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Contribution of Smart Learning on Students' Academic Competences in Private Universities in Rwanda

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ABSTRACT

The integration of smart learning in teaching and learning process can be successful and increase Students' academic competences as long as smart learning facilities are integrated. This study titled "contribution of smart learning on students' academic competences in private universities in Rwanda" assessed the contribution of smart learning technologies on students' academic performance and explored the relationship between smart learning and students' academic competences in private universities in Rwanda. In order formulate research design, the study was guided by system and flipping classroom theory. The research adopted a descriptive research design. The targeted population of the study was 400 respondents who were sampled by using Yamane's formula of sample calculation to become 200 composed by 7 Staff members, 23 lecturers and 170 students. The staff members were purposively chosen while students and lectures were simple randomly sampled. The data collection tools used in this study were Questionnaires and interview. In order to analyses data, the study adopted descriptive, quantitative and qualitative techniques. Through retesting piloted study, reliability was employed by using accurate valid measures. The results showed that the use of smart learning facilities has improved the students' competences in campuses where 70.6 % strongly agree and 15.9 % answered agree. The study further confirmed that smart learning tools engage and motivate students' learning process where 71.2 % responded strongly agree and 17.1% responded agree. The study concluded that there was a correlation between smart learning and students' academic competences where Karl Pearson coefficient of correlation was 0.751, which means the smart learning, contribute to the students' academic competences. The study recommended that through ministry of education government of Rwanda need to increase fund allocated in supporting private universities. Higher Education Council also need to increase its intensive monitoring and evaluation on the effective use of smart learning within campuses. Lecturers need allow all students to interact with computers and smart digital tools.

Key words: E-Learning, ICT, Smart Learning, Smart Classrooms

I. INTRODUCTION

In the 21st century smart learning skills play development and implementation of new ideas and it is believed to be a basis of modern development and social behavior change. It develops students' intelligence and improves their problem solving and abilities in a smart learning environment (Al-Ruz & Khasawneh, 2011). These technologies have been most prevalent in advanced private and public universities, but recently, they have reached the most disadvantaged schools around the globe. Many of these schools and teachers rely on smart digital technologies to assist learners in their education. The pervasiveness and the affordances of digital technologies are transforming the teaching and learning spaces. In all parts of the world higher education has been influenced by the rapid development of information and communication technology (ICT), resulting to creation and development of global educational environment whereby through digital learning ICT complete authentic teach anytime and anywhere (Alajmi et al., 2020).

According to United Nations (2015), after independence African countries owned universities controlled by their recent colonizers, due lack of skilled indigenous labor the continent remains poor until 2000s when many privates were constructed and Accessed ICT facilities and well-equipped smart classes with trained Lecturers improved academic success of learners. In East Africa, the region faced with protests, conflicts, misunderstandings, corruption and crises in the years following her independence but the adaptation ICT facilities helped the restoration of democracy determined by individual learning which improved grades and helped graduates to respond the needs of technological world. (EAC, 2000). There is a believe the uses of ICT in education will be solutions of these challenges and will help to improve quality of teaching and learning by solving social and economic problems.

The integration of digital and internet technologies in education plays an important role in extending the boundaries of teaching and learning. However, to experience meaningful integration of digital and internet technologies, there is a need to understand their pedagogical affordances in education, and to further substantiate the arguments with practical cases by accessing digital facilities, well-equipped smart classes with trained lecturers (Hwang et al., 2020). To this effect, students must be prepared to use smart devices to live in lifelong Learning with technological world, improved scores and grades of in exams, and using online resources to construct individual

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learning as a result of digitalization in education, there have been innovative approaches to teaching and learning which adopted ICT policy with legal and regulatory compliances within campuses, Digitalization of Teaching, and Learning process with operational efficiency. In Rwanda communication technology played important role in achieving vision 2020 and construction of knowledge-based economy. The Rwandan ministry of education started integrating computers in schools especially universities (Rubagiza et al., 2011). Therefore, this research till evaluates the contribution of smart learning on students' academic competences in private universities in Rwanda.

