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E-LEARNING AND ITS EFFECT ON STUDENTS' ACADEMIC PERFORMANCE IN CAMEROONIAN STATE UNIVERSITIES

A Dissertation submitted to the University of Yaoundé 1, Faculty of Education, Department of Curriculum and Evaluation in Partial Fulfillment of the Requirements for the Award of a Masters' Degree in Education.

Specialty: Curriculum Development and Evaluation

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DECLARATION

The project entitled "**E-LEARNING AND ITS EFFECTS ON STUDENTS' PERFORMANCE IN CAMEROONIAN STATE UNIVERSITIES**" has been written by NJOBAM CYNTHIA YUFELA (MATRICULE 19P3872).

This project is my endeavor and borrowed ideas have been acknowledged and referenced.

Signature

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DEDICATION

This piece of work is dedicated to my mother, Njobam Florence, My husband, Ndzi Nfor and to my siblings.

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I would like to express my sincere gratitude to all those who have contributed to the completion of my thesis during my time at the University of Yaoundé 1. Their unwavering support and assistance have been invaluable, and I am deeply appreciative of their efforts.

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To my beloved family words cannot adequately express my appreciation for their unwavering support, both financially and emotionally.

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LIST OF ACRONYMS

COVID 19:	Coronavirus Disease of 2019
E-learning:	Electronic Learning
FSE:	Faculty of Education
GMET:	Google Meet E-learning Technology
GPA:	Grade Point Average
ICT:	Information and Communication Technology
ICTE:	Information and communication Technologies in Education
LMS:	Learning Management Systems
MAC:	Media Access Control
MCQs:	Multiple choice questions
MINEDUB:	Ministry of Basic Education
MINESEC:	Ministry of Secondary Education
MINESUP:	Ministry of Higher Education
MOOCs:	Massive open online courses
OCL:	Online Collaborative learning
OCLS:	Online Collaborative Learning Strategy
OECD:	Organization for Economic Co-operation and Development
PLATO:	Programmed Logic for Automated Teaching Operations
SEPT:	Science education performance test
SPSS:	Statistical product for service solution
UICOMP:	University of Illinois College of Medical Peorra
UNESCO:	United Nations Educational Scientific and Cultural Organisation

ABSTRACT

The advent of the COVID-19 pandemic has significantly disrupted traditional modes of education delivery, leading to concerns about students' poor academic performance in Cameroon state universities. This study examines "E-learning and its effects on students' performances in Cameroonian state universities." The research questions focus on the extent to which e-notes, e-assignment, e-collaboration, and video conferencing affect students' performance. The study adopted a descriptive survey design and employed a quantitative approach to collect and analyze data. A sample size of 310 master's students from the Faculty of Education in the University of Yaoundé 1 and University of Buea was selected through simple random probability sampling. The instrument for data collection adopted in this study was a structured questionnaire. The findings of the study on the effects of e-learning components, including e-notes, e-collaboration, e-assignments, and video conferencing, suggest positive impacts on students' performances. E-notes and lectures provided easy access to course materials and contributed to students' understanding, although some students still preferred traditional handwritten notes. E-collaboration enhanced learning experiences by promoting knowledge sharing and critical thinking, but challenges such as unequal participation and a preference for physical collaboration need to be addressed. While e-assignments facilitated timely submissions, most students did not believe they improved their performance compared to traditional methods, emphasizing the importance of effective feedback. Video conferencing-maintained classroom community and interaction, positively influencing students' attitudes, although its effect on academic performance was relatively low. The study recommends that educators and policymakers in Cameroon should design e-learning courses that are engaging and interactive, and provide support to students to ensure they are able to succeed in online environments. A balanced approach accommodating diverse learning preferences is also recommended, along with promoting effective e-collaboration practices and providing constructive feedback.

Key words: E-learning, students' academic performance, effects, state universities.

RÉSUMÉ

L'avènement de la pandémie COVID-19 a considérablement perturbé les modes traditionnels de prestation de l'éducation, suscitant des préoccupations quant à la mauvaise performance académique des étudiants dans les universités d'État du Cameroun. Cette étude examine "L'apprentissage en ligne et ses effets sur les performances des étudiants dans les universités d'État camerounaises". Les questions de recherche se concentrent sur l'ampleur de l'impact des notes électroniques, des devoirs électroniques, de la collaboration électronique et des vidéoconférences sur les performances des étudiants. L'étude a adopté une conception d'enquête descriptive et a utilisé une approche quantitative pour collecter et analyser les données. Un échantillon de 310 étudiants de master de la Faculté d'éducation de l'Université de Yaoundé 1 et de l'Université de Buea a été sélectionné par échantillonnage aléatoire simple. L'instrument de collecte de données adopté dans cette étude était un questionnaire structuré. Les résultats de l'étude sur les effets des composantes d'apprentissage en ligne, notamment les notes électroniques, la collaboration électronique, les devoirs électroniques et la vidéoconférence, suggèrent des impacts positifs sur les performances des étudiants. Les notes électroniques et les cours ont permis un accès facile aux matériaux de cours et ont contribué à la compréhension des étudiants, bien que certains préfèrent encore les notes manuscrites traditionnelles. La collaboration électronique a amélioré les expériences d'apprentissage en favorisant le partage des connaissances et la pensée critique, mais des défis tels que la participation inégale et une préférence pour la collaboration physique doivent être abordés. Bien que les devoirs électroniques aient facilité des soumissions en temps opportun, la plupart des étudiants ne croyaient pas qu'ils amélioraient leurs performances par rapport aux méthodes traditionnelles, soulignant l'importance d'un feedback efficace. La vidéoconférence a maintenu la communauté et l'interaction en classe, influençant positivement les attitudes des étudiants, bien que son effet sur les performances académiques soit relativement faible. L'étude recommande que les éducateurs et les décideurs au Cameroun conçoivent des cours d'apprentissage en ligne engageants et interactifs, et fournissent un soutien aux étudiants pour s'assurer qu'ils sont capables de réussir dans les environnements en ligne. Une approche équilibrée qui prend en compte les préférences d'apprentissage diverses est également recommandée, ainsi que la promotion de pratiques efficaces de collaboration électronique et la fourniture d'un feedback constructif.

Mots-clés: Apprentissage en ligne, performance académique des étudiants, effets, universités d'État.

CHAPTER I

INTRODUCTION

E-learning has been rapidly emerging in a variety of higher education organizations worldwide, both private and public. Many higher schools are mindful of the effect of e-learning on the academic success of students (Zolochevskaya, 2021). Alameri et al., (2020) presented several socio-economic and pedagogical factors that have driven higher institutions to adopt e-learning such as greater information access; greater communication via electronic facilities; synchronous learning; increased cooperation and collaboration, cost-effectiveness. Traditional learning was a very popular method of learning in the world up until the 2000s. With the advent of the internet, many educational systems have replaced traditional learning with e-learning also known as distance learning. E-learning platforms were adopted following the outbreak of the COVID 19 pandemic that led to the closure of schools, consequently, many schools had to adopt different methods of learning to enhance learning out of the classroom (Noah & Gbemisola, 2020). Educational institutions had to search for innovative digital tools that could be used in the continuation and improvement of learning and performance. One of such tools that could be adopted to enhance learning and to engage students is Google classroom (Noah & Gbemisola, 2020). Several schools adopted digital technologies such as Google classroom, WhatsApp groups and emails of parents through which they sent lesson notes and other assignments to pupils and students (Cameroon tribune, 2020). Google classroom is an interface portal devised by Google companies as an online educational platform that enables teachers to design classes, distribute assignments, post announcements, send feedback, upload course materials for students to look and interact with mates and instructors via class stream or by email (Hemrungrote et al. 2017)

BACKGROUND OF THE STUDY

The Background of the study sets the context and provides a rationale for why the research is important and relevant. It explains why it is important and relevant to study, and outlines the key research questions and objectives.

The background of this study composes of: Historical background, Contextual background, Theoretical background, problem of the study, Research questions/hypotheses, justification of the study Significance of the Study, scope of the study and operational definition of terms.

Historical Background

The roots of e-learning can be traced back to the early 1960s, when the first computer-based training programs were developed (Clark, 2001). The first computer-based training program was developed in the early 1960s by Donald L. Bitzer at the University of Illinois. The program was called Programmed Logic for Automated Teaching Operations (PLATO) and it allowed students and teachers to use graphic terminals and TUTOR, an educational programming language to users through electronic notes. (Bitzer et al., 1962). Originally, the first online learning systems were set to deliver information to students but in the 70s they started becoming interactive. In the 1970s and 1980s, the development of personal computers and the internet paved the way for new forms of e-learning (Rosenberg, 2001). Personal computers began with the first MAC in the 1980's. This enhanced learning specific subjects and acquiring certain skills. By the 90s several schools had been set up that delivered purely online courses making most of the internet and resolving the problems of geographical and time constraint. According to Sander Tamm, "the first online school, Compu High was established in 1994. It served U.S nationals and international English-speaking students from grade 9 through 12" (Tamm, 2015). In the late 1990s, Learning Management Systems (LMS) were developed to manage and deliver online courses. These systems made it possible to track student progress, provide feedback, and administer assessments.

Businesses in the 2000s began using e-learning to train their employees and the rise of mobile devices and wireless technology further revolutionized e-learning, making it possible for learners to access educational materials from anywhere, at any time (Weller, 2014). With the emergence of Massive Open Online Courses (MOOCs) in the

mid-2000s, accessing courses from top universities and institutions worldwide became possible for anyone with an internet connection (Siemens, 2005).

Today, e-learning is a rapidly growing field, with a wide range of online courses, degree programs, and professional development opportunities available to learners of all ages and backgrounds. The COVID-19 pandemic has also accelerated the adoption of e-learning, as schools and universities around the world have had to rapidly transition to online learning to keep students safe.

Contextual Background

In Cameroon, the use of e-learning in the higher education system has been on the rise in recent years, with several universities and institutions of higher learning adopting various e-learning technologies and platforms to deliver education to their students. The integration of e-learning into the higher education system has been acknowledged by the government of Cameroon as a potential solution to the challenges faced by the system, and measures have been taken to support its implementation.

In the Education and training strategy document (2013-2020), one of the solutions to the Cameroonian Education system challenges was to expand the use of ICT in education and training by;

- Encouraging new opportunities and new training tools such as e-learning, distance learning, tutorials, and many others.
- Improving the learning environment in schools.
- Enhance the capacity of teachers and support staff to use computer tools and digital teaching resources.

Also, other actions have been put in place to promote the integration of ICT in Cameroonian universities which include:

An implementation framework agreement with the technical and financial support of the People's Republic of China which was signed on June 18, 2015 in Beijing by the Cameroonian Minister of Economy, Planning and Regional Development and the Chinese Minister of Commerce in the presence of the Cameroonian Prime Minister, Head of Government. This was done in an attempt to ensure the digital transformation of Cameroonian universities in conformation with futuristic project: E-National Higher Education Network set up by the Head of State, His Excellency Paul Biya. The E-national Higher Education Network Project was launched. This New Governance Policy implemented by the Government, aimed at on the one hand to give a better cybernetic

visibility to the Cameroonian universities and, on the other hand to allow the appropriation and the generalization of the new modes of teaching and learning based on the ICTE (E-Learning). The E-National Higher Education Network project is the first phase of the process of building the Digital University of Cameroon. Its purpose is: a) the establishment in State Universities of high-performance material (computer and telecommunications networks, data centres) and immaterial (e-administration and e-learning) infrastructures, b) the facilitation of student access to digital terminals and, c) the development of skills essential to the digital transformation of the Cameroonian University. (MINESUP, 2020).

In 2016, the President of the Republic of Cameroon donated 500,000 computers to students in both state and private universities as part of the e-National Higher Education Network project. Other initiatives introduced as a means to enhance learning in schools include the use of mobile phones and distributions of computers. Also, State universities in Cameroon have established computer and technology centers that provide students with easy access to the internet for research and study purposes. In addition, some universities have implemented learning management systems and virtual learning environments to facilitate online learning and enhance the learning experience of students. (Mbakwa, 2019).

Following the outbreak of COVID-19 Pandemic, several measures were initiated by the Cameroon government such as the use of distance learning platforms, TV/ radio and communication tools. Distance teaching and learning tools were adopted to compensate for the cessation of “Live” teaching by the MINEDUB, MINESEC, and MINESUP. (Beche, 2020)

The Ministry of Higher Education and the Cameroon Telecommunication Corporation, CAMTEL signed a partnership agreement on September 8, 2020, in Yaoundé, for the provision of bandwidth higher enough to interconnect state universities and the Congo-Cameroon Inter-State University of Sangmelima. This was done in order to ease distance learning in state Universities during this period of COVID19 and after. The Minister of State, Minister of Higher Education Prof. Jacques Fame Ndongo signed on behalf of the government and the Director General of CAMTEL, Judith Yah Sunday for the Company she is heading. (CRTV, 2020; Business in Cameroon, 2020) This framework agreement which contributed to the fight against the spread of COVID-19 and its social and economic repercussions in the higher education sub-sector, aimed at providing electronic communications services to state universities. For the MINESUP,

this agreement was another step taken towards the "E-National Higher Education" project. (Business in Cameroon, 2020)

Despite the efforts to integrate e-learning into the higher education system in Cameroon, there are still challenges such as limited internet access and bandwidth, inadequate infrastructure, and limited resources for training and support. However, with the increasing demand for higher education and the potential of e-learning to provide flexible and accessible education, the use of e-learning is expected to continue to grow in Cameroon's higher education system.

Theoretical Background

This study is grounded on the Cognitive Theory of Multimedia Learning by Dr. Richard E. Mayer, Socio Constructivism Theory by Lev Vygotsky, and Online Collaborative Learning Theory by Linda Harasim.

Cognitive Theory of Multimedia Learning by Dr. Richard E. Mayer (1997)

The cognitive theory of multimedia learning, developed by Dr. Richard E. Mayer, is grounded in cognitive psychology and information processing theory. The Cognitive Theory of Multimedia Learning is grounded in cognitive psychology, which explores how individuals acquire, process, and organize information. Drawing upon key theoretical foundations, this theory incorporates the following principles:

Dual Coding Theory: According to this theory, proposed by Allan Paivio, humans have separate channels for processing verbal and visual information. By leveraging both verbal and visual formats, multimedia learning enhances comprehension through dual processing.

Cognitive Load Theory: Developed by John Sweller, this theory focuses on the limitations of working memory and emphasizes the management of cognitive load during learning. It suggests that instructional design should consider intrinsic cognitive load (complexity of the material), extraneous cognitive load (related to instructional design), and germane cognitive load (mental effort required for learning).

Constructivism: Aligned with the work of Jean Piaget and Lev Vygotsky, constructivism asserts that learners actively construct knowledge based on their experiences and interactions with the environment. It underscores the significance of learner engagement and the connection of new information to existing knowledge for effective learning.

Constructivism by Lev Vygotsky (1978)

Constructivism draws its theoretical foundation from the writings of prominent psychologists and educational thinkers, including Jean Piaget and Lev Vygotsky. Constructivism is predicated on the idea that students actively create meaning and knowledge via their interactions, experiences, and thought processes. Important elements of the theoretical framework consist of:

The Theory of Cognitive Development by Jean Piaget highlighted how learners actively create knowledge through cognitive processes including accommodation and assimilation. The four phases of cognitive development he proposed—sensorimotor, preoperational, concrete operational, and formal operational—describe how people's comprehension and thought processes change as they engage with their surroundings.

The Socio-Cultural Theory of Lev Vygotsky places a strong emphasis on the social and cultural dimensions of learning. He suggested that social interactions are the primary means of learning and that people pick up information and skills through working with others who are more experienced. The Zone of Proximal Development (ZPD), which is the difference between a learner's present abilities and their potential abilities with the assistance and supervision of a more knowledgeable person, was first proposed by Vygotsky.

THE STATEMENT OF THE PROBLEM.

The poor academic performance of students in Cameroon has emerged as a pressing issue of concern for the government, parents, and educational institutions. In higher education, achieving optimal academic outcomes is vital for personal development, institutional success, and societal advancement. However, the COVID-19 pandemic has posed significant challenges to traditional education methods, leading to a decline in student performance within state universities in Cameroon (Sigimi et. al, 2022). This decline not only affects students themselves but also has broader implications for educational institutions and society as a whole.

The ideal scenario would involve universities implementing effective measures and strategies to enhance student academic performance. These measures would encompass proactive administrative initiatives that prioritize student support, innovative teaching approaches, and efficient learning management systems to facilitate the educational journey. By adopting such measures, universities can foster an environment conducive

to improved student outcomes. However, the current reality reveals a substantial disparity between the desired and actual student performance, particularly in the context of the COVID-19 crisis. The pandemic has disrupted traditional teaching methods, resulting in reduced student engagement, motivation, and learning outcomes (Béché, 2020; Isidore and Kibinkiri, 2023). This concerning decline in academic performance calls for a comprehensive investigation to identify the underlying factors and understand their consequences. The experiences during the COVID-19 crisis have highlighted the challenges associated with traditional, in-person instruction, which contribute to the decline in student academic performance. This raises the question of finding alternative approaches to enhance student learning.

Therefore, this study proposes the utilization of e-learning and aims to examine the effects of e-learning on student performance within state universities in Cameroon. By investigating the impact of e-learning methods and strategies on academic outcomes, this research endeavors to provide valuable insights and recommendations to improve student performance, inform policy decisions, and foster a more resilient and effective educational system in the face of future challenges.

General Research Question of the study

The main research question is "What is the effect of E-learning on students' performance in Cameroon state universities?"

Specific Research Questions of the study

The specific questions are as follows:

- To what extent can e- notes affect students' performance?
- What effect does e- assignment have on students' performance?
- What is the effect of e- collaboration on students' performance?
- In what ways can video conferencing affect students' performance?

General Objective of the study

The main purpose of this study is "To examine the effect of e-learning on students' performance in Cameroon state universities."

Specific Objectives of the study

The specific objectives are as follows:

- To examine the effect of e- notes on students' performance.
- To investigate the effect of e- assignment on students' performance.
- To analyze the effect of e- collaboration on students' performance.

