

# Artificial Intelligence: Reconstructing A New Paradigm Shift In Enhancing Ubiquitous Learning (U-Learning) In Higher Education. University Student's Opinion.

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## **Abstract**

Ubiquitous learning (U-learning) refers to learning in which education can take place anywhere and anytime. U-learning is important in situations where physical learning cannot take place due to restriction as observed in the covid-19 pandemic period. In U-learning, learners get access to readily available information in an interactive platform that allows them to interact with each other, their teachers and intelligent tutoring agents. Artificial Intelligence as a field in Computer Science has offered opportunities in which unique tools and technologies that can support the growth of u-learning. The application of AI in Education (AIEd) in areas such as Chatbots and intelligent tutoring systems has been used to assist the process of teaching and learning, educational data mining and in pedagogical innovations. Online learning is a form of U-learning. The aim of this study was to obtain the opinions of students using u-learning in university education at Tom Mboya University regarding AIEd integration in online learning. The study adopted a descriptive survey design. Data was collected using online questionnaires and interviews. A sample of 638 students was obtained from a population of 5700 using Yamane's formula. The collected data was then analyzed using frequencies and percentages. The outcomes of this study indicated that most students are aware of AIEd integration in e-learning. They however indicated that they have not been inducted properly to use various features of the AIEd programs. They further indicated that u-learning can enable them to complete their academic programs promptly since the learners could conduct concurrent learning activities with limited involvement of the lectures. The respondents further indicated that there is need for adoption of Smart Mobile devices in achieving the success of u-learning since smartphones are readily available to them. These findings will help education practitioners to make informed decisions while implementing e-learning as a form of u-learning with the support of Artificial Intelligence.

**Keywords:** Artificial Intelligence (AI), Ubiquitous Learning (U-learning), e-learning, pedagogy

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## **I. Introduction**

Innovations and widespread use of educational technology has given birth to Artificial intelligence in Education (AIEd) and Ubiquitous Learning (U-learning). Success cases of AI innovations have been witnessed in many dimensions; Education not left out. The Key application areas in which AI has been used in educational systems includes; Learning analytics dashboards, teaching robots, adaptive learning systems, Intelligent tutoring systems, and human computer interaction among others (Chen, Xie, & Hwang, 2020). According to Schilit et al., (1994), localization and ubiquity and the vital components u-learning. Demands of education across all levels of learning should be met with the adoption of learning anywhere, anytime without the effects of geographical boundaries.

Mohamed and Lamia (2018) carried out a study involving the use of smart devices in classroom teaching and learning. They looked at the several educational items on the internet that can facilitate online learning. They used flipped classroom teaching as an approach to improving performance in mathematics. The outcome of their study showed that using intelligent tutoring systems helps in improving performance among students.

A study done by El Aissaoui et al., (2020) indicated that the use of intelligent technology has helped in predicting academic outcomes of students in various subjects that were observed. This had proved to be a great breakthrough to educators in need of supporting academically weak learners before they can fail in various subjects. In their suggestion they proposed a machine learning approach using Multiple Linear Regression (MLR) as a model that predicts the performance. The major procedures applied on this methodology included: i) pre-processing and analyzing the characteristics of students using statistical analysis; ii) Selecting critical variables; iii) building MLR models based on variables selected and using cross-validation technique to compare the academic results of the respondents.

Artificial Intelligence in Education (AIEd) have provided educators with opportunities to for more educational innovations that have the capabilities of changing personalized learning, online collaborative and interactive learning and the development of complex educational systems (Pires et al, 2016). It is further important to note that even though AIEd has provided many educational opportunities, several challenges also exist (Gundogan et al., 2018). AI requires skilled personnel in both education and technology, the cost of initial implementation of AIEd can be very expensive for learning institutions in developing countries, and lack of recognition of AIEd in higher education curriculum prevents the successful implementation of AI.

The benefits of AIEd in U-learning comes in handy especially in the times when competency-based curricula are being implemented by educational institutions across the globe (Pires et al. 2016). Chen et al, (2017) suggested a teacher training model using a ubiquitous learning environment. The suggested model had the capability to provide the various teachers with adaptive and personalized content which supports intergroup and intra group collaboration. This supported the teachers with the ability to construct knowledge and inculcate in-depth study. It further promoted reflection amongst its users with the support of summarization and review of the supervisory teachers.