1.1 Statements of the Problem

Smart learning refers to the use of technology to encourage students to acquire new knowledge, enhancing their learning even while engaging in fun activities (Hwang, et al., 2020). Education in private universities now exceeds the class. Smart education or smart learning is a new paradigm in global education. Now, the education and learning environment is increasingly emphasized in the use of innovative learning tools and techniques. The evolution of the learning process is increasing and faster because new technologies place more on the use of tools. According to Bergmann & Aaron (2012) learning nowadays is becoming smarter due to the rapid development of technology. This causes changes in the settings of conventional learning, where learning can occur anywhere and anytime and in the context of the real world. In this world challenged with wars, climate changes and others.

The use of smart learning facilities increases self-efficacy in students and facilitates access to information and improve the quality of university education in general (Kim, 2011). Due to absence of development in information communication technology many parts of sub-Saharan Africa, especially East remain poor connected. There is hope that future will better than today because many governments like Kenya, Uganda and others started to deploy whiteboards and smart teaching tools along with new technology (EAC, 2000). In Rwanda smart learning adopted in 2016 when one-laptop per-child initiatives and smart classes were distributed entire country, the university educators were also supplied with Laptops on credit (Wallet & Kimenyi, 2015).

Although the prevalence of smart digital technologies in education is a global interest, this paper grounds its argument in the context of a developing country, Rwanda. It is in this and similar emerging economies that the use of such technologies has the potential to fast-track socioeconomic development for the benefit of the citizenry. Despite the government of Rwanda's efforts to implement smart learning higher educational institutions, the performance rate and frequency of smart learning in private universities remained low. Not addressing related issues can lead to several negative outcomes, such as ineffective use of technology, lack of personalized learning, Missed opportunities for collaboration and Stagnation in educational progress.

1.2 Research Objective

i. To assess the contribution of smart learning technologies on students' academic performance in private universities in Rwanda.
ii. To explore the relationship between smart learning and students' academic competences in Private universities of Rwanda.

1.3 Research Questions

i. How does the utilization of smart learning technologies influence the academic competences of students enrolled in private universities in Rwanda?
ii. What is the relationship between smart learning and students' academic competences in Private universities of Rwanda?

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 System Theory

According to the Systems theory developed by Ludwing von Bertalanffy in 1956, Smart education represents a collection of e-services that employ digital media and information technologies for supporting all educational processes. In scientific research the concept is considered as the most relevant and important stage of digitalization of the educational (Dneprovskaya, 2008). From the technological point of view, the term includes smart course can be considered as technology-enhanced learning play important role of media or tools for accessing learning content communication and collaboration, construction, expression and evaluation (Zhu & Riezebos, 2016). In recent years' different countries design various strategies of smart education development with the purpose to improve position in the global digital competitive environment. In private universities smart education can be considered as reading books and doing research on the internet, translation simulation as the main content in order to enhance learning, foster creativity, innovation and continuously learn.

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2.1.2 Flipped Classroom Theory

According to flipped class room theory developed by Wesley Bake modern information and communication technology has contributed to the development and change of modern education and the emergence of innovative strategies based on various tools of technology. The most prominent of which has recently spread in education and is the flipped classroom, a form of integrated education that intelligently employs modern technology. In a flipped classroom, the 21st century skills are transformed by the student using technology effectively through learning outside the school boundaries, reinforcing critical thinking, self-learning, communication skills, and collaborative work among students, bring (Bergmann, et al., 2012). Flipping the classroom promotes self-learning, contributes to raising the level of motivation towards learning and also gives students social networking skills; through the application of cooperative learning in the classroom when solving activities and exercises (Tune et al., 2013).

2.2 Empirical Review

Different studies have shown findings regarding the behavior, skills and knowledge of students in private universities on how the use of smart learning improve their academic performance. This section represents literature reviewed by other researchers.

