING VIDEO- CONFERRING : APPROACHES AND CHALLENGES¹

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¹The author is thankful to staff of Tele-Education through PanAfrican eNetwork in the UR-College of Education for the access to video-conference lectures.

Abstract: Video-conferencing teaching removed the barrier of distance learning, and reduced studying cost. This type of learning has boosted the number of graduates in a short time at a low cost. However, the quality of education has been criticized; the literature review showed that the Community of Inquiry framework (CoI) cognitive, social, and teaching presences must be followed in order to improve the learning and teaching quality. This paper investigates the pedagogic approaches and challenges of video-conference teaching in a multi-campus environment. Two methods are used in this study; namely, literature review and case study. The literature review shows the state-of-the-practice of video-conferencing teaching in order to know the challenges in this area and providing a base for conducting the study on the field. As a result, thoughts and experiences could lead course developers and designers to alleviate issues that are present in this type of teaching. In order to have real world experience, a case study is conducted on tele-education learning center of University of Rwanda (UR). In this center, Indian universities offer courses at the college of education learning center in the UR and to other Universities across African countries simultaneously.

The data is collected through unstructured interviews, and the analysis is done using the CoI coding template which embeds the key indicators of CoI. It was found that teacher centered learning method is improved by a synergy of students centered, project based, and inquiry based learning in order to engage students to think critically and creatively. This is referred as from “sage on the stage to guide on the side.”

Keywords: Simultaneous Multi-campus teaching, Synchronous teaching, Real-time teaching, Video-conference teaching, Video-conferencing pedagogical strategies, Teaching with technology



1. Introduction

Video-conference is a blended synchronous approach to teaching both remote and face to face students in multi-campus in order to remove geographical distance barrier. It can also be recorded and delivered on demand to learners in an asynchronous manner. It enables learner and educator to interact from a distance, thus saving travelling cost (Baecker et al., 2007).

Based on the Community of Inquiry framework (CoI) (Garrison et al., 1999; UW Bothell, 2014), this paper investigates the pedagogic approaches and challenges of video-conference teaching in a multi-campus environment. Two methods are used in this study; literature review and a case study.

Through the literature review, teachers and students gave different thoughts and experience that could lead course developers and designers to alleviate issues that are present in this type of teaching and learning.

In order to have real world experience about this study, a case study is done on the tele-education learning center of University of Rwanda (UR). UR is a multi-campus university that consists of 6 campuses that are located across the country with headquarters in Kigali. Every campus represents a college namely, College of Arts and Social Sciences (CASS), College of Agriculture, Animal Sciences and Veterinary Medicine (CAVM), College of Business and Economics (CBE), College of Education (CE), College of Medicine and Health Sciences (CMHS), and College of Science and Technology (CST). The campuses are significantly separated, and the average separation between campuses is more than 200 km which makes regular face to face teaching difficult due to a number of staff as well as accommodating students that will be required to move from one campus to another (UR Statement and Concept, 2013).

In order to ensure equitable learning experience at local and remote sites, video-conferencing was proposed to facilitate teaching across campuses. Today, there is one learning center at the college of education where students attend lectures offered by Indian universities through video conferencing.

This study was conducted at the college of education premises in order to see how tele-education is offered, what challenges may hinder this learning method.



The emphasis is put on the teaching and learning approaches. Since the technology is assumed to be working properly. The outcomes of this paper will help to improve the video-conference teaching methods with respect to CoI.

1.1 Objective

This study will:

1. Synthesize quality research evidence relevant to simultaneous multi-campus video-conferencing pedagogical teaching approach and best practice.
2. Identify challenges of video conferencing from teachers and students perspectives.
3. Draw recommendations to contribute building a continuous improvement of the state of the practice of teaching using video-conferencing

2. Background

Throughout this paper, the phrase “blended synchronous teaching and learning” is defined as a synchronous video-conference to remote site and a face to face attendance. In this paper, CoI is used as a guideline framework to survey video-conferencing teaching and learning.