- To evaluate the effect of the use of video conferencing on students' performance.

General Hypothesis

Ha: E-learning significantly affects students' performance.

H0: E-learning does not significantly affect students' performance.

Specific Research Hypothesis

Ha: E- notes and lectures significantly affect students' performance.

H0: E-notes and lectures do not significantly affect students' performance.

H1: E- assignment significantly affects students' performance.

H0: E-assignment does not significantly affects students' performance.

H2: E-collaboration significantly affects students' performance.

H0: E-collaboration does not significantly affect students' performance.

H3: Video conferencing has an effect on students' performance.

H0: Video conferencing does not have an effect on students' performance.

JUSTIFICATION OF THE STUDY

This study on the "Effects of e-learning on student performance in Cameroon's state universities" is justified due to the urgent need to address the challenges faced by the education system, the potential of e-learning to enhance academic outcomes, and the broader societal impact of students' performance. The findings of this study can provide valuable insights and recommendations for policymakers, educators, and stakeholders to improve the quality of education and ensure the success of students in Cameroon.

SIGNIFICANCE OF THE STUDY

The study on the effects of e-learning in Cameroonian state universities is significant for several reasons which include:

To Policy Makers

This study is significant because enhancing e-learning in higher institutions would facilitate teaching and learning in all sectors of education as a whole. The study would help with policy decisions related to the implementation of e-learning in state universities in Cameroon. Having a clear understanding of the benefits and drawbacks of e-learning would enable policy makers make informed decisions about the distribution of resources and the development of policies that support the integration of e-learning into the educational system.

To Administration and Teachers

This study can assist administrators and teachers in designing and delivering curriculum that maximizes the benefits of e-learning. It will enable them identify the areas where e-learning is most effective and design instructional approaches that leverage the strengths of e-learning to enhance student learning outcomes. It can also enable the development of appropriate assessment methods and criteria specific to e-learning, allowing teachers to monitor student progress, identify areas of improvement, and provide feedback.

To Students

The study is important to students as it will enable them enhance their learning experience. By identifying the strengths and limitations of e-learning, students can adapt their study habits, use effective online resources and engage in strategies that align with their learning styles and preferences, thereby maximizing their learning outcomes.

To Future Researchers

This study is important to future researchers as it will significantly contribute to the current literature on e-learning and its effects on students' performance. The findings of this study will be useful to future researchers who are interested in further exploring the effects of e-learning on education. This will enable them generate new ideas to ease the integration of e-learning into the learning process.

The study will contribute in developing Cameroon at large as it will encourage and enable the integration of innovative technologies in education to enhance learning.

SCOPE OF THE STUDY

Geographical Scope

The geographical scope of this study would be limited to the University of Yaoundé 1 and the University of Buea. The choice of the above universities is because both universities use Google classroom as a method of e-learning and are also more accessible to the researcher. This study will be further delimited to the Faculty of Education, specifically to masters' students. The choice of masters' students is guided by the fact that the Faculty of Education in Yaoundé 1 only had the graduate and post-graduate program at the time this research was conducted. Other faculties in these universities won't be considered due to time and financial constraints. Using a larger sample would have required larger financial resources which could not be afforded.

Content Scope

The content scope of this study would be limited to reviewing the following variables: e-learning, e-notes, e-assignment, e-collaboration and their effects on academic performance.

Methodology Scope

This methodology scope of this study would be limited to a Descriptive survey design and a Quantitative approach would be applied.

OPERATIONAL DEFINITION OF TERMS

E-LEARNING

Kibinkiri, (2014) defines e-learning "as a modern strategy or method of teaching and learning which involves Computer-Based Direct Instruction (CBDI) – direct instructions for example, lectures, demonstrations and illustrations facilitated or enhanced by ICTs."

Clark and Mayer, (2011) defines e-learning as "instructions delivered through digital devices with the intent of supporting learning."

This study defines E-learning as the use of digital technologies such as online platforms, video conferencing tools and learning management systems in education to strengthen the learning process and structure in order to improve students' learning and academic performance.

ACADEMIC PERFORMANCE

Narad and Abdullah (2016) define academic performance as “the educational goal to be achieved by a student over a certain period and is measured either by examinations or continuous assessments and the goal may differ from one person to another.”

According to the UNESCO Institute for Statistics, academic performance refers to “the knowledge, skills, and competencies students have acquired through their educational experiences, as demonstrated by their performance on assessments, tests and other measures of learning.”

In this study, Students’ Academic performance refers to the measurement of students’ achievement across various academic subjects using measurable indicators such as participation, timeliness, attendance, overall academic progress and standardized tests scores.

Effects is referred to as the outcomes or consequences of a particular action or phenomenon, which can be positive, negative, or neutral.

State Universities are universities owned and operated by the government of a particular state or region, and are typically funded through public sources such as taxes and tuition fees.

CHAPTER II

LITERATURE REVIEW

This section involves analyzing, evaluating, and summarizing scholarly literature (typically journals and articles) related to my topic. This chapter will lay emphasis on conceptual review, Empirical Review by objectives, theoretical review and summary of the chapter.

CONCEPTUAL REVIEW

In this section, we will examine several important concepts related to E-learning and its effects on students' performance. Reviewing these concepts is essential for gaining insights to the impact of e-learning initiatives in the educational context. The concepts to be reviewed are: e-learning, academic performance, e-assignment, e-collaboration, e-notes and video conferencing. These concepts will be reviewed below:

E-learning

E-learning has emerged as a new form of learning, facilitated by electronic communication systems such as the internet. Many educational institutions worldwide have recognized the significance of e-learning, as it has significantly transformed the teaching and learning methods in higher education.

The definition of e-learning has been subject to debate and varies among different authors and researchers. Here are various definitions provided by scholars:

The OECD (2005) defines e-learning as the utilization of information and communication technologies in educational processes to support and enhance learning. This includes using technology as a complement to traditional classrooms, online learning, or a combination of both.

Arkorful and Abaidoo (2015) define e-learning as the use of information and communication technologies to enable access to online teaching and learning resources.

Clark and Mayer (2016) view e-learning as instructional content delivered through digital devices with the aim of supporting learning.

Moore Dickson-Deane and Galyen (2011) conceptualize e-learning as any form of electronically supported or mediated learning and teaching.

Urdan and Weggen (2000) define e-learning as the delivery of content through electronic media, encompassing the internet, intranets, extranets, satellite, broadcast, audio/video tape, interactive TV, and CD-ROM.

Oye, Salleh, and Iahad, Zaid (2009) describe e-learning as a unifying term that encompasses online learning, web-based training, and technology-delivered instructions.

Khan (2005) defines e-learning as an innovative approach that delivers well-designed, learner-centered, interactive, and facilitated learning environments utilizing various digital technologies and learning materials suitable for open, flexible, and distributed learning.

Arasteh et al. (2014) consider e-learning as a method that enables individuals, especially students, to access courses remotely as long as they have internet access and other relevant platforms.

Laurillard (2004) describes e-learning as the interaction in which students utilize various information and communication technologies in their learning processes.

Franklin and Nahari (2018) define e-learning as web-based learning, online learning, distributed learning, computer-assisted instruction, or internet-based learning.

Tavangarian et al. (2004) define e-learning as the adoption of electronic media to facilitate the teaching and learning process. In summary, e-learning refers to the utilization of electronic communication technologies and digital devices to support and enhance learning experiences. It encompasses a wide range of approaches, methods, and resources that enable remote access to educational materials and interactions between learners and instructors.

Types of E-learning

Under the classification provided by Algahtani (2011) and Negash and Wilcox (2008), e-learning can be categorized into several types:

Computer-Based Learning: This type of e-learning involves using hardware and software for communication and learning purposes.

Internet-Based Learning: Internet-based learning builds upon computer-based learning by making learning content available on the internet. It includes links to related knowledge sources that learners can access anytime and anywhere.

Asynchronous E-Learning: Asynchronous e-learning does not require real-time interaction between instructors and learners. It allows learners to access learning materials and complete activities at their own pace and convenience. Examples include self-paced online courses, pre-recorded lectures, discussion forums, and online reading materials.

Synchronous E-Learning: Synchronous e-learning involves real-time interaction between instructors and learners, simulating a traditional classroom experience. It utilizes tools such as video conferencing, webinars, and live chat to facilitate communication and collaboration. Synchronous e-learning allows for immediate feedback, live discussions, and active participation.

Blended Learning: Blended learning combines online and in-person instructional methods. It integrates face-to-face classroom sessions with online learning components. Blended learning provides flexibility and personalized learning while still allowing for direct interaction and socialization. It often includes a mix of online modules, virtual discussions, and in-person activities.

Mobile Learning (M-Learning): M-learning leverages mobile devices such as smartphones and tablets to deliver educational content. It allows learners to access learning materials anytime and anywhere, making learning more convenient and accessible. M-learning can include mobile apps, educational games, podcasts, and multimedia resources designed specifically for mobile devices.

Gamification and Game-based Learning: Gamification and game-based learning incorporate game elements and mechanics into the learning process. Gamification uses game-like features to motivate and engage learners, while game-based learning involves using educational games or simulations as the primary learning medium.

Virtual Reality (VR) and Augmented Reality (AR) Learning: VR and AR technologies create immersive and interactive learning experiences. VR places learners in a simulated virtual environment, while AR overlays digital information onto the real-world

environment. These technologies enhance understanding through visualization and interactivity.

Self-paced Learning: Self-paced learning allows learners to take control of their learning process. They set their own goals, progress at their own speed, and choose resources and materials that suit their needs. Self-paced learning can be facilitated through online courses, learning management systems, and digital libraries.

Face-to-Face E-Learning: Face-to-face e-learning combines traditional face-to-face instruction with online technologies. Learners and instructors interact in real-time through video conferencing or live streaming platforms. It enables synchronous learning, immediate feedback, and dynamic discussions.

It's important to note that these types of e-learning can overlap and be combined in various ways to create more effective and engaging learning experiences. The choice of e-learning types depends on factors such as learning objectives, content, target audience, and available resources.

Aspects of e-learning that are key to this study and form the basis of the objectives include E-Collaboration, E-Notes, E-Assignment, and Video Conferencing.

E-Collaboration:

E-collaboration, as defined by Kibinkiri (2014), is the application of technology to extend and enhance the collaborative capabilities of individuals, regardless of their physical location, enabling them to effectively work together. It encompasses the use of electronic communication and collaboration tools that facilitate teamwork and communication among individuals or groups. Common examples of E-collaboration tools include email, video conferencing, and instant messaging, which enable real-time communication and collaboration, irrespective of geographical barriers.

The implementation of E-collaboration offers numerous advantages. One of the key benefits is improved communication and collaboration among team members. By leveraging electronic tools, individuals can easily share information, exchange ideas, and coordinate their efforts, leading to more effective collaboration and enhanced productivity. Additionally, E-collaboration can result in cost reduction, as it eliminates the need for physical meetings or travel expenses associated with traditional face-to-

face collaboration. This not only saves time but also contributes to a more environmentally sustainable approach to working together.

Moreover, E-collaboration plays a significant role in enhancing efficiency. By leveraging digital tools, individuals can access and retrieve information quickly, collaborate on projects in real-time, and streamline workflows. This efficiency boost enables teams to accomplish tasks more effectively, meet deadlines, and adapt to changing circumstances with greater agility.

From an educational perspective, the ability to collaborate effectively in online environments has become increasingly important. As Bates (2005) highlights, it is a crucial skill for the modern workplace. E-collaboration provides students with valuable opportunities to engage in shared learning experiences, foster teamwork, and cultivate their creativity, all without the constraint of physical presence. It allows learners to work collaboratively on projects, share resources, provide feedback, and engage in discussions, regardless of their location. This fosters a sense of community and encourages active participation, creating a rich and dynamic learning environment.

However, it is important to note that effective collaboration in online settings requires clear communication and guidelines. Due to the absence of non-verbal cues and face-to-face interactions, establishing clear expectations, guidelines, and protocols becomes essential. These guidelines should address aspects such as communication etiquette, task allocation, deadlines, and conflict resolution mechanisms. When properly implemented, these guidelines can help mitigate potential challenges and ensure productive and harmonious collaboration.

E-Assignment:

E-assignment refers to the utilization of technology to assign, submit, and assess academic tasks. With the increasing prevalence of digital devices and online platforms, the adoption of E-assignment has gained significant popularity in recent years.

As highlighted by Nuraeni et al. (2021), there are several benefits associated with using tools like Edmodo for assignment submission. One key advantage is the ability for students to receive instant feedback from teachers, enabling them to gain timely insights into their performance and make necessary improvements. E-assignment also facilitates

timely submission of assignments, as students can conveniently submit their work online, eliminating the constraints of physical submission locations.

Furthermore, the flexibility offered by E-assignment allows students to complete their tasks from anywhere, as long as they have access to the necessary application on their mobile devices. This flexibility promotes self-paced learning and accommodates different learning styles. Additionally, E-assignment provides opportunities to incorporate multimedia elements into the assignments. This enables more engaging and interactive tasks, such as video presentations or audio recordings. By leveraging multimedia, students can enhance their creativity, communication skills, and presentation abilities. This approach adds a dynamic and interactive dimension to the learning experience, fostering deeper engagement and understanding.

Video Conferencing:

Video conferencing can be described as a form of synchronous and interactive communication that facilitates the transfer of voice, video, and data between multiple locations through dedicated communication lines (Gough, 2006). In recent years, the use of video conferencing has skyrocketed, particularly in the context of remote work and online education.

The advantages of video conferencing are numerous. Firstly, it eliminates the need for physical travel, thereby reducing costs and time constraints associated with traditional face-to-face meetings. This aspect has been particularly beneficial in the realm of education, as it enables learners and instructors to connect from different locations without the need for physical classrooms. As a result, video conferencing contributes to increased accessibility and inclusivity, allowing individuals to participate in educational activities irrespective of their geographic location.

Moreover, video conferencing enhances productivity by facilitating real-time collaboration and communication. It enables participants to interact and engage with each other as if they were in the same physical space. This fosters a sense of presence and enables instant feedback and clarification, promoting efficient decision-making and problem-solving. The ability to see and hear each other also helps to establish a stronger sense of connection and social presence among participants.

However, video conferencing is not without its challenges. Technical issues, such as unstable internet connections or audio/video quality problems, can hinder the effectiveness of the communication. Moreover, the absence of non-verbal cues and body language can make it challenging to interpret participants' intentions or reactions accurately. To mitigate these challenges, it is important to provide technical support, establish clear communication protocols, and encourage participants to be mindful of their communication styles and active engagement during video conferences.

E-Notes:

E-notes, also known as electronic lecture notes, have emerged as a tool to enhance active learning experiences for students. They provide an alternative to traditional note-taking methods and leverage technology to support and augment the learning process.

One of the primary benefits of e-notes is that they address the challenges associated with traditional note-taking. Instead of spending valuable time transcribing information, students can focus on actively listening and engaging with the material being presented. This shift in attention from note-taking to understanding promotes active learning, as students are encouraged to think critically, analyze concepts, and participate in class discussions.

E-notes also enhance attentiveness during lectures. With the use of digital devices, students can easily follow along with the lecture slides or materials provided by the instructor. This accessibility eliminates the need to scramble to keep up with the instructor or copy information from a whiteboard, allowing students to concentrate on comprehending the content.

Furthermore, e-notes facilitate reflective thinking. Students can easily revisit and review their notes, reinforcing their understanding and connecting concepts across different topics or courses. The digital format enables quick information retrieval, enabling students to search for specific keywords or concepts. This feature contributes to self-paced learning, as students can revisit their notes at any time, even outside the classroom.

In conclusion, E-collaboration, E-assignment, video conferencing, and e-notes are integral aspects of e-learning that have revolutionized the educational landscape. These tools and approaches facilitate effective collaboration, enable flexible assignment

submission and assessment, foster real-time communication and engagement, and enhance active learning experiences. By leveraging these technological advancements, educators and learners can create a more inclusive, dynamic, and interactive learning environment that promotes knowledge acquisition and skill development.

Advantages and Disadvantages of E-learning:

E-learning has become an inevitable trend in the education sector worldwide, with many institutions adopting e-learning methods for instruction. Previous studies have highlighted several advantages and disadvantages of implementing e-learning technologies in university education (Raspopovic et al., 2017).

Advantages of E-learning:

One of the key advantages of e-learning is its flexibility in terms of time and space (Smedley, 2010). Learners can access educational materials and participate in courses at their own convenience, breaking the barriers of traditional classroom settings. This flexibility allows individuals to study from any location and at their own pace, accommodating diverse schedules and personal commitments. Additionally, e-learning provides opportunities for people with disabilities or those in remote areas to access education and expand their learning opportunities (Brown, Cromby, & Staden, 2001; Rawashdeh et al., 2021).

Another advantage is that e-learning enables students to focus more on the course content, without being distracted by issues such as parking or traffic (Thomson, 2010). Additionally, e-learning eliminates schedule restrictions, allowing lessons to last as long as needed in the virtual space (Thomson, 2010).

The integration of e-learning technologies has also contributed to cost savings and improved the quality of education. Institutions can reduce the expenses associated with physical infrastructure, textbooks, and other resources, making education more affordable and accessible (Songkram, 2015). Moreover, e-learning often incorporates multimedia elements, interactive exercises, and gamification, enhancing student engagement and comprehension of the subject matter.

Furthermore, e-learning facilitates self-paced learning, allowing individuals to progress at their own pace and speed (Codone, 2001; Marc, 2002; Klein & Ware, 2003; Algahtani, 2011). This flexibility encourages lifelong learning by removing physical

and perceived barriers of higher education (Serwatka, 2002). E-learning also facilitates multitasking, as students can pursue their personal objectives and maintain their careers without being subjected to rigid schedules (Borstoff & Lowe, 2007).