2.2.1 The Contribution of Smart class on Learning Concepts

In this 21st century where Information Communication and Technology played important role in higher education, there is, no doubt its absence will cause a serious harm. Due to the development of educational technology, education can be done anywhere and anytime sufficient space has been gained for the use of ICT in school research in most developed countries (Jena, 2013). The use of computers for teaching and learning purpose play's important role in education. It is more important for teaching and learning material to stored more easily and to be able to do the work you do on the computers more easily than text (O'Farrel, 2007). This teaching brings many changes to the teaching of almost all subject. The findings obtained from the study conducted in Delhi to examine the impact of ICT tools in biological classes using secondary students as example shows a positive relationship between biological education and ICT performance of both private and public schools (Jena, 2013). There is a hope that this form of education will encourage Rwandan education sector to incorporate ICT into its teaching and learning process.

2.2.2 Relationship between Smart Learning and Students' Academic Competences

Recent findings showed that smart learning played a distinctive role in acceleration of students' academic performance. The coming of smart classrooms improved the engagement of the students in the effective learning for gaining scores and higher grades. For example, in Singapore the Ministry of education provides all the requirements for students to explore the needs of the country and promote economic growth through good education (Wallet & Kimenyi, 2015). The study carried out in there aimed on checking what increase or decrease motivation for using these technologies among students in polytechnic. The 737 students of year one registered in polytechnic attended the survey study in answering asked questions (The checking of the beliefs, choices and rejecting in using ICT). After analyzing quantitative data, education was qualified as positively correlated with the ICT usage. Students were found strongly joyful in using ICT the difficulties risen were costly internet connection, technical issues are not solved by all the students and still have little knowledge in the use of these technologies. It is suggested that teachers need to be able to use ICT supported learning tools in order to fully use ICT in PBL program in the classroom (Rubagiza et al., 2011).

III. METHODOLOGY

3.1 Area of study

This study was carried out in Huye, a district located in Southern province of Rwanda to investigate the contribution of smart learning on students' academic competences in private universities of Rwanda a case of Protestants institutes of Arts and Social Sciences and Catholic University of Rwanda.

3.2 Research Design

According to researcher Kombo and Tromp (2006), the research design is a framework of taking action to collect, organize and analyze data and research purpose for which it can be used. To achieve the goal, the study used a descriptive research design with mixed method approach. The researcher uses both qualitative and quantitative survey to collect data. In qualitative method, the researcher included clear items in which participants can expressed their opinions. Information was categorized content is created, coded and entered.

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3.3 Targeted Population

The target population is a group of people, objects the entire population or collective context from which the sample is drawn and include all members a real or credible group of people, events or object in their work (Bernard, 2002). In this study, targeted population consisted of population of Protestant Institutes of Arts and Social Sciences and Catholic Universities of Rwanda composed by 2 Deputy vice chancellors, 6 Head of academic services, 6 Heads of departments, 46 lecturers and 340 students.

3.4 Sample Size and Sampling Procedures

This sample consist of a small number of participants selected from the target group to make the study affordable and manageable in terms of financial and time cost (Bernard, 2002).

$n = \frac{N}{1+N(e)2}$, Where **n**=sample size, **N**=total population, **e**= Margin error of 0.05. For this research, the calculation c of the sample will be done and error of tolerance of 95%. In this study, the sample size was calculated under Yamane's formula as follow:

Table 1

The Sampled Summary of the Respondents

Respondents	Targeted population	Sample size
Students	340	170
Lecturers	46	23
Head of Academic Services	6	3
Head of Departments	6	3
Deputy Vice Chancellors	2	1
Total	**400**	**200**

In order to allow respondents to have equal chance of being selected, Simple random sampling techniques were used to collect the data from the sampled lectures and students. Furthermore, the purposive sampling technique were used to collect data from Deputy vice chancellors, the Head of Departments and Academic Services due to their roles and ability to enable the researcher to get data. This technique is the deliberate choices of the researcher because of the qualities of the respondents possess (Bernard, 2002).