2.1 Community of Inquiry framework (CoI)

An educational community of inquiry is a group of people who collaboratively engage in a purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding. The CoI framework represents a process of creating a deep and collaborative and constructivist learning experience through the development of three elements, namely social, cognitive and teaching presence.

Figure 1 shows the CoI framework. The center of CoI is teaching, social and cognitive presences, the three elements represent three dimensions of characterizing the educational experience. The social presence is all about socially and emotionally engaging students in learning from remote site as if they are physically present (Garrison et al., 1999). E.g., if there is exclamation about something from



remote site and local. Both sites should feel the same. The cognitive presence is to actively give opinions, ask questions, and this should be on both sites where local site interacts with remote and vice versa. Finally, the teaching presence is all about setting the course requirements; make the environment not frustrating to either of the sites by being methodical and sharing information. Basically, teachers should avoid any gaps between remote and local site. Focusing on the experiences in a community of inquiry, the framework has been widely recommended and adopted in various studies of online learning.

Figure 1 shows the CoI framework and its three presences. This framework can be used to develop and design new courses, and redesign existing courses (Szeto, 2014). Figure 2 shows an example of what video-conferencing looks like. The course that was offered is engineering drawing course for first year engineering students. The study explored the potentiality of video-conference learning for two groups; one local and one remote. Though the study focused on one remote group, it does not forbid that there could be even more than one remote group. However, the number of groups should be reasonable within time and course subject constraints. This needs a though rough study for the sake of class settings. Since CoI framework can guide teachers to select efficient methods that encourage productivity and improve learning experience, CoI coding template is used to analyze the data collected from the case study.