E-learning enhances opportunities for enrollment, particularly for students who cannot access traditional educational institutions (Alenezi, 2011). Learners in rural or small districts can actively participate in courses that may not be otherwise available to them (Chaney, 2001; Radu, Radu, & Croitoru, 2015). This helps bridge the gap between privileged and non-privileged individuals, providing equal learning opportunities for all (Radu, Radu, & Croitoru, 2015).

Furthermore, e-learning platforms often provide opportunities for collaboration and interaction among learners through discussion forums, virtual classrooms, and group projects, fostering a sense of community and facilitating knowledge sharing.

Disadvantages of E-learning:

Despite the numerous benefits, there are also some disadvantages associated with e-learning. One drawback is the lack of face-to-face interaction and reduced social engagement compared to traditional classroom settings. (Arkorful & Abaidoo, 2014). Some learners may struggle with a sense of isolation or decreased motivation in the absence of physical interactions with instructors and peers. Additionally, the lack of peer interaction can negatively impact certain aspects of the learning process that rely on social and emotional aspects (Donlevy, 2003).

Another disadvantage of e-learning is the emergence of a digital divide, as highlighted by McIntosh (2005:3). While the Internet and e-learning have expanded access to higher education, reaching previously underserved geographic areas and populations, they have also created new challenges. The digital divide refers to the gap between those who have easy access to information and communication technologies (ICTs) and those who do not. This division adds to the existing divide between the privileged "info rich" and the disadvantaged "info poor." The digital divide restricts equitable access to e-learning resources and opportunities, further exacerbating educational inequalities.

Another disadvantage is the potential for increased unanticipated costs in terms of time and money due to congestion or heavy use of certain websites (Collins et al., 1997; Klein & Ware, 2003; Mark, 2002). Learners may also experience delays in receiving

immediate feedback from teachers, particularly in asynchronous e-learning environments (Bennet & Maniar, 2007).

Furthermore, students may be prone to distractions from social media platforms, leading to a decline in concentration and focus on studies (Rawashdeh et al., 2021). This can hinder the effectiveness of e-learning as a learning tool.

Finally, certain subjects or disciplines that heavily rely on practical training or hands-on experience may be more challenging to teach effectively through e-learning (Arkorful & Abaidoo, 2014). Skills that require physical demonstrations, laboratory work, or real-life practice may be difficult to replicate in an online environment.

Overall, while e-learning offers significant advantages such as flexibility, accessibility, cost savings, and self-paced learning, it also presents challenges such as limited social interaction, potential costs, delayed feedback, distractions, and limitations in certain fields. Institutions and learners should carefully consider these advantages and disadvantages when implementing e-learning approaches.

Barriers to the adoption of E-learning in institutions.

No access to technology: One of the most recurring barriers to e-learning is the lack of access to technology. Some learners lack access to electronic devices such as computers and mobile phones often due to lack of money or the means. As a result, most of them are often left out in the online learning process. Thus, students should be granted more access to electronic devices which will enable them gain access to information available on the internet. According to Chaney, (2001, p.28), “Familiarity with technology can bridge the gap between the rich and the poor, the experienced and the unworldly.”

Another barrier of e-learning is lack of motivation. According to Savenge, (2005), students who lack self-motivation and independence overall have lower success rates than their counterparts. You and Kang (2014), went further to state that students who lack self-regulation do not pay much attention to their assignments, and therefore turn in poor quality work or late assignments. Thus, according to the researcher, understanding learning styles and self-behaviour is essential in determining one’s success when undertaking an online course.

STUDENT PERFORMANCE

Student performance is a crucial determinant of the success or failure of an academic institution, as emphasized by Narad and Abdullah (2016). They define academic performance as the knowledge acquired and demonstrated by students through marks awarded by their teachers. Academic performance is measured through various assessments, including examinations and continuous assessments, and its goals may vary across individuals and institutions. According to Yusuf, Onifade, and Bello (2016), academic performance refers to the observable and measurable behavior of students within a specific timeframe, including scores obtained in class exercises, tests, and examinations. Martha (2009) adds that academic performance is assessed through continuous assessment or examination results, reflecting students' performance in various assessments and coursework. Educators and researchers have extensively studied the factors that contribute to improvements in students' academic performance (Singh, Malik & Sign, 2016; Ali, Haider, Munir, Khan & Ahmed, 2013; Farooq, Chaudhry, Shafiq & Behanu, 2011; Abaidoo, 2018). Ali et al. (2013) highlight that student academic performance is influenced by multiple factors, including gender, age, teaching faculty, schooling background, economic status, medium of instruction, study hours, tuition patterns, and accommodation arrangements. These factors play a role in shaping students' academic achievements and outcomes.

EMPIRICAL REVIEW

The Effect of Online Notes and videos on Students' Performance

It is believed that the human brain can easily remember and relate to what is seen and heard via moving pictures or videos. It has also been found that visuals, apart from holding the attention of the student, are also retained by the brain for longer periods. (The Economic Times, 2022) Alloway and Horton (2013) share the view that education supplied using multimedia and other visual aids have strengthened the curriculum in a while. A number of recent advances, most notably the rapid growth in access to high-speed internet through homes, schools and personal devices such as tablets or smartphones, have had a significant impact in changing the learning environment and accelerating video use in higher education. The effects of online notes on students' performance will be examined below:

Singh (2021) carried out a study titled “The Educational Impact of Adopting Electronic Notes Pre Covid-19”. The aim of the study was to determine students’ perceptions on e-learning material, particularly the shift from paper-based notes to electronic notes and its impact on their learning experience. The target population for this study included second year students studying computer science or Information Systems and Technology at one of the five campuses of South African University. Data was obtained using an online questionnaire which consisted of thirty-three MCQs and 3 open-ended questions. The random sampling strategy was employed in this study. The findings revealed that participants felt comfortable or at ease transitioning from paper-based notes to e-notes. Students were of the opinion that e-notes allowed them study more frequently and engage with the material better. Thus, the use and implementation of e-notes primarily have a positive impact on the students.

Ha & Im (2020) in their study “The Role of an Interactive Visual Learning Tool and its Personalizability in Online Learning: Flow Experience” aimed at evaluating the effect of interactive online learning tools on college students learning using flow as a guiding perspective. The sample size of this study consisted of 45 undergraduate students, randomly selected and assigned to either interactive (N=24) or non-interactive site (N=21). The results portrayed those students who used the interactive visual learning tools witnessed a higher level of the flow than those who used non-interactive ones. Thus, interactive online learning tools enabled students’ active learning by increasing attention, curiosity and interest about the online activity and by minimizing awareness of physical surroundings. Also, students’ test scores were significantly improved by the interactive activity.

Abdulla et al. (2019) in their study “The Impact of Supplementing PowerPoint with detailed notes and Explanatory videos on Student Attendance and Performance in a Physiology Module in Medicine”, aimed at examining the impact of detailed notes and videos as a supplement to PowerPoint slides on student attendance and performance. The sample size was n=82 and it involved first-year graduate entry medicine students. Data was obtained using a survey. The findings revealed that providing supplementary notes and videos along with PowerPoint slides assisted students’ understanding of cardiovascular physiology in a medical programme and did not affect lecture attendance.

A study carried out by Bollmeier et al. (2015) on “The Impact of Online Lecture-capture on Student Outcomes in a Therapeutics Course” aimed at examining whether providing online lectures (both audio and lecture slides), along with customary lecture handouts, to pharmacy students enrolled in the spring 2009 Therapeutics II course improved student performance. The use of the live lecture capture system (Tegrity) did not affect student grades or attendance in the Therapeutics II course. The total number of lecture accessions or minutes viewing the files did not correlate with students’ final course grades. Therapeutics II students did have higher scores on the Therapeutics II final examination compared to their Therapeutics I final examination Students subjectively found the system useful and indicated they would enjoy having more online lecture files available in the future.

Weiling and Hofman (2010) in their study “The Impact of Online Video Lecture Recordings and Automated Feedback on Student Performance” assessed the effect on student performance of offering online demand video recordings of the face-to-face lectures, taking into account the number of lectures the students attended in person. Also, it aimed at investigating the effect of online quizzes with appropriate feedback on the performance of these students. A between-subjects design was employed in which students were assigned randomly to a group having access to the online lectures including multiple choice quizzes and appropriate feedback, or to a group having access to the online lectures only. A sample of 474 students (161 men and 313 women) of the European Law participated in the experiment. Data was obtained using questionnaires and all official university grades of the student before the exam of the European Law. Using regression analysis, the study found that the course grade of the student was predicted by their grade point average, their study discipline, their grade goal for the course, the expected difficulty-level of the course, the number of online lectures they viewed, the number of lectures the students attended in person and the interactions between the lectures they viewed online and attended in person. Students who attended few lectures benefitted greatly from viewing lectures online than students who attended lectures. The regression analysis did not show a significant effect of automated feedback on student performance.

These empirical studies suggest that the use of e-notes in e-learning environments can have positive effects on students' academic performance. The interactive and

multimedia features of e-notes can enhance students' engagement, understanding, and retention of the course material, leading to improved learning outcomes.

In relation to this study, e-notes falls within the broader scope of investigating the impact of specific e-learning interventions on student performance. By examining the effects of e-notes specifically, the research contributes to the understanding of how specific e-learning tools, such as e-notes, can influence students' performance outcomes in e-learning environments. This empirical evidence can help to support the thesis on the effects of e-learning on students' performances by providing specific insights into the role of e-notes in enhancing student learning and academic achievement within the broader context of e-learning.

The influence of E- assignment on students' performance.

Many educators regard homework as a necessary extension of the classroom. Irrespective of its use, it is traditionally believed that homework plays an important role in classrooms and in student learning. (Hong, Wan & Peng, 2011, p.280) Homework can either be assigned online or physically. Online homework according to El Hajjaji and Ouardaoui, is a modern instructional tool adapted by the educators of the higher education community to maintain pace with their students rapidly changing learning style and working habits in an increasingly internet-driven world. Penner et al. view online homework as assignments that are submitted electronically and computer graded. According to them, these homework systems, which permit instant grading and allow errors to be corrected at the option of the instructor, are replacing or supplementing traditional pen and pencil homework that is handed in during class, graded by the instructor or an assistant, and returned with marks and comments days or weeks later. Educators are primarily interested in the impact of online homework on student performance. (Dodson, 2014)

Salame and Hanna, (2020) in their study, "Studying the Impact of Online Homework on the perceptions, attitudes, study habits, and learning experiences of Chemistry students" conclude that online homework positively impacts students' perceptions, attitudes, learning experiences, understanding and learning outcomes. Also, online homework increases time on task by the students and thus positively impacts learning and studying habits. This study aimed at studying students' perceptions about the usefulness of online homework, the role it plays in improving their problem-solving skills and study habits

and the effect it has on their attitudes and learning. A sample size population of 163 students enrolled in an Urban Commuter school, Minority serving institute, and a public college in New York were taken in this research. In this research, data was obtained using a Likert-type and open-ended questionnaire. Also, interviews were conducted on a subset of the participants to illicit more information.

Cook and D. Bishop, 2018 in their study titled, "The impact of online homework, time on homework, gender, and metacognition in improving student achievement in undergraduate biology courses" portray a correlation between online homework score and course grade when the homework is a significant part of the course grade. They also portray that time spent on homework correlates higher course grades. Also, it makes students engaged with the course material. This study aimed at determining whether homework grades in online homework systems can predict student achievement in introductory undergraduate biology courses. The study population consisted of a small private Christian University in the South East with a sample population of 311 selected using the Convenience sampling technique. A quantitative correlational study was applied in this research and data was obtained using archival data.

Ouardaoui & El Hajjaji (2017) conducted a comparative study examining comparatively "The effect of online homework on undergraduate engineering students taking a General Chemistry I course". Questionnaires were administered at the end of the semester in order to evaluate the impact as well as the advantages and disadvantages of each type of homework, based exclusively on students' perspective. Most students expressed their preference for online homework over the paper-based one because it is in their view, user-friendly, intuitive and clear, it provides answers right away and it increases students' motivation. The study indicated that the transition from paper-based homework to online homework can enhance students' academic performance.

Ratniyom et al. (2016) conducted research titled "The effects of online homework on first year pre-service science teachers learning achievements of Introductory Organic Chemistry" which aimed at examining the effects of the Introductory Organic Chemistry homework on first year pre-service science teachers' learning achievements. A quasi-experimental, pre-test, post-test was employed in this study. Selection of participants for this study was based on their demonstration of low academic

performance in the previous semester. The sample population included 78 first year pre-service science teachers who enrolled in general chemistry (SCE 1403).

These students were from the General science program in the faculty of education at Suan Sunandha Rajabhat University, Thailand. This study was conducted during the second semester of the 2015 academic year. Data collection instruments included a paper-based pre-test, online homework, a paper-based post-test. The online homework was designed with the help of a web-based Google form in order to enhance the pre-service teachers' learning achievements. The findings revealed that online homework practices can enhance the pre-service teachers learning achievements of introductory organic chemistry. This is due to the fact that post achievements of introductory organic chemistry were higher than their pre-achievements after being exposed to online homework treatment. Thus, it was concluded that online homework is a significant factor for the enhancement of learning achievements of introductory organic chemistry. Also, it was considered an important factor in developing students' learning achievements and a strategy to improve their study habits.

Fatemi et al. (2015) in their paper "Student Performance in Intermediate Accounting: A comparison of the effectiveness of online and manual homework assignments" investigated differences in students' exam performance across two sections of intermediate accounting II taught by the same professor where one section submitted their homework manually and the other used online homework system to submit the same homework assignments. The results portrayed that student who submit their homework online perform better when assessed by their ability to solve problems but perform significantly worse than students who submit homework manually in the multiple-choice questions. The researchers suggested that a hybrid homework system may be excellent for student learning.

A study conducted by Wooten & Dillard-Eggers (2013) examined the characteristics and perceptions of user and non-user students in class sections that required the use of online homework compared to user and non-user students in class section where the online homework was available but was not a required part of the course grade. The findings indicated that users tended to have a higher-grade point average and earned a higher grade in the class when, compared to non-users.

Thus, users of online homework seemed to be students who were more motivated to study and do well in class. However, high-performing students scored a course grade close to their GPA regardless of whether they used the online homework or not. On the other hand, poorly performing students (as indicated by a lower grade point average) were the ones who chose not to use online homework. Non-users were almost entirely not accounting majors and appeared to be less motivated to use the software when it was not required. The study was quantitative with a sample 453 students in 16 accounting principles classes that were taught by eight different instructors.

Arasasingham et al (2011) in their study "Online Homework and Student Achievement in a large enrollment Introductory Science Course" indicated that online homework led to higher achievement scores on final exams. Most students were of the opinion that it enabled them comprehend the materials better and that it offered a realistic approach to the traditional approaches of handwritten homework. The researcher concluded that online homework could improve student engagement, provide more opportunities for self-directed learning and provide effective feedback if appropriately designed. This was a six-year study and thirteen sections of the same course were examined with 3806 students taught by five different instructors.

Richards-Babb et al. (2011) conducted a research titled "Online homework, help or hindrance?" What students think and how they perform. According to the researchers, online homework was introduced to improve students' retention rates in general chemistry. The research questions addressed in this study were; does online homework improve student performance in general chemistry homework? In particular, (a) are grade components and online homework performance correlated, and (b) does online homework improve success rates in general chemistry; do students complete online homework and do they recommend its continued use? how is online homework perceived by students? Do they feel that online homework is helpful in (a) learning chemistry content, (b) improving their study habits and (c) improving their exam scores and final grades? The Wiley PLUS system was employed when administering online homework from fall 2006 to fall 2008. This online homework was delivered using a mastering chemistry platform. Before the implementation of online homework, weekly in-laboratory quizzes were used for formative assessment of content knowledge in second-term general chemistry. Graded online homework was introduced in fall 2006 to improve time-on-task, retention rates and student content knowledge since quiz

performances were poor. Data was obtained using a five-point Likert scale questionnaire entitled “Chemistry 116 Online Homework Evaluation” After the research was conducted, the findings revealed a mildly positive correlation ranging from 0.39 to 0.74 between online homework averages and grade components for off-semester second term general chemistry courses taught by instructors A. Students were of the opinion that online homework use should continue as graded online homework has a positive impact on student learning. However, the researchers revealed that there is no evidence to support the use of online homework over conventional hand-graded homework.

Equally, Lee at al. (2010) conducted a study investigating whether use of online homework leads to improved student performance in principles of microeconomics courses compared to use of traditional homework assignments. A sample of 171 students took part in the study. Of these, 77 were assigned IAG homework and 94 used Aplia. The results indicate that improvement in student performance using the three different methods of homework were similar. Results of the study suggest that while students significantly improve their understanding of microeconomics principles over the course of a semester as measured by the TUCE, this improvement does not appear to be affected by use of different homework methods. The study also found that making an online homework system available to students improved learning for those with a grade of ‘B’ or higher. These results lend some insight into the fact that not all students are impacted equally by different homework systems. Moreover, the Aplia online homework method takes much less time to administer than traditional homework and can be assigned more often which keeps students continually engaged throughout the term. It also allows instructors to use their time more effectively preparing for class and presenting other activities that enhance learning, including current events, case studies, experiments, review sessions and meeting with individual students. Finally, while this study shows that online homework is not more effective in improving TUCE scores for all students than traditional homework, it also suggests that student performance is not adversely affected by using online homework.

A study conducted by Demirci (2010) titled “The effect of web-based homework on University Students’ Physics Achievements”, aimed at comparing the effect of web-based homework and pen- and paper homework on University students’ Physics achievement as measured by exam and homework performance. Convenience sampling technique was used to choose the participants of this study from the Computer

Education department because they are more experienced in online and computer-based assessment methods. Two identical classes were used this study; one class used the online homework system while the other used pen-and-paper homework. 41 students in the fall semester of 2005, and 48 students in the spring semester of 2006 used the web-based homework system. 37 students in the fall of 2005, and 42 students in the spring semester of 2006 used the pen-and-paper based homework. A two-group pretest-posttest quasi- experimental design was used. One group was the experiment group and the other the control group. No significant difference was found in the means of the web-based and grouped pen-and-paper homework with respect to FCI and CSEM pre- and post-test scores. The study concluded that web-based does not bring significantly greater advantage to the students but neither is it worse than pen-and-paper based homework.