3.5 Data Collection Tools and Procedures

Kombo and Tromp (2006) agreed that the researcher collect the information from the population through systematic method of gathering the data and the information related to the research objectives, research questionnaires, hypothesizes and the assumptions. The study employed descriptive survey by administering questionnaires the sampled lectures and students via online platform. The interview was also utilized to collect the information from deputy Vice chancellors and Head departments.

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IV. FINDINGS & DISCUSSION

4.1 Demographic Characteristics of the Respondents

4.1.1 Educational Level of Students

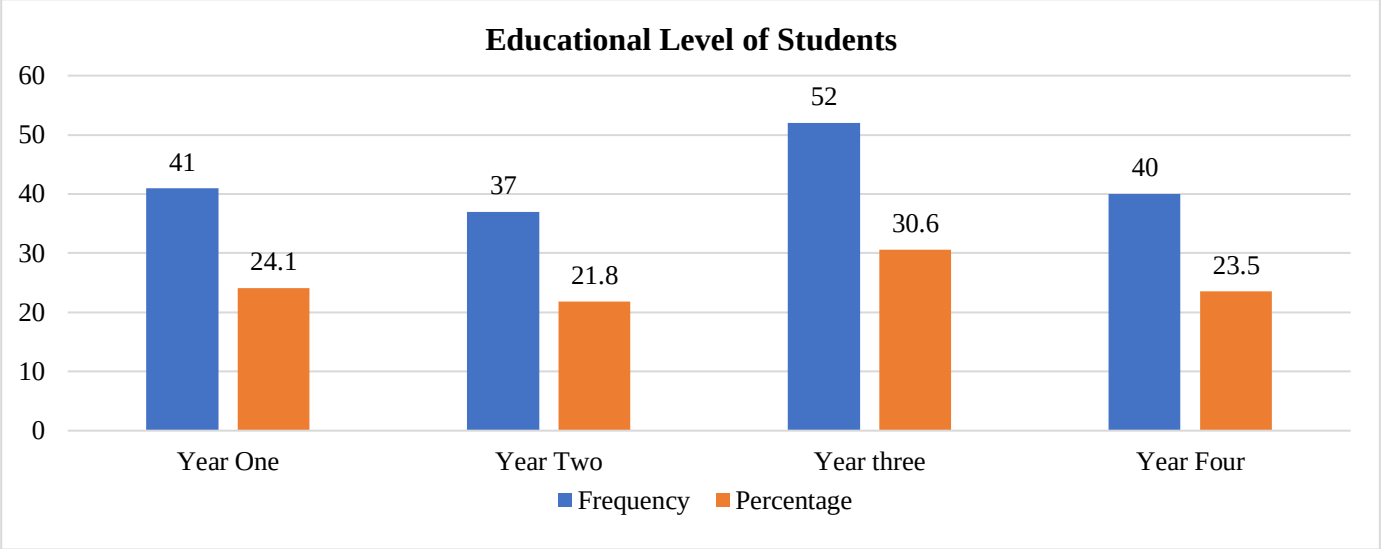

Figure 1
Educational Level of Students

Figure 1 describes the category of students' educational level participated in this study, the statistics shows that all sampled students were present and returned the questionnaires during the study. Where among 170 respondents 41 of them were in year one, 37 in year two, 52 in year three and remain 40 were in final year. Both sexes were also given equal chances of participation whereby 50% of them were female and remaining one were male. The statistics further witnessed that the majority of campus students were aged between 18 and 28 with 41.2%, there was 35.9% between 29-37, others participants aged between 38-48 occupied 21.8 and above 49, and there was 2.1%.

4.1.2 Education Level of Lecturers

The figure present educational qualification of lecturers who participated in the study. The statistics indicated that 73.9 of lecturers had masters' degrees and remaining 26.1% upheld PhD. Both female and males' lecturers were given equal opportunity to participate in this study where the majority of 60.9% were female while 39.1% were male. The statistics further witnessed that by 4.3% of respondents aged between 18-28, between 29 and 37 were 34.8%. The largest number of lecturers was aged between 38 and 48 with 47.8%, the respondents aged above 49 occupied 13% of total respondents.