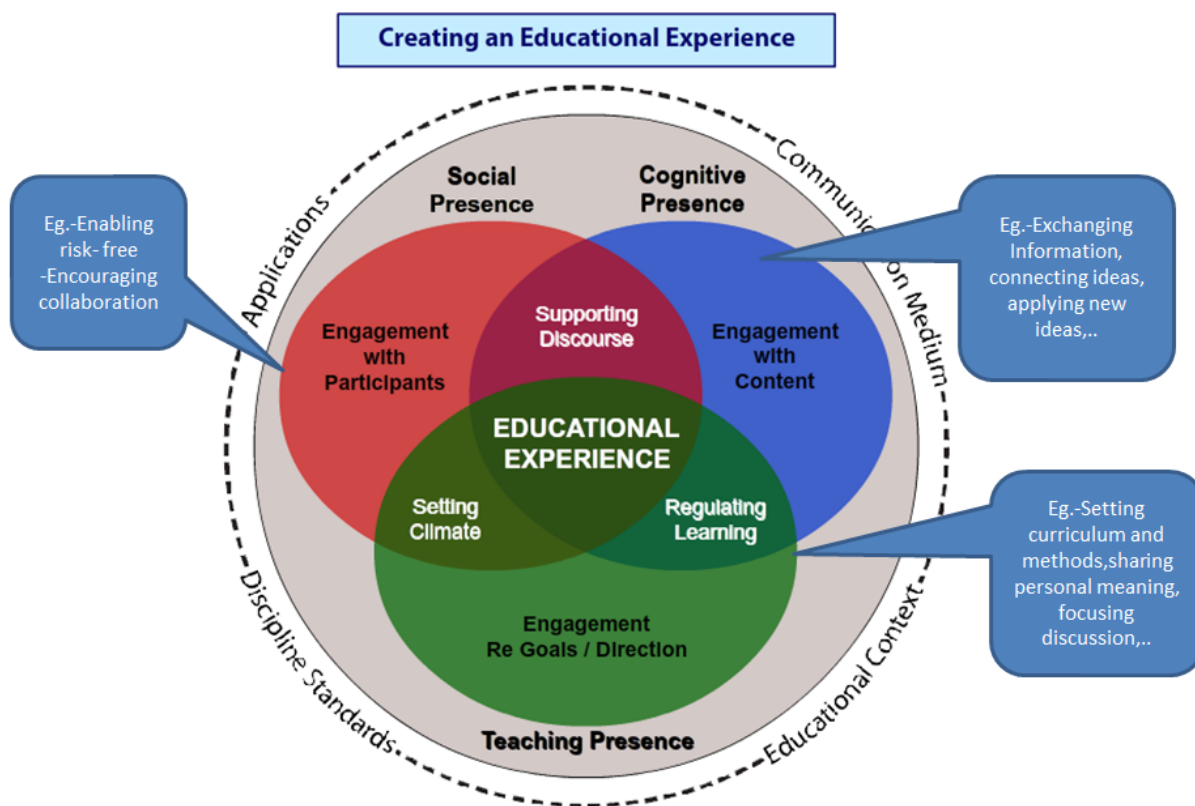


Figure 1. The community of Inquiry framework from Garrison et al., figure adopted from (UW Bothell & athabascau, 2014).



Figure 2. Synchronous blended teaching and learning (Szeto, 2014)



3. Methodology

Literature Review is used to explain the state of the practice of video-conferencing teaching in order to know the challenges in this area and providing a base for improvement. The search engine that is used is; Summon search engine, which is a collection of large number of databases such as *compendex* and *inspec*, they mostly covers journal articles, conference proceedings in the field of engineering. As video-conferencing teaching is supported by technological tools, relevant articles about video-conferencing are likely to be found in this search engine. It contains also *ERIC* which is a database that contains education research and information. Google search engine also is not left out, since it contains a large number of articles.

Besides the literature review a case study is conducted in the field, the data collection and analysis are based on coding template of CoI. The research questions I insist on pedagogical teaching approach using video-conferencing. However, technological tool and functionalities issues are not concerned in this paper. In order to discover the pedagogical challenges that are hindering the state of the practice of video-conferencing teaching across many campuses, three research questions are arranged.

1. What are common pedagogical approaches that are used in simultaneous video-conference teaching?

2. What are pedagogical challenges in simultaneous video-conference teaching approach?

3. What are pedagogical challenges in simultaneous video-conference teaching approach in the context of University of Rwanda (UR)?

Answer to research question 3 reveals practical challenges and bridges the literature review outcomes and what is actually happening on the field.

The quality of the relevant articles is assessed by selecting conference and journal articles that are peer reviewed, and those articles which present practical experience of a real world learning environment.



- Internationalizing the nursing curriculum using a community of inquiry framework and blended learning (Stephens and Hennefer, 2013)
- The pains and gains of blended learning: social constructivist perspectives (Pillay and James, 2014)
- Promoting effective e-learning practices through the constructivist pedagogy (Keengwe et al., 2013)
- Teachers' experiences of teaching in a blended learning environment (Jokinen and Mikkonen, 2013)
- Strategies Study on How to Achieve Good Teaching Quality for Teachers in Multi-campus Education (Chen, 2013)
- We're on a steep learning curve: The benefits and challenges of multi-campus university course delivery (Ebdem.M, 2010)
- Faculty Guide to Teaching through Videoconferencing (Allan Gyorke, 2014)
- Bridging the students' and instructor's experiences: exploring instructional potential of videoconference in multi-campus universities (Szeto, 2014)
- Diversification of adult education with the help of video lectures (Hakala et al., 2010)
- Seeing is believing: the role of videoconferencing in distance learning (Martin, 2005)
- Teaching the Same Literacy Course Online and On Campus: Keeping the Balance (Lester, 2007)
- Enhancing Students Learning Through Instructional Videos during Hands-On Laboratories on Renewable Energy Sources (Pantchenko et al., 2011)
- The Use of Synchronous Videoconferencing Teaching to Increase Access to Specialist Nurse Education in Rural KwaZulu-Natal, South Africa (Chipps, 2010)

4. Results of Literature Review

In Stephens and Hennefer (2013), authors studied the effectiveness of using skype as a medium of communication between students and staffs with different countries. The data has been collected from students who are doing nursing at different countries in the world. Video-conferencing using skype permitted the students abroad to attend the lecture virtually and receive feedback and support from



the facilitator. The aim of the study is to enhance the international experience of the students and staffs in the curriculum through virtual mobility. Students expressed concern about the internet connection otherwise skype using video-conferencing was favorable more than using blog with students citing that they preferred the face to face contact. As soon as they saw a familiar face online, they felt calmer and more at ease, a student says “just having a smiley face on the other end helped” This is the social presence effect as Garris et al mentioned in the CoI. In the conclusion, authors suggested that if skype is used in conjunction with pedagogical approach such as action learning, it can enhance development of social and cultural differences in practice.

