Challenges and Opportunities for Using Information Technology in Online Learning During COVID-19

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Abstract
This research used library study and survey methods to determine the challenges and opportunities of using information technology in online learning at Groupe Scolaire de Butare during the COVID-19 pandemic. The sample used in this research was all Groupe Scolaire de Butare Semester I and Semester II students. The COVID-19 pandemic has impacted universities in Rwanda by implementing a physical distancing policy, which became the basis for online lectures using information technology. The media most widely used in online learning at Groupe Scolaire de Butare are WhatsApp and Google Classroom because this application is straightforward to use. However, several obstacles exist, such as the need for more facilities. Based on survey results, 50% of students do not have laptops, 80% need help getting a signal, and are wasteful in using data plans because many live far from urban areas. This research was ineffective because 61.5% of students stated they had never used online learning media before the COVID-19 pandemic. However, using online learning has triggered the acceleration of the digital transformation process of Rwandan education. Before the pandemic, several discourses, supporting policies, and outreach regarding the education era 4.0 were unsuccessful. However, COVID-19 has tremendously impacted digital transformation towards the education era 4.0.

Keywords: Information; Technology; COVID-19; Online Learning; Education Era 4.0

Introduction
The spread of COVID-19 has made the world anxious, including Rwanda. Covid-19 is a new type of virus, so many people do not know and do not understand how to deal with this virus. The whole world is currently busy with various efforts to prevent COVID-19 to contain the surge in positive patients because until now, there has been no cure or vaccine found. With the COVID-19 virus, the government has made several policies to stop the spread of this outbreak, such as doing lockdowns in areas included in the red zone for the spread of the virus or physical quarantine to avoid the virus by physical contact. The Government of the Republic of Rwanda has also issued various health protocols. The government implements This protocol throughout Rwanda, guided centrally by the Rwandan Ministry of Health (2020).

The spike in positive COVID-19 cases impacts the economic world and is also felt by the world of education. Policy enforcement physical distancing, which becomes the basis for implementing learning at home, by utilizing information technology that suddenly applies, often surprising educators, pupils, students, and parents because they are unprepared. Educators were shocked because they had to change the learning system from face-to-face learning to now that all teaching is done online (online).

The policy for implementing online education by schools and universities in Rwanda is to respond to the COVID-19 pandemic, which has hit almost the entire world. The Ministry of Rwandan Education encourages the implementation of the learning process online. This follows the Circular Letter of the Minister of Education of the

Republic of Rwanda, number 3 of 2020, concerning preventing coronavirus disease (COVID-19) in Education Units. Secretary General's LetterMinistry of Education dated March 12, 2020, concerning prevention of the spread Coronavirus Disease (COVID-19), in addition to following circulars and appeals from each regional government where the university is domiciled. Information Technology is a solution for online enforcement. Educators use many information media to learn online (Adedoyin & Soykan, 2023; Quang & Tri, 2021). Information technology as a support for the implementation of online learning during this pandemic includes e-learning, home study, Edmodo, EdLink, Moodle, Google Classroom, and class online. Students must be ready for the learning that is carried out online. After three months of implementing online learning, students experienced many complaints due to the unpreparedness of the facilities they had.

Online learning is also applied in Groupe Scolaire de Butare, which requires all teachers and students to be technologically literate. Teachers must prepare materials in the form of teaching materials and video tutorials first before conducting learning online. Likewise, students must study harder to understand the material provided by the teacher online. The learning process online has yet to be carried out optimally due to unpreparednessTeacher and students need to adjust first. Many students need more facilities to support online learning. Starting from a limited signal, wasteful use of data packages, many students who do not have laptops, and even many students who do not live in the city but live in the interior/mountains far from internet access. This condition can cause the learning gap to become stronger. This indicates that many challenges are faced in online learning using information technology. However, besides these challenges, there are opportunities to use information technology that teachers need to develop innovatively and will undoubtedly be very useful worldwide for learning and the digital era. This kind of study has been carried out by Turnbull, Chugh & Luck (2021), who found several opportunities and challenges in using information technology to support educational activities. Meanwhile, Elberkawi et al. (2021) also studied using information technology in evaluation activities through interactive games. The results show the effectiveness of information technology in supporting learning and evaluation as long as it is used appropriately and has adequate support capacity. Although the study appears similar to this research, the COVID-19 situation impacts psychology learning, causing it to be different. Apart from that, the subjects touched by information technology are also different, so there are new things that can certainly support the two previous studies.