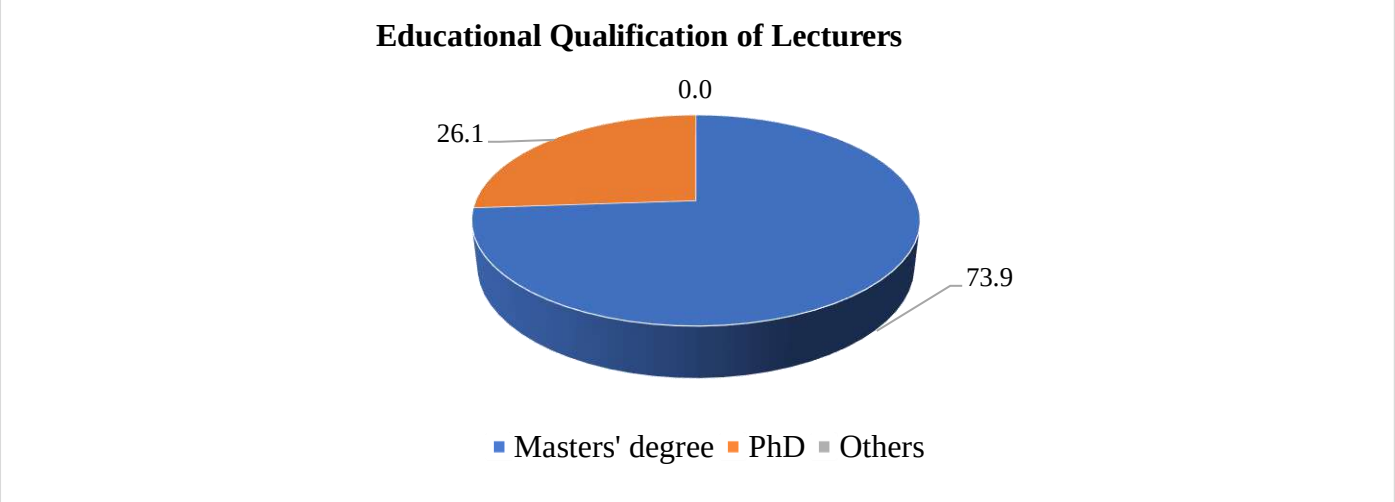

Figure 2
Educational Qualification of Lecturers

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4.2 Presentation of the Findings

4.2.1 To Assess the Contribution of Smart Learning Facilities on Academics of Student

In the first objective, the researcher assessed the Contribution of smart learning technologies on students' academic performance in private universities in Rwanda where the students and lectures provided their views.

Table 2

Students' Views Towards the Contribution of Smart Learning in Private Universities in Rwanda

	SD		D		N		A		SA	
Statement	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Smart learning technology enhance academic competence of students.	5	2.9	12	7.1	6	3.5	27	15.9	120	70.6
Smart learning technology affect engagement and motivation of students' learning.	6	3.6	7	4.1	8	4.2	37	21.8	112	65.9
Academic competences of students use Smart learning technology differs from does who don't use it.	4	2.4	10	5.9	8	4.7	32	18.8	116	68.2

The respondents were asked about the status of smart learning on students' academic competences and majority of them strongly agreed with 70.6% others agreed with 15.9% that integration of smart learning technology increase academic competences of the students in private universities of Rwanda. When they were asked about engagement and motivation 63.5% of students strongly agreed and 21.8% agreed that smart learning motivate them. The students strongly agreed with 63.5 % and agreed with 21.8% that smart learning was more interesting. The students further strongly agreed with 70% and agreed with 17.1% that they find difficult task on internet. Finally, the students strongly agreed and agreed that academic competences of students use smart learning is higher than those who does not use it at 68.2%. The study results posited who showed the use of ICT facilities improve academic competences of the students where the scores, retentions and participation in teaching and learning process gradually increase. Similarly, outcomes aligned with findings obtained from the study conducted in Delhi to examine the impact of ICT tools in biological classes using secondary students as example shows a positive relationship between biological education and ICT performance of both private and public schools (Jena, 2013).