In Pillay and James (2014), authors compare the perceptions of students towards face to face learning and blended learning. They did a survey among students who were doing master’s program in commerce either as part or full time at the campus in Australian University. The students had one course using video on demand and a limited real time video streaming. Authors found that the emotion, energy, fluidity and ease of face to face exchange capture very real advantages that most people enjoy about face to face exchange. Nevertheless as the higher education landscape is becoming increasingly heterogeneous in terms of the demographic composition authors argue that pervasive influence of culture should be regarded as a significant concern in the design of technology enhanced learning systems while teaching students from across culture.

In Keengwe et al. (2013), with help of literature review authors examine the theory of constructivism and the design of e-learning activities using constructivist principles. In order to run an effective e-learning, one should ask oneself; does it allow for group communication, is there time for independence can users respond immediately or reflect and compose response as their convenience, etc. These criteria are aligned with video-conferencing teaching, since they specifically meet the requirement for cognitive presence and social presence. Active learning could be encouraged through participation in structured online discussions, interactive course material and the changing of role of the teacher from a “sage on the stage” to a “guide on the side”. The same holds for video-conference teaching thus meeting teacher’s presence requirement as mentioned in CoI.



In Jokinen and Mikkonen (2013), authors studied the teacher's experiences on planning and implementing the teaching to undergraduate nursing students in a blended learning environment. The program supports students to reflect on theory and practice in real life problem solving and decision making. The study was conducted through interview at Savonia University of applied science. The collected data were qualitatively analyzed. University officials recommended using online learning in teaching and all teachers must have basic online teaching and learning education. They remarked that the challenge is the lack of skills about technology tools while planning for the course, this yet was found on students' side whereby new tools could frustrate students at the beginning. Anyways, training from IT side plays an important role.

Chen (2013) analyzes how to achieve good teaching quality as a teacher in multi-campus education according to the basic principles of education and teaching. Merging campuses with every campus has its own culture, history and different disciplines. The study was carried in China universities. Authors give insights about things that should be taken into consideration when preparing courses and lectures that will fit all students from different campuses. As far as this current study is concerned, video-conferencing could be one of the methods that can alleviate distance obstacle, once teachers' pedagogy is well structure in the context of students and discipline. Since students from different educational area are influenced by different culture, campus environment and social environment, they have different cognitions. As a result they will have different views towards courses and study attitude. There should be guidance in different campuses and teaching by varying methods can enhance the comprehensibility of the course.

In Ebdem (2010), Eben explored the best practice in teaching across multi-campus universities, namely face to face and video-conferencing. This study investigated benefits from multi-campus teaching from a Cross-Campus Teaching Special Interest Group (CCTSIG) at University of Deakin University in Australia. CCTSIG identified the benefits and challenges and find ways to overcome and manage the challenges of multi-campus teaching. Through the literature, author found a number of strategies to support best practice in teaching across multiple campuses. In addition to campus based courses, students may register for courses that are offered from remote campuses. Eben described how Deakin as many other multi-campus universities in Australia cope with locations dispersion.



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They use a combination of face to face teaching and video-conferencing in order to provide educators and learners with eclectic range of teaching and learning formats. Both CCTSIG and literature suggested a number of solutions such as increasing videoconferencing facilities, training teachers about IT tools, having a backup communication media in case of equipment's failure.

In Allan Gyorke (2014), Allan prepared a document about video conferencing tips for Penn state university. He stated what to do before class just to mention few of those; to be familiar with equipment, run test session, and have a backup plan like phone speaker in case video fails.

