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RESEARCH ARTICLE **Section:** *Literature & Criticism*

An Analysis Of The Impacts Of Blended Mode Of Learning On Student's Performance In University Of Rwanda College Of Education

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ABSTRACT

This study investigates the impact of the blended mode of learning on students' academic performance at the University of Rwanda – College of Education. Blended learning, which combines face-to-face instruction with online components, has been increasingly adopted in higher education institutions across Rwanda. The study employed a mixed-methods approach involving questionnaires, interviews, and analysis of academic records from a sample of 114 undergraduate students. Quantitative data were analyzed using descriptive statistics and correlation analysis, while qualitative data were thematically examined. The findings revealed that students exposed to blended learning demonstrated improved engagement, flexibility in learning, and slightly higher academic achievement compared to those in traditional learning settings. However, challenges such as limited access to devices, unstable internet connectivity, and an increased level of cheating were identified as barriers to effective implementation. The study recommends increased institutional support and digital infrastructure investment to maximize the benefits of blended learning. These findings have implications for education policy and instructional design in Rwandan universities seeking to enhance academic outcomes through technology integration.

KEYWORDS: Blended learning, education, technology, Rwanda, academic.

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1. General Introduction

Internet technology is the fastest-growing technology in RWANDA and even generally in the world. In 2013, Rwanda had 27% of the population who had access to an internet connection, and was also ranked among the top six developing countries that are most dynamic in ICT development (Mlay et al., 2012). Educators would want to take advantage for educational purposes. Blended tools for learning can make education more democratic, allowing a wider variety of students to have access to learning. Also, a combination of synchronous and asynchronous modes encourages students to spend more time reflecting on the lesson.

Alongside these positive developments, researchers and practitioners have identified risks and potential losses from the use of technology-mediated learning tools, such as Decreases in social connectedness. Therefore, consideration of the effects of blended learning must be in terms of the academic performance of students. Because of this, this study aimed to identify the impacts of blended learning in terms of student performance as well as assess if it can be improved with the purpose of making it effective and efficient in UR-CE.

2. Background Of The Problem

At the University of Rwanda, even in the college of education, a method of teaching and learning called blended learning was introduced. This mode of learning can be defined as a mode of learning that uses the advantages of both traditional classroom and ICT-supported learning, which means that it includes both online and offline learning (Lalima & Lata Dangwal, 2017). Although some studies indicate that this mode of learning is effective and positively affects students' performance.

(Singh & Reed, 2001), Other studies show that it is not easy to implement this mode of learning (Lalima & Lata Dangwal, 2017). Especially in developing countries like Rwanda, as it requires expensive and advanced technologies, software, and infrastructure (Uwizeyimana, 2021). Some studies also indicate that online assessment does not reflect students' competencies, but some of those kinds of assessment give instant feedback (Amasha et al., 2018). In addition, some students in UR-CE are claiming that blended learning is not always effective, especially in this college. Moreover, some of the modules that were taught using this mode of learning in the COVID-19 Lockdown were re-taught in a face-to-face classroom after lockdown (example CTE111). From those, our study puts forward to investigate whether this mode of learning impacts students' performance either positively or negatively, or if there are some conditions needed such that it can impact the performance positively.

3. Statement Of The Problem

Blended learning is suggested to be a method of learning where both traditional face-to-face and online classes are combined with the aim of optimizing the achievement of objectives. It requires different infrastructures, ICT tools such as laptops and smartphones, ICT and technological skills, as well as software. From this, less time will be spent face-to-face in the classroom (Heinze et al., 2007), while much time will be spent using technological approaches such as videos, online meetings, social media, etc. because of those, blended learning brings a variety of resources and materials that are needed by students for doing researches but they do not do enough experiments and practical works that are required by scientists, especially educators. On the other hand, it is possible that some students may not attend online classes or visit teaching websites regularly, and for those who attend, their attention is not enough.

In the university of Rwanda, requirements for blended learning such as infrastructures, ICT tools such as laptops and smartphones, ICT and technological skills as well as software are seen to be insufficient (Dieu, 2021), because of this, academic goals were not achieved in COVID-19 lockdown when this mode of learning was being used (Uwizeyimana, 2021).

To this end, this mode of teaching and learning is very fantastic, but there are different problems, such as insufficient ICT tools (such as laptops and smartphones), smart classrooms, and technological skills. In response to these problems, our study aims to investigate whether this mode of learning is impacting UR-CE students' performance positively or negatively, as well as to suggest different ways of improving blended learning such that it can be effective and productive in terms of student performance.

4. Literature Review

Research by the University of Tennessee's Physician's Executive MBA (PEMBA) program2 for mid-career doctors has demonstrated that blended learning programs can be completed in approximately one-half of the time and at less than half of the cost using a rich mix of live e-Learning, self-paced, and physical classroom delivery (Singh & Reed, 2001).

Organizations are rapidly discovering that blended learning is not only more time and cost-effective, but also provides more natural ways to learn and work (Singh & Reed, 2001). According to them, blended learning seems to be effective as it saves both costs and time. But according to (Nsengimana et al., 2021), blended learning systems do not allow students to perform enough practical work and experiments, particularly for students being trained to be teachers, which will hinder effective teaching of the subject in the workplace. Also, by the time they are assigned academic practical tasks, it will affect them negatively.

According to DeCoito & Estaiteyeh (2022), for teachers, teaching and assessing STEM subjects online does not reflect academic expectations. It is difficult to know whether students have understood the concepts or mastered skills, which also calls into question the authenticity of the assessment. Some educational systems, such as the Indian educational system, are facing different problems, such as failing to provide free and compulsory education to all children, a curriculum that does not meet international market demands, and being unable to conserve their values. Simply, urgent radical steps and changes are needed to overcome the challenges. Blended learning is the best way to help in solving those problems of India's educational system to some extent (Lalima & Lata Dangwal, 2017). Although blended learning seems to be an effective response to these serious problems, it is not an easy task. It requires certain fundamental preparations in all the elements of the teaching and learning process: teacher, student, content designing, and infrastructure (Lalima & Lata Dangwal, 2017).

In blended learning, techniques used in online assessments do not generally include many creative tools; because of this, many teachers see this kind of teaching and learning to be ineffective and unauthentic. 76% of the teachers view online assessment to be ineffective. Also, most teachers view the impact of online teaching on students' achievement and engagement negatively (DeCoito & Estaiteyeh, 2022).

According to (Li et al., 2014), although students were unwilling to review the pre-recorded lectures on their own before the class, in a blended learning environment, students' performance is better than in traditional face-to-face learning. E-learning, more specifically blended learning, affects students' performance. Although some educational systems require professional development of both

students and teachers on these technologies to be able to hold the growth and penetration of ICT in education (Lumadi, 2013). In this case, teacher training institutions need to revise or change their training approaches, strategies, and activities by inserting technologies.

Nowadays, academic performance is not only based on teachers' activities, as learners need to access other resources and materials. Thus, they can use the internet and other online sources of knowledge, which can equip them with sufficient knowledge to pass any given tasks that are not accessible in face-to-face learning (Dieu, 2021). Moreover, implemented blended learning approaches may have strong potential for improving student learning outcomes in health sciences courses (Kiviniemi, 2014).

According to (Ceylan (2017), students who were taught using a blended learning mode are likely to be more academically successful than those who have studied in a face-to-face classroom. Although in the discussion made It was found that students generally liked using the online videos because it gave them more choice, control, accessibility, and depth, but by this mode of learning students missed the social interaction and motivation as well as the opportunity to immediately ask questions or hear the responses to questions asked by others (Kwak, n.d.). Although students preferred the implementation of the blended mode of learning. According to (Kwak (n.d.), blended learning has no impact on student performance. Moreover, student performance is not affected by the introduction of blended learning regardless of students' characteristics such as age, nationality, primary language, and achievement level (Kwak, n.d.).

In addition, during the COVID-19 lockdown, the University of Rwanda introduced blended and online learning. The teaching staff has to upload the materials online, whereas students had to download the online course, but both staff and students say that the method was not effective, especially in undergraduate programs. This is because of various challenges such as the lack of training and technical support for students and staff, and the lack of access to the required infrastructure, technological devices, and software.

These are the main reasons why, except in the postgraduate program, no learning outcomes were achieved in remote online and blended learning at UR. According to what happened in this period of lockdown where blended and online learning were being implemented, both students and teaching staff are not trained enough to use blended and online teaching and learning effectively, also they do not have access to the required tools and infrastructure, then positive teaching and learning outcomes cannot be achieved effectively (Uwizeyimana, 2021).

But according to (Fleck, 2012), blended learning will become the more dominant mode of learning, because even in face-to-face campus-based teaching, online activities are important elements. For example, in face-to-face classes, information and resources are available on websites and social media. Because of this, our study aimed to investigate if this mode of learning impacts students' performance either positively or negatively, and check if there are some conditions needed so that it can impact the performance positively.

5. Methodology

5.1. Research Design

This research was conducted in UR-CE to investigate the impacts of blended learning on students' performance. Because of this, the participants or respondents in this research were UR-CE students. The methods to be used while collecting research data are online questionnaires, and Document analysis/review guide or schedule.

5.2. Participants

During this data collection, respondents were chosen to be UR-CE students, as our research was focused on investigating the impacts of the blended mode of learning in UR-CE. Specifically, respondents were from all departments in UR-CE. For the online questionnaire method of data collection, respondents are all UR-CE, as the questionnaire link was given to all students. But for the Document analysis/review guide or schedule method of data collection, respondents were selected to be year III MPE students as they had experienced blended learning, face-to-face learning, as well as online learning.

5.3. Procedures

Respondents were selected to be UR-CE students. Specifically, for the online questionnaire method of data collection, respondents were all UR-CE students who agreed to respond. But for document analysis/review guide or schedule, respondents were students from combinations who have studied in both blended modes of learning and traditional face-to-face learning in a certain module. From those combinations that had used both modes, one combination was chosen randomly. Simply, a sampling method called stratified random sampling was used.

5.4. Tools Or Measurement

One of the methods used in data collection in our research is called an online questionnaire. An online questionnaire is a method of data collection where the researcher sends a questionnaire to the respondents via online modes such as Email, SMS, WhatsApp, and Facebook. We have preferred to use this method as our respondents can access ICT tools such as smartphones and computers. Because of this, they can access the internet easily, which is the main factor (Granello & Wheaton, 2004).

We also preferred to use this method as it saves time; by this method, many respondents can provide their responses at the same time. Also, as respondents and researchers' face-to-face interaction is reduced, respondents provide information freely. Another method of data collection used in this research is a Document analysis/review guide or schedule. There are many reasons for choosing this method. Firstly, this method gives real and accurate information as the researcher himself/observes the official documents. In addition, this method of data collection does not reflect the respondent's bias effects.

6. Results Or Findings

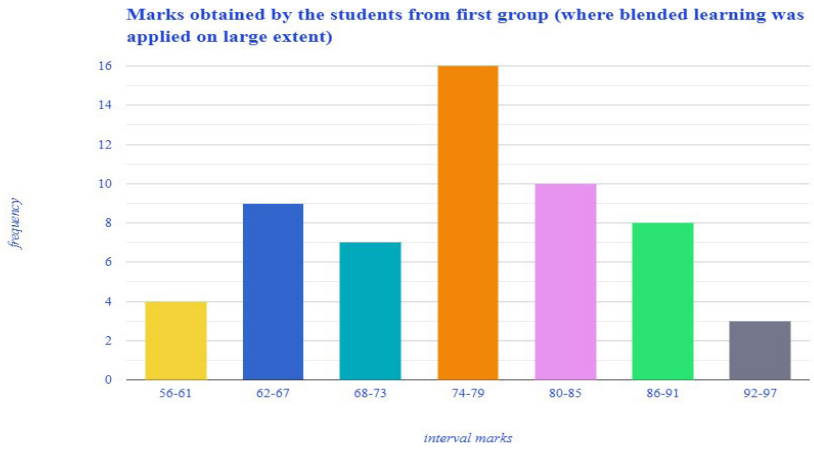
6.1. Results Or Findings

6.1.1. Quantitative Findings

In a PHY2345 module, in the academic year 2020-2021, the MPE class of 114 students was divided into two groups, each made of 57 students. In the first group, blended learning was applied to a large extent where they had face-to-face sessions combined with different online tools such as videos, online classes by Zoom and Microsoft Teams, gifs, animations, etc. In the second group, the blended mode of learning was applied to a very small extent, where only projectors and WhatsApp seem to be the only online tools that were used (in general, traditional face-to-face was significantly used).

The following are marks obtained by the students from first group (where blended learning was applied to significantly used)

Class (marks)	56-61	62-67	68-73	74-79	80-85	86-91	92-97
Frequency	4	9	7	16	10	8	3

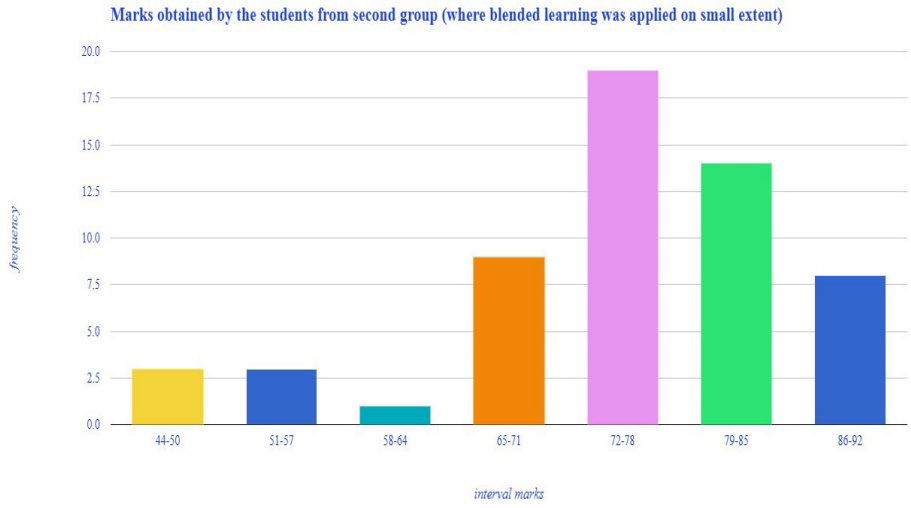


From those collected data, mean marks can be calculated as

Mean marks $= \frac{\sum_{i=1}^{k}(\text{class mid-point})(frequency)}{total\ number\ of\ students} = \frac{4348.5}{57}$ or mean marks=76.29%, median marks=76.68

The following are marks obtained by the students from second group (where blended learning was significantly used)

Class (marks)	44-50	51-57	58-64	65-71	72-78	79-85	86-92
frequency	3	3	1	9	19	14	8

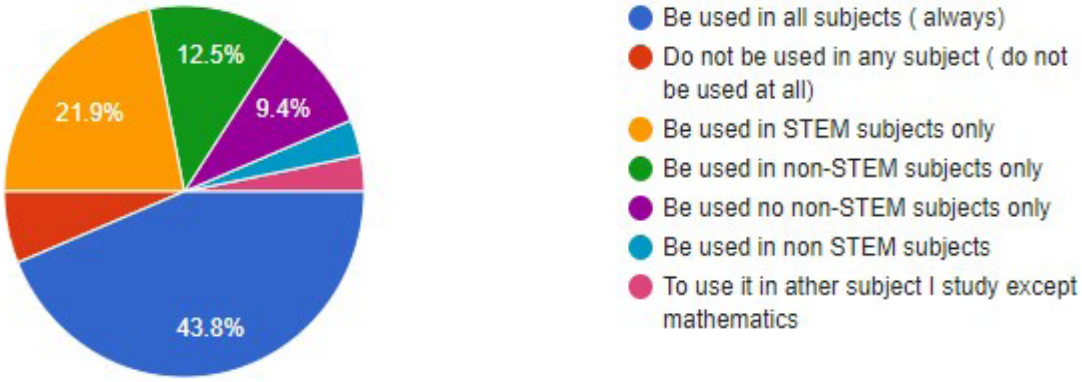


From those collected data, mean marks can be calculated as

Mean marks $= \frac{\sum_{i=1}^{k}(\text{class mid-point})(frequency)}{total\ number\ of\ students} = \frac{4261}{57}$ or mean marks=74.75%, median marks=75

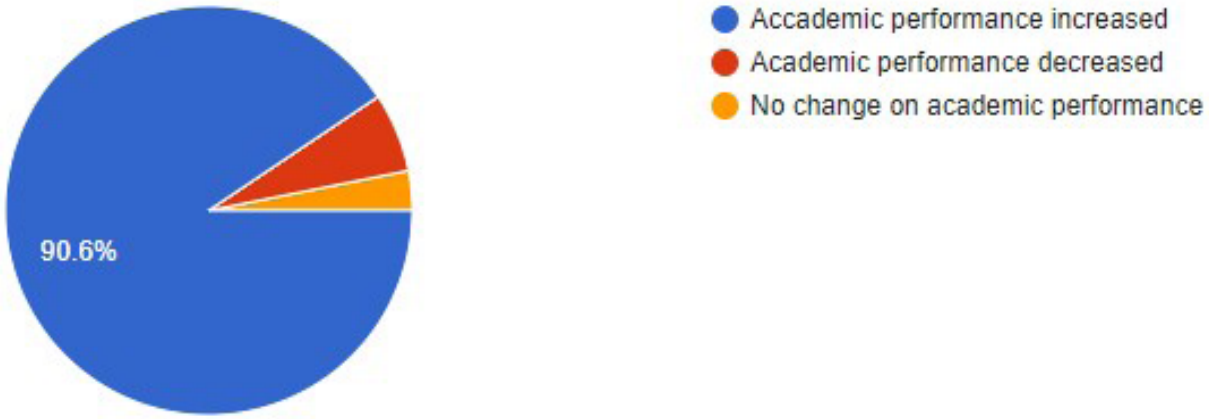
6.1.2. Qualitative Findings

The responses from the online questionnaire reveal that more than 43% of the UR-CE students would like to use the blended mode of learning, while about 6% do not like to learn in this mode, while others prefer it to be used in specific modules. This chart illustrates how UR-CE students perceive the use of a blended mode of learning.



Although more than 43% of the respondents said that UR-CE students are not equipped with all necessary resources, 71.9% confirmed that those students have the necessary ICT skills for mode, and 78.1% said that ICT labs and WIFI are at least moderately available. Although 65,6% say that blended mode assessment is enough to access all required competencies, 40.6% say that in most of the assessment modes, cheating increases.

From this questionnaire, 90.6% of the respondents said that when the blended mode of learning is used, academic performance increases, while only 6.3% said that the performance decreases. This pie chart illustrates how UR-CE perceives its performance when the blended mode of learning was used.



6.2. Discussions On Results And Findings

Discussions On Results And Findings

From the study on students' performance in PHY2345 in the academic year 2020-2021 shown above, the students who significantly used the blended mode of learning succeeded better (with average marks more than 76%) than those who used the blended mode of learning to a small extent (who had about 74% average marks). Also, from those results, the median marks are 76.68% in the first group while it is 75% in the second class. This means that the number of students who have scored above 75% increases when the blended mode of learning is used.

In addition to this, the lowest mark in the blended class was found to be 57% while in the less blended mode, the lowest mark was 45%. This shows that there are students who have received less than 50% marks when the blended mode of learning was not significantly used, but when it is used, there is no student who has received below 50%. In addition, most of the students (about90.6%) who were asked about their academic performance when the blended mode of learning was used said that their performance increased. This means that student performance in UR-CE students increases in the blended mode of learning.

Although most students prefer this method to be used, this study shows that cheating levels in this mode of learning increase during the assessment. In addition to this, although students are equipped with ICT skills and the college has some opportunities like ICT labs and WIFI networks, students are not equipped with all the necessary equipment, and the college cannot provide it to all students. The findings from this study are in line with previous research, which suggested that student performance in the blended learning environment is as good as or better than in traditional face-to-face learning or in online learning alone.

7. Conclusions And References

7.1. Conclusions

Based on these research findings, the following conclusions were made on the students' performance when the blended mode of learning was used;

- When it is effectively used, a learner who was taught using the blended mode of learning academically performs better than one who was taught using the traditional face-to-face mode of learning.
- Also, a learner who is taught using a blended mode academically performs better than one who is taught using an online mode.
- ICT tools available in UR-CE are not enough for both students and educators to use a blended mode of learning. Because of this, the college and students need to do whatever is possible to make that equipment available.
- UR-CE students and staff members are equipped with the necessary technological and ICT skills needed for using blended learning.
- Online assessment strategies are not effective enough. Although it comprises all the necessary tools, the level of cheating increases. Because of this, it requires enough attention from both educators and students.
- When a blended mode of learning is effectively used, marks obtained by students in blended assessments correspond to their academic abilities.
- Therefore, if blended learning is effectively used in learning, students' performance increases.

7.2. Recommendationsions

From our research, we would like to recommend the University of Rwanda College of Education, its students, and its partners the following, with the main purpose of making blended learning more effective and fruitful;

- UR-CE should put efforts into establishing new computer labs and make sure that all computers in the lab operate effectively. This will help students to access blended learning tools easily.
- UR-CE should also put efforts into increasing internet accessibility in the college. This can be done by adding more WIFI connections on the campus so that they become available everywhere and every time.
- UR-CE Lecturers should put effort into invigilating blended assessments as they do for face-

to-face assessments. This can be done by limiting the assessment time for online quizzes, checking plagiarism in students' work, and so on. This will reduce the cheating level in blended assessments.

- UR-CE should put efforts into encouraging partners and sponsors who can help students get blended learning tools.
- UR-CE students should try their best to get blended learning tools like computers and smartphones, and use those tools to do more practice and research.

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