Table 3

Lecturers' Views Towards the Contribution of Smart Learning in Private Universities in Rwanda

	SD		D		N		A		SA	
Statement	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Integration of smart learning technology enhance academic competence of students	3	13	0	0	1	4.3	6	26.1	17	73.9
Smart learning increase interaction between students and lectures.	0	0	0	0	2	8.7	8	34.8	13	56.5
Smart learning technology affect engagement and motivation of students' learning	0	0	0	0	0	0	7	30.4	16	69.6

The respondents were asked whether smart learning technology enhance academic competence of the students and strongly agreed with the statement at 82.6 %. The lecturers further strongly agreed with 69.6% and agreed with 30.4 % that smart learning technology positively affect engagement and motivation of students' academic cycle when classes are well equipped with ICT facilities. The respondents were further asked whether the schools which use smart succeed perform well more that those without it, and the majority confirmed that students learn effectively when using ICT gadgets where 22.5% responded strongly agreed and 70% responded agree. The teachers were asked if students learning using smart learning increase their scores and grades where 52.5% responded strongly agree and 40% responded agree. The respondents' lecturers were asked if the use of smart classrooms helped students completing homework where 20% responded strongly agree while 55% responded agree.

4.2.2 Students' Academic Competences

The dependent variable for the study was students' academic competences. The findings from students' and teachers' perspectives were presented in Tables 4 and 5.

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Table 4

Students' perspectives towards their Academic Competences in Private Universities in Rwanda

Statement	SD		D		N		A		SA	
	F	%	F	%	F	%	F	%	F	%
The use of smart learning facilities helps students to survive in real world of technology after graduation.	5	2.9	6	3.5	6	3.5	33	19.4	120	70.6
The use of smart learning facilities improves grade and score of students in exams.	4	2.4	6	3.5	7	4.1	42	24.7	111	65.3
The use of smart learning facilities helps students to construct their own knowledge.	5	2.9	6	3.5	10	5.9	43	25.3	106	62.4

When the students were asked whether the use of smart learning helps them to survive in real world of technology after graduation, the majority of them strongly agreed with 70.6% and remain ones agreed with 19,4%. The students were further strongly agreed with 65.3% and agreed with 24.7% that the use of smart learning facilities improve their grade and score in exams. Finally, 62.4 % of respondents strongly agreed and 25.3% of them agreed that the use of smart learning tools help them to construct their own learning instead of traditional method.

Table 5

Lecturers' perspectives towards students' Academic Competences in Private Universities in Rwanda

Statement	SD		D		N		A		SA	
	F	%	F	%	F	%	F	%	F	%
The use of smart learning facilities helps students to survive in real world of technology after graduation.	0	0	0	0	0	0	6	26.1	17	73.9
The use of smart learning facilities improves grade and score of students in exams.	0	0	0	0	1	4.3	6	21.6	15	65.2
The use of smart learning facilities helps students to construct their own knowledge.	0	0	1	4.3	2	8.7	6	26.1	14	60.9

When respondent lecturers were asked if the use of smart learning facilities help their students to survive in real world after graduation, the majority of them strongly agreed with 73.9% and remain ones agreed with 26.1%. The lecturers further strongly agreed with 62.5% and agreed with 26.7% that their students download notes online. About the role of smart learning in the increase of students' score and grade, majority of respondent lecturers strongly agreed with 65.2% and agreed with 21.6% with the statement. Finally, 60.9 % of the lecturers strongly agreed and 26.1% agreed that the use of smart learning tools helps students to construct their own knowledge within their academic cycle.

The study agreed with "Systems theory" which was based on the concept of a system for learning. The researcher related this system with the effective process of learning where each tool and activity within universities plays a part in supporting students learning and succeeding. In the same vein, recent findings by Wallet and Kimenyi (2015) showed that smart learning played a distinctive role in acceleration of students' academic performance. The coming of smart classrooms improved the engagement of the students in the effective learning for gaining scores and higher grades. The authors asserted that provision of all the requirements needed for students to explore the needs of the country promotes economic growth through good education.