Send out material to students ahead of time, if the remote location has a computer and projector, have a designated remote student show a copy of the presentation as you are showing it in your local classroom. In order to encourage remote students, learn their names and ask questions directly to someone. If teacher wants to encourage student-student collaboration, he/she may create a contact list for each location and use name tents, thus students learn the names of everyone regardless of their location. If video-conference teaching is joining more than two locations, the conversation is moderated by giving the order of discussion, e.g., group 1 speaks after group 2, and so on. Every group can have moderator (one of the students) who alerts the teacher when a question pops up. The moderator role should be rotated among students. If students develop "us versus them" attitude between locations, this attitude can be constructively used as the basis for healthy competition. Have each location focus on a particular aspect of controversial topic and then hold an inter-locations debate.

In Szeto (2014), Authors explored the instructional potential of video-conference through the students 'learning and instructor's teaching experience. The study was conducted in a multi-campus Chinese university, in engineering drawing course for 1st year students. The students were grouped into 2 one group followed on video at remote site and the other followed the teacher face to face. Based on CoI pillars, the authors used grounded theory method to build a theory; they did a survey through interview, this interview was guided by CoI code (teaching presence, social presence, and cognitive presence). Authors received impressive feedback that students at remote site appreciated the teaching better than student at local site.



In (Hakala et al. (2010), authors investigated the participation of student in master studies in Mathematical Information Technology at Kokkola University. In order to collect data about various possibilities and habits related to students' experience, questionnaires are given at every course and questionnaires related to quality control are directed to lecturers.

Video lecturing increases the participation even more than face to face teaching, since it offer flexibility to adults people who do not have enough time to be based at campus on a regular basis.

In Martin (2005), Marie shares some of experiences, together with those of educators in other parts of the world, in order to demonstrate what has already been achieved and to help point the way towards integrating videoconferencing into curriculum delivery and into any form of distance learning. Teaching to students that are located in different continents thus different time zone where some places it is morning, other it is evening, and so on. Marie found that exclusive teacher centered methodologies do not transfer easily to lessons delivered by video-conference; this can lose the interest of the remote learners. Marie reminded a rule that can capture the attention of students, that is, "no more than 10 to 15 minutes of instructor talk without some learner-centered response".

In Lester (2007), From her experience, Julie explains how to reduce social loafing phenomenon, this is that in any group there is always. This is likely to happen between remote students who may be idle in a sense that they don't participate in the course. Thus, there is inequality in the amount of work done by different students.

Julie proposed requirement to prepare a good online lecture in general, this could be video, online material and so on. The author emphasizes on giving a clear instruction or a protocol how to follow the lecture, assignment. She suggested three principles that can help to manage the classroom.

1. Provide a thorough syllabus and course schedule so that students have clear expectations.
2. Provide online discussion areas specifically designated for students to post questions about the content and assignments.



3. Provide rubrics, samples of assignments, and specific assignment instructions so that students are aware of the specific formats, requirements, and expectations for submitted work.

In Pantchenko et al. (2011), the authors found that the instructional video plays a paramount role for demonstrating how to conduct experiment. A concrete example was done at University of Santa Cruz, where students conducted experiment in the lab about renewable energy following instruction given as a video. The Authors realized that since students have difficulties to follow paper based instructions (especially those students with no prior background in the field), the instructional video was found important to enhance student learning by providing more time to focus on the data gathering and analysis processes by minimizing the assembly time. This method of using video is very convenient in trainings for many fields, the trainees have a not priori experience. As far as video conferencing is concerned, when it comes to practical part of the course, instructional video will play a paramount role in guiding students through the lab-experiments.

In Chipps (2010), the authors conducted a survey about the use of video-conferencing for nursing courses in Kwazulu Natal University South Africa. Two nurses' education courses conducted via videoconferencing were evaluated against a set of criteria developed and validated by the Department of TeleHealth at the University. They claim video-conference to be a potential cost saving. Video-conferencing becomes potential even more to deliver trainings to remote rural area in developing countries where the economy does not permit the populations to have access to campuses. Though group sizes were large (>20) in both courses, both courses reported that the participants perceived the presenters to be comfortable using video-conferencing which may have contributed to the overall satisfaction with the courses.