These empirical studies indicate that the use of e-assignments in e-learning environments can have positive effects on students' academic performance. The interactive features of e-assignments, such as immediate feedback, multimedia resources, and self-assessment opportunities, can enhance students' engagement, understanding, and application of the course content, leading to improved learning outcomes. By examining the effects of e-assignments specifically, the research provides insights into how the implementation of e-assignments can influence students' performance outcomes in e-learning environments. This empirical evidence supports the thesis on the effects of e-learning on students' performances by shedding light on the role of e-assignments in facilitating student learning, engagement, and academic achievement within the larger framework of e-learning.

The Impact of Online Collaboration on Students' Performance.

Erten et al. (2020) carried out a study on "The Effects of Online Collaborative Learning and Using E-portfolio on Success, Attitudes and Permanency." The main aim of this study was to examine the effects of e-portfolio implementation in the online collaborative learning (OCL) setting on students' academic success, attitude, achievement and permanency levels in the operation systems and Applications course (OSA). The sample consisted of students from Firat University, Faculty of Education, Department of Computer and Instructional Technologies Education. (CEIT) The sample size was 68 students; 35 in the experimental and 33 in the control group. A mixed

research method was applied in this study. The pre-test, post-test, control group model was used in this quantitative study while a semi-structured interview was used for the qualitative study. The Achievement test and attitude scale were used to assess the achievements of the students. The implementation results indicated that both methods had positive effects on student success. No significant differences were observed between the achievements of the groups. However, it was observed that permanency was higher in the e-portfolio implementation in the OCL setting than in the traditional method.

A study conducted by Ajayi and Folasayo Ajayi (2020) on "The Use of Online Collaborative Learning Strategy in enhancing post-graduates learning outcomes in science education". This study aimed at determining the effects of Online Collaborative Learning Strategy (OCLS) on postgraduates' Learning outcomes in science education. The research questions were as follows; what is the distribution of the postgraduates in science of Education across marital and employment statuses? What are the challenges faced by the post graduates in their studies? The design used was a pre-test, post-test, control quasi-experimental research. Data was obtained through a 10-item questionnaire and a science education performance test (SEPT). The sample size consisted of 38 post graduates studying science education at Masters level selected from two universities in south west Nigeria. Simple random sampling technique was used to select 2 states out of the six states in south west Nigeria. Purposive sampling was used in selecting 20 science education students for experimental group and 18 science education students for the control group. The findings indicated that there was no significant difference in the pre-test mean scores of both groups. It also indicated that there was a significant difference in the post- test mean scores of both groups. Experimental group performed better than the control group as a result of the treatment. The study presented OCLS as one of the most effective strategies for post graduates in science education as it gave students the opportunity of coordinating their study activities alongside the office work and home obligations. This study recommended that OCLS be used too for post graduates in science Education to enable them cope with the trio commitments of study, workplace and home and at the same time to enhance sharing of information and ideas among them which in turn would enhance their performance and retention in the course.

Mehar & PrabhjitKaur, (2020) carried out an experimental study on "Effect of Online Collaborative Learning Strategy on Achievement in Economics in Relation to Self-

Efficacy" which aimed at enquiring the effect of online collaborative learning strategy on achievement in economics in relation to self-efficacy. A pre-test and post-test factorial design was employed with a random sample of 120 Economics students of XI class of two English medium private schools with facility to teach through online collaborative learning strategy of Amritsar in Punjab affiliated to Central Board of Secondary Education, New Delhi. The two schools were randomly selected from a list of schools of Amritsar. The sample included 60 students from Shri Guru Harkrishan Senior Secondary Public school, Amritsar and 60 students from Spring Dale Senior School, Amritsar. Further, from each school the two intact sections of 30 students were selected randomly to serve as experimental and control group. The findings of this study portrayed that the achievement of students taught through online collaborative learning strategy was found more effective than that of students taught through conventional teaching strategy group in Economics. This could result from the ability to work in peer groups by the students. There was no significant interactional effect between online collaborative strategies and self-efficacy on achievement scores. The researchers recommend the use of online collaborative learning strategy for better achievement of secondary school students in Economics.

Al-Rawahi and Al-Mekhlafi (2015) in their quasi-experimental study "The Effect of Online Collaborative Project-based Learning on EFL Learners' Language Performance and Attitudes", investigated the effect of online collaborative project-based learning on the language performance and attitudes of intermediate level students at the college of Applied sciences in Oman. The sample consisted of four classes (93 students: 20 males and 73 females) in Nizwa College of Applied Sciences. Two classes were assigned to the experimental group (46 students) and the other two classes were assigned to the control group (47 students) Data was obtained using a language test containing reading and writing questions, students' projects' scores, an attitude scale and messages' transcripts of individuals and focus group discussions. The study revealed that the main positive effect of online collaborative project-based learning was clear on students' writing skill in the post-test as students in the experimental group outperformed students in the control group.

These empirical studies indicate that e-collaboration in e-learning environments could enhance students' academic performance. The collaborative activities, such as online discussions, group projects, and peer feedback, foster active engagement, critical

thinking, and knowledge construction among students, which contribute to improved learning outcomes. However, some studies do not notice any significant difference between e-collaboration and physical collaboration. This empirical evidence supports the thesis by highlighting the significance of e-collaboration in enhancing student learning, engagement, and academic achievement within the overall framework of e-learning.

The Impact of the use of Video conferencing on students' performance

Wiesemas & Wang, (2010) view videoconferencing as a synchronous model for interactive voice, video and data transfer between two or more groups/people. It improves learning by meeting people that were previously inaccessible due to several problems such as time and financial constraints (Dogget, 2008; Jian-Xiang, 1998; Martin, 2005) Video conferencing has been adopted by many institutions to continue learning with the outbreak of COVID- 19. Many educational institutions are dependent on digital tools such as: Discord, Google Meet, Microsoft Team, Skype and Zoom. (Rio-Chillcce et al. 2021) Google Meet is an application that has been adopted by many institutions to continue learning with the outbreak of COVID-19. It is beneficial because students, educators or workers who work from home can easily join the lesson through video conferences or live videos from their respective homes. (Aswir et al., 2021) The effects of video conferencing on students' performance will be examined below:

Darr et al, 2021 in their study "The Effect of Video Conferencing on Student Academic Performance: Evidence from Pre –clinical Summative Assessment Scores" aimed at examining the potential impact of transitioning to remote learning on students' performance in medical education. The study involved second year preclinical medical students at the University of Illinois College of Medical Peorra (UICOMP). An evaluation of the potential impact of transitioning to remote learning on exam performance was done by comparing summative assessment data for a medical neuroscience course over a 2-year period (2019 and 2020), which corresponds to pre and post transitioning to remote learning, respectively. In response to the Covid-19 pandemic, UI COMP suspended all in person sessions in March of 2020, transitioning to an entirely online delivery of preclinical curriculum. Thus, all interactive sessions occurred synchronously over Zoom virtual platform in the year 2020 contrary to the year 2019 when all interactive synchronous sessions were conducted in-person. A summative assessment of 110 items was administered at the end of the course. The findings indicated that summative assessment performance reduced significantly for

items related to materials taught in an interactive, synchronous way after approximately 24 weeks of remote delivery of preclinical curriculum.

Pizarro (2021) carried out a study on "Lived experiences of utilization of Google Meet for academic outcome of the senior high school students". This study aimed at determining problems of online distance learning modality with the use of Google Meet in teaching Physical Education to find huge opportunities for the learners' despite of the challenges that we are facing now. The research questions were as follows: What are your experiences in using Google Meet in online learning in your virtual class? What are the advantages and disadvantages of online learning and use of Google Meet as online platforms in virtual class? Are you comfortable in your virtual class using the Google Meet? Why? How do you find it easy or difficult? What can you advise to our education department at this moment? The researcher conducted research at the Barangay Longos Senior High School located at Kalayaan, Laguna. Ten (5) selected participants participated in the said research and religiously answer the questions that the researcher asked. Purposive Sampling was utilized as a sampling technique. The findings indicated that the participants understood the situation amidst pandemic they were lucky to experience a free education for their future opportunity to learn and be digitally literate. It is beneficial in this time of pandemic to use the Google meet as virtual learning tool in this pandemic. However, the disadvantage was the poor internet connection; the eagerness of the participants to learn was distracted by it.

Research was conducted by Obinna-Akakuru et al. on "the Effect of Google Meet E-learning Technology on Building Students Knowledge (2021)." A quasi-experimental, pre-test, post-test, control group design was employed in this study. This study utilized Google Meet E-learning Technology Instructional Package (GMET-IP) and the Economics Achievement Test (EAT) to obtain data. The main purpose of this work was to determine the effect of Google Meet E-learning Technology (GMET) on building student's knowledge in tertiary institutions in Imo State, Nigeria. The population of the study was 2,063, comprising the entire year two students in Alvan Ikoku Federal College of Education, Owerri. The sample for this study consisted of 80 year two students from Economics Department. Purposive sampling technique was used to assign the two classes to experimental and control groups. The findings revealed that Video Modules E-learning approach method had effect on the academic achievement of students in Basic Sciences. Based on the findings, the researcher concluded that the GMET of teaching enhances students' knowledge in Economics. The treatments have

more positive impact on the female students than male students, showing an interaction occurred between the genders. The researcher recommended that there is need for the incorporation of modern instructional methods like Google meet e-learning technology into the teaching and learning of Economics in tertiary institutions in Nigeria. This will ensure that students are abreast with global best practices which enhance achievement. The entire teachers must train and retrain themselves continuously on the use of instructional. This will enable students to participate actively in the lesson and arouse the interest of the students.

Setyawan et al. (2020) carried out a study on "The Effects of the Google Meet Assisted Method of Learning on Building Student Knowledge and Learning Outcomes". The main purpose of this study was to investigate the effect of the Google Meet media-assisted lecture method on building student knowledge and learning outcomes while learning from home (SFH). The main research question was whether the method of lectures assisted by Google Meet media affects building student knowledge and learning outcomes. A quasi-experimental in the form of pre-test-post-test control group design was used in this study. The knowledge building test, Cognitive Learning Outcomes Test was adopted in this study. The sample was 96 first-year students (70 girls and 26 men; aged 18-20) in the elementary school teacher education study program at the University of Trunojoyo Madura in the academic year 2019/2020. The results of the two-way MANOVA revealed that students who were taught using the Google Meet media-assisted lecture method had higher post test scores, building knowledge and learning outcomes than comparison groups. Therefore, it was concluded that the method of lectures assisted by Google Meet media has a significant influence on building knowledge and student learning outcomes in lecturing learning strategies in elementary schools.

"Influence of Interactive Videoconferencing on the Performance of Pharmacy Students and Instructors" by Chisholm et al. (2000) aimed at investigating the effects that IVC (interactive videoconferencing) have on pharmacy students' academic performance and pharmacy instructors' teaching evaluations. All doctor of pharmacy students enrolled in the University of Georgia College of Pharmacy's Pharmacotherapy II and Clinical Pharmacokinetics II courses in 1998 (n=61) were included in the study. Twenty-six of the students were at the College's satellite campus at the Medical College of Georgia (MCG) and 35 of the students were at the main campus at the University of Georgia (UGA). A 6-item teaching evaluation form was made available to the students in order

to evaluate each instructor by filling this. The findings revealed that academic performance in the Clinical Pharmacokinetics II course and the Pharmacotherapy II course was not different between students taught by IVC versus live lectures, however, there was a difference in the teaching evaluation scores in approximately 27 percent (n=4) of the instructors based on whether students received their lectures live or via IVC.

THEORETICAL FRAMEWORK

The theoretical framework is essential in understanding and analyzing the concepts and principles that support a particular phenomenon. It outlines the theories, concepts and ideas that shape the research design, methodology, and data analysis. In this study, the theoretical framework helps to explain the underlying mechanisms and processes through which e-learning interventions may impact student outcomes. The theories that will be applied in this study include; Cognitive Theory of Multimedia Learning, Online Collaborative Learning Theory and Constructivism.

Cognitive Theory of Multimedia Learning

This theory was originally developed by Richard Mayer in 1997. Cognitive Theory of Multimedia Learning refers to the utilization of simultaneous techniques in instructional message design, such as combining narration and visuals in a presentation. Multimedia is the use of multiple presentation tools or techniques to deliver information. (Miguel, 2019) Cognitive Theory of Multimedia Learning predicts that children learn content more deeply and effectively when words and pictures are combined than when one or the other alone conveys content.(International Encyclopedia of the Social & Behavioral Sciences (Second Edition), 2015) The theory is based on three main assumptions about how people process information: dual channels, limited capacity, and active processing. Firstly, the human information processing system comprises of two channels, namely visual/pictorial and audio/verbal for information processing. This assumption states that students' process information through two separate channels: visual and auditory. The second aspect is the Limited-Capacity Assumption which asserts that each channel has a limited capacity to process information. In other words, human beings can only process information in limited amounts, and they try to understand the information by creating mental representations from the information sources Miguel, (2019). The third aspect which is the active-processing assumption asserts that humans do not learn by just

passively absorbing information. Instead, they need to engage in active cognitive processes. (Davis & Norman, 2016)

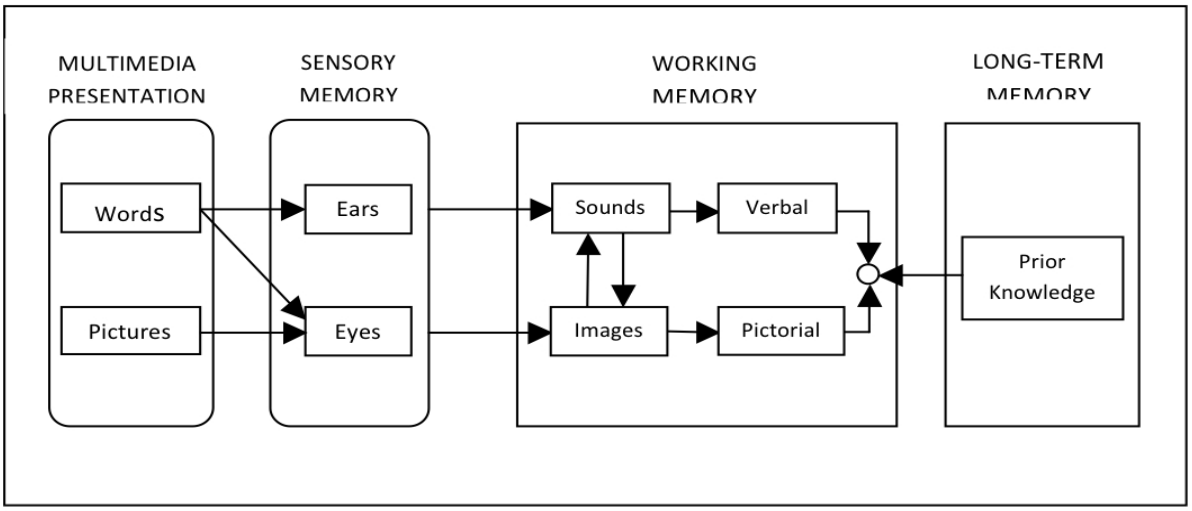
The theory proposes several principles for designing multimedia materials that optimize learning, including the coherence principle, the redundancy principle, the spatial contiguity principle, the temporal contiguity principle, and the modality principle.

The coherence principle suggests that extraneous material should be eliminated to reduce cognitive load and enhance learning. The redundancy principle suggests that redundant material should be eliminated to avoid overloading cognitive capacity. The spatial contiguity principle suggests that related material should be presented together to enhance learning. The temporal contiguity principle suggests that related material should be presented at the same time to enhance learning. Finally, the modality principle suggests that information should be presented through both visual and auditory channels to enhance learning.

This theory enumerates five cognitive processes in multimedia learning which include: selecting relevant words from the presented text or narration, selecting important images from the presented graphics, organizing the selected words into a coherent verbal representation, organizing selected images into a coherent pictorial and verbal representations and prior knowledge. (Mayer, 2014) This is represented in the fig 1 below;

Mayer's result portrayed that learning was most efficient during treatments where the participants were able to see the animation and visuals as well as hear the integrated audio narration of those visuals at the same time (Mayer & Anderson, 1991).

Figure 1: Presentation of the Cognitive Theory of Multimedia.



Mayer (2005a) states that there are also five forms of representation of words and pictures that occur as information is processed by memory. Each form represents a particular stage of processing in the three memory stores model of multimedia learning. The first form of representation is the words and pictures in the multimedia presentation itself. The second form is the acoustic representation (sounds) and iconic representation (images) in sensory memory. The third form is the sounds and images in working memory. The fourth form of representation is the verbal and pictorial models which are also found in working memory. The fifth form is prior knowledge, or schemas, which are stored in long-term memory. (Stephen D. Sorden)

Significance of this theory to the study.

In the classroom, this theory can be useful in several ways as follows:

- This may enable better understanding as students have the opportunity to process more than one source of information. Visual and audio channels can help students learn more effectively as some students find it hard to process information without visualization.
- Also, this theory will enhance students' engagement as they will find the materials more fun, interesting and engaging.

Constructivism by Lev Vygotsky (1978)

Among many, Lev Vygotsky and Jean Piaget are the two most often mentioned people who are attributed to constructivism (Maddux & Cummings, 1999). The constructivist theory of learning holds that people learn by constructing their own understanding and knowledge of the world through experience and reflecting upon that experience. (Harasim, 2017) It holds that knowledge is constructed and not innate, or passively absorbed. Learners integrate previous ideas with the new experiences and information encountered. Some ideas may be altered or rejected based on investigations, asking questions and negotiating what they know with others.

Also, Constructivism holds that learning is and active process and not passive. For learners to construct knowledge or meaning, they must be actively involved with the world by solving authentic problems. Active learning enables students become 'lifelong learners.' With e-learning, teachers serve as facilitators who guide the learners to learn effectively. Active learning gives students' autonomy and greater involvement in their learning process. It also encourages students to achieve higher grades based on their improved skills and comprehension.