Most of the studies that have been conducted by scholars have focused on the various systems that are powered by AI and how they can be used in educational and non-educational environments. Few studies have focused on the different roles played by AI in learning, to what extent the use of AI is supported by educational policies and educational curricula, how AI is linked to the postulated educational theories and the extent to which AI influence instruction and learning. This paper therefore investigates pedagogical and theoretical aspects of AIEd among university students using u-learning via Moodle Platform.

Some of the studies that have been done to support the use of AIEd u-learning amongst students are shown in Table 1.0 below:

**Table 1.0: Artificial Intelligence methods and techniques used in teaching and learning.**

#	Authors	Year	AIEd Techniques and Methods applied in education.	The Key area of Focus	Sample size
1.	Meyliana et al	2015	Role of the Intelligent Decision Support (IDSS) Systems in Education	Integrating Social media platforms on the formal learning platforms in universities	1021 University students
2.	Rad et al.	2015	Educational IDSS (Intelligent Decision Support Systems)	Assessing the various factors affecting social media network sites and the intentional bias on media. Using Decision Support Systems Technology	291 University Students
3.	Elyazgi et al.	2016	Educational IDSS (Intelligent Decision Support Systems)	The Choice of Electronic books (e-book) by students examining the factors influencing the choice using TOPSIS	417 School Learners
4.	Omorogbe et al.	2016	Educational IDSS (Intelligent Decision Support Systems)	Decision by parents to select Urban Schools in Nigeria: The role of Fuzzy Logic	144 Teachers and Parents
5.	Pires et al.	2016	Using Genetic Algorithm And The Chi-Square function in IDSS	Using Special Needs education in u-learning environments to form Adaptive Objects	3,600 Early Childhood Education Learners
6.	Angeli et al.	2017	Role of AI in Educational Data Mining and Data Warehousing	Using AI to gather Educational Data for both teaching and personalized learning	115 Higher Education Learners
7.	Xu et al.	2017	Role of AIEd in the Prediction of Academic Performance of Learners	Using present learners' academic performance in order to predict future performances.	1000 Students
8.	Khoshi et al.	2018	Using AIEd to ensure teachers are qualified in the various fields of professions.	Criteria to qualify and index teachers using AI technology.	200 University Students
9.	Mohamed et al.	2018	Intelligent Decision Systems in Flipped Classrooms	Using Internet of Things to create Flipped Classrooms Environments	50 University Students

10.	Sirait et al	2018	Educational IDSS (Intelligent Decision Support Systems)	Developing support systems for social Media Platforms for Learning.	401 University students
11.	El Aissaoui et al.	2019	AI Educational Systems for detecting individual Learner Differences to create customized Learner platforms	Applying adaptive learning systems in multi-variate platforms	1235 University Students
12.	Purbasar et al.	2019	Using AI algorithms for Mind Mapping of Learners	Using Intelligent systems to automatically group learners according to provided lists.	275 School Learners
13.	El Aissaoui et al.	2020	Using AI Algorithms to mine Educational Data located on the Internet Libraries	Using Multiple Linear Regressions to conduct multi-facet search of Data	395 School Learners

Table 1.0 shows that several technological studies have been conducted in the past decade in line with how to successfully use Artificial Intelligence in Education (AIEd). The majority of the respondents in the above studies were conducted on learners and teachers in higher education and kindergarten schools. The recommendations of most of the studies show that applying technology in education requires an interactive platform in which ubiquitous learning can be enhanced. With the increased demand for online education, having intelligent tutoring systems can help solve educational challenges if properly implemented.

## II. Methodology

This study adopted Descriptive Survey Design. The study was located at Tom Mboya University (TMU) with a population of 5700. A sample size of 638 was obtained from the population to form the subjects of the study. The sample size was obtained using stratified random sampling since the students fall in different schools and different departments. Data was collected from the student's using questionnaire and interview schedule. To ensure the validity of the research instruments, the questionnaires were analyzed by two experts from the Department of Computer Science and Curriculum and Instructional Technology. The questionnaires were further administered to fifteen respondents from the school of education to ensure readability of the questions. Interviews were open-ended questions and only 15 students were interviewed. The collected data was analyzed using frequencies and percentages. The interview responses were thematically organized, and repeating points were grouped appropriately.

## III. Findings

The study sought the answers to the following questions from the students using online learning in various courses at the school of Biological and Physical Sciences (FBPS) at Tom Mboya University.