By explaining the background to the problem above, interest arose in researching the opportunities and challenges of using information technology in learning online of Groupe Scolaire de Butare during the COVID-19 pandemic.

Method

This research uses library research and survey methods. Library research collects information and data with the help of various kinds of library materials such as documents, books, magazines, historical stories, news, etc. Meanwhile, according to experts, library research is theoretical studies, references, and other scientific literature related to culture, values, and norms that develop in the studied social situation. In this research, data collection was obtained from news and articles in online journals. Researchers searched articles using the keywords ``Impact of COVID-19'' and "Online Learning". Survey research was carried out by distributing questionnaires using Google Forms. Primary data for this research was collected by distributing questionnaires to respondents (Creswell, 2014). Data collected from various data collection methods is then processed and combined to obtain interpretations related to the challenges and opportunities of using information technology in learning activities online during the COVID-19 pandemic.

Results and Discussion

The policy for implementing online learning in all primary education in Rwanda is to respond to the COVID-19 pandemic, which has hit almost the entire world. The Rwandan Ministry of Education encourages the implementation of the learning process online. This is following the Circular Letter of the Minister of Education of the Republic of Rwanda, concerning the prevention of Coronavirus Disease (COVID-19) in Education Units, and the Secretary General's Letter Ministry of Education dated March 17, 2020, concerning prevention of the spread of Coronavirus Disease (COVID-19).

Policy enforcement of physical distancing, which then became the basis for implementing online learning, by utilizing information technology that suddenly came into effect, surprising teachers and students because they were not ready. Some teachers were shocked because they had to change the learning system from face-to-face to online learning. In detail, the findings obtained in this research are described as follows.

1. Challenges of Using Information Technology in Online Learning

Based on questionnaire data, information about lectures was obtained online during the COVID-19 pandemic, and many students at Groupe Scolaire de Butare still need to be ready for lectures online.

Table 1. Challenges Faced by Students

No	Aspect	Percentage of Students
1	Do not have laptop facilities yet	50%
2	Only use the facility cell phone in online learning	50%
3	Before this, Covid-19 never implemented online learning	61,5%

Based on the table above, 50% of students stated that they did not have laptop facilities, and 50% did not use cell phones as a medium of Online Learning. This data shows that many students still need help to participate in online learning maximally.

Although not difficult, changing the conventional learning paradigm to online takes a long time. Because this is closely related to changes in the academic cultural paradigm. As a result of a survey of students, it was found that 61.5% of students before COVID-19 had never carried out online learning. The survey data above shows that students need more time to be ready to carry out online learning because it concerns academic culture, which includes values, attitudes, knowledge, skills, and the readiness of facilities and infrastructure related to information literacy among students. Ideally, this policy change regarding the learning paradigm will be used as momentum for students to freely and critically seek knowledge information digitally. Likewise, learning opportunities can be free because they are not bound by face-to-face attendance (He, Zhang & Li, 2021). Students can manage their time freely to meet the demands of their learning assignments. In this way, students will become literate in information related to their academic needs, which will continue to increase (Kamysbayeva et al., 2021). However, the reality is the opposite. Many students complained about this change in learning paradigm as proof that unprepared students internally related to values, attitudes, knowledge, and skills in obtaining, evaluating, and organizing information.

