

Mobile application for teaching and learning

Timothy Gachanga,

Nairobi Kenya

Abstract

When COVID-19 was first reported in Kenya on March 13, 2019, education at every level – from elementary school to professional training – was disrupted and had to shift online. Many learning institutions including universities were unprepared for online or distance learning modes of learning. Those that were unable to shift online were forced to close down indefinitely. Some took over a year to figure out how to resume learning. Internet connectivity presented another challenge. The staff and students had to be trained on how to use education portals, Moodle, Zoom or Google Meet. Going online required teachers and students to have internet bundles which according to the Communication Commission of Kenya (CCK) costs Sh240 (USD2.25) for one GB of the Internet. This is too expensive for many to afford. My innovation seeks to help learners access learning content through their mobile phones. It also seeks to address the issue of climate change by reducing the over-reliance on papers in teaching at the university.

Key words: Innovation, mobile application, mobile devices, learning content, climate change

Introduction

When COVID-19 was reported in Kenya on March 13, 2019, learning in all schools, colleges and universities were suspended. This led to an immediate shift from face-to-face teaching and learning to emergency remote learning using technology and the internet (Bozkurt, *et al*, 2020). Many learning institutions including universities were unprepared for remote learning. Those that were unable to shift to remote learning were forced to close down indefinitely. Some took over a year to figure out how to resume learning. According to Bozkurt, *et al* (2020), the resumption of learning depended on access to the internet, data and devices to provide continuation of teaching and learning.

Internet was a major challenge to the shift to remote learning. A study by Pete and Soko (2020) showed that most learners and instructors accessed internet connection at campus and the place of work. At campus, internet is free for students and lecturers in most universities. When learning institutions were closed, quite significant number of learners and instructors were disadvantaged because they did not have internet at their homes. They accessed internet from family members, their neighbors' homes, public libraries or cyber caffes. This posed a challenge to online.

Data was another major challenge to the resumption of learning (Tarus, *et al*, 2015). Data from the Communication Commission of Kenya (CCK) shows that the cost of one GB of Internet in Kenya is Sh240 (USD2.25). This is too expensive for many to afford. The same is the internet

speed and stability. A study by Pete and Soko (2020) showed that the majority of the learners and instructors were dissatisfied with these elements. This posed a challenge to online learning, especially where video-based platforms such as zoom and Google Meet were being used. These platforms require a strong internet connection.

Regarding devices that learners and instructors use to access the internet, studies show that the use of mobile phones is quite high. A study by Pete and Soko (2020) which was conducted in Ghana, Kenya and South Africa, showed that 34% of instructors and learners in Ghana used mobile phones for learning, in Kenya 23%, and South Africa 32%. This is encouraging because it shows that learning could continue even when learning was suspended in universities. After all, they could continue using their mobile devices even when at home.

Regarding digital competency, the study showed that the majority of learners and instructors had intermediate digital competence. This means that they could use a range of applications effectively. However, many universities organized training programs for their faculty on how to design courses, teach and even assess online. One of the programs that were offered in 80 universities in 10 African countries was Pedagogical Leadership in Africa (PedaL) (Nakweya, 2021).

The other challenge was pedagogical. According to Makoe (2012), mobile learning ascribes to a student-centered approach. This approach requires learners to construct their knowledge through peer collaboration. To create a collaborative environment, students created a WhatsApp group where they would be able to link up with their colleagues for discussions. I would also use the same platform to share the link where they would download the app or inform them about tasks that I would like to perform.

The Innovation

This innovation aimed to help learners access course content even when there is no internet. Studies show that mobile devices can offer solutions to many challenges faced by education, such as access, mobility, timely access to learning, and peer collaboration (Park, 2011, Makoe, 2012).

I was teaching two courses at the university when the pandemic struck the country. When physical teaching and learning were suspended, I had to figure out how I was to continue teaching and deliver learning content to my learners, some of whom had to travel to rural areas where internet access was a challenge.

To address these challenges, I developed two mobile apps, the [Conflict Resolution and Transformation Toolkit](#) and the [Peace and Conflict Reporting Toolkit](#) to help my learners access learning content. Learners download the app and could access much of the content offline, wherever they are and wherever they wish to learn. They only required an internet connection to stream content hosted by other platforms. Through the app, learners could also listen to recorded

lectures, watch online educational videos, access online books or journal articles, and engage in collaborative activities such as journal writing, chats, or discussions. They can also do assignments through Google Forms.