Constructivist state that knowledge is socially constructed. They consider learning as a social activity. Dewey, 1938 views learning as an interactive process that must be done together since it is a social activity.

Contribution of Constructivism to the study

Constructivism, as a learning theory, has significant relevance to the topic of e-learning and its effects on student performance. This theory posits that learning is an active process in which individuals construct their understanding of the world based on their prior knowledge, experiences, and interactions with their environment.

In the context of e-learning, constructivism underscores the importance of students' active engagement and participation in the learning process. E-learning platforms provide opportunities for students to interact with digital content, engage in online discussions, collaborate with peers, and apply their knowledge in practical ways. These interactive and participatory elements align closely with the constructivist principles of knowledge construction.

One of the key contributions of constructivism to the study of e-learning and student performance lies in its emphasis on meaningful and authentic learning experiences. Constructivist approaches advocate for learning that is relevant, contextualized, and connected to students' real-world experiences. In the e-learning environment, this can be facilitated through the integration of multimedia resources, simulations, case studies, and problem-solving activities. By providing students with meaningful and authentic learning experiences, e-learning can enhance student engagement, motivation, and ultimately their performance.

Furthermore, constructivism highlights the importance of social interactions in the learning process. It emphasizes the role of collaboration, peer-to-peer interactions, and discussions in constructing knowledge. In the context of e-learning, virtual classrooms, discussion forums, and group projects can facilitate social interactions and foster collaborative learning. Through online collaboration, students can share ideas, engage in critical thinking, and collectively construct knowledge. These collaborative opportunities in e-learning platforms can positively impact student performance by promoting deeper understanding and higher-order thinking skills.

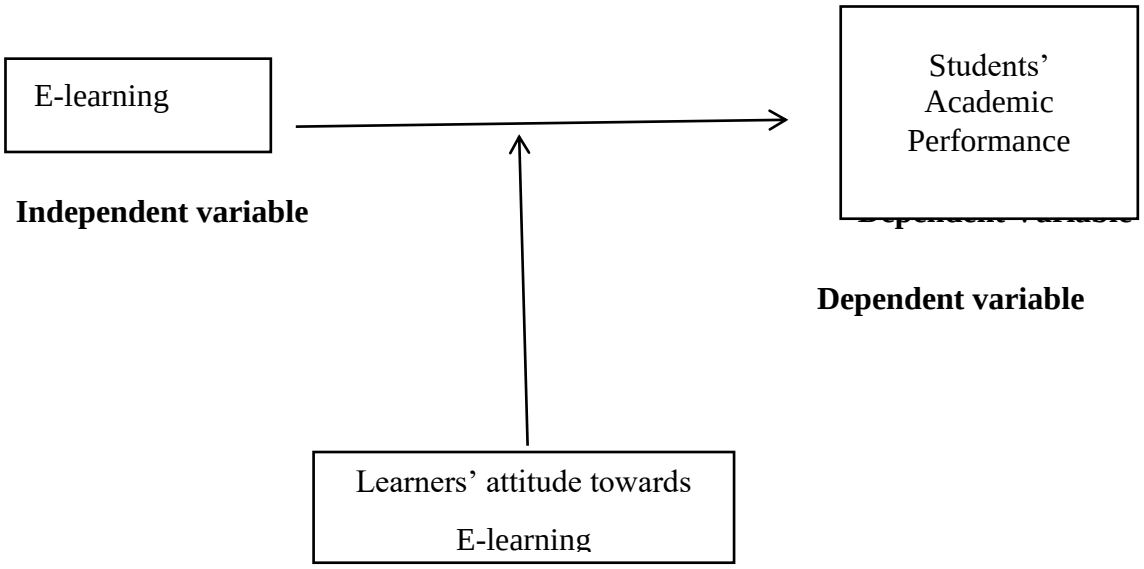
Constructivism also underscores the value of reflective thinking and metacognition in the learning process. E-learning platforms can incorporate features that encourage students to reflect on their learning, monitor their progress, and evaluate their understanding. By engaging in metacognitive processes, such as setting goals, planning,

self-assessment, and self-regulation, students can take ownership of their learning and make necessary adjustments to improve their performance.

In summary, constructivism offers valuable insights and contributions to the study of e-learning and student performance. Its focus on active learning, meaningful experiences, social interactions, and metacognitive processes aligns with the goals and potential benefits of e-learning. By understanding and applying constructivist principles in the design and implementation of e-learning environments, educators and researchers can promote enhanced student performance, engagement, and overall learning outcomes.

CONCEPTUAL FRAMEWORK

Figure 2: Conceptual diagram



Source: (Author 2022)

The above conceptual framework was used in this study, the independent variable includes E-learning, that may affect the academic performance of a student. This study will examine the effect e-learning has on students' academic performance. Academic performance is the dependent variable in this study, how does academic performance vary based on the independent variable. Learners' attitude examines the overall perception of the learner about e-learning and hence influencing performance as the intervening variable.

Chapter Summary

In this chapter, we explored in detail the concepts and theories used in this study. The researcher examined the empirical framework, theoretical framework and the conceptual framework. In the next chapter, the research methodology is discussed

CHAPTER III
RESEARCH METHODOLOGY

Maxwell (2012) defines research methodology as an approach that gives a context within which appropriate techniques and methods can be adopted and developed to achieve the overall purpose of the study. This chapter describes the methods that were used by the researcher in the study. It outlines the research design, the study, the study population, sampling method and procedures, data collection procedures and instruments, data analysis, reporting and ethical issues.

Research Design

The research design used in this study was the descriptive survey design. According to Creswell & Plano Clark (2007), a research design refers to the methods employed for collecting, analyzing, interpreting, and reporting information in research studies. Boru (2018) identifies three possible forms of research design, namely exploratory, descriptive, and explanatory. In this study, the descriptive survey design was adopted. A survey is chosen because the design is well suited for descriptive data which the researcher intends to collect on 'E-learning and its effects on Students' Performance.' With the results gotten from the study, the sample shall be generalized to the entire population. Furthermore, the research design is considered descriptive because it utilizes descriptive statistics, such as average scores, mean scores, and Spearman's correlation, to analyze the data collected. These statistical measures provide a summary of the data and help in describing the relationship between variables.

Research Approach

This study employed a Quantitative approach which was descriptive and predictive/inferential in nature. To achieve this, Spearman's Correlation coefficients as well as ordinal regression were used to analyse the data. This study sought to examine the effects of e-learning on students' performances in Cameroonian state Universities. The results from the bivariate analysis indicated that the dataset for this research was not normally distributed; therefore, the nonparametric Spearman's rank order correlation test was used to identify relationship between the independent variables and dependent variable instead of Pearson correlation analysis. In this study, inferential statistics were used to test the hypotheses and the ordinal regression model was used to determine the best predictor of academic performance of students.

Area of the study

This study was carried out in Yaoundé, the Centre region of Cameroon and in Buea, the South-west region of Cameroon. Yaoundé is the capital city of Cameroon, located in the central region of the country. It is the second- largest city in Cameroon and is home to several universities including the University of Yaoundé 1. The University of Yaoundé 1, is a public university that was established in 1962. It is one of the oldest and most prestigious universities in Cameroon, offering a wide range of graduate and undergraduate programs in various fields of study. The faculty of Education is one of the largest faculties at the university, with a focus on training teachers and educational professionals.

Buea is a city located in the southwest region of Cameroon, and it is the capital of the southwest region. It is known for its beautiful scenery, including the Mount Cameroon, which is the highest mountain in West Africa. Buea is also home to the University of Buea, which is a public university that was established in 1993. The University of Buea is one of the leading universities in Cameroon, offering undergraduate and graduate programs in various fields of study. The choice of the study area was first of all, because the researcher limited the scope to two state Universities due to financial and time restraints, so the University of Yaoundé 1 and Buea were chosen for this study because both universities had a common e-learning tool, which is Google Classroom.

Population

Gray, (2014) defined population as the totality of people, organizations, object, or occurrences from which a sample is drawn. Shukla, (2020), defines population as "the set or group of all the units on which the findings of the research are to be applied." According to McMillan and Schumacher (2010) population can be viewed as the total group of individuals from which a sample is drawn and to which results can be generalised. The population of this study was the total number of students in all the Cameroonian state Universities. There are eight state universities, which include the University of Yaoundé 1; University of Yaoundé 2, University of Bamenda, University of Buea, University of Dschang, University of Maroua, University of Ngaoundere and University of Douala and each university has several faculties and grand institutions. Thus, it was difficult for the researcher to manage the target population due to constraints such as money, time and practical issues. As a result, the target population

was scaled down to master's students in the faculty of education in the university of Yaoundé 1 and University of Buea respectively. The study consisted of all the masters' students in the Faculty of Education with a population of 1077 students in Yaoundé 1 and a population of 551 students in the Buea. Therefore, the total population of Masters 1 and 2 students in the faculty of education in the University of Yaoundé 1 and Buea amounted to 1,628.

Sample Size

Yin, 2009 defines sample size as the number of samples used by the research and which can represent the entire population. According to Saunders et al. (2007) sample size is essential or important because the findings gathered from the primary data are reliant on it and inaccuracy could bring about misleading findings. It is indispensable to select from the whole population, since it is not possible to seek the opinion of everyone in a target population involved in the process of data collection for a quantitative study (Aboderin, 2017). A sample size of 310 was selected out of the sample frame of 1,628 master's students from the Faculty of Education in the University of Buea and Yaoundé 1. The sample size was determined using Krejcie and Morgan's table on "determining sample size for research activities" (Krejcie and Morgan, 1970).

Table 1: Population and sample size of the study

State Institution	Target Population (total number of students in Faculty of Education)	Accessible Population (Masters students in Faculty of Education)	Sample Size
University of Yaoundé 1	1431	1077	205
University of Buea	2962	551	105
Total	4393	1628	310

Source: University of Buea IT Centre and Diploma service office (FSE) Yaoundé 1

Sampling Technique

According to Saunders, Lewis & Thornhill (2007), sampling technique refers to the process of selecting an appropriate sample size from a larger population. In this study, a Simple Random Probability sampling technique was employed. This method, as described by Creswell (2011), is commonly used in quantitative research and allows for

making generalizations to the population under investigation, ensuring that the sample represents the entire population. By utilizing this sampling technique, all participants had equal chances of being selected, aiming to create a sample that is representative of the entire population (Creswell, 2011).

Data collection instrument

The instrument of data collection used in this study was a five type Likert-scale, close-ended questionnaire. Creswell (2014), defines a questionnaire as "a form used in a survey design that participants in a study complete and return to the researcher". The questionnaire was structured in three parts with a total of 30 closed-format questions. The first part consisted of questions concerning demographic variables such as gender, level of study and computer experiences. The second part addressed the independent variables, E-assignment, E-notes/videos, E-collaboration and Video conferencing based on a five -item Likert scale. Responses were given to each statement using a five-point Likert-type scale, for which "1=strongly disagree to 5= strongly agree." The third part examined the dependent variable "students' performances". A translated version of the questionnaire into French was developed from the original version in English due to language differences.

Validity

Validity establishes the relationship between the data and the variable or construct of interest. It estimates how accurate the data obtained in a study represents a given variable or construct in the study. (Mugenda, 2003) In this study, a pretest was conducted by the researcher after constructing the questionnaires in order to validate them. This was to ensure its consistency and that it addressed the right population. Also, the researcher conducted face validity by approaching experts or individuals who had in-depth understanding of the subject such as supervisors or subject instructors to read through the questionnaire and evaluate if the questions effectively captured the topic under investigation. Also, the supervisor identified common errors for correction.

Reliability

In order to ensure reliability, the researcher established test-retest reliability. The test-retest reliability procedure evaluates the degree to which scores from one sample are stable over time from one test administration to another (Creswell, 2011). This was

done by issuing the questionnaires to the respondents, collecting them and checking the responses. After two weeks, the questionnaires were re-tested by administering them to respondents with similar characteristics. The second responses were similar to the first, thus, the questionnaires were reliable.

Also, internal consistency was used to ensure reliability through the pilot test by calculating the Cronbach's coefficient Alpha after obtaining the responses for respondents. A pilot study was conducted in preparation for the study. The Pilot study validates the research method and research approach (Coleman, 2011). After the questionnaire was designed, a draft was distributed to ten master's students to test the clarity and meaningfulness of the questions. Fink (2003b in Saunders et al., 2007) suggested that a minimum of ten members for pre-testing is adequate. Every respondent was told the purpose of the questionnaires and assured anonymity and confidentiality before the responded to the questionnaires. After administering the questionnaires, the Cronbach's coefficient Alpha was calculated using SPSS. Subsequently, improvements and modifications were made after conducting a pilot testing. This was to ensure the instrument was very effective.

Table 2: Alpha Coefficient Range

Alpha Coefficient Range	Strength of Association
<0.6	Poor
0.6 to <0.7	Moderate
0.7 < to 0.8	Good
0.8 to <0.9	Very Good
>=0.9	Excellent

Source: adapted from Aboderin (2017) for this research

Table 3: Cronbach's alpha of the researcher's instrument.

Variable	Number of Items	Reliability
Academic performance	**5**	**.775**
E- assignment	**5**	**.840**
E-collaboration	**5**	**.634**
E-notes and videos	**5**	**.748**
Video conferencing	**5**	**.812**

Source: Developed by the researcher for this research

Data Collection Procedure

The researcher sought permission to pursue this study and to collect data from the faculty, signed by the Dean of Studies. The first phase included the pilot test which was carried out to validate the data collection instrument. Thereafter, the researcher went ahead to administer the questionnaires. The questionnaires were physically administered to the level 4 students in their various classrooms. A digital questionnaire was made and sent to the level 5 students as they had completed their physical class sessions already, so the researcher could not reach them physically.

The researcher went to the various departments in the faculty of Education and presented herself and authorization to the delegates of these departments seeking permission to administer these questionnaires, which was granted. The researcher explained the purpose and procedures of this research to the respondents and later handed them out to be filled. The questionnaires were filled and handed back immediately.

Table 4: Return Rate of Students' Questionnaire

School	Number Administered	Number Returned	Return Rate (%)
University of Yaoundé 1	205	179	87.3
University of Buea	105	104	99.05

Table 4 above shows that a total of 310 questionnaires were administered to students and 283 were returned.

Data Analysis

As soon as data was collected, analysis commenced. Data validation was established. This is to ensure that data was collected without any bias. Data was later edited to identify errors that could hamper the accuracy of the results. After that, data coding was established. Data was grouped and values were assigned to responses from the survey. The quantitative data was arranged systematically by the researcher and was computed applying statistical tolling SPSS (Statistical Product for Service Solution). Inferential statistics was used in this study. Ordinal Regression analysis and the Spearman rank were conducted to predict the effect of e-learning on students' performance. This is because the data set were not normally distributed, so the researcher had to adopt Ordinal regression instead of the Simple Linear Regression analysis.

Ethical Consideration

According to Silverman (2013), ethical considerations include the right of the participants to withdraw from the research at any stage; protection of the participants; obtaining a consent form; and causing no harm.

Voluntary Participation

The participants were invited to participate in this process but were not forced to participate. Participation was completely voluntary.

Informed Consent

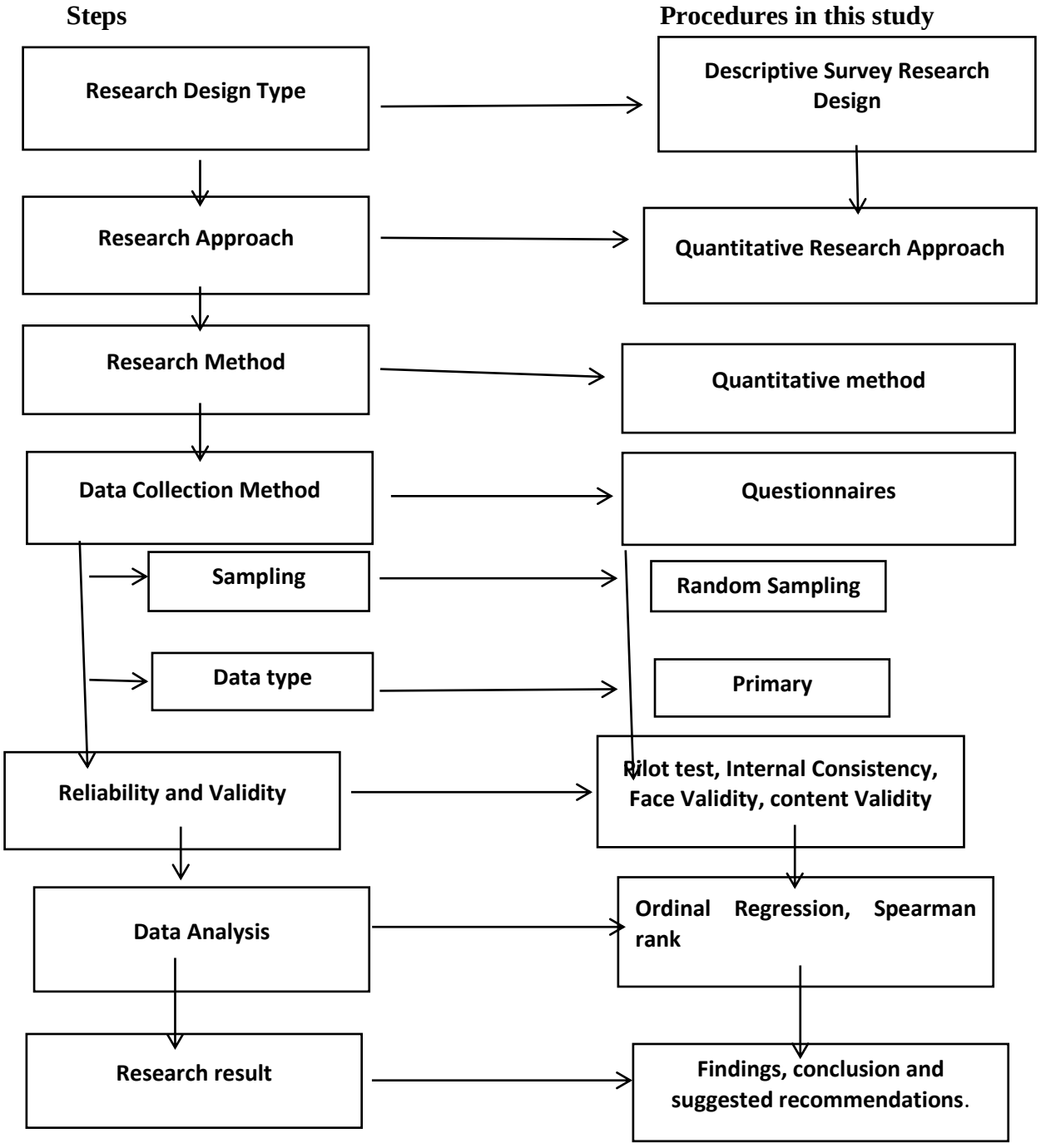
Participants were fully informed on the procedures involved in the research and the objectives of the study before commencing this process.