The student's geographical location also causes this student's unpreparedness. Groupe Scolaire de Butare is far from urban areas, so many students need help getting an internet connection. Based on the survey results, it was found that as many as 80% of students experienced signal problems and wasteful use of data packages when conducting online lectures. This is a critical concern for Groupe Scolaire de Butare because many students expect to get administrative fee subsidies. Considering it is still being determined when lectures will run normally again.

According to the Ministry of Education's circular letter No. 1 of 2020 concerning the Prevention of the Spread of Coronavirus Disease (COVID-19) in elementary schools, the Ministry of Education point five states, "Organizing distance learning following the conditions of each higher education and advising students to learn from home with online learning is good synchronous nonsynchronous, via platforms: Google Classroom/ Edmodo/ Schoology/ Classdojo (for kids), to record video material via Camtasia/ Screencast-O-Matic/ Seesaw/ Xrecorder, and for practice via Quizlet (flashcards and diagrams), Quizizz (homework) or Kahoot" (Qurotul Aini, et al., 2020).

Based on this circular, the Learning System in Groupe Scolaire de Butare 1 has been carried out using distance learning platforms Google Classroom, Edmodo, EdLink, Schoology, Zoom, and WhatsApp Groups. Based on survey results regarding the use of online lecture applications, it is stated that teachers and students most widely use the applications: Groupe Scolaire de Butare Google Classroom 40%, Whatsapp group as much as 39%, third schoology 15%, Edmodo 3%, Edlink 2%, and zoom 1% use of media Google classroom and Whatsapp Group This has become very popular among teachers and students Groupe Scolaire de Butare Because it is straightforward to understand and can be reached by the signals and data packages that students have. In order for lectures to be more exciting and for students to understand the material presented, teaching creativity is needed from each teacher, such as providing explanations of the material using videos, learning combined with video conference Zoom or other applications for students to explain the material that will be given to students.

2. Opportunities for Using Information Technology in Online Learning

Digital transformation of the education sector in Rwanda is a discourse that has been introduced previously, and there are various discussions, supporting regulations, and concrete efforts to implement digital transformation in elementary schools and all school levels in Rwanda. Previously, various discourses, supporting policies, and outreach regarding the industrial era 4.0 had not succeeded in creating an industry education universities, institutes, elementary schools, polytechnics, academies, and secondary elementary schools) are achieving significant progress in the digital transformation of Rwandan education. COVID-19, or the coronavirus, has tremendously impacted this aspect (Mahyoob, 2020).

Viewed from various aspects, it is clear that Covid-19 is a disaster that hurts almost all sectors of human life. Especially efforts to prevent the spread of COVID-19 through Large-Scale Social Restrictions or Lockdowns with various appeals just at home, work from home, learn from home, stay home, and others. However, it cannot be denied that the disaster of the COVID-19 pandemic also brought various positive impacts, such as natural conditions improving. In the education sector, it turned out to be a trigger for accelerating the digital transformation process of Rwandan education.

All universities and schools in Rwanda have stopped face-to-face teaching and learning activities at Groupe Scolaire de Butare. However, of course, the teaching and learning process cannot stop. Currently, everyone has to carry out online learning. Like it or not, you may or may not feel technologically clueless. The result is that most lecturers, teachers, students, and students are starting to become proficient in using various devices and media to support online learning. Even though it may face various obstacles and various limitations. However, this progress is worth being grateful for and getting used to utilizing technology in the learning process.

Webinar is an abbreviation of web seminar, namely seminars conducted via internet-based applications such as Zoom, Google Meet, Jitsiand others. With webinars, this process is possible knowledge transfer without distance and space limitations. Since

limiting social activities to prevent COVID-19 in Rwanda, many teachers and educators conduct webinars, and many webinar activities have been carried out, including several teachers Groupe Scolaire de Butare. There are paid webinars, and there are also many that offer quality webinars for free. This is undoubtedly an indication of positive developments in the digital transformation process of education in Rwanda.