The [Conflict Resolution and Transformation Toolkit](#) app aims to provide learners with a basic understanding of the field of conflict resolution and transformation and how these concepts can be applied in practice to peacebuilding. It covers 11 topics and aims to cover both theoretical and practical issues, from the nature of conflict, its analysis, mediation, dialogue, restorative justice and post-conflict reconstruction.

The [Peace and Conflict Reporting Toolkit](#) is designed to support those who wish to learn about reporting in situations of conflict. The app also covers 11 topics. This includes functions of media in society, peace journalism, basic rules of peace journalism, and reporting on the peace process among others.

As Makoe (2012) has pointed out, mobile learning requires learners to construct their knowledge through peer collaboration. To create collaborative tasks, I use Google Documents and then hyperlink it in the app with instructions on what to do. When learners open the link, they are directed to a Google Document where they can see what other learners are doing.

TRAINING MODULE

Understanding Conflict

1.3 Dimensions of Conflict

Conflict has three dimensions:

1. The cognitive dimension(perception),
2. The emotional dimension (feeling), and
3. The behavioural dimension (action).

Open this **document** and read page 2 about the three dimensions of conflict.

Analyse a conflict that you have experienced in terms of the three dimensions of conflict.

1.4 Causes of Conflict

There is no single cause of conflict. Rather, conflict is context-specific, multi-causal and multidimensional and can result from a combination of forces:

Watch this **video** and then answer the following questions:

1. In reference to the video, give 5 causes of conflict in Africa.
2. Is there any hope for Africa according to the video?



Use this **google document** to write your responses and read responses from your colleagues.

Click the **link/** below to learn more about

Critiques of mobile learning argue that it is not possible to assess your learners through a mobile device. This innovation discounts this. To assess the learners, I prepare the assessment on Google Forms and then hyperlink it in the app with instructions on what to do. When they open the link, they are directed to Google Forms for the assignment.

TRAINING MODULE

Understanding Conflict

three dimensions of conflict.

Analyse a conflict that you have experienced in terms of the three dimensions of conflict.

1.4 Causes of Conflict

There is no single cause of conflict. Rather, conflict is context-specific, multi-causal and multidimensional and can result from a combination of forces:

Watch this [video](#) and then answer the following questions:

1. In reference to the video, give 5 causes of conflict in Africa.
2. Is there any hope for Africa according to the video?

Use this [google document](#) to write your responses and read responses from your colleagues.

Click the [link](#)/ below to learn more about causes of conflicts:

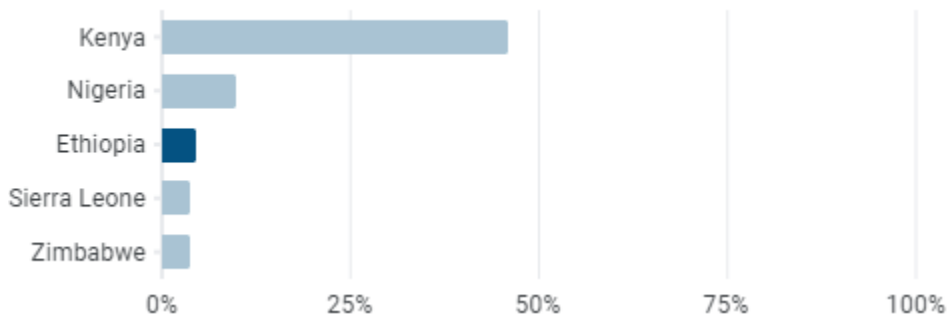


Self-Assement Exercise

1. Describe the acronym [TRIP](#)
2. Explain the term [conflict trigger](#) and give 3 examples.

Impact of the innovation

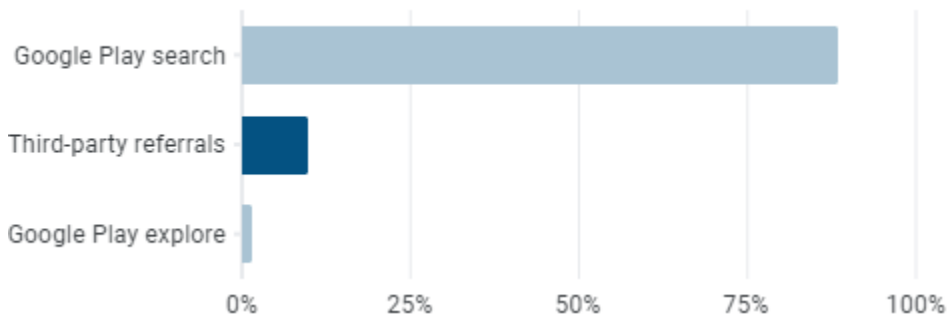
Though the apps were primarily intended for use by the students I was teaching during the session, their coverage has been much wider. Statistics from Google Play Store show that over 878 devices in 176 countries across the globe have downloaded the application and are actively using the toolkits.