Confidentiality and Anonymity

Privacy was guaranteed to the researchers as they would remain anonymous throughout the research and their responses would remain confidential. They were told not to write any names on the questionnaires that could disclose their identity. Equally, permission

was guaranteed as the researcher was granted permission by the University to carry out this research.

Figure 3: The Research Design of the Study



Source: Author's Framework

Chapter Summary

In this chapter, the research methodology was discussed. A descriptive survey design was adopted in this study alongside a quantitative approach. A questionnaire was designed and was given to some people to scrutinise and check the wordings as well as the items of the questions before the distribution to respondents. A sample size of three hundred and ten (310) respondents composed of masters 1 and 2 students in the Faculty of Education from the University of Yaoundé 1 and Buea were selected. Data was computed using the SPSS; Descriptive and inferential statistics were used to analyse this data.

CHAPTER FOUR

This section presents the different results of our analysis. We will first of all present the descriptive statistics results, then the inferential statistics results.

DESCRIPTIVE STATISTICS

Socio demographics information

Over the 283 Masters students who responded to the questionnaire, 115 are males (40,6%) and 168 are females (59,4%) as presented in the following table.

Table 5: Gender of participants

Gender

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Male	115	40,6	40,6	40,6
Female	168	59,4	59,4	100,0
Total	283	100,0	100,0	

Source: Researcher Field Work (2022)

Table 4: School of the respondents

School of the respondents

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
University of Yaoundé 1	179	63.3	63.3	63.3
University of Buea	104	36.7	36.7	100,0
Total	283	100,0	100,0	

Source: Researcher Field Work (2022)

Two Universities were retained for conducting this study. According to the results of Table 4, 179 students were from the University of Yaoundé 1 (63.3%), 104 students were from the University of Buea (36.7%).

Table 5: Level of study

Level of study

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Masters 1	203	71,7	71,7	71,7
Masters 2	80	28,3	28,3	100,0
Total	283	100,0	100,0	

Source: Researcher Field Work (2022)

As we have chosen to work with Master's students, the number of students who responded to the questionnaire is 203 students for masters 1 (71,7%) and 80 students for Master's 2 (28%).

Table 6: Frequency of computer usage

Frequency of computer usage

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Once a week	59	20,8	20,8	20,8
2-3 times a week	102	36,0	36,0	56,9
4-5 times a week	55	19,4	19,4	76,3
6 or more times a week	67	23,7	23,7	100,0
Total	283	100,0	100,0	

Source: Researcher Field Work (2022)

The frequency of computer usage varies from one student to another. Among the students, 59 use their computer once a week (20,8%), 102 use their computer two to three times a week (36%), 55 students use their computer four to five times a week (19,4%) and 67 students use their computers six or more times a week (23,7%).

Table 7: Frequency of internet connection

Frequency of internet connection

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Everyday	106	37,5	37,5	37,5
	Twice a week	64	22,6	22,6	60,1
	thrice a week	40	14,1	14,1	74,2
	At least one month	56	19,8	19,8	94,0
	Never	17	6,0	6,0	100,0
	Total	283	100,0	100,0	

Source: Field Work (2022)

Table 7 shows that the frequency of internet connection varies from one student to another. Among the students, 106 are connected everyday (37,5%), 64 students are connected twice a week (22,6%), 40 students are connected thrice a week (14,1%) 56 students are connected at least one month (19,8%) and 17 are never connected (6%).

Table 8: Possession of a smartphone

Possession of a smartphone

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Yes	270	95,4	95,4	95,4
	No	13	4,6	4,6	100,0
	Total	283	100,0	100,0	

Source: Field Work (2022)

Concerning the possession of a Smartphone, 270 students agreed to be in possession of a smartphone (95,4%), while 13 revealed not to be in possession of one.

Statistics related to the independent variable

In analysing Tables 9, 10, 11, 12, 13 the mean values greater than 3.0 is considered high impact of e-learning, while mean values less than 3.0 is considered low students' performance given the fact that we are using a 5 Likert scale analysis.

Table 9: E-assignment

E-assignment

Descriptive statistics

E-assignment	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard deviation
I have adequate training on how to submit my assignment online.	98 34,6%	68 24%	25 8,8%	49 17,3%	43 15,2%	**2,5442**	**1,48539**
Online assignment encourages me to submit my task or work on time.	26 (9,2%)	34 (12%)	71 (25,1%)	95 (33,6%)	57 (20,1%)	**3,4346**	**1,20216**
I can effectively submit my homework on Google classroom without any help.	34 12%	53 18,7%	43 15,2%	91 32,2%	62 21,9%	**3,3322**	**1,32726**
I perform better when I conduct my homework online than on paper.	44 (15,5%)	61 (21,6%)	63 (22,3%)	89 (31,4%)	26 (9,2%)	**2,9717**	**1,23451**
My lecturers always put notes or make remarks on my online homework so that I can perform better the next time.	50 17,7%	68 24%	61 21,6%	74 26,1%	30 10,6%	**2,8799**	**1,27429**
Overall E-Assignment						**3,0325**	**,83848**

Source: Field Work (2022)

The table above shows that the impact of E-assignment on students' performance is low (m=3,0325, SD=.83848). Among the 5 items that were designed to measure the influence of E-assignment, only 2 of the elements have a mean of 3 which is the cut-off mean. This shows that the influence of E-assignment is low partly due to poor or no proper mastering of digital tools by students.

Table 10: E-notes

E-Notes

Descriptive statistics

E-Notes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
Our lecturers provide us with e-notes to complement that which is presented in lectures.	44 15,5%	38 13,4%	46 16,3%	114 40,3%	41 14,5%	3,2473	1,29741
I can easily get access to notes shared by the lecturers online.	24 8,5%	35 12,4%	55 19,4%	116 41%	53 18,7%	3,4912	1,17710
With e-notes, I can read and prepare for lectures in advance	20 7,1%	28 9,9%	59 20,8%	121 42,8%	55 19,4%	3,5760	1,12218
I have a better understanding of the lectures with e-notes	37 13,1%	39 13,8%	75 26,5%	94 33,2%	38 13,4%	3,2014	1,22260
I prefer e-notes to notes taken in class during lectures.	61 21,6%	72 25,4%	60 21,2%	62 21,9%	28 9,9%	2,7314	1,29043
Over all E-Notes						**3,2495**	**,79508**

Source: Field Work (2022)

The table above shows that E-notes have an impact on students' performance (m=3,2495, SD=.79508). Among the 5 items that were designed to measure the influence of E-notes, 4 of the elements have a mean of 3 which is the cut-off mean. This shows that most students can easily access notes and videos shared online and they perform better when using this method of learning.

Table 11: E-Collaboration

E-Collaboration

Descriptive statistics

E-Collaboration	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Ecart type
I have good skills on working a presentation online with my classmates	43 15,2%	78 27,6%	63 22,3%	74 26,1%	25 8,8%	2,8587	1,21799
I enjoy working with my teammates in a virtual space	32 11,3%	55 19,4%	67 23,7%	104 36,4%	25 8,8%	3,1237	1,16490
I can effectively converse and exchange information with others using e-learning communication tools	17 6%	36 12,7%	54 19,1%	122 43,1%	54 19,1%	3,5654	1,11651
I prefer e-collaboration to physical collaboration	65 23%	74 26,1%	60 21,2%	62 21,9%	22 7,8%	2,6537	1,26332
Every team mate participates during group work.	56 19,8%	85 30%	50 17,7%	63 22,3%	29 10,2%	2,7314	1,28768
Over all E-Collaboration						**2,9866**	**,78367**

Source: Researcher Field Work (2022)

The table above shows that the impact of E-collaboration on students' performance is very low (m= 2,9866, SD=.78367). Among the 5 items that were designed to measure the influence of E-collaboration, only 2 of the items have a mean of 3 which is the cut-off mean. This shows that the influence of E-collaboration is low partly due to the fact that students do not possess the necessary skills required to work with peers online and as such are not familiar with this mode of learning.

Table 12: Video Conferencing

Video Conferencing

Descriptive statistics

Students' performance	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
I am aware of the existence of videoconferencing tools.	17 6%	35 12,4%	30 10,5%	101 35,7%	100 35,3	3,8198	1,21137
My network is always good during video conferencing.	58 20,5%	92 32,5%	57 20,1%	57 20,1%	19 6,7%	2,6007	1,20854
I am able to join a videoconferencing meeting without any help	28 9,9%	59 20,8%	50 17,7%	95 33,6%	51 18%	3,2898	1,25794
I have a good phone or computer that permits me to join the virtual classroom.	33 11,7%	63 22,3%	47 16,6%	92 32,5%	48 17%	3,2085	1,28645
I can effectively manage the video conferencing tools without disturbing the other participants.	32 11,3%	54 19,1%	65 23%	89 31,4%	43 15,2%	3,2014	1,23702
Over all Video conferencing						**3,3534**	**,88245**

Source: Field Work (2022)

The table above shows that Video Conferencing has an impact on students' performance. (m=3,3534, SD=.88245). Among the 5 items that were designed to

measure the influence of Video conferencing, 4 of the elements have a mean of 3 which is the cut-off mean. This shows that the Video conferencing has an influence on students' performance.

Table 13: Students' performance

Students' performance

Descriptive statistics

Students' performance	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard deviation
The use of e-learning enhances my learning performance.	15 5,3%	40 14,1%	61 21,6	109 38,5	58 20,5	3,5477	1,12374
I become motivated to learn independently.	13 4,6%	36 12,7%	59 20,8%	127 44,9%	48 17%	3,5689	1,05757
Students are more engaged in the E-learning method than in the traditional method.	45 15,9%	72 25,4%	67 23,7%	71 25,1%	28 9,9%	2,8763	1,23580
Students frequently participate more with e-learning.	36 12,7%	73 25,8%	66 23,3%	79 27,9%	29 10,2%	2,9717	1,20838
E-learning enhances my learning experience as well as communication skills	9 3,2%	34 12%	41 14,5%	119 42%	80 28,3%	3,8021	1,07670
Over all Students performance						**3,3534**	**,73847**

Source: Researcher Field Work (2022)

The table above shows that students' performance is low (m=3,3534, SD=.73847). Among the 5 items that were designed to measure students' performance, 3 of the elements have a mean of 3 which is the cut-off mean.

Inferential Statistics

In order to determine the kind of test that we are going to use to analyse the collected data, we need first of all to carry out the test of normality to determine if our data are normally distributed or not. The following table present the result of the normality test.

Table 14: Test of normality

Test of normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistique	ddl	Signification	Statistique	ddl	Signification
E_Assignment	,064	283	,006	,989	283	,035
E_Notes_	,115	283	,000	,977	283	,000
E_Collaboration	,079	283	,000	,988	283	,022
E_Video_Conferencing	,078	283	,000	,986	283	,006
Students_performance	,089	283	,000	,984	283	,003

a. Correction de signification de Lilliefors

Source: Researcher Field Work (2022)

In this table, we are interested only on the results of Kolmogorov-Smirnov because our sample population is greater than 100. Also, the table shows that the data are not normally distributed because all the p value of our variables are statistically significant, meaning that they are lower than 0.05. Furthermore, as we have those results, we are going to use the ordinal regression to analyse and test our hypothesis.

Presentation of the normality results of the first independent variable

The figures 5 and 6 reveal the results of the normality test for e- assignment. In the two images the points don't fit the line of the line of the normogramm. This means that the data for the variable of E-assignments are not normally distributed.

Figure 4: Histogram of normality for E-assignment

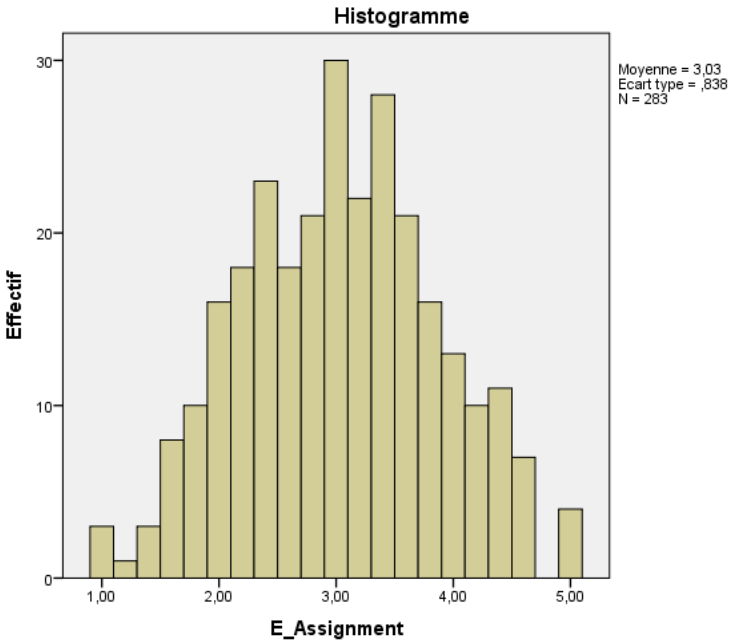
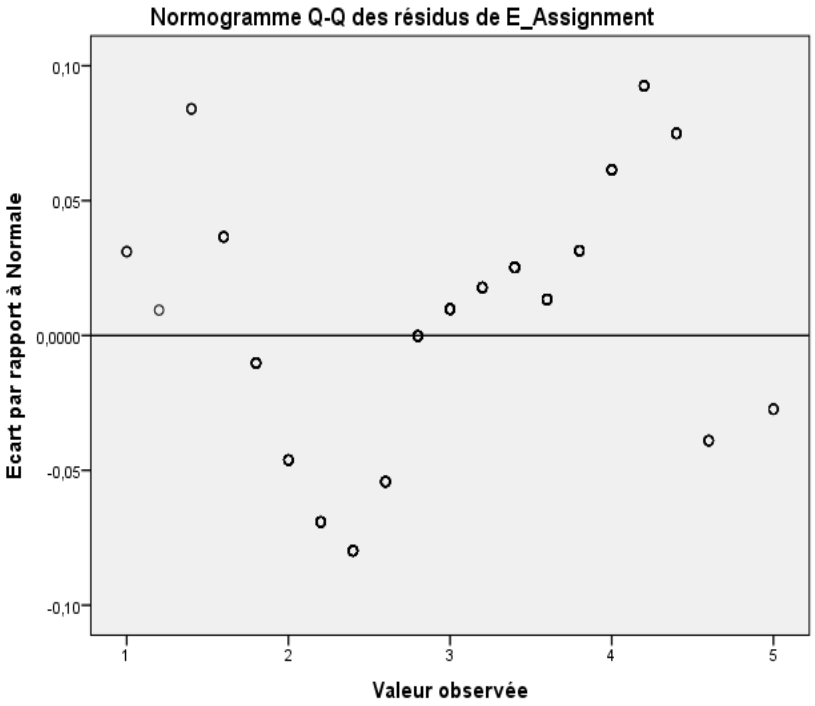


Figure 5: Normogramm results for E-assignment



The figures 7 and 8 reveal the results of the normality test for the E-notes. In the two images the points don't fit the line of the line of the normogramm. This means that the data for the variable of E-notes are not normally distributed.

Figure 6: Histogram of normality for E-notes

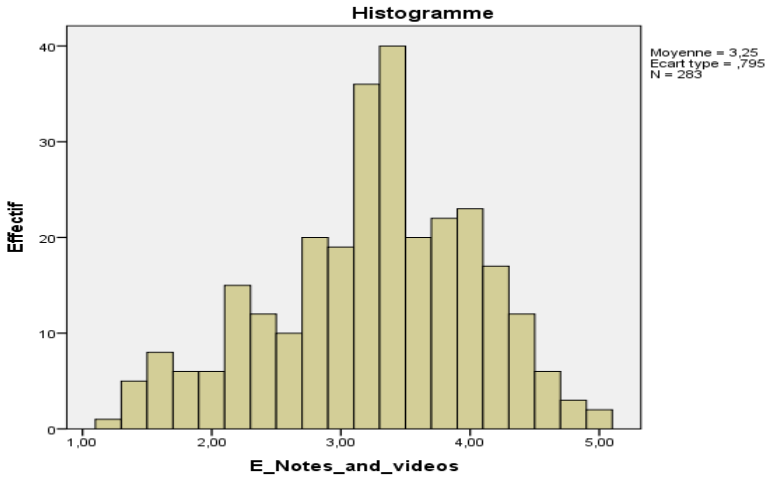
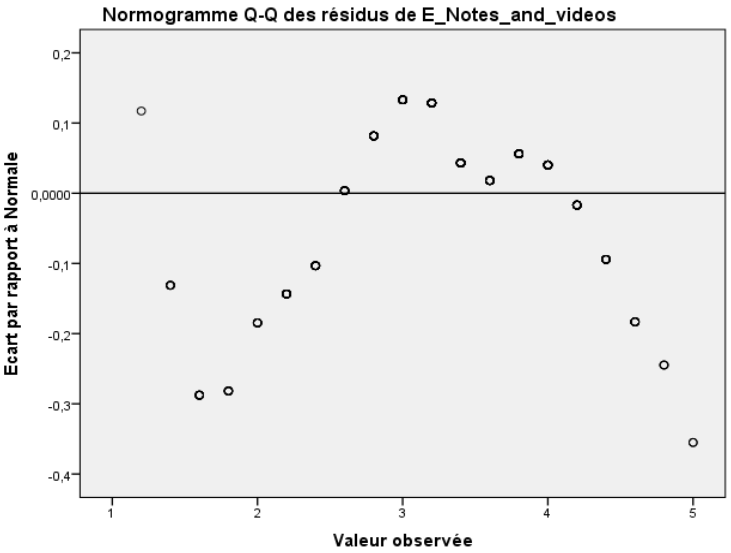


Figure 7: Normogramm results for E-notes



The figures 9 and 10 reveal the results of the normality test for the language. In the two images the points don't fit the line of the line of the normogramm. This means that the data for the variable of E-collaboration are not normally distributed.