Education 4.0 is a creative response in which humans utilize digital technology, open source content, and global classrooms to apply lifelong learning (lifelong learning), a flexible education system, and personalized learning to play a better role in society. On the other hand, new normal e-learning is not the answer to a question but an adaptation of a condition that everyone is "forced" to do. After the COVID-19 pandemic, the new average education that has been started should be continued and refined until it meets the concept of blended learning, namely an educational concept that combines face-to-face lecture method in the classroom with e-learning and, in turn, the world of education will truly inside era education 4.0. Regarding e-learning in junior high schools, if the measurement is "it can be done," it cannot be denied that all schools can do it. Teachers and students are encouraged to understand at least the use of digital technology. On the other hand, students are also forced to explore information technology and distribute their creativity through innovations in the tasks given.

Various information technology platforms have the opportunity to be used to support online learning activities and, at the same time, also have the opportunity to force teachers to become information technology literate. Some of them are as follows: e-learning, Home study, Edmodo, EdLink, Moodle, Google Classroom, and online classes.

a. E-learning is information and communication technology that enables students to learn anytime and anywhere (Almazova, 2020). E-learning has two types, namely: first synchronous. Synchronous means at the same time. The learning process occurs at the same time between educators and students. This allows direct interaction between educators and students online. Synchronous training is a picture of an actual class but is virtual (virtual), and all students are connected via the internet. Synchronous training is often also referred to as a virtual classroom. Second, Asynchronous means not at the same time. Students can take different learning times when the teacher provides the material. Asynchronous training is prevalent in learning because students can access learning materials anywhere and anytime. Students can learn and solve it at any time according to the predetermined schedule. Learning can be read, animation, simulation, educational games, tests, quizzes, and tasks. Edmodo is an application that is safe for use by both teachers/lecturers and students. Jeff O'Hara is a learning platform to collaborate and connect students and teachers in sharing educational content, managing projects or assignments, and handling notifications for each activity. In another definition, Edmodo is a safe and free social network-based learning that makes it easier for teachers to create and manage virtual classes so that students can connect with classmates and teachers anytime and anywhere (Yusuf & Ahmad, 2020). Definition Edmodo another thing is that Edmodo is an educational application with a social media and cloud platform such as Facebook that can be used in learning. In line with Yusuf's view, Tamah, Triwidayati & Utami (2020) stated that Edmodo was created using a concept similar to Facebook, where the purpose of its creation is specifically for the educational sector, which can support the learning process effectively online.

b. EdLink is an Android-based application specifically for the world of education to help teachers and students in the Learning process. Some of the benefits of Edlink for teachers are saving time, keeping classes organized, improving communication with students, and many others. It is helpful for teachers and students, where students can be more updated about school information, making the learning process easier.

c. Moodle is a platform to learn (a learning platform) which is specially designed for educators, admins, and students. Moodle is an abbreviation for Modular Object-Oriented Dynamic Learning Environment. This platform is classified as a CMS but specifically for educational purposes.

d. Google Classroom or Google Classroom is a mixed learning platform for the educational scope. It can make it easier for teachers to create, share, and classify each assignment without paper (Al-Ansi, Garad & Al-Ansi, 2021). Google Classroom is used to maximize the process of delivering material to students but is done online so that the material can be delivered in its entirety. Google Classroom is an internet-based service provided by Google as an e-learning system. This service is designed to help teachers create and give assignments to students paperless (Simamora, 2020).

e. Schoology Is a social network based on a school environment developed by Nicolas Borg and Jeff O'Hara in 2008. Schoology is intended for teachers, students, and parents of students. Appearance Schoology is almost the same as the social network Facebook; the social networking site Facebook is commonplace among Teenagers, and even elementary school-age children already know what Facebook is.

f. Zoom is a free HD meeting app with video and screen sharing for up to 100 people. Zoom is a communication application using video. This application can be used on various mobile devices, desktops, telephones, and space systems.

g. Whatsapp is one of the most popular communication media used today; Whatsapp is an application used to carry out conversations using text, voice, or video. WhatsApp to stay connected with family and friends anytime and anywhere. Whatsapp is free and offers a simple, secure, reliable messaging and calling experience available on phones worldwide.