5. Field Data Collection and analysis

The data collection is based on the survey conducted as an unstructured interview to teachers and to students who have already had at least a lecture using video-conferencing. This type of interview will develop a real sense of understanding about teachers and students experience, since there is no strict predefined questions (Zhang and Wildemuth, 2009), rather as the discussion about



video-conferencing teachings grows as we expect to learn more about this type of teaching. The analysis is based on the CoI coding template which embeds the key indicators of CoI. This coding template has been recommended by Garrison et al. in (Garrison et al., 1999). Table 1 illustrates the relationship between three elements of CoI, those are, cognitive, social, and teaching presences and their indicators.

Table 1. Coding structure from Garris (Garrison et al., 1999, p. 3)

Codes	Categories	Indicators (examples)
Cognitive Presence	Triggering Event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
Social Presence	Emotional Expression	Emoticons
	Open Communication	Risk-free expression
	Group Cohesion	Encouraging collaboration
Teaching Presence	Instructional Management	Defining & initiating discussion topics
	Building Understanding	Sharing personal meaning
	Direct Instruction	Focusing discussion

6. Tele-Education through PanAfrican eNetwork

Tele-education implies the use of electronic information communication technologies to provide educational facilities to the students at remote locations. The key benefits of tele-education are; electronic virtual classroom, anytime and anywhere learning (i-Grandee Virtual Tele-ED LMS, 2014). In tele-education there is a project called PanAfrican eNetwork, which is a joint initiative of the African Union and the Government of India. This network provides electronic services with



priority on tele-education and tele-medicine services, and VVIP connectivity (video-conferencing and voice over Internet Protocol) among African countries.

The networks connects the following elements,

In India:

- A data center at TCIL Bhawan, New Dehli (it acts as a Hub for all the Indian sites& Super Specialty Hospitals)
- Tele-Education set-up in 7 Universities/ Educational Institutions
- Tele-Medicine set-up in 12 Super specialty Hospitals

In Africa:

- Satellite Hub earth station at Dakar, Senegal
- Five Regional Leading Universities
- Five Regional Super Specialty Hospitals
- Fifty three Learning Centre (LC) for tele-education, one in each country
- Fifty three patient-end hospitals for tele-medicine, one in each country
- Fifty three VVIP communication nodes, one in each country

On 23rd march 2007, Rwanda signed agreements with India in order to start a learning center for tele-education through PanAfrican eNetwork. On 26th February 2009, a center hosted by Kigali Institute of Education (KIE) was inaugurated. KIE later in 2013 became a college of education, one of the colleges in University of Rwanda. The first intake of students started in September 2009. Until 2014, 157 students have graduated from various programs on offer by Amity University under PanAfrican eNetwork Project. Apart from Amity University, four more Indian Universities are running their courses under Rwanda learning center hosted by the same college of education. These are Indira Gandhi National Open University (IGNOU), University of Madras (UNOM), Birla Institute of Science and Technology (BITS), and Delhi University (DU) (Pan-African e-Network, 2007).

6.1 Results of the survey and discussion

Figure 3 shows students that are attending a session of Managerial Economics offered by Amity University. The students are enrolled in the program of masters



in MBA. The program lasts for 2 years and all courses are offered through tele-education. The session starts at 9.10 and ends at 11.30, the session usually lasts for 3 hours. In the classroom there is a facilitator who is a staff at college of education, his/her role is to set up the communication equipments, communicate of-fline queries from students to teacher.

The teacher is teaching from India, students from different centers in Africa are attending the lecture. Whenever a student has question, he/she will raise a hand and starts interacting with the teacher. The class setup is as follows: a big screen that displays the slides as the teacher goes through; this screen has a portion that shows different learning centers and another screen that displays the teacher.

There is a camera that faces the students, it lets the teacher and the other learning centers seeing learning center's students at college of education. Exams are conducted offline, i.e., the teacher send the exam to the facilitator, the students write the exams under facilitators' supervision, thereafter, the answers are sent back to the teacher who grades them and then the results are communicated again through the facilitator or the portal.