1. Ubiquitous learning (u-learning) and Artificial Intelligence for Education (AIEd) are terms well known to me?
2. What is your level of preparedness to learn with the support of technology anywhere, anytime without the involvement of lecturers?
3. How available are AI supported technologies usable in online learning platform adopted by the university?
4. How much experience do you possess as a pre-requisite of using AI supported learning technologies in e-learning platform?
5. Can smart mobile phones be a solution to u-learning (learning anywhere, anytime with the support of technology) if integrated with appropriate AI technologies?
6. Are there serious challenges that you face while using AIEd learning platforms appended in the e-learning platform?
7. Do you agree that AIEd supported platforms are better than online learning platforms in which lecturers have mandatory control?
8. AIEd are beneficial to me as a student.
9. Do the Lecturers have appropriate skills to integrate instructional resources in AIEd powered platforms?
10. What is the level of complexity of AIEd supported online learning platforms?

The results obtained from the respondents were organized based on what level they agree with each question item. A five-point Likert scale was used as shown in Table 2.0 below.

**Table 2.0: Students opinions on usage of Artificial Intelligence for Education**

Potential Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Ubiquitous learning (u-learning) and Artificial Intelligence for Education (AIEd) are terms well known to me?	273(43%)	235(37%)	82(13%)	27(4%)	18(3%)
I am ready to learn with the support of technology anywhere, anytime without the involvement of lecturers.	274(43%)	248(39%)	93(15%)	19(3%)	4(1%)
AI supported technologies usable in online learning platform adopted by the university are readily available.	59(9%)	93(15%)	201(32%)	208(33%)	74(12%)
I have pre-requisite skills of using AI supported learning technologies in e-learning platform.	93(15%)	117(18%)	58(9%)	206(33%)	164(26%)
Smart mobile phones are a solution to u-learning (learning anywhere, anytime with the support of technology) if integrated with appropriate AI technologies.	401(63%)	170(27%)	22(3%)	40(6%)	5(0.8%)
There are serious challenges that I face while using AIEd learning platforms appended in the e-learning platform.	10(2%)	163(26%)	41(6%)	236(37%)	228(36%)
AIEd supported platforms are better than online learning platforms in which lecturers have mandatory control	156(24%)	236(37%)	10(2%)	154(24%)	82(13%)
AIEd are beneficial to me as a student.	346(54%)	172(27%)	41(6%)	45(7%)	34(5%)
Lecturers have appropriate skills to integrate instructional resources in AIEd powered platforms.	298(47%)	212(33%)	65(10%)	62(9%)	1(0.2%)
Artificial Intelligent powered online learning platform is too complex for me to use	277(43%)	66(10%)	44(7%)	179(28%)	74(12%)

From the findings of Table 2.0 above, the majority of the students agreed that they have proper understanding of u-learning and Artificial Intelligence. This is evident in the 508(80%) of the respondents who either agreed or strongly agreed that ubiquitous learning and AI are terms that are familiar to them. Majority of the students, 522 (82%), further agreed that they were ready to learn with the support of technology anywhere anytime.

It is worth noting that most students, 282(44%) disagreed that technologies supported by AI for online learning are readily available at the university, however, a large number of students were neutral on the same as evident by 201 (32%). Most respondents, 370 (59%), disagreed that they had pre-requisite skills of using online AI supported learning technologies in the online learning platform used by the university. This collaborates with the results of the interview in which most students suggested that they need more training regarding how to handle learner-centered online learning supported by AI.

The findings further showed that 571(90%) of the respondents agreed that using smart phones with AI powered components and applications is the solution to Ubiquitous learning (u-learning) if integrated properly. The findings of these data is supported by the results of the interview in which one respondent indicated that:

*“...not everyone can afford a computer whether desktop or laptop, if the university can properly adopt a system in which the learners are able to use AIEd applications with the normal connectivity the use for social media platforms, then we will be able to learn anywhere anytime which is the philosophy of u-learning...”*

Most learners were comfortable with using various AI powered technologies used by the online learning platforms as observed by 464 (73%) who disagreed that there are serious challenges they face while using Artificial Intelligence for Education (AIEd) platforms within the online learning platform at the university. It is also worth noting that most respondents, 392(61%), agreed that AIEd supported platforms are better than the normal online learning platforms in which lecturers have mandatory controls. Regarding whether they have benefited from AIEd platforms for ubiquitous learning, most respondents indicated that they have benefited from the AI powered applications integrated in the online learning platform at the university.