Figure 8: Histogram of normality for E-collaboration

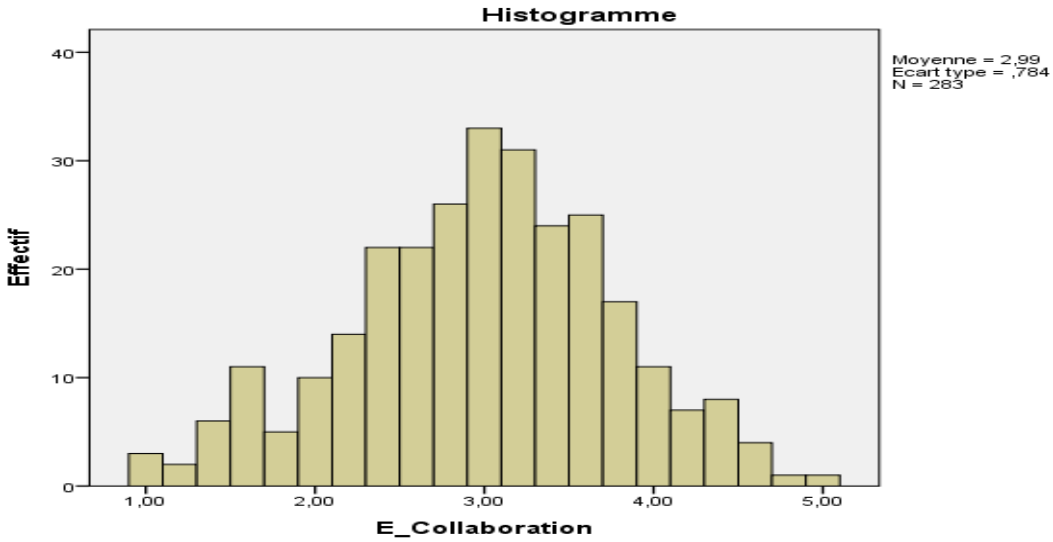
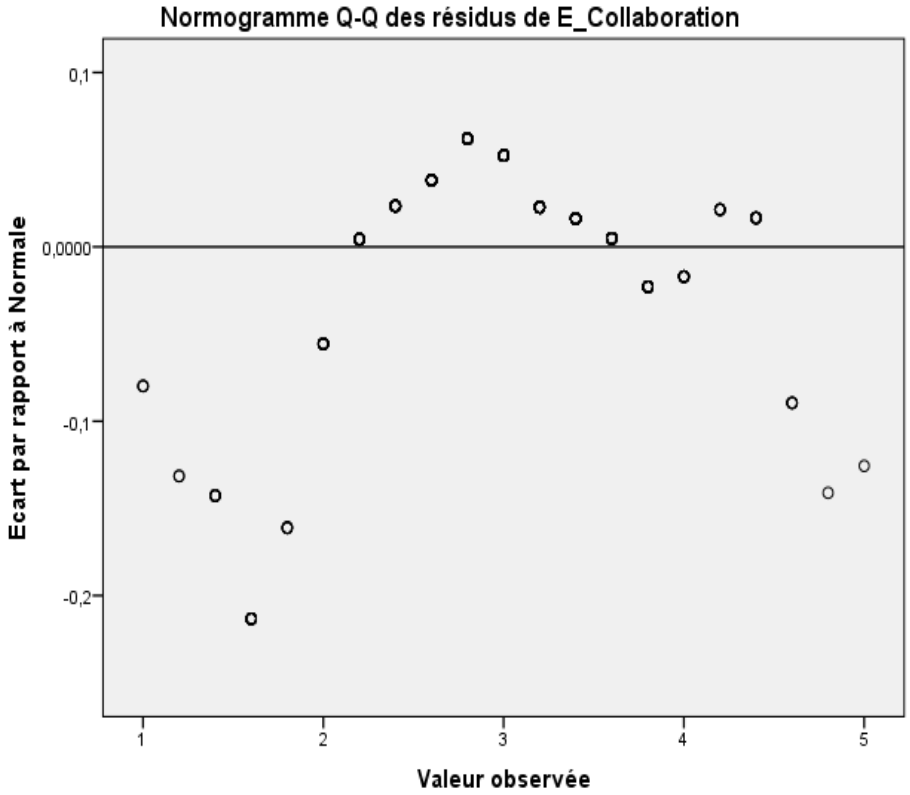


Figure 9: Normogramm results for E-collaboration



The figures 11 and 12 reveal the results of the normality test for video conferencing. In the two images the points don't fit the line of the line of the normogramm. This means that the data for the variables of video conferencing are not normally distributed.

Figure 10: Histogram of normality for video conferencing

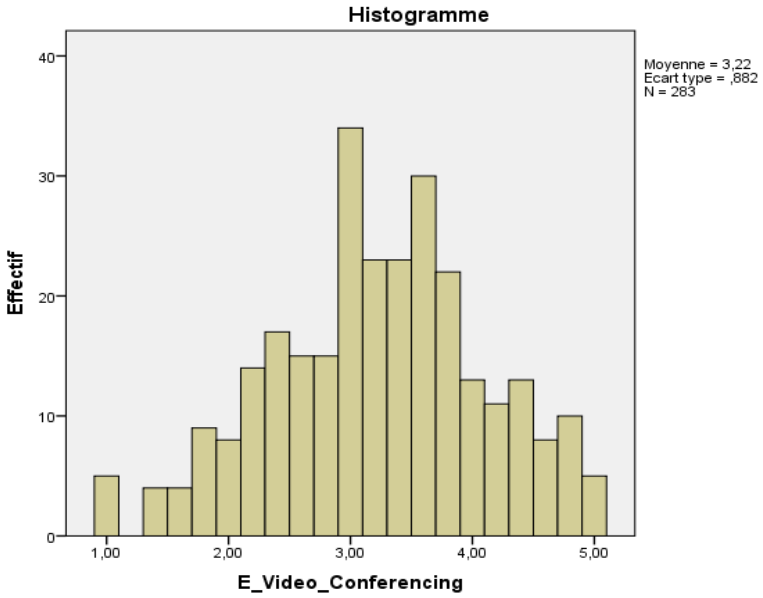
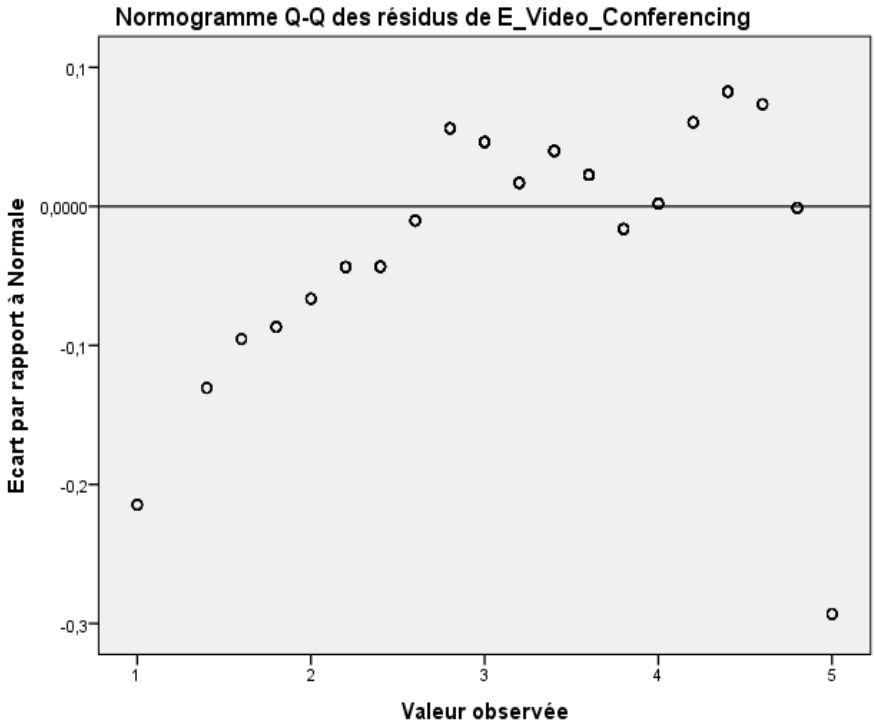


Figure 11: Normogramm results for Video conferencing



The figures 13 and 14 reveal the results of the normality test for the students' performance. In the two images the points don't fit the line of the line of the normogramm. This means that the data for the variable of students' performance are not normally distributed.

Figure 12: Histogram of normality for students' performance

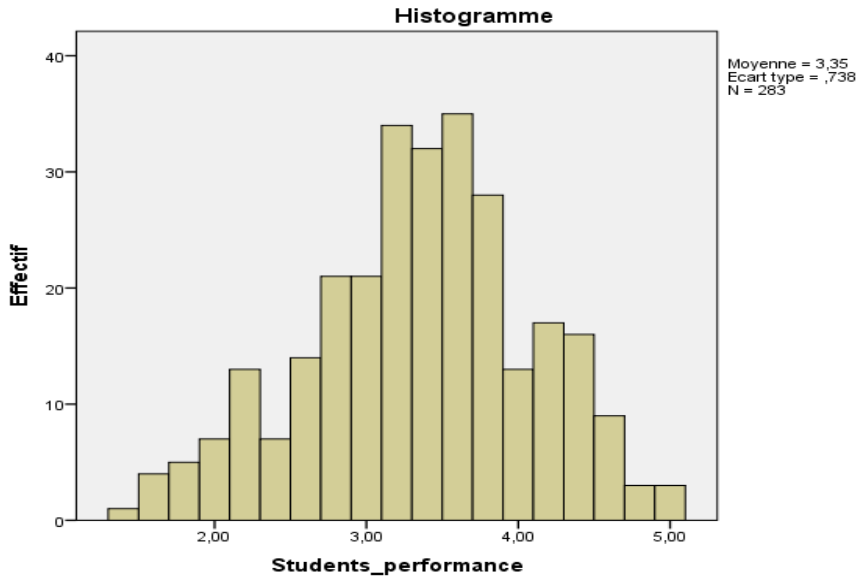


Figure 13: Normogramm results for Students' performance

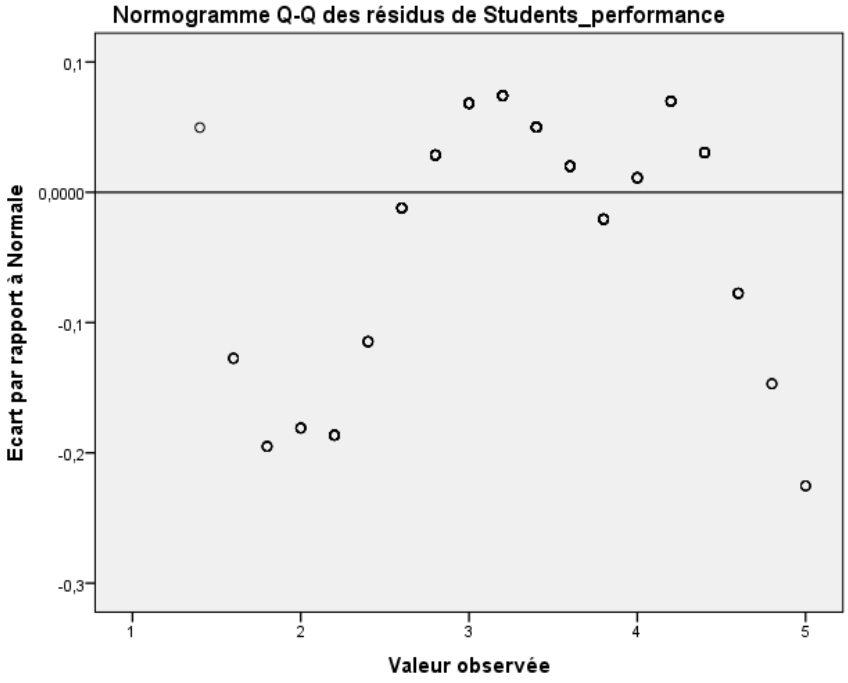


Table 15: Ordinal regression

Ordinal regression

Parameter Estimates

		Estimates	Std. error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Students_performance = 1,40]	,128	1,137	,013	1	,911	-2,100	2,356
	[Students_performance = 1,60]	1,837	,682	7,261	1	,007	,501	3,172
	[Students_performance = 1,80]	2,636	,609	18,752	1	,000	1,443	3,828
	[Students_performance = 2,00]	3,253	,584	31,005	1	,000	2,108	4,398
	[Students_performance = 2,20]	3,974	,578	47,292	1	,000	2,841	5,106
	[Students_performance = 2,40]	4,278	,580	54,460	1	,000	3,142	5,414
	[Students_performance = 2,60]	4,794	,587	66,636	1	,000	3,643	5,945
	[Students_performance = 2,80]	5,405	,601	80,857	1	,000	4,227	6,583
	[Students_performance = 3,00]	5,883	,614	91,790	1	,000	4,680	7,087
	[Students_performance = 3,20]	6,551	,634	106,661	1	,000	5,307	7,794

	[Students_performance = 3,40]	7,138	,653	119,534	1	,000	5,858	8,418
	[Students_performance = 3,60]	7,823	,675	134,312	1	,000	6,500	9,146
	[Students_performance = 3,80]	8,493	,697	148,549	1	,000	7,127	9,859
	[Students_performance = 4,00]	8,864	,709	156,320	1	,000	7,475	10,254
	[Students_performance = 4,20]	9,476	,730	168,436	1	,000	8,045	10,907
	[Students_performance = 4,40]	10,397	,769	182,789	1	,000	8,890	11,904
	[Students_performance = 4,60]	11,425	,842	183,951	1	,000	9,774	13,076
	[Students_performance = 4,80]	12,141	,939	167,171	1	,000	10,301	13,982
Location	E_Assignment	,255	,149	2,924	1	,087	-,037	,548
	E_Notes_	1,009	,170	34,999	1	,000	,674	1,343
	E_Collaboration	,701	,166	17,779	1	,000	,375	1,027
	E_Video_Conferencing	,193	,139	1,915	1	,166	-,080	,466

Link function: Legit.

Source: Field Work (2022)

The results of the ordinal regression reveal the following

E-assignment is a non- significant but positive predictor of students' performance. For every one unit increase in E-assignment, there is a predicted increase of **(ß=0.255)** in the log odds of being at a higher level on students' performance.

E-Notes is a significant positive predictor of students' performance. For every one unit increase on E-notes, there is a predicted increase of **(ß=1.009)** in the log odds of being at a higher level on students' performance.

E-collaboration is a significant and positive predictor of acquisition for students' performance. For every one unit increase on E-collaboration, there is a predicted increase of **(ß=0.701)** in the log odds of being at a higher level on students' performance.

Video conferencing is a non- significant positive predictor of acquisition for students' performance. For every one unit increase on video conferencing, there is a predicted increase of **(ß=0.193)** in the log odds of being at a higher level on students' performance.

From these results, we can say that E-notes and E-collaboration are the two strongest predictors of students' performance by using ICT tools in education. Both of them have respectively a prediction percentage of 100,9% and 70,1%. E-assignment and video conferencing are also predictors but their percentages of prediction is very low (25% and 19,3%)

Table 16: Spearman's rho

Correlations

			E-Assignment	E-Notes and _videos	E-Collaboration	Video Conferencing	Students performance
Spearman's rho	E-Assignment	Correlation Coefficient	1,000	,515**	,377**	,389**	,370**
		Sig. (2-tailed)	.	,000	,000	,000	,000
		N	283	283	283	283	283
	E-Notes and videos	Correlation Coefficient	,515**	1,000	,487**	,406**	,534**
		Sig. (2-tailed)	,000	.	,000	,000	,000
		N	283	283	283	283	283
	E-Collaboration	Correlation Coefficient	,377**	,487**	1,000	,460**	,488**
		Sig. (2-tailed)	,000	,000	.	,000	,000
		N	283	283	283	283	283
	Video Conferencing	Correlation Coefficient	,389**	,406**	,460**	1,000	,398**
		Sig. (2-tailed)	,000	,000	,000	.	,000
		N	283	283	283	283	283
	Students' performance	Correlation Coefficient	,370**	,534**	,488**	,398**	1,000
		Sig. (2-tailed)	,000	,000	,000	,000	.
		N	283	283	283	283	283

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Researcher Field Work (2022)

In table 16, we have chosen the Spearman Rank Correlation because the data set were not normally distributed. This correlation analysis was done in order to know if there was a relationship between the different independent variables and the dependent variable.

Hypothesis testing

Ho1: E-assignment has no significant effect on student's performance

Ha1: E-assignment has a significant effect on student's performance

The results of the Spearman Rank Correlation as shown in the table indicate a low positive correlation between E-assignment and students' performance, **(r_s=0.370, p<0.05).**

Decision: We reject the null hypothesis and accept the alternative.

Ho2: E-notes and videos have no significant impact on students' performance

Ha2: E-notes and videos have a significant impact on student's performance

The results of the Spearman Rank Correlation show a moderate positive correlation between E-notes and videos and students' performance **(*r*=0.534, p<0.05).**

Decision: We reject the null hypothesis and accept the alternative

Ho3: E-collaboration has no influence on student's performance

Ha3: E-collaboration has an influence on student's performance

The results of the Spearman Rank Correlation show a moderate positive correlation between E-collaboration and students' performances, **(*r*=0.488, p<0.05).**

Decision: We reject the null hypothesis and accept the alternative

Ho4: Video conferencing has no influence on student's performance

Ha4: Video conferencing has an influence on student's performance

The results of the Spearman Rank Correlation show a low positive correlation between video conferencing and students' performance, **(*r*=0.398, p<0.05).**

Decision: We reject the null hypothesis and accept the alternative

CHAPTER V

DISCUSSION, CONCLUSION AND RECOMMENDATION

Discussion

This chapter comprises a discussion of the results that were presented in chapter four. The discussion aims at giving responses to the research questions and hypothesis presented in chapter 1.

Socio- demographic data.

The socio-demographic characteristics of the participants play a significant role in understanding the potential impact of e-learning on students' performance. In the study on e-learning and its effects on student performance, these characteristics provide valuable context and considerations for interpreting the findings.

In this section, the socio-demographic characteristics of the participants in the study are discussed. A total of 283 master's students took part in the study, with a higher percentage of female participants compared to male participants. The higher percentage of female participants in the study suggests that the effects of e-learning on student performance may be influenced by gender dynamics. It is important to consider any potential gender differences in engagement, motivation, or learning styles that could affect how students respond to e-learning interventions. This can help in identifying any gender-specific patterns or needs when analyzing the impact of e-learning on student performance.

The study involved two universities, namely the University of Yaoundé 1 and the University of Buea. The involvement of two universities in the study indicates a diverse sample, which adds to the generalizability of the findings. It suggests that the effects of e-learning on student performance may not be limited to a specific institution or context but can be applicable across different educational settings.

The majority of the participants were at the Master's 1 level, while a smaller proportion were at the Master's 2 level. This is because the students at the Master’s 2 level had already completed their courses and were not present on campus during the data collection period.

In terms of computer usage frequency, a significant percentage of students reported using their computers 2-3 times a week, followed by those who used them six or more

times a week. A smaller percentage reported using their computers once a week or four to five times a week. Regarding internet connection frequency, the majority of the students reported being connected every day, followed by those who were connected twice a week or thrice a week. A smaller percentage reported being connected at least once a month, while a few students reported never being connected to the internet. The frequency of computer usage and internet connection among the participants indicates their access to technology. Students who use their computers more frequently or have regular internet connectivity may have a higher level of engagement with e-learning materials and resources. This can potentially impact their performance positively, as they may have more opportunities to access and engage with e-learning materials, collaborate with peers, and seek support from instructors.

In terms of smartphone ownership, a large majority of the students reported having a smartphone, while a small percentage reported not owning one. Smartphone ownership is relevant to the study because smartphones can serve as a tool for accessing e-learning materials and resources. The high percentage of smartphone ownership suggests that students may have additional opportunities to engage with e-learning outside of the traditional computer-based platforms.

Considering these socio-demographic characteristics helps in understanding the context in which e-learning interventions are implemented and how they may impact student performance. It allows for the identification of potential factors that could moderate or mediate the relationship between e-learning and student performance. For example, gender differences, access to technology, and prior knowledge may influence how students engage with e-learning materials and subsequently affect their performance outcomes.

Considering these socio-demographic factors is important for understanding the characteristics of the participants and how they may influence the findings of the study on the effects of e-learning on student performance.

Discussion by Objectives

Research Question 1: What is the effect of e-notes and lectures on students' performance?

The objective of this research question was to investigate the effect of e-notes and lectures on students' performance. The findings revealed that most students agreed that their lecturers provided online notes to complement lectures, and they could easily access these materials. Students also reported that online notes helped them study and prepare for lectures in advance, and they believed that they had a better understanding of the course through electronic notes. However, it was found that most students did not prefer electronic notes over notes taken in class during lectures.

The overall mean score for the items related to e-notes indicated a positive effect. The results of the ordinal regression analysis and Spearman rank correlation further supported this finding, indicating that e-notes were significant positive predictors of students' performance. The analysis showed that an increase in e-notes was associated with a predicted increase in students' performance.

These findings are consistent with a study by Nasim et al. (2021), which also highlighted the positive impact of video-based learning websites on students' academic performance. The use of video-based learning websites during the COVID-19 pandemic served as an alternative to in-person lectures and helped enhance students' listening, speaking, and writing skills, as well as their in-depth knowledge of the subject. The study recommended the inclusion of video learning in the curriculum to improve students' performance.

In relation to the broader context of e-learning and its effects on students' performance, these findings support the notion that the integration of e-notes and videos can have a positive impact on students' learning outcomes. These digital resources provide students with additional learning materials, the ability to review content at their own pace, and the opportunity for self-directed learning. However, it is important to consider students' preferences and ensure a balance between digital and in-person learning experiences.

Overall, this analysis contributes to the understanding of how e-notes and videos can positively influence students' performance in the context of e-learning. It underscores the potential of e-learning platforms to supplement traditional teaching methods and

engage students in more interactive and flexible learning experiences. By incorporating e-notes and videos effectively, educators can leverage technology to support students' learning and enhance their overall academic achievements.

Research Question 2: What is the effect of e-assignment on students' performance?

The research question focused on investigating the effect of e-assignment on students' performance. The findings reveal that most students in the study were not adequately trained on how to submit their assignments online. However, it was observed that when using e-assignment, students tended to submit their tasks on time, and they were able to effectively submit their homework on platforms like Google Classroom without assistance.

On the aspect of performance, the results indicate that most students did not agree that they performed better when conducting their homework online compared to using traditional paper-based methods. Additionally, it was found that the majority of lecturers did not provide notes or remarks on students' online homework to help them improve their performance.

The overall mean score for the items related to e-assignment is 3.03, suggesting a moderate level of agreement among the students. The ordinal regression analysis shows that e-assignment is a non-significant but positive predictor of students' performance. This means that while e-assignment has some influence on performance, its predictive power is relatively low.

The Spearman Rank Correlation further confirms a low positive correlation between e-assignment and students' performance. The correlation coefficient ($r=0.370$) indicates a positive relationship, and the p-value ($p<0.05$) suggests that the correlation is statistically significant. Consequently, the null hypothesis is rejected, and it can be concluded that there is a significant, albeit low, positive correlation between e-assignment and students' academic performance This finding aligns with a study by Cook and D. Bishop (2018) that examined the impact of online homework, time spent on homework, gender, and metacognition on student achievement in undergraduate biology courses. Their research indicated a correlation between online homework scores and course grades when the homework constituted a significant portion of the overall grade. They also highlighted the importance of time spent on homework in achieving higher course grades and increasing student engagement with the course material. In

relation to the broader study on e-learning and its effects on students' performance, these findings suggest that while e-assignment may have a positive influence on performance, its impact is relatively modest. Other factors, such as instructional design, teacher feedback, and students' level of engagement, may also play significant roles in determining the overall effectiveness of e-learning approaches. Therefore, it is essential to consider these factors holistically when examining the effects of e-learning on students' performance.

Research Question 3: What is the effect of e-collaboration on students' performance?

The objective of this research question was to analyze the impact of e-collaboration on students' academic performance. The findings indicate that most students in the study did not possess good skills in working on an online presentation with their classmates. However, they expressed enjoyment in working with their teammates in a virtual space. Additionally, it was observed that most students agreed that they could effectively converse and exchange

information with others using e-learning communication tools. On the other hand, students did not prefer online collaboration over physical collaboration, and it was noted that not all team members participated equally during group work.

The overall mean score for the items related to e-collaboration is 2.9, indicating a moderate level of agreement among the students. The ordinal regression analysis shows that e-collaboration is a significant and positive predictor of students' performance. For every one unit increase in e-collaboration, there is a predicted increase in the log odds of being at a higher level of performance. The Spearman Rank Correlation further confirms a moderate positive correlation between e-collaboration and students' performance, suggesting a statistically significant relationship.

These findings are consistent with a study conducted by Mehar (2020), which investigated the effect of an online collaborative learning strategy on achievement in economics in relation to self-efficacy. The study found that students taught through online collaborative learning demonstrated greater achievement compared to those taught through conventional teaching methods. The research employed a pre-test and post-test factorial design with a sample of 120 Economics students from two English medium private schools in Amritsar, Punjab. The schools were randomly selected, and

the sample included both experimental and control groups. These findings show that e-collaboration plays a crucial role in positively influencing students' academic performance in e-learning. Despite some students initially lacking skills in online collaboration, the study reveals a positive relationship between e-collaboration and performance. This highlights the importance of promoting effective teamwork, communication, and the use of e-learning tools in educational settings to enhance student outcomes.

However, it is important to acknowledge the challenges associated with e-collaboration. Students' preference for physical collaboration and the limited participation of all team members during online group work need to be addressed. By overcoming these challenges, e-collaboration can be more effective in improving students' performance in e-learning environments.

Research Question 4: What is the effect of video conferencing on students' performance?

This research question aimed to examine the effect of video conferencing on students' academic performance. The findings reveal that most students agreed they were aware of the existence of video conferencing tools. However, they expressed disagreement regarding the quality of their network during video conferencing. Nonetheless, most students reported being able to join a video conferencing meeting without assistance and possessing computers that allowed them to participate in virtual classrooms. Moreover, students agreed that they could effectively manage video conferencing tools without disturbing other participants.

The overall mean score for the items related to video conferencing is 3.35, indicating a moderate level of agreement among the students. The ordinal regression analysis shows that video conferencing is a non-significant but positive predictor of students' performance. While video conferencing has some influence on performance, its predictive power is relatively low. The Spearman Rank Correlation confirms a low positive correlation between video conferencing and students' performance, supporting a statistically significant relationship.

These findings are consistent with the work of Palisada (2018), which examined the use of video conferencing technology to enhance classroom instruction and its effect on students' attitudes toward learning. The study found a strong positive and significant

difference in students' attitudes before and after engaging in video conferencing. Thus, video conferencing was found to have a significant influence on students' attitudes toward learning. In the context of e-learning and its effects on students' performance, this analysis suggests that while video conferencing may influence students' attitudes, it does not significantly predict or enhance their academic performance. It is important to consider these findings when designing and implementing e-learning strategies, recognizing that video conferencing alone may not be sufficient to drive significant improvements in students' academic achievements.

Conclusion

This study was out to assess the effect of e-learning on students' academic performance. The study was guided by four research questions and four hypotheses. From the findings of the study, it could be concluded that e-assignment, e-videos/notes, e-collaboration and video conferencing affect students' academic performance. From the ordinal regression analysis, the study concluded that e-notes and e-collaboration were the best predictors of academic performance of university students. E-notes is a significant positive predictor of students' performance. This means that an increase in the use of e-notes and videos will lead to an increase in students' performance. Therefore, instructors and institutions should integrate e-notes and videos into the curriculum to enhance learning and performance. E-collaboration was found to significantly predict students' performance, highlighting the importance of effective teamwork and communication in virtual environments. However, students' preference for physical collaboration needs to be addressed. Thus, it means e-collaboration affects students' performance but more students should be trained how to use this mode of learning so they become familiar with it. E-assignment and video conferencing are also predictors but they are non-significant and have a very weak correlation with students' performance. This is probably because students do not have enough training on this innovative mode of learning and are faced with some barriers such as poor internet connectivity and inability to effectively use this mode of learning.

Suggestions

Following the findings obtained in this study, some recommendations were made. The researcher made some recommendations based on the conclusions drawn from the hypotheses and conclusions as follows:

This study has been focused purposely on the E-learning and its effects on students' academic performance in Cameroonian state Universities. The researcher recommends that this topic or a similar study should be carried out on students in other levels of education such as the secondary or primary level by future researchers.

The government and school administrators should organize training seminars and workshops to train the teachers and students on how to effectively use these innovative methods of learning.

Institutions should provide students with easy access to technology such as setting up digital libraries for students.

Limitations of the study

- One of the limitations of this study was accessing the master's level 2 students during the data collection process. This is because at the moment of data collection, level two students had already written their final exams and were no longer coming to school. This limitation was counteracted by administering the questionnaires to them online even though it was struggle because most of them were reluctant to respond to these questionnaires.
- Moreover, the research focused on the effects of e-learning components on performance, without considering other factors that may influence academic achievements.

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APPENDICES

APPENDIX A

I am a research student from the University of Yaoundé 1, Department of Curriculum and Evaluation. The purpose of this study is **to examine E-learning and its impact on students' performances in Cameroonian State Universities.** Do NOT write your name on this questionnaire. Your responses will be anonymous and will never be linked to you personally. Your participation is entirely voluntary. Thank you for your cooperation.

PART I.

Socio-Demographic Characteristics

What is your gender? Male ◯ Female ◯

What is your current level of education? Masters 1 ◯ Masters 2 ◯

How often do you use computers? Once a week ◯ 2-3 times a week ◯ 4-5 times a week ◯

6 or more times a week ◯

How often do you receive online notes? Everyday ◯ twice a week ◯ thrice a week ◯

at least once a month ◯ never ◯

Do you have a smart phone? Yes ◯ No ◯

PART II. Independent Variables

For the following items, please tick the answers that best show your opinion: 1= strongly disagree (SD). 2= Disagree (D). 3=Neutral (N). 4= Agree (A). 5= strongly agree

No	**E-LEARNING**	1	2	3	4	5
A.	**E-ASSIGNMENT**	**SD**	**D**	**N**	**A**	**SA**
1	I have adequate training on how to submit my assignment online.					
2	Online assignment encourages me to submit my work on time.					
3	I can effectively submit my homework on Google classroom without any help.					
4	I perform better when I conduct my homework online than on paper.					
5	My lecturers always put notes or make remarks on my online homework so that I can perform better the next time.					

B.	**E-NOTES/VIDEOS**	**SD**	**D**	**N**	**A**	**SA**
1	Our lecturers provide us with online notes/videos to complement that which is presented in lectures.					
2	I can easily get access to notes/videos shared by the lecturers online.					
3	With online notes/videos, I can read and prepare for lectures in advance.					
4	I have a better understanding of the lectures with e-notes or videos.					
5	I prefer online notes/videos to notes taken in class during lectures.					

C.	**E-COLLABORATION**	**SD**	**D**	**N**	**A**	**SA**
1	I have good skills on working a presentation online with my classmates.					
2	I enjoy working with my teammates in a virtual space.					
3	I can effectively converse and exchange information with others using e-learning communication tools.					
4	I prefer online collaboration to physical collaboration.					
5	Every team mate participates during group work.					

D.	**VIDEO CONFERENCING**	**SD**	**D**	**N**	**A**	**SA**
1	I am aware of the existence of videoconferencing tools such as Zoom, Google Meet, and Skype.					
2	My network is always good during video conferencing.					
3	I am able to join a videoconferencing meeting without any help.					
4	I have a good computer that permits me to join the virtual classroom.					
5	I can effectively manage the video conferencing tools without disturbing the other participants.					

No	**PartIII. Dependent Variable- STUDENTS' PERFORMANCE**	**SD**	**D**	**N**	**A**	**SA**
1	The use of e-learning enhances my learning performance.					
2	I become motivated to learn independently when using e-learning.					
3	Students are more engaged in the electronic learning method than in the traditional method.					
4	Students frequently participate more with electronic learning.					
5	E-learning enhances my learning experience as well as communication skills.					

Thanks for your collaboration.

APPENDIX B

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
****
UNIVERSITE DE YAOUNDE I
****
FACULTE DES SCIENCES DE L'EDUCATION
****
DEPARTEMENT DE CURRICULA ET EVALUATION
****

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
****
UNIVERSITY OF YAOUNDE I
****
FACULTY OF EDUCATION
****
DEPARTEMENT OF CURRILUM AND EVALUATION
****

The Dean

N° 485 /21/UY1/FSE/VDSSE

AUTHORISATION FOR RESEARCH

I the undersigned, **Professor MOUPOU Moïse,** Dean of the Faculty of Education, University of Yaoundé I, hereby certify that **NJOBAM Cynthia YUFELA,** Matricule **19P3872,** is a student in Masters II in the Faculty of Education, Department: **Curriculum and Evaluation**, Specialty: **Curriculum Development and Evaluation.**

The concerned is carrying out a research work in view of preparing a Master's Degree, under the supervision of **Professor YARO Loveline YULE (Associate Professor).** Her work titled: **"E-LEARNING AND ITS EFFECT ON STUDENTS PERFORMANCE IN CAMEROONIAN STATE UNIVERSITIES."**

I would be grateful if you provide her with every information that can be helpful in the realization of her research work.

This Authorisation is to serve the concerned for whatever purpose it is intended for.

Done in Yaoundé..... 09 MARS 2021

For the Dean, by order

Le Vice-Doyen
Professeur

APPENDIX C

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
****
UNIVERSITE DE YAOUNDE I
****
FACULTE DES SCIENCES DE L'EDUCATION
****
DEPARTEMENT DE CURRICULA ET EVALUATION
****

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
****
UNIVERSITY OF YAOUNDE I
****
FACULTY OF EDUCATION
****
DEPARTEMENT OF CURRILUM AND EVALUATION
****

The Dean

N° 460 /21/UY1/FSE/VDSSE

AUTHORISATION FOR RESEARCH

I the undersigned, **Professor BELA Cyrille BIENVENU,** Dean of the Faculty of Education, University of Yaoundé I, hereby certify that **NJOBAM Cynthia YUFELA** Matricule **19P3872,** is a student in Masters II in the Faculty of Education, Department: **Curriculum and Evaluation**, Specialty: **Curriculum Developer and Evaluator.**

The concerned is carrying out a research work in view of preparing a Master's Degree, under the supervision of **Prof. YARO Loveline YULE.** Her work is titled: **"E-LEARNING AND ITS EFFECT ON STUDENTS PERFORMANCE IN CAMEROONIAN STATE UNIVERSITIES."**

I would be grateful if you provide her with every information that can be helpful in the realization of her research work.

This Authorisation is to serve the concerned for whatever purpose it is intended for.

Done in Yaoundé 12 9 JUIN 2022

For the Dean, by order

Le Vice-Doyen