Before starting a certain course, the teacher gives the syllabus, therefore students read before class, which makes them asking questions for more clarifications. During interview with students, they reveal that project based learning and cooperative learning methods help them to understand much better the subject. The teachers prepares beforehand projects that are to be done in groups of students, while students are working on this projects they learn most of the things from each other about the subjects. The remaining inquiries are addressed to the teacher during teaching session. Moreover, the lectures are recorded and are made available on the students learning portal in order that later students can replay it. In common, students reveal that video conferencing learning program allows them to share experience through discussion with even students from other countries simultaneously.

Nevertheless, when teacher is reading the presentation, students do not follow. Talking to students, they said that since they have the syllabus the presentation is not necessary but they add that it depends on how interactive the teacher is. Some of the teachers are interesting to listen to but others not. Besides this, when it



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comes to the part that is dedicated to answering questions from the projects work, all the students are very attentive.

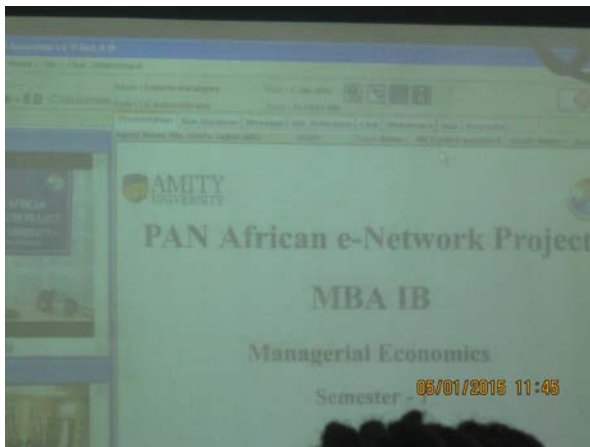


Figure 3. Students at college of Education (UR) learning center

Table 2. Findings according to Coding structure from Garris

Codes	Findings
Cognitive Presence	Fewer students raise questions. Mostly they asked questions about their project, since they have to pass those projects ¹ in order to pass the course. Project based learning plays a key role.
Social Presence	The students are physically present because the attendance is mandatory, however, their mind is absent since they feel like they are just listening to a machine.
Teaching Presence	Syllabus given beforehand helps, however, since teaching in English as second language and teacher is not observing students feelings, sometimes students feel bored and do not follow at all. The method used is content driven learning which limits the student to syllabus only.

7. Conclusion and Recommendation

Video-conferencing teaching removed the barrier of distance learning, and the studying cost has been cut down. This type of learning has boosted the number of graduates in a short time at a low cost. However, the quality of education has been criticized; the literature review showed that cognitive, social, and teaching presences must be followed in order to improve the learning and teaching quality. It has been seen that the teaching mostly teacher centered where knowledge is transmitted from teacher to students. With the experience on field, students limit themselves on the syllabus only. I believe that moving from highly teacher centered dominated learning to students centered could improve the quality of education and it increases the motivation for students. Students will develop a culture of creativity, as a result, teachers will learn from students as well as students learn from teachers. As far as tele-education is concerned, it is partly students centered since the project based learning is the main driver of the learning.

Teachers are recommended to use students centered learning, and complement this with an interactive inquiry learning based, where teacher does not present, instead he/she let students asks questions. For example, in the session I attended,

¹ Project means the same as assignment



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at the end of the session, teachers gave few minutes for asking questions about the presentation. It would be better rather dedicating at least a half or a whole session to answering questions raised during projects' work since this engages students and promote their critical thinking. It does not mean that the presentations are not important, however, answering and discussing with students about their enquiries should be highly considered. Briefly, teachers' role should be to coach and facilitate the learning together with students.

In summary, the following are the main approaches that are suggested;

1. From sage on the stage to guide on the side
2. Training about IT tools
3. Run test session
4. Having a backup communication like a telephone
5. us versus them between learning groups (inter location debate)
6. learner centered approaches
7. Handout materials beforehand

And the main challenges are;

1. Lack of basic IT skills
2. Teacher centered approaches
3. Lack of Social presence
4. Teachers presentation that takes long without interacting with students (10 to 15 minutes talk is a recommendation).
5. Inequality of amount of work between different group of students (remote and face to face)



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