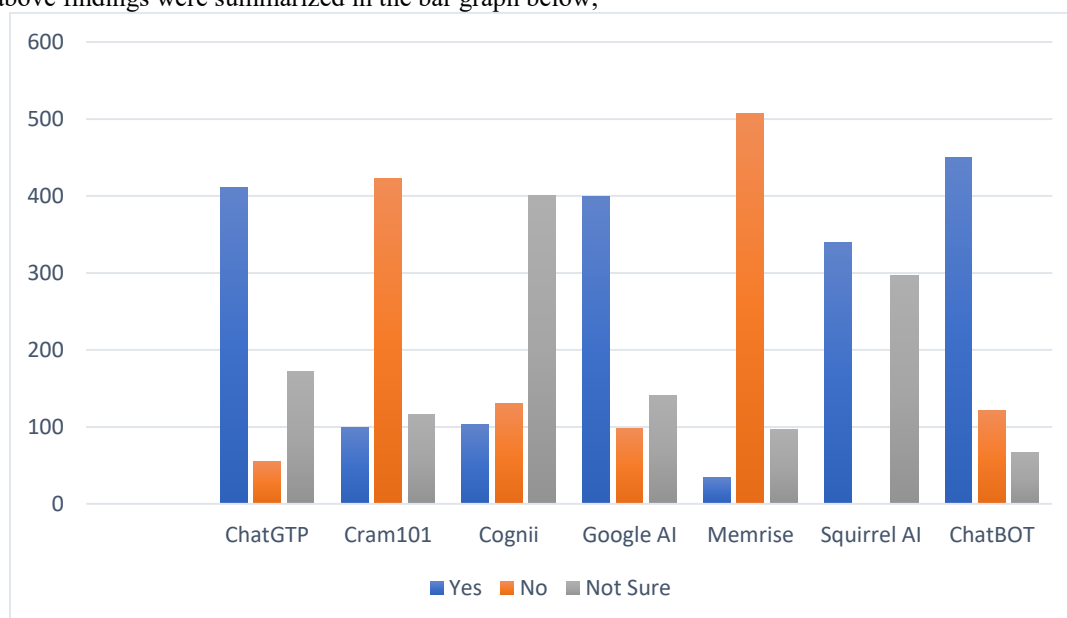
Finally, most respondents, 518(81%) indicated that the lecturers had appropriate skills in integrating instructional resources in the AIEd powered platforms for learning. It is also notable that the students agreed that indeed AIEd platforms are not complex to use and if adopted properly by the institutions, they can aid ubiquitous learning far much better than the non-AI powered learning platforms.

The respondents were asked if they have interacted with the following AI powered applications for online learning:

**Table 3.0: AI Powered online applications used by learners.**

AI powered Application	Yes	No	Not Sure
ChatGTP	411	55	172
Cram101	100	422	116
Cognii	103	130	400
Google AI	399	98	141
Memrise	34	507	97
Squirrel AI	340	1	297
ChatBOT	450	121	67

The above findings were summarized in the bar graph below;



From Table 3.0 above, most respondents indicated that they had used ChatGTP, Google AI and Squirrel AI for purposes of learning. It is however evident that most students have not used Cram101 which is a text synthesizer online AI, they have also not used Memrise for the purpose of Ubiquitous learning. Most students were also not sure whether they had used Cognii AI powered platform for the purpose of online learning.

#### IV. Conclusions

In establishing the role of Artificial Intelligence powered learning platforms, it is evident that universities need to capitalize in integrating features that can support U-Learning in their online learning platforms. Learning in any place at any time will help the students interact with new contents and even complete assignments and other research work with a lot of ease. Mobile learning (M-Learning) has gained popularity among scholars and students given the accessibility and availability of smart-mobile phone, to achieve success in u-learning, there is need of integrating AI powered mobile phone applications in the online learning platforms.

#### V. Recommendations

These findings will help education practitioners to make informed decisions while implementing e-learning as a form of u-learning. It will further help researchers get insight into more advanced learning techniques supported by Artificial Intelligence for Education (AIED). System developers will also be able to adopt system designs capable of supporting AI for educational purposes.

It is recommended that system developers to consider the pedagogical structure of university education before they can integrate AI platforms into the educational systems.

It is recommended that a policy be formulated to ensure uniform AI platforms for education to avoid the confusions that might arise as a result of complex and unauthorized systems being acquired for learning by the universities.

Study can be conducted on integration of AIED on mobile phone platforms for ease of accessibility be the learners. The smartphones are presently available for the learners and teachers hence this will ensure ubiquitous learning using the artificial intelligence platforms.

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