Store Listing Acquisition

Source: Google Play Console

Among those using the app, 92% learnt about the app by searching online, 10 % through referrals while 2% acquired it through Google Play explore.



Traffic sources

Source: Google Play Store

This is important because it shows the potential mobile applications have in reaching marginalized communities across the globe. According to UNESCO, mobile technology has reached the furthest corners of the planet including communities where traditional services are scarce (UNESCO, 2022). This is significant because it offers the possibility to open-up access to education, make education systems more resilient, and to provide new modes of learning (INASP, 2021). If this potential is harnessed, it can make learning more inclusive, more accessible and more equitable.

Impact of the innovation on climate change

Though COVID-19 was a catalyst for this innovation, climate change also motivated the development of the application. Data shows that universities use enormous amounts of paper daily. In Kenya for instance, there are 454,826 students enrolled in universities in Kenya, 15,186 lecturers and 5,113 courses being offered at the universities (CUE, 2019). Most instructors still use the traditional way of teaching where they send reading materials and assignments to learners via email or post such materials to learning management systems like Moodle or Google Classroom and other learning platforms (Bozkurt, et al, 2020). Since reading online is expensive many learners printed the notes instead. If we are to quantify the tones of papers used to produce learning modules and notes, it is enormous. This is contributing to a reduction in forest cover which is a major contributor to climate change. Mobile applications can slow down climate change by reducing over-reliance on papers in teaching and learning.

Conclusions and recommendations

- Mobile devices can offer solutions to many challenges faced by education, such as access, mobility, timely access to learning, and peer collaboration. It should be embraced and supported.
- Mobile devices make it easy for students to access learning content, access online journals, books, videos and collaborate with their lecturers and peers. It also makes higher education more accessible and relevant.
- The innovation can be replicated by other faculty members and other universities.
- Most of the universities' e-resources are not accessible off-campus. Since mobile learning is a student-centered approach, this can hinder learners from accessing materials that can help in generating their knowledge.
- More awareness needs to be created on Open Education Resources (OER) so that it is embraced.
- While developing this innovation, there was no institutional support in terms of funding to develop the content or to create the tool. This may discourage innovators
- There was also a lack of enabling institutional policies to encourage and support this work. I had to teach myself because there is no mobile development unit in the ICT department.

References

Bozkurt, A., Jung, I., Xiao, J., Vladimirsch, V., Schuwer, R., Egorov, G., Lambert, S. R., Al-Freih, M., Pete, J., Olcott, Jr., D. Rodes, V., Aranciaga, I., Bali, M., Alvarez, Jr., A. V., Roberts, J., Pazurek, A., Raffaghelli, J. E., Panagiotou, N.,. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1-126.
doi:<https://doi.org/10.5281/zenodo.3878572>

INASP. (2021). *Creating digital content and delivering digital learning in African universities*. England: INASP.

- Judith Pete and Jeketule Soko. (2020). Preparedness for online learning in the context of Covid-19 in selected Sub-Saharan African countries. *Asian Journal of Distance Education*, 15(2), 37 - 47. doi:<https://doi.org/10.5281/zenodo.4292688>
- Makoe, M. (2012). The Pedagogy of Mobile Learning In Supporting Distance Learners. *11th World Conference on Mobile and Contextual Learning* (pp. 1 - 8). Pretoria: UNISA.
- Nakweya, G. (2021, June 10). Generosity and collegiality as institutions embrace blended learning. *University World News Africa Edition*. Retrieved from <https://www.universityworldnews.com/post.php?story=20210607161245419>
- Park, Y. (2011). A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types. *International Review of Research in Open and Distance Learning*, Vol.12(2), 78 - 102.
- Tarus, J. K., Gichoya, D., & Muