8.2 Introduction to E-Teaching & E-Learning

Distinguishing E-Teaching, E-Learning and E-Coaching

Definition of Terms

E-Teaching

The alternative to face-to-face or conventional education is electronic teaching (e-teaching). Sanford (2020) describes it as an online teaching method in which no physical intervention of instructors and students is necessary. At the time of the teaching process, participants are located in several separate locations. It entails using information and communication technology (ICT) to interact and work with learners to accomplish instructional goals effectively. In literature, the notion of e-teaching is not widely discussed as often as e-learning is. As the back end of e-learning, e-teaching involves the technical mix of content experience, pedagogy, knowledge from/through multiple media outlets, and the use of learning theories to accomplish both formal and informal instructional goals.

As suggested by Ali (2018), E-teaching can include asking students to search for items online before the next class and providing forums for students to share their thoughts. To Klement et al. (2014), e-teaching puts together all the preferred modes of instruction into what is referred to as VARK (Visual, Aural, Reading/Writing, and Kinaesthetic). It requires the use of interactive tools that enable students to create and process knowledge in their own space and speed. Lytvynova and Pinchuk (2018) state that ICT encourages teaching and learning autonomy, produces constructive learning incentives, enhances learning consistency, strengthens evaluation practices, and improves record-keeping of educational achievements.

The facilitator of e-teaching is the e-teacher. Hoskins (2010) states that an e-teacher must be a good teacher called to the honourable career of molding young/unknowledgeable minds and with the requisite broad or technical knowledge. aGAINthe e-teacher must be familiar with ICTs, including their continuing dynamism, to be readily influenced by necessary adjustments and scaling.

However, it should be noted that e-teaching is not synonymous with online teaching, the latter being a branch of the former, in which e-teaching can be carried out both in a face-to-face setting and at a distance. In contrast, online teaching frequently does not require face-to-face contact. For e-teaching, though, it is necessary to connect electronically because Internet resources are essential for the e-teacher. Ultimately, since it is one of the leading development areas within the education profession, e-teaching is an essential component for every educational institution to consider.

E-Teaching Tools	**E-Teaching Platforms**
Podcasts	World Wide Web (WWW)
Video clips using hyperlinks, projectors	Learning Management System (LMS)
Use of electronic books (e-books),	Skype
Open educational resources (OERs)	WhatsApp & Zoom

E-Learning

The e-learning concept emerged in the mid-1990s when the Internet started to gain popularity (Garrison, 2011), and computer-based learning and web-based learning were included in the application of e-learning. E-learning, also known as web-based learning, is defined as the versatile and simple delivery of education through the use of the Internet to promote individual learning or organizational success (Clarkand Mayer, 2011, Maqableh et al., 2015).

E-learning is the use of ICT to provide academic knowledge where teachers and students are distanced by location, time, and/or both to improve the educational experience and performance of the students (Keller et al., 2007; Tarhini et al., 2016). E-learning is described by Horton (2011) as a series of instructions given via all electronic means, such as the Internet, intranets, and extranets. Thus, people can now take care of their own lifelong learning by overcoming the constraints of time and space (Almajali et al., 2016; Bouhnik and Marcus, 2006; Fletcher, 2005; Obeidat et al., 2015).

Sharma and Kitchens (2004) observed that e-learning entails learning through web-based training services, such as virtual colleges and classrooms, allowing remote communication and distance learning aided by technology. E-learning plays a vital role in educational growth in every country, according to Ally (2005). It creates opportunities for developed nations to increase their academic progress. In addition, it also allows the new generation of teachers to develop their teaching pedagogy skills. E-learning enables organizations to provide all staff with training regularly; upgrade training content when necessary; minimize travel expenses to outside training facilities; and provide workers with training on-demand, at any time and everywhere (Burgess & Russell, 2003). Papanis (2005) claimed that e-learning offers all participants in the learning process with innovative teaching at a reduced cost, improved access to learning, and

strong accountability.

In their study, Sangrà, Vlachopoulos and Cabrera (2012) indicated that e-learning definitions from the literature focus on four different elements and categories, which are: 1) technology-driven, 2) delivery-system-oriented, 3) communication-oriented, and 4) educational-paradigm oriented. The table below presents details of all four categories and their definitions.

Category	Definition	Source
Technology-Driven	"E-learning is the use of electronic media for a variety of learning purposes that range from add-on functions in conventional classrooms to full substitution for the face-to-face meetings by online encounters."	Guri-Rosenblit, (2005)
	"E-learning is distance education through remote resources."	Marquès, (2006)
Delivery-System-Oriented	"E-learning is the delivery of education (all activities relevant to instructing, teaching, and learning) through various electronic media."	Koohang & Harman, (2005).
	"E-learning is an online education defined as the self-paced or real-time delivery of training and education over the internet to an end-user device."	Lee & Lee, (2006).
	"E-learning is the delivery of a learning, training or education program by electronic means."	Li, Lau & Dharmendran, (2009).
	"E-learning is defined as education delivered, or learning conducted, by Web techniques."	Liao & Lu, (2008).
Communication-Oriented	"E-learning is education that uses computerized communication systems as an environment for communication, the exchange of information and interaction between students and instructors."	Bermejo, (2005).
	"E-learning is learning based on information and communication technologies with pedagogical interaction between students and the content, students and the instructors or among students through the web"	González-Videgaray, (2007).
	"E-learning is the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration."	Alonso et al., (2005).

Educational-Paradigm-Oriented	"E-learning is a broad combination of processes, content, and infrastructure to use computers and networks to scale and/or improve one or more significant parts of a learning value chain, including management and delivery."	Aldrich, 2005).
	"E-learning is defined as information and communication technologies used to support students to improve their learning."	Ellis, Ginns & Piggott, (2009).
	"E-learning refers to educational processes that utilize information and communications technology to mediate synchronous as well as asynchronous learning and teaching activities."	Jereb & Šmitek, (2006).

E-Coaching

E-coaching is also known as online coaching, remote coaching, web coaching, cyber coaching, digital coaching, i-coaching, distance coaching, and virtual coaching. E-Coaching, previously referred to as virtual coaching, plays a critical role in producing efficient teachers through advanced online bug-in-ear (BIE) technology. E-Coaching is described as a relationship in which the practical instructional abilities of one or more individuals are actively and eventually strengthened by online experiences with another person (Gallant & Thyer, 1989; Hess, 1980). E-Coaching does not require onsite delivery, unlike face-to-face supervision or elbow coaching (Rock, Zigmond, Gregg, & Gable, 2011).

The word e-coaching is also used interchangeably with virtual coaching, distance coaching, online coaching, remote coaching, etc. Although the e-coaching debate is new, there is an apparent lack of agreement about its meaning. For example, Clutterbuck (2010) refers to e-coaching as a developmental interaction that is conveyed by e-mail and maybe augmented by other media. An alternate definition considers e-coaching to be a technology-mediated coach-customer relationship to promote customer development (Hernez-Broome, 2010). E-coaching is described by Hernez-Broome, Boyce, and Whyman (2007) as two-way communication between a mentor and mentee that is enabled through the use of technology, particularly computer-mediated communications (CMC) such as e-mail and online chat or threaded discussion" (p. 6).

Technologies for e-coaching consist of advanced telecommunications and multimedia tools that enable synchronous and asynchronous communication through ordinary telephone lines and high-speed cable connections to desktop computers or wirelessly through cell phones and other mobile devices (Gunawardena & Mclsaac, 2004). Technological e-coaching modalities include the following: (1) telephone communication; (2) visual communication; (3) text-based synchronous communication; and (4) asynchronous text-based communication. E-coaching includes tools for synchronous interactions, contact and reflection (in real-time), and asynchronous (time-delayed) (Headlam-Wells et al., 2006). From the above definitions and in all three cases, it can be observed that one crucial element that runs through them is the use of computer-based technology, and it also does not necessarily require that both parties meet face-to-face.

References

Aldrich, C. (2005). *Simulations and the future of learning: An innovative (and perhaps revolutionary) approach to e-learning*. San Francisco: Pfeiffer.

Ali, J. (2018), "Seven ways digital education is transforming teaching methods", Educational Technology Online, available at: https://elearningindustry.com.

Ally M (2005) Using learning theories to design instruction for mobile learning devices. Mobile Learning Anytime Everywhere (pp. 5–8), London, UK: Learning and Skills Development Agency

Almajali, D. A. Masa'deh, R., & Al-Dmour, R. (2016). The Role of Information Technology in Motivating Students to Accept E-Learning Adoption in Universities: A Case Study in Jordanian Universities. *Journal of Business & Management (COES&RJ-JBM)*, 4 (1), 36-46.

Alonso, F., López, G., Manrique, D., & Viñes, J. M. (2005). An instructional model for web-based e-learning education with a blended learning process approach. *British Journal of Educational Technology, 36*(2), 217-235.

Bermejo, S. (2005). Cooperative electronic learning in virtual laboratories through forums. *IEEE Transactions on Education, 48*(1), 140-149.

Bouhnik, D., & Marcus, T. (2006). Interaction in Distance-Learning Courses. *Journal of the American Society for Information Science and Technology,* 57, 299-305.

Boyce, L. A., & Clutterbuck, D. (2010). E-Coaching: Accept it, It's Here, and It's Evolving! *Advancing executive coaching: Setting the course for successful leadership coaching*, 285-315.

Boyce, L. A., & Hernez-Broome, G. (2010). E-coaching: Consideration of leadership coaching in a virtual environment.

Burgess, J. R. D., & Russell, J. E. A. (2003). The effectiveness of distance learning initiatives in organizations. Journal of Vocational Behavior, 63(2), 289–303.

Clark, R., & Mayer, R. (2011). *E-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning*. Pfeiffer; 3rd Edition (August 16, 2011).

Ellis, R. A., Ginns, P., & Piggott, L. (2009). E-learning in higher education: Some key aspects and their relationship to approaches to study. *Higher Education Research & Development, 28*(3), 303. Retrieved from http://www.informaworld.com/10.1080/07294360902839909.

Fletcher, K. M. (2005). Self-Efficacy as an Evaluation Measure for Programs in Support of Online Learning Literacies for Undergraduates. *The Internet and Higher Education,* 8 (3), 307-322.

Gallant, J. P., & Thyer, B. A. (1989). The" bug-in-the-ear" in clinical supervision: A review. *The Clinical Supervisor*, *7*(2-3), 43-58.

Garrison, D. R. (2011). *E-Learning in the 21st Century: A Framework for Research and Practice* Taylor & Francis.

González-Videgaray, M. (2007). Evaluación de la reacción de alumnos y docentes en un modelo mixto de aprendizaje para educación superior. *RELIEVE, 13*(1) Retrieved from http://www.uv.es/RELIEVE/v13n1/RELIEVEv13n1_4.htm

Gunawardena, C. N., & McIsaac, M. S. (2004). Distance education. Handbook of research on educational communications and technology. *Mahwah, NJ: Lawrence Erlbaum Associates*, *2*, 355-395.

Guri-Rosenblit, S. (2005). 'Distance education' and 'e-learning': Not the same thing. *Higher Education, 49*(4), 467-493.

Headlam-Wells, J., Craig, J., & Gosland, J. (2006). Encounters in social cyberspace: E-mentoring for professional women. *Women in Management Review*, *21*(6), 483-499.

Hernez-Broome, G., Boyce, L. A., & Whyman, W. (2007). Critical issues of coaching with technology. In *E-coaching: Supporting leadership coaching with technology. Symposium conducted at the 22nd Annual conference of the Society for Industrial and Organizational Psychology, New York, NY*.

Horton, W. (2011). *E-Learning by Design*. Wiley, London: UK

Hoskins, B.J. (2010), "The art of E-teaching", The Journal of Continuing Higher Education, Vol. 58, pp. 53-56, doi: 10.1080/07377360903524641.

Jereb, E., & Šmitek, B. (2006). Applying multimedia instruction in e-learning. *Innovations in Education & Teaching International, 43*(1), 15-27.

Keller, C., Hrastinski, S., & Carlsson, S. A. (2007). Students' Acceptance of E-Learning Environments: A Comparative Study in Sweden and Lithuania. *International Business*, 395-406

Klement, M., Dostal, J. and Maresova, H. (2014), "Elements of electronic teaching materials with respect to students' cognitive learning styles", Procedia – Social and Behavioural Sciences, Vol. 112, pp. 437-446.

Koohang, A., & Harman, K. (2005). Open source: A metaphor for e-learning. *Informing Science Journal, 8*, 75-86.

Lee, T., & Lee, J. (2006). Quality assurance of web-based e-learning for statistical education. *COMPSTAT: Proceedings in Computational Statistics: 17th Symposium,* Rome

Li, F. W., Lau, R. W., & Dharmendran, P. (2009). A three-tier profiling framework for adaptive e-learning. *Proceedings of the 8th International Conference on Advances in Web Based Learning,* Aachen.

Liao, H., & Lu, H. (2008). *Richness versus parsimony antecedents of technology adoption model for E-learning websites.* Retrieved from http://dx.doi.org/10.1007/978-3- 540-85033-5_2

Lytvynova, S. and Pinchuk, O. (2018), The Evolution of Teaching Methods of Students in Electronic Social Media. (Online), Cornell University, Ithaca, New York, NY, available at: https://arXiv.org.

Maqableh, M., Masa'deh, R., & Mohammed, A. B. (2015). The Acceptance and Use of Computer Based Assessment in Higher Education. *Journal of Software Engineering and Applications*, 8 (10), 557.

Marquès, P. (2006). *Definición del e-learning.* Retrieved from www.pangea.org/peremarques

Obeidat, B., Al-Suradi, M., & Tarhini, A. (2016). The Impact of Knowledge Management on Innovation: An Empirical Study on Jordanian Consultancy Firms. Management Research Review, 39 (10), 22-42

Papanis E (2005) Traditional Teaching versus e-learning. Experimental Approach, Statistical Review 1 (1): 19–35

Rock, M.L., Zigmond M. G. and Gable R.A., (2011). "The Power of Virtual Coaching." Educational Leadership, 69(2).

Sanford, D. R. (2020). The Rowman & Littlefield Guide for Peer Tutors: Rowman & Littlefield Publishers.

Sangrà, A., Vlachopoulos, D., & Cabrera, N. (2012). Building an inclusive definition of e-learning: An approach to the conceptual framework. *International Review of Research in Open and Distributed Learning*, *13*(2), 145-159.

Sharma SK and Kitchens FL (2004) Web services architecture for m-learning. International Journal of Mobile Communications 2(1): 203–216

Tarhini, A., Elyas, T., Akour, M. A., & Al-Salti, Z. (2016). Technology, Demographic Characteristics and E-Learning Acceptance: A Conceptual Model Based on Extended Technology Acceptance Model. *Higher Education Studies*, 6 (3), 72-89.

Teaching & Learning

Teaching and Learning Today

It's more than only integrating new contents, but also requires social and methodological competencies. Problems/difficulties at schools show that the teaching forms institutions need to be questioned.

Main characteristics of teaching and education *should* be:

- critical thinking (action oriented)
- cognitive orientation (evolutive)
- analytical & rhetorical capacities → deliberation of society

Taught topics should be related to:

- Global Education: Human rights education; Environment education; Development education
- Civic Education: Learning by speaking; Learning by doing (Service learning)
- Education towards Democracy
- **New learning:** long-term, flexible, functional, meaningful, generalizable, application-oriented

(Eichelberger; Laner et al. (2010); p. 47ff.)

Parallelization of the new understanding of learner centred learning and the new technologies (Kergel, Heidkam-Kergel, 2020, p. 39):

New Learning	New Technology
Personalised	Personal
Learner centred	User centred
Situated	Mobile
Collaborative	Networked
Ubiquitous	Ubiquitous
Lifelong	Durable

Open Educational Resources and Creative commons for the digital age

Open educational resources (OER) refers to (mostly digital) teaching/learning materials that are provided independently of the institutions. OER are openly accessible, openly licensed texts, media and other digital contents that may be useful for teaching, learning, evaluation and research. (Kergel, Heidkam-Kergel, 2020, p. 53)

At the UNESCO forum in 2002, the term has been defined for the first time among the 'Open Courseware' and a global logo has been introduced:

OER describes openly accessible material and resources, that any user can use under certain licenses, change (remix) and distribute. The different types of use are summarized under "5R". They refer to:

- *Retain*: the right, to copy, own and control the content
- *Reuse:* the right to use the content in diverse ways (e.g. in a study group or on a website)
- *Revise:* the right to adapt, modify or change the content by myself
- *Remix:* the right to combine the content with other material and create something new
- *Redistribute:* the right to pass on copies of the original content, of the changes or the remixes, to others.

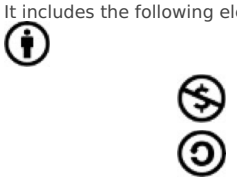
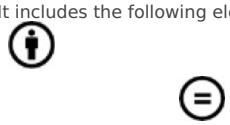
(Kergel, Heidkam-Kergel, 2020, p. 54)

OER uses Creative Commons Licenses that allows the reuse of creative property. Through a Creative Commons License, the intellectual product becomes "free content".

According to the official website of Creative Commons (https://creativecommons.org/about/cclicenses/, 15 Oct. 2020), there are currently six license types available:

Type	Abbreviation	Permissions

	CC BY	This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use.
It includes the following elements: 	BY	Credit must be given to the creator
	CC BY-SA	This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows **for commercial use**. If you remix, adapt, or build upon the material, you must license the modified material under identical terms
It includes the following elements  	BY SA	Credit must be given to the**creator** Adaptations must be shared under the same terms
	CC BY-NC	This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format **for noncommercial purposes only**, and only so long as attribution is given to the creator.
It includes the following elements  	BY NC	Credit must be given to the creator Only **noncommercial uses** of the work are permitted
	CC BY-NC-SA	This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format for noncommercial purposes only, and only so long as attribution is given to the creator. If you remix, adapt, or build upon the material, you must license the modified material under identical terms.

It includes the following elements 	BY NC SA	Credit must be given to the creator Only noncommercial uses of the work are permitted Adaptations must be shared under the same terms
	CC BY-ND	This license allows reusers to copy and distribute the material in any medium or format in unadapted form only, and only so long as attribution is given to the creator. The license allows for commercial use.
It includes the following elements 	BY ND	Credit must be given to the creator No derivatives or adaptations of the work are permitted
	CC BY-NC-ND	This license allows reusers to copy and distribute the material in any medium or format in unadapted form only, for noncommercial purposes only, and only so long as attribution is given to the creator.
It includes the following elements	BY NC ND	Credit must be given to the creator Only noncommercial uses of the work are permitted No derivatives or adaptations of the work are permitted
	CC0 (CC Zero)	This is a public dedication tool, which allows creators to give up their copyright and put their works into the worldwide public domain. CC0 allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, with no conditions.

Handbook of Applied Teaching and Learning

"Welcome to the first edition of the Handbook for Applied Teaching and Learning designed primarily for educators, administrators, and students interested in applied teaching and entrepreneurial education. This handbook documents some of the outcomes of a very fruitful German-African collaboration among higher education institutions in the field of entrepreneurial education which was funded by the German Academic Exchange Service (DAAD) and the German Ministry of Economic Cooperation and Development (BMZ)."

E-Teaching

E-Teaching Concepts

How E-Teaching should be done / What should be taken into consideration

The lecturer should be engaged in the developing of learning materials. According to Yengin*et al.,* 2010 tools for designing Learning Materials includes

- **Audio recording tools**: The lecturer can record audio, convert tapes and records into a digital file, edit MP3 files, mix sounds together and change the sounds dynamics in the recordings with a number of available audio recording tools.
- **Program Image Editing**: There are a number of software's that are available to enable lecturers edit images. Lecturers can use this tool to create – edit graphics and photo file for their lessons. They create and modify many of the known digital photo file.
- **Screen recording**: Most of the e-learning lessons may need some screen recording because lecturers need to show something to the students in their desktops. Also with screen, recording lecturers can have tutorial and presentation on how to use software applications
- **Emails, blogs, wikis, e-portfolios, animation, video links**. For the lecturer to use this they need to be very innovative. For instance, Blogs or individual platforms are gradually being adopted by innovative lectures to share educational materials, visuals, exercises and assignments to students.
- **Wikis** have originated from the concept of Wikipedia. It allows students to read, add or edit materials posted by the lecturer. This thus allows for interactions between students and lecturer. The material may be presented in form of text, tables, visuals, photographs etc. A teacher constructs a wiki on any specific area and therefore ideal for teaching a diverse of subject area.
- **Video links provide links** – This is commonly used by lecturers teaching in specialized units to supplement the regular form of teaching.
- **E-blackboard** - The blackboard platform is ideal because it allows for online discussion between learners and the lecturer. Either the lecture or the student can initiate a discussion or pose a question that allows for student interaction.

E-Teaching Strategies

Strategies use in e-teaching should strive to make the lesson very interactive more when it comes to giving feedback to the students. The system should be able to allow for discussion forums. This will not only allow feedback from the lecturer; the students will also have some good feedback from his/her peers because they can have time to think on the responses and time to construct a good question or feedback. The lecturer should also be trained on methods of motivating and encouraging student's interaction.

1. E-mentoring - This strategy can encourage learners to reach out to the lecturer for online professional assistance from the lecturer.
2. E-structured group activity - this allow learners to learn in structured groups electronically in the form of

- Structured group discussion
- Peer learning groups
- Role play
- Seminars

E-Coaching

E-learning can be viewed as a mean of delivering three key outcomes: improved and consistent rates of lifelong learning, improved productivity and improved innovation and competitiveness (chang, 2016). Another desired outcome is increased equity. The globalization of education is increasing rapidly: students attend courses from all over the world, employees work and study globally in multinational companies. Education around the world is becoming strongly networked, and we are beginning to see fundamental changes taking place in the organization of education (pucciarelli & kaplan 2016).

Definition and types of e-learning:

- **One-way (asynchronous) technologies:** technologies that deliver content (learning, knowledge and skills) one way at one point in time. They include:
  - broadcast television that delivers learning content;
  - Computers;
  - CD-Roms;
  - Audiovisual aids;
  - E-mail;
  - Film;
  - Internet/intranet/extranet networks;
  - Video;
  - Wireless technologies;
  - Digital video disk (DVD).

- **Two-way (synchronous) technologies:** technologies that deliver content (learning, knowledge and skills) two ways or more at the same time. They include:
    - ICQ/IRC—interactive conferencing and chat rooms;
    - Teleconferencing;
    - Internet/intranet networks;
    - Web conferencing;
    - Wireless technologies.

The e-learning term was originated in the mid-1990s when the internet began to gather the momentum (garrison, 2011) and the application of e-learning includes a computer-based learning as well as web-based learning. Finally, these learning contents can be transferred via internet, intranet, video/audio tapes, CD-Rom, DVD, and TV channels (Sujit Kumar Basak, 2018). Papanis (2005) as cited in Tittasiri (2003: 69) stated that “e-learning provides faster learning at reduced cost, increased access to learning, and clear accountability for all participants in the learning process”. A study conducted by Harriman (2010) indicated different types of e-learning, namely, online learning, distance learning, blended learning, m-learning. A learning system based on formalized teaching but with the help of electronic resources is known as e-learning. While teaching can be based in or out of the classrooms, the use of computers and the internet forms the major component of e-learning. E-learning can also be termed as a network enabled transfer of skills and knowledge, and the delivery of education is made to a large number of recipients at the same or different times. Earlier, it was not accepted wholeheartedly as it was assumed that this system lacked the human element required in learning (times, 2020).

Different authors define e-learning as e-learning provides the potential to provide the right information to the right people at the right times and places using the right medium. E-learning is about information, communication, education and training. Regardless of how trainers categorize training and education, the learner only wants the skills and knowledge to do a better job or to answer the next question from a customer (clark& mayer, 2016).

E-learning is a way of acquiring new, or reinforcing existing knowledge skills, using electronic technologies. In most cases it is done completely online, although offline is also an option (UMURERWA, 2016). E-learning is further defined by the South African department of education (SADE) as the connection of learners to learners, teachers and professional support services as well as providing platforms for learning. Electronic learning (e-learning) refers to the intentional use of networked systems in teaching and learning (Nyarko, 2011). The intentional use of ICT in education support is what is referred to as e-learning; it encompasses learning at all levels, both formal and informal, from simple tutoring to the delivery of whole courses. ICT refers to a diverse set of tools and resources

What is digital infrastructure?

Infrastructure can refer to a wide array of physical assets. One definition is “essential facilities, services, and organizational structures for cities and communities,” and this includes not only roads and rails, but also fire stations, prisons, dams, roads, etc. (robert et *al*, 2016).

Digital technologies are giving rise to the so-called fourth industrial and digital as they are allowing or enhancing an unprecedented convergence of computing, communications, contents, and networking of humans.

A digital infrastructure is the set of digital technology tools and systems that offer communication, collaboration, and computing capabilities (gianluca et *al*, 2020).

Used to communicate, create, store and manage information. These tools and resources include computers and the internet, telephones, television and radio. In Rwanda, schools were closed almost immediately after the country recorded its first case of covid-19. They are expected to resume in September 2020.primary and secondary schools will restart the academic year while higher learning institutions will resume teaching activities. As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms. Different remote learning strategies have been put in place by both government and private learning institutions in order to facilitate continued learning. Some of the initiatives include airing classes on public radios and televisions.

Electronic learning, or commonly known as e-learning, is among the earliest applications of web-based technology ((Azhari, 2015). E-learning is defined as the delivery of learning using purely internet and digital technology (Al-Busaidi, 2013). It uses a computer and software programs for its learning process, and was first designed for working adult students who were unable to receive formal education as full-time students (Moore, 2016).

According to Moore, Dickson-Deane& Galyen ,2016 they said that, digital learning is "learning facilitated by technology that gives students some element of control over time, place, path and/or pace.":

- **Time:** learning is no longer restricted to the school day or the school year. The internet and a proliferation of internet access devices have given students the ability to learn anytime.

- **Place:** learning is no longer restricted within the walls of a classroom. The internet and a proliferation of internet access devices have given students the ability to learn anywhere and everywhere.

- **Path:** learning is no longer restricted to the pedagogy used by the teacher. Interactive and adaptive software allows students to learn in their own style, making learning personal and engaging. New learning technologies provide real-time data that gives teachers the information they need to adjust instruction to meet the unique needs of each student.

- **Pace:** learning is no longer restricted to the pace of an entire classroom of students. Interactive and adaptive software allows students to learn at their own pace, spending more or less time on lessons or subjects to achieve the same level of learning.

Digital learning is more than just providing students with a laptop. Digital learning requires a combination of technology, digital content and instruction.

- **Technology:** technology is the mechanism that delivers content. It facilitates how students receive content. It includes internet access and hardware, which can be any internet access device – from a desktop to a laptop to an IPad to a smartphone. Technology is the tool, not the instruction.

- **Digital content:** digital content is the high quality academic material which is delivered through technology. It is *what* students learn. It ranges from new engaging, interactive and adaptive software to classic literature to video lectures to games. It isn't simply a pdf of text or a PowerPoint presentation.

- **Instruction:** educators are essential to digital learning. Technology may change the role of the teacher but it will never eliminate the need for a teacher. With digital learning, teachers will be able to provide the personalized guidance and assistance to ensure students learn and stay on track – throughout the year and year after year – to graduate from high school. Teachers may be the guide on the side, not the sage on the stage.

Digital learning tools

According to Danielle et *al*(2017) and Mr, G Praveen & Dr. M.Vasi(2019), here are some of the digital learning tools that make a big difference in classrooms:

- YouTube channels
- Google classrooms
- Class dojo
- Prezi
- Edmodo
- Edmodo
- Socrative
- Kahoot
- Quizz
- Socrative

The most "must-have" digital marketing tools (Brent, 2020):

- Organic Social Media
- Paid Social Media
- Email Marketing
- Display Retargeting
- Programmatic Advertising
- Website Testing
- Video Hosting
- Content Creation
- Content Curation
- Website Analytics
- Customer Service
- Search Engine Optimization
- Affiliate Marketing

What is coaching?

Coaching, of course, is about purposeful interactions between a coach and the person or persons being coached.

E-coaching moves the process online and expands the possibilities. Some e-coaches call what they do "distance coaching," "distance mentoring," or even "telementoring." What's interesting here is that online experiences and tools are the fundamental way of supporting the coaching relationship

E-coaching is the practice of coaching through technology. In this very broad sense, this means that if a human coach uses technology as a mode of communication (e.g., to get information about a coachee's behavior or to give feedback), this is considered e-coaching. Consequently, it could be argued that the communication systems that human coaches and coachees use to communicate in this practice are types of "e-coaching systems" (Bart A., 2017).

E-Coaching System

An e-coaching system is a set of computerized components that constitutes an artificial entity that can observe, reason about, learn from and predict a user's behaviors, in context and over time, and that engages proactively in an ongoing collaborative conversation with the user in order to aid planning and promote effective goal striving through the use of persuasive techniques (Bart A., 2017).

Features of E-coaching Systems(Bart A., 2017):

1. The system will need to have **social ability** in order to engage in an ongoing conversation with the user. This conversation is crucial for establishing and maintaining a collaborative relationship between user and system.
2. As coaching requires repeated interactions between user and system, the system should be **designed to be credible**, i.e., to be perceived as having expertise and being trustworthy
3. In order to stimulate ideas and action, and to assess whether a person's goals are consistent with that person's life values, the system will need to be in some relevant sense context-aware (for more on the importance of context for e-coaching systems.
4. In order to ask questions that are pertinent to a specific situation the user is in or will be in, and to develop and maintain the trust that is needed for a customized, collaborative coaching relationship, the system will need **the ability to ask questions, give feedback, and offer advice that is tailored to the individual user**. For this, the system will need learning abilities to build up and maintain a personalized user model
5. The system will need **to have information on which to base its questions and recommendations,** which means it will need to be able to interface with (different types of) data streams (e.g., direct user input, but potentially also measurements of physical activities, mood self-reports, sleeping patterns, etc.)
6. **The system has to be proactive** in order to initiate interactions with the aim of stimulating action or reflection. For example, the system could invite the user to reflect on his or her commitment to a particular goal, or warn the user at suspected moments of weakness. For this type of proactiveness, prediction of user behavior is key.
7. If the system is to be successful in supporting behavior change, not as a mere instrument, but as a coach, it needs to have some notion of what a behavior change trajectory looks like. For this, it needs to **operate on some type of model of behavior change** cf. the COM-B model and the COMBI model
8. In order to support users in setting themselves up for behavior change success, the system needs the **ability to guide its user in a process of future-directed**

Defining e-Coaching

Most of the terms (online learning, open learning, web-based learning, computer-mediated learning, blended learning, m-learning, for ex.) Have in common the ability to use a computer connected to a network that offer the possibility to learn from anywhere, anytime, in any rhythm, with any means.

E-learning refers to the use of information and communication technologies to enable the access to online learning/teaching resources.

E-learning has the potential to enable Africa to achieve education for all. As Africa faces a severe shortage of trained teachers, e-learning is increasingly gaining universal acceptance as a viable means of enabling large numbers of students to access education. Although blended learning is ideal for beginners, the eventual advantage of e-learning lies in its capacity to serve both on-campus and distance learning students concurrently.

The interest in integrating eLearning platforms in teaching environments are on the increase in higher learning institutions.

The rapid growth of information and communication technology (ICT) has brought about significant changes in the practice of e-learning globally. In recent years, there has been an increasing adoption of learning management system (LMS) assisted e-learning in higher education institutions (HEIS) in developing countries.

The 12th e-learning conference hosted by the government of Mauritius and UNESCO, in the final week of September this year, focused on the perspective of e-learning in the African continent with a lot of interesting papers and discussions presented by international academics and industry people. There are a number of activities indicative of interest by local and international communities seeking to utilize e-learning technology to improve access to education. Governments and educational institutions look at e-learning as one option that can be exploited to achieve the important millennium goal, which is 'education for all' (Betchoo, 2017)

Communication-oriented definitions

This category considers e-learning to be a communication, interaction, and collaboration tool and assigns secondary roles to its other aspects and characteristics. Representative examples of these definitions, which come mostly from the academic and communication sectors, include the following.

- "E-learning is education that uses computerized communication systems as an environment for communication, the exchange of information and interaction between students and instructors.
- "E-learning is learning based on information and communication technologies with pedagogical interaction between students and the content, students and the instructors or among students through the web .
- "E-learning is defined as learning facilitated by the use of digital tools and content that involves some form of interactivity, which may include online interaction between the learner and their teacher or peers .

Educational-paradigm-oriented definitions

This category defines e-learning as a new way of learning or as an improvement on an existing educational paradigm. The majority of the authors falling into this category work in the education sector. Some of the most representative examples of these definitions include the following.

- “E-learning is the use of new multimedia technologies and the internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration .
- “E-learning is a broad combination of processes, content, and infrastructure to use computers and networks to scale and/or improve one or more significant parts of a learning value chain, including management and delivery.
- “E-learning is defined as information and communication technologies used to support students to improve their learning.

Because of the benefits of digital technologies, all infrastructure will become digital at some point in the future. But absent proactive public policies, this needed transition may well take a very long time. As a result, governments need to ensure that policies support the transition from traditional infrastructure to digital infrastructure.

Create “digital-friendly” regulatory policies

The robust deployment of hybrid infrastructure requires a smart and streamlined regulatory environment. Outdated and costly regulatory policies designed for the infrastructure of the 20th century may impair the development and deployment of infrastructure of the 21st century. For virtually every digital infrastructure, there is a need to modernize existing regulations to reflect significant changes in technology advances and leading industry practices.

Increase funding for digital infrastructures

For infrastructures where government is involved as an owner or operator, government should increase funding to transition to digital infrastructure. This means, for example, agencies like the departments of defense and interior upgrading the infrastructures they are responsible for with digital technologies.

Don’t let privacy and security concerns slow deployment

While digital infrastructure projects manage and manipulate large volumes of data, realizing their promise need not require the sacrifice of privacy nor security.

Irembo is one example of the substantial public investment in digital infrastructure and digital service delivery highlighted in the Rwanda economic update (REU15) accelerating digital transformation in Rwanda.(Malpass, 2020)

The government of Rwanda seeks to provide better, faster and more secure services to all Rwandans. This requires a strong move towards online services, better protection of private information, more collaboration between government departments, and a change in public service culture. The future of government ICT is not just about technology. It is also about how the government uses information and technology to deliver better services, create jobs and transform the Rwandan society and economy in a constantly changing environment. Achieving these objectives requires a transformation in our approach to ICT. This is the focus of the smart Rwanda master plan. (ICT, 2018).

A Context-Based computer-assisted Teaching and Learning; KNUST Example

Introduction

Globally, there is a growing debate about the relevance of traditional forms of teaching and learning in the 21st century. This is because conventional teaching, typically involving face-to-face teaching and learning, is basically about information delivery with the lecturer as "the sage on the stage." However, modern forms of teaching emphasize collaborative learning (group discussion, demonstrations, practical application of knowledge, peer review, and scaffolding), which has an estimated higher retention rate of 90% (Bjørke, n.d). Currently, there is an increasing demand for relevant higher education programmes given global economic and developmental challenges. This has led to the search for innovative forms of learning that provide individuals with across cultures access to market-driven educational programmes irrespective of geographic location.

That notwithstanding, there exists a fundamental challenge globally to secure adequate resources to expand educational facilities to accommodate the growing number of tertiary students in need of capacity building. UNESCO (2002) reports that "there has been a mad rush for enrolments in institutions of higher learning across the globe. As a result, governments all over the world are making considerable efforts to expand academic facilities to meet the growing numbers of students. Perhaps, the expansion based on traditional models of educational provision has peaked in many countries particularly in the contexts of limited public funding and disconnect between supply and demand are expected to persist. The situation has sparked an interest in finding more versatile and cost effective ways of meeting tertiary education needs. On this basis, modern forms of innovative learning have explored the potential of e-learning technologies to the Open University systems like United Nations University (UNU), the Massive Open Online Courses (MOOC) and HASTAC Future Education Initiative. All these foreshadow the future of higher learning.

The Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi, Ghana have responded to this growing need to find and develop innovative and cutting edge approaches to educational delivery that defies physical and geographical distances. It is therefore timely that the University through its Institute of Distance Learning (IDL)-KNUST since 2012 has given meaning to the very essence of distance education by the adoption of and integration of e-learning approaches and technologies to revolutionalize the traditional way of teaching and learning while also offering open access education to a wide array of willing and qualified Ghanaian students to pursue higher learning from all corners of the country. Indeed, from 2015, the University through the Institute of Distance Learning started migrating most of its core programme to the e-learning platform, using the Learning Management System (LMS) powered by Moodle after a successful implementation of its E-learning strategy for innovative teaching and learning from 2012. This has thus given the University a competitive advantage over other universities in Ghana in e-learning technologies and pedagogical advances that employs a social constructionist approach for teaching and learning.

This position paper therefore presents a good practice case adopted by the Institute of Distance Learning which has served as a basis for the accelerated and effective implementation of the E-Learning agenda of the institute going into the future of online education delivery in Ghana.

Good Practices In Online Education Delivery: KNUST's Institute of Distance Learning-Msc Development Management Programme's Approach

In the world over, many people view e-learning as a mere channel for information delivery. To them, online learning is a new way to reduce cost of operation by making studying materials readily accessible for download and admit more students for economies of scale. This however is not the case. In this regard, KNUST's Institute of Distance Learning (IDL), has in recent years attempted to change this erroneous perception by employing e-learning technologies to improve its service delivery to the university community especially in its teaching and learning in ways previously unknown within the university community. In spite of such initiatives, some think tanks in the university community still share the general perception that online education is about information delivery as against its real intent of knowledge creation and for the IDL, this constituted a major potential draw back to its attempt at successfully implementing an e-learning pedagogy at the University going into the future.

In this regard, the Institute in 2012 established the Centre for E-learning Technologies (CELT) as the fundamental vehicle for changing and revolutionarizing E-learning and online educational perceptions not only in the Institute but across the University community. Fundamentally, CELT was tasked with pursuing and coordinating the E-learning strategy implementation processes of the Institute towards a full adoption of an integrated E-Learning and online educational pedagogies. Consequently, CELT set out organizing series of training sessions and workshops for *facilitators* and students on the relevance of collaborative learning using the Learning Management System (LMS) known as Moodle also referred locally as the KNUST Virtual Classroom. This KNUST IDL E-Learning infrastructure is an

open source platform that has all the features supported by major open universities in the world. Initially, the training sessions were sporadic and less formal until 2013 when the University through the Institute developed its MSc. Development Management (DM) programme that made exclusive and optimal use of the 'KNUST Virtual Classroom' platform that had already been procured and managed by the institute.

Curriculum Development and Course Structuring

As a first step, facilitators on the MSc Development Management programme who it must be noted had been trained in E-Learning approaches and pedagogies in Norway began a collaborative working relationship with the Institute through CELT by embarking on a drastic redevelopment and re-design of course curriculum and course outlines to formats that can be fitted to an e-learning environment. Course outlines were developed into study guides that spelt out course overviews, course aims, learning outcomes, Text and Reading materials, grading, assignment schedules that specified the assignment number, assignment description, assignment type (group assignment, group discussion, individual assignment etc), deadlines and value of grade for each assignment. On the basis of this, each chapter or topic to be studied had the contents to be covered, its learning outcomes, Sessions/activities to be carried out by both the facilitator and students which usually involved the reading activities and other practical steps to be undertaken towards the assignment that is given. Assignments followed each session/activity and are carefully timed based on the weight or demands of the assignment. Mostly, the assignment type, i.e. group assignment, individual assignment or group discussion as well as the grade value for the assignment etc is clearly indicated in the study guide so that students are able to adequately estimate the amount of effort required to perform the tasks related to the assignments. Indeed, the study guides are structured that they cover all the teaching period for every semester so that every day and week of the semester, students know and are aware of what is expected of them in the course of life of the semester and hence, prepare adequately towards meeting their obligations as students.

Moreover, the reading materials are also reduced to soft copies and appropriate hyperlinks to those reading materials are created and embedded into the study guides. Initially, study guides were copied on CD-ROMS and distributed to students. However, with time, these study guides were uploaded to all course classrooms or forums for easy downloads by all students in all courses. On the Virtual Classrooms, the course contents are structured according to the respective course study guides so that for each course, the course content in the study guide is exactly the same content placed in the respective course forum in the Virtual Classroom. Indeed, reducing course outlines, curriculum and reading materials to study guides and in soft versions drastically reduced IDL operational costs and expenditure in relation to the printing of handouts and course booklets for students over the years. Currently, the Institute does not print a single course material for students in all programmes run by the Institute since all has been reduced to soft versions for easy download by students. It has also created some permanence in knowledge storage and repositories.

Online Pedagogical Training Sessions for Students

Once the curriculum and course structure are redesigned to fit an E-Learning pedagogical structure, facilitators shift their attention to the students who are perceived as the ultimate drivers of success for any E-Learning approach introduced. On this basis, as students are admitted into the MSc Development Management programme, facilitators through CELT begin 2-3 weeks intensive E-Learning and collaborative learning training sessions for the students before the semester academic work begins. As already stated, the approach used derives from a social constructionist perspective noting that individuals construct their own meanings to social reality based on shared knowledge and assumptions. In this regard, the sessions are designed in such a way that first, previously help perceptions about online teaching and learning are deconstructed and subsequently reconstructed to appreciate the essence of E-Learning and working in a virtual collaborative environment.

During such training sessions, students are first introduced to the technologies used for teaching and learning and the available resources for them in using such technologies for their studies. Emphasis is particularly placed on working together as teams and groups which in many ways run counter to what exist in traditional face to face teaching and learning systems. Students are trained in approaches such as engaging in group discussions and assignments in an online forum, accessing and downloading reading materials on the Virtual Classroom, sharing reading and learning materials with fellow students in the virtual classroom, netiquette in an online teaching and learning environment, submission or hand-In of assignments, Evaluating Courses and facilitators, Messaging, Conferencing, accessing assignment feedback among others. Throughout the training sessions, students and facilitators interact with each other in the Virtual classroom in what is termed as "practice sessions" where students practice all the activities that they are introduced to and taught at the training sessions. Practice tasks are usually given during the training sessions and feedback given. This process, within short period of time builds the confidence of the students in using the technology, debunks their widely held notions and fears about learning in a virtual environment and subsequently generates their interest in using such platforms and technologies for their learning.

Learner Support Systems

However, effective teaching and learning requires very effective Learner support systems that are up to speed and sensitive to disruptions in the E-Learning value chain. Due to the entrenched skepticism about online education in the Ghanaian educational space, ineffective technological and pedagogical processes can easily de-motivate students and other users of the system for teaching and learning and eventually sabotage the smooth operation of the system. Aware of such an existential threat, IDL through CELT has set up a Learner Support Unit made up of facilitators and technicians working on shift basis at the CELT office who respond to students queries and challenges and get them rectified within a short of period time. The technicians typically work on the smooth operations and maintenance of the Virtual classroom platform on daily basis to avoid interruptions to the functioning of the platform likely to affect teaching and learning activities on the virtual classroom. The facilitators on the Learner Support Unit also respond to students' enquiries regarding activities on the Virtual Classroom and provide them with answers, advice or suggestions

to help them use the platform for their academic activities more smoothly. This has ensured that students using the e-learning systems do not get frustrated and ultimately abandons their programmes out of frustrations with use of the system implemented.

However, in the interim, video guides and skits of between 10-15 minutes as well as written manuals on how to use the Virtual Classroom has also been developed and uploaded on the virtual classroom for students to watch and read when they are having challenges on using the various functions on the platform. In this regard, only very complex and extremely technical cases get reported to the Learner Support Unit for rectification and solution. In line with the provision of Learner support systems, the Institute has set up a fully furnished recording studio for the production of audio-visual lecture materials and an ICT Lab where students and facilitators can use to for their various online teaching and learning activities.

Online Teaching and Learning in collaborative ways

Our online pedagogical approach to teaching and learning is mostly student centred. While facilitators are generally the originators of content on the virtual classroom, the students are mostly responsible for generating and sharing knowledge in the teaching and learning process. In this approach, facilitators assign students tasks to perform based on the study guides and allocate students to their respective groups and teams to work together in solving the task. Within stated deadlines, student teams and groups work in a collaborative way through group activities and discussions, knowledge and information sharing, active forum engagements as well as peer review and critique to contributions to shape their activities towards producing assignment documents for submission by the group. As already stated, since each chapter in the study guide correspond to a broad topic of study, facilitators guide the thought processes of the students by pre-recording lectures videos on the topic to be studied and uploads on the virtual classroom. Students play and watch the lecture and read around the topic of study and subsequently join their respective groupings in the course forum and engage each other in solving the tasks or assignments at hand.

Usually, facilitators are to observe the students' online activities and contributions when assignments are given and to take notice of each students contributions towards the assignment and award participation grades appropriately based on their individual contributions. This is to make all students active participants and generators of knowledge in the learning process rather than passive receptors of knowledge. Generally, facilitators do not partake in the discussion that results in submission of group work. Students and their groups are in such group assignments required to figure out the task demands and provide appropriate solutions to them on their own. However, when tasks require only discussions by the groups, facilitators engage the students in the discussions by asking questions to shape the discussions on topic while also answering questions from the students on the topic being discussed. Feedbacks on submitted assignment are supposed are sent back to students within three days so that corrections can be made by the students to help them identify their strengths and weaknesses and make improvements in subsequent assignments. This process creates a feedback loop between the students and the facilitators on course activities for the entire semester.

Grading and Assessments

On students' assessments, grading and assessment of our students' online academic activities and works are somewhat different from what pertains in the traditional face to face teaching and learning approaches. Whiles for instance, face to face class contributions and participation may not be necessarily graded, in our E-Learning approach, all students' contributions and participations are graded and eventually constitute an integral part of the students' final grade for the course at the end of the semester. Group discussions as well as group discussions resulting in the submission of group assignments attract what is termed "Participation Grade" [1]which is simply derived from each student's contribution and participation in the group discussions and group assignments. This grade differs from the assignment grade that is earned after the assignment is graded.

In determining participation grade for instance, facilitators work to predefined set criteria for assessing contributions in an online discussion forum. For example, in a discussion rubric, students are measured by posting on 3 different days by making a minimum of 4 postings in total, one new thread and three thoughtful responses to different members. A typical *A-level* contribution or participation involve those that are made in a timely fashion, giving others an opportunity to respond, are thoughtful and analyze the content or question asked, make connections to the course content and/or other experiences, extend discussions already taking place or pose new possibilities or opinions not previously voiced and if students are aware of the needs of the community, motivate group discussion, and present a creative approach to the topic being discussed. On the contrary, typical F-level or bad contributions are not made in timely fashion, if at all, are superficial, lacking in analysis or critique, contribute few novel ideas, connections, or applications, may veer off topic as well as showing little effort to participate in learning community as it develops. These criteria are strictly applied to the grading of each student's participation in group discussions and discussions leading to group assignments. In submitting assignments, assignments folders are created by facilitators for assignment submissions for each assignment or task given. Submitted assignments are downloaded en masse and graded and feedback sent back to students via the same assignment folder created for the assignment. Not only are assignments submitted through submission folders, multiple choice question assignments are also taken using the virtual classroom platform for conducting multiple choice exams where chosen answers and options are immediately graded for each student and generated as a file for the facilitators perusal and feedback to the students.

Technological Integrations and Pedagogical Approach

On media and technology integration, our current approach is an asynchronous one. Asynchronous approach works for developing country contexts such as Ghana where typical lack of ICT4D[2] infrastructure is largely limited in

deployment. Indeed, sensitivity to the infrastructural limitations of the university especially on matters such as Internet bandwidth means that the asynchronous approach works best in such limitations. The asynchronous approach ensures that all students access online teaching and learning resources and activities throughout the day from different part of the country or even across the world without having to congregate at one particular place on campus or logging in at the same time. In such limited infrastructural environment, synchronous approaches have the tendency to crash the system when the capacity is not adequately supported. Therefore, the asynchronous approach works best in our strategy such that all our students are able to actively participate in their respective course activities on the principle of flexibility and easy access throughout the days.

Again, improvements in mobile telephony technologies have been exploited for our purposes and have served to bring online teaching and learning closer to our students. The compatibility of Moodle Learning platform and ultimately the KNUST Virtual Classroom on Android and Iphone Operating Systems (iOS) for mobile phones ensures that our students are able to access the virtual classroom on their mobile handsets anywhere they have mobile internet connectivity. In this regard, the Institute has been spared the very costly internet provision services for our students since most of our students own internet-based mobile phones that can access their virtual classrooms anywhere across the country and the world. In this sense, students follow course activities and undertake their group and individual's tasks even while on the move. It must however be emphasized that our current technological and pedagogical strategy adopted in delivering context-based online education to students across Ghana and the world generally reflects four critical principles of *Scalability* (i.e. the system must be open to upgrades, either with new technology or expansion of users), *Security* (i.e. able to perform as required with a high sense of security by preventing unauthorised access from without including attacks from viruses, *Performance* (able to perform the tasks required with a high number of multiple users without breaking down) and *Availability* (available for use when required, versatile and resilient).

Course Evaluations and Assessments for Quality Assurance

Another good practice area worth sharing is the integration of an evaluation and assessment of facilitators and their performance feature on the Virtual Classroom for quality assurance purposes. Student feedback on facilitators' performance is considered an integral part of the feedback loop between students, facilitators and the university administration in fine tuning our online education processes and integration in the overall university strategy. However, while students initially were sceptical of such evaluation for fear of victimization by facilitators upon linking their respective responses to the student, the evaluation and assessment feature has been designed to be anonymous such that students' evaluation and assessments cannot be linked or connected to any particular student. Such evaluation and assessment have helped improved our teaching approaches, online presence, provision of student feedback as well as overall course structuring over time as the it has enhanced the continuous auditing of our online teaching and learning approaches.

Collaborative Relationships and Partnerships Building

The successful use of our eLearning approach and technology in delivering good quality education through the MSc Development Management Programme to a sizeable number of Ghanaians from all corners of the country has resulted in the building of a number of collaborative working relationships between the Institute of Distance Learning (IDL) and other educational institutions across the country. Currently, the Ghana Health Service as well as the Ghana Midwifery and Nurses Council have tasked the Institute to conduct their pre-admission exams to the nursing and midwifery colleges across Ghana using the Virtual Classroom platform. Based on our usage of the platform to conduct credible and highly impersonal exams and grading, the platform has been found to be a much better tool to use in assessing students in ways that reflect their very performance without much discretion from highly subjective examiners. In this regard, IDL has been running these exams for the past two years and it is hoped that in subsequent years, the capacities and capability of the technology used would be enhanced to provide more advanced and cutting edge educational resources to many students and institutions in Ghana and other countries across the world.

Outcomes/Impact

Since 2013 when the Institute of Distance Learning (IDL) through its MSc Development programme began the full utilization and adoption of the E-Learning pedagogical approach in online education delivery with the Virtual Classroom, a number of outcomes has been realized even in the midst of glaring financial and logistical challenges that every educational institution face in a developing country context. Even in such challenges, the University through the IDL has withered the storm to a larger extent and ensured that its ambition of providing universal and wide access education to many Ghanaian students who hitherto could not have had access to tertiary education due to limited infrastructural space is realized.

Deconstructing Widely Held Perceptions and Attitudes

A major outcome of our online education pedagogy has been a shift in attitudinal and perceptual suspicions of the possibility of using E-learning approaches to deliver quality education to Ghanaian students over the country. The success achieved over the years it has been noted has influenced many lecturers and students alike in the university community on the relevance of using technology to enhance teaching and learning. These days, it is common to see members of the university community asking if their programmes and courses can be enrolled on the Virtual Classroom platform so they could use that to conduct their lectures, organize assignments and exams as well as disseminating academic resources for their students. Subsequently, a new teaching and learning culture different from the traditional modes of teaching (face to face) is beginning to develop and emerge across the university community as colleges, departments and faculties have realized the possibility of using the approach in admitting more students to their departments in cases where their infrastructural capacity cannot support the growing numbers. This signals the gradual behavioral and attitudinal modification needed to open up the educational opportunity space in Ghana for

many students who ordinarily would have been left behind in educational access.

Programme Migration and Structuring in ICT-supported Modules

Secondly, the successful use of our current eLearning approach has resulted in a massive paradigm shift in the way IDL programmes are run by the institute since 2015. Flowing from the apparent successes we have chocked since 2013 in providing quality tertiary education to many Ghanaian students, the Institute have subsequently migrated all its Bachelors and Masters programmes on the Learning Management System, the Virtual Classroom Platform. On this basis, all lecturers teaching on programmes run by the IDL are as a matter of requirement trained in the E-Learning pedagogies used for online teaching and learning. Subsequently, series of workshops and training sessions are organized periodically for lecturers and even students to improve their knowledge and skills in using the Virtual Classroom as new features and functions are added on periodically.

Increased Students Enrolment

Furthermore, our online education pedagogy has resulted in increased student numbers pursuing varied programmes at the Institute in a short period of time. As already stated, lack of infrastructure to admit the growing numbers of qualified Ghanaian students have been a major setback to educational delivery and expansion in the country for a number of years. Consequently, many qualified students have been left out in terms of access to tertiary education because the limited available spaces could not guarantee them places of offer in the tertiary institutions. Because our online pedagogical approach latently guarantees flexibility by meeting the educational needs of many students across the country, many of the programmes run by the institute has become the preferred programmes of choice for many students since they are guaranteed the flexibility of studying or pursuing a degree while also focusing on other aspect of their social lives such as family and work. The approach minimizes disruptions to one's career and family life as students are able to follow lessons and academic work from any part of the country without having to travel distances and physical boundaries to campus which in many cases is risky and challenging for the students.

Breaking Traditional Barriers to Conventional Education Systems

Again, an important outcome has been the breaking of educational barriers for many women across Ghana. Traditionally, several barriers have impeded women's educational attainment as they continue to joggle between the performance of their productive and reproductive roles (Opoku-Ware, 2014). Difficulties in the concurrent performance of these roles limit women's abilities to pursue higher educational opportunities largely due to inherent socio-structural constraints. Subsequently, our online pedagogical approach has ensured that many women can take up educational opportunities while focusing on their reproductive roles more importantly. The flexibility embedded in the system helps women in particular plan their reproductive lives while also paying attention to the demands of academic work. It is therefore not surprising that over the years, the MSc Development Management programme in particular has recorded huge numbers of married women applicants with burning passion to pursue or further their education with the Institute of Distance Learning.

Improved Students Graduation Turnover

Finally, an important outcome has been the rise in the graduate turnover or graduation rates from the Institute of Distance Learning (IDL) when compared with other traditional departments in the University. Indeed, the apparent blurring of distance and boundaries offered by our current online education approach ensures constant interaction between facilitators and students in terms of feedback and assessments of academic and other research activity. The processes involved are such that feedback is timely and flexible without students having to travel miles across distances to meet their facilitators and academic supervisors in the life-cycle of their academic journey. In this regard, academic work and activities required to obtain a degree is facilitated and enhanced in a timely manner as students do not leave behind too many academic deficits resulting in unnecessary delays in their academic fulfillments. This has resulted in greater number of students taking up the MSc Development Management programme for instance, graduating on time compared to other students who take up programmes in the other departments using the traditional face to face mode of teaching and learning. Consequently, the IDL is able to free more academic spaces and admission slots in providing educational access to many Ghanaians desiring to undertake further studies through our E-Learning approach and online pedagogy.

Conclusion

Delivering education through computer-assisted pedagogies has been advocated in recent times. While deep seated skepticism has been identified as a major challenge towards efforts at integrating computer-based approaches to teaching and learning in developing country contexts such as Ghana, the MSc Development Management (DM) Programme at KNUST's Institute of Distance Learning (IDL) has proven a major breakthrough in educational access and delivery in Ghana's educational system at the tertiary level in the last five years. The computer-based pedagogy employed to teaching and learning has demonstrated the significance of ICT blended educational pedagogies that are sensitive to socio-cultural milieu while breaking the digital divide created by entrenched pessimism and skepticism. Through the approach adopted by the MSc DM programme at IDL, individuals with minimal computer literacy skills eventually get equipped with ICT skills through the hands-on experience they get while pursuing their degrees using the online learning mode. This has contributed immensely towards providing educational access and opportunities to many Ghanaians who hitherto may not have obtained such educational opportunity or access in spite of the numerous infrastructural and technological constraints such as bandwidth capacities which in some ways limit our ability to integrate other functions into our current online pedagogy deployed.

On this basis, it is not surprising that the IDL and its MSc DM programme continues to enjoy many positive reviews

from within and outside the university community, attracting many applicants year on year even without any massive advertisement. Indeed, our students have over the years advertised the programme to others by themselves due to their experiences on the programme and has encouraged other prospective students especially those with very tight work and family schedules to pursue their degrees through the online learning modes employed by IDL's MSc Development Management (DM) programme.

References

- Bjørke, S. A. (2016). E-Teaching and E-Learning. Available on https://eteachingandlearning.wordpress.com/introduction/ [Accessed June 2019].
- Opoku-Ware, J. (2014). Women's Productive and Economic Roles towards Household Poverty Reduction in Ghana: A Survey of Bongo District in Northern Ghana. *Research on Humanities and Social Sciences, 4(19)*, 148-155.
- UNESCO (2002) Open and Distance Learning. Trends, policy and strategy considerations, Division of higher education, Paris. Available at: http://unesdoc.unesco.org/images/0012/001284/128463e.pdf [Accessed June 2019].

[1] *Participation Grade* is the grade students earn by virtue of their contribution to group activities in an online virtual task or assignment. It is awarded according to predefined assessment criteria in an eLearning environment.

[2] **ICT4D** stands for Information Communication Technology for Development

What to consider when teaching online?

Things to consider when teaching online

Things to consider when teaching online

1. Both students and the lecturer should have access to electronic devices and internet.
2. **Ensuring high-quality participation:** It is important for the facilitator to adopt some measures to improve the degree and depth of students' class participation. To encourage participation and learning, students need to be comfortable with the course material, be actively involved and be able to analyse the material (Chen, Lambert & Guidry, 2010).
3. Due to students' characteristics of low concentration in online learning, it is essential for the facilitator to adjust the teaching speed in order to ensure the effective delivery of teaching information.
4. **Provide timely feedback:** Facilitators of online teaching must respond students promptly in the process of teaching online as students feel more engaged with the course when they receive timely feedback (Lear, Ansorge & Steckelberg, 2010; Britt, Goon & Timmerman, 2015; Martin, Wang & Sadaf, 2018).
5. **Accessibility of Course Materials:** Student engagement in online courses is very much dependent on students' ability to access the material (Khan et al., 2017). Students can have access to the course materials through their mobile devices and this can enhance the chances of online teaching and learning success.
6. **Create a Community of Learning:** One of the most important components of online learning is to provide a forum for the development of a community (McInnerney & Roberts, 2004). It is very important to have a statement of clear expectations of the students at the beginning of the course. One way to provide expectations is through the use of a recorded welcome video to the course. This allows students the opportunity to virtually meet you as you set the tone for the course as well as set the stage for student participation and engagement in the course.
7. Communication is critical in an online course. Interaction and communication between the students and between students and lecturer are one of the most important elements of online learning (Boling et al., 2014).
8. **Engaging students through Discussion:** In an online course, discussion is an important component that can determine the success of the course. The success of online discussion largely influences the effectiveness of online courses (Maddix, 2012). Discussions are beneficial for promoting student engagement and developing critical thinking skills. It is critical to provide an environment in online classes that allows a high level of discussion, which at the very least is similar in quality to discussions that take place in a face-to-face classroom. Online discussion allows instructors more time to interact with students without the time restriction imposed by face-to-face-classes.
9. The quantity, difficulty, and length of teaching content should match with the academic readiness and online learning behaviour characteristics of students.
10. Data privacy and security is also essential in online teaching and learning.

Sources / References

Boling, E. C., Holan, E., Horbatt, B., Hough, M., Jean-Louis, J., Khurana, C., ... & Spiezio, C. (2014). Using online tools for communication and collaboration: Understanding educators' experiences in an online course. *The Internet and Higher Education*, *23*, 48-55.

Britt, M., Goon, D., & Timmerman, M. (2015). How to better engage online students with online strategies. *College Student Journal*, *49*(3), 399-404.

Chen, P. S. D., Lambert, A. D., & Guidry, K. R. (2010). Engaging online learners: The impact of Web-based learning technology on college student engagement. *Computers & Education*, *54*(4), 1222-1232.

Khan, A., Egbue, O., Palkie, B., & Madden, J. (2017). Active learning: Engaging students to maximize learning in an online course. *Electronic Journal of E-Learning*, *15*(2), pp107-115.

Lear, J. L., Ansorge, C., & Steckelberg, A. (2010). Interactivity/community process model for the online education environment. *Journal of online learning and teaching*, *6*(1), 71-77.

Maddix, M. A. (2012). Generating and facilitating effective online learning through discussion. *Christian Education Journal*, *9*(2), 372-385.

Martin, F., Wang, C., & Sadaf, A. (2018). Student perception of helpfulness of facilitation strategies that enhance instructor presence, connectedness, engagement and learning in online courses. *The Internet and Higher Education*, *37*, 52-65.

McInnerney, J. M., & Roberts, T. S. (2004). Online learning: Social interaction and the creation of a sense of community. *Journal of Educational Technology & Society*, *7*(3), 73-81.