4.2.2 To Explore the Relationship between Smart Learning and Students' Academic Competences in Private Universities of Rwanda

In the second objective, the researcher explored the relationship between smart learning and students' academic competences in Private universities of Rwanda where the students and lectures provided their views.

Table 6

Students' Views Towards the relationship between smart learning and students' academic competences in private universities in Rwanda.

Variables	Correlation	Improves students' grades	The use of smart learning
Improves students' grades	Pearson Correlation	1	0.751
	Significance. (2-tailed)	133	0.04
	N		133
The use of smart Learning	Pearson Correlation	0.751	1
	Sig. (2-tailed)	0.04	
	N	**133**	**133**

Correlation is significant at the 0.05 level (2-tailed).

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As the results described in the views of students, the different variables were assessed and the findings showed that the P-value was 0.04 which was significant, due to that if P-value is less than 0.05 then it is significant. This is interpreted that contribution of smart learning was very significant to the academic competences of private university students. There was a correlation between smart learning and students' academic performance, the result showed that Karl Pearson coefficient of correlation was 0.751 which means the smart learning contribute to the students' performance. Therefore, when Karl Pearson coefficient lies between 0 and 0.5 there is low positive correlations while when it lies between 0.5 and 1, there is high positive Karl Pearson correction. The study concludes that university students who are likely to use smart learning facilities perform well in their academic studies more than their peers who never use it.

Table 7

Lecturers' Views Towards the relationship between smart learning and students' academic competences in private universities in Rwanda.

Variables	**Correlations**	**Improves Students' performance**	**The use of smart Learning**
Improves students' performance	Pearson Correlation	1	0.823
	Significance. (2-tailed)	40	0.02
	N		40
The use of smart Learning	Pearson Correlation	0.823	1
	Sig. (2-tailed)	0.02	
	N	**40**	**40**
Correlation is significant at the 0.05 level (2-tailed).			

The results described in the views of lecturers, different variables to find out the relationship between smart learning and students' performance where the Karl Pearson correction coefficient was 0 .823 and the P-value was 0.02 which was significant. If P-value is less than 0.05 then it is significant. the relationship between the use of smart learning facilities and students' academic performance in private universities of Rwanda. it was interpreted that contribution of smart learning was very significant to the university students' academic performance. Therefore, when Karl Pearson coefficient lies between 0.5 and 1, there is high positive Karl Pearson Correction; indicating that there was a positive correlation between smart learning and students' academic competences.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusions

The study was well conducted and the respondents provided their views towards the contribution of smart learning on students' academic competences in private universities in Rwanda. Therefore, after identifying the areas need improvements the researcher has addressed the recommendations: It was recommended that the Ministry of Education should extend its project of distributing computers to all higher learning institutions including private universities in Rwanda. The Higher Education Council should encourage its intensive monitoring and evaluation on the effective use of smart learning facilities. Private universities and lecturers should allow all students to interact with computers and smart digital tools in order to get familiar with them due to that the findings showed that the students did not get enough time to visit smart rooms independently for their research and exploration for their daily learning.

5.2 Recommendations

The study was well conducted and the respondents provided their views towards the contribution of smart learning on students' academic competences in private universities in Rwanda. Therefore, after identifying the areas need improvements the researcher it was recommended that: The Ministry of Education should extend distribution of computers to all higher learning institutions including private universities in Rwanda. Higher Education Council should increase its intensive monitoring and evaluation on the effective use of smart learning facilities. Private universities lecturers should allow all students to interact with smart learning facilities in order to become familiar with.

This study has achieved the overall objective and the results have provided the researcher with an insight for suggesting topic for other researchers' further studies: Firstly, the researchers were suggested to conduct the studies on the barriers related to effective implementation of smart learning in higher learning institution in Rwanda. Secondly, the other researchers should carry their studies on the monitoring and evaluation for the use of smart learning in private universities in Rwanda and how ICT tools are taken care by the university leaders.

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