Of the several digital fashion platforms mentioned above, WhatsApp is the most common among students and students genders. Groupe Scolaire de Butare because before the COVID-19 pandemic, students and teachers had also intensively communicated and interacted regarding learning via WhatsApp groups. However, online learning during this pandemic should be utilized by lecturers to develop digital competence so that every guru utilizes digital mode to be more varied. This aims to avoid boredom in studying and absorbing information related to teaching material and avoid monotonous patterns carried out by students part great Master. The conventional system that has existed so far should be combined with multimedia communication media, especially since the discovery of this multimedia communication media. Due to the nature of the internet that can be contacted at any time, students can utilize educational programs provided at any time in their free time so that the space and time constraints they face in finding learning resources can be overcome. With rapid telecommunications, multimedia, and information technology developments, listening to lectures and taking notes on paper is undoubtedly outdated. According to Yeung, & Yau (2022), ICT utilization (Information, Communication, and Technology) is classified into three types. First, ICT as a media (tool) for education is only a complement to clarify the description presented. Second, ICT as a source, namely as a source of information and seeking information. Third, ICT is a learning system.

Various learning models emerged online in line with the development of ICT (Information, Communication, and Technology). Next came the term web-based school (web-school) or internet-based schools (cyber-school), which use internet facilities. Starting from these two terms, various new terms emerged in learning using the internet, such as online learning, distance learning, web-based learning, and IT learning (Bakhov, et al., 2021).

The very rapid development of technology is currently the gateway for the arrival of the Industrial Revolution 4.0 or Industry 4.0. According to Xie, Siau & Nah, (2020), industry 4.0 is cyber-physical systems, which means technology is no longer a 'tool' but is embedded in people's lives. Artificial Intelligence, nanotechnology, biotechnology, autonomous vehicles, and 3D printing are examples of the increasingly widespread development of technology today. Speed, reach/coverage, and impact are three reasons from Schwab (World Economic Forum, 2016), which explains that the current technological transformation is not an extension of the third industrial revolution but rather the arrival of the industrial revolution 4.0. Some of these applications could be the first step for elementary schools when preparing e-learning in implementing blended learning to create education 4.0 that will be the new Normal in the Industrial Revolution 4.0 era after the COVID-19 pandemic.

Conclusions

The COVID-19 pandemic has significantly impacted Rwandan education, including Groupe Scolaire de Butare. Policy enforcement physical distancing becomes the basis for implementing online lectures by utilizing information technology such as WhatsApp groups, Edmodo, EdLink, Moodle, Google Classroom, and online classes. The most widely used media in online learning are Groupe Scolaire de Butare Ie, WhatsApp group, and Google Classroom because these applications are straightforward. However, there were several obstacles experienced, such as inadequate facilities. Based on the survey results, it was stated that 50% of students did not have laptops, and 80% of students stated that it was difficult to get a signal and that it was wasteful to use data packages. This was because many students lived far from urban areas. Online lectures could be more effective because they are not used to learning online, so they need to make adjustments first. This is also because, before the COVID-19 pandemic, 61.5% of students said they had never used online lecture media.

Viewed from various aspects, it is clear that COVID-19 is a disaster that has hurt almost all sectors of human life, including education. However, the COVID-19 pandemic also provides an opportunity for educational institutions to be technologically literate, and the implementation of online lectures has become a trigger for accelerating the digital transformation process of Rwandan education. Previously, various discourses, supporting policies, and outreach regarding the industrial era 4.0 had not succeeded in creating an industry education; universities, institutes, high schools, polytechnics, academies, and even primary and secondary schools) have achieved significant progress in the digital transformation of Rwandan education. COVID-19, or the CoronaVirus, has had an extraordinary impact on digital transformation towards the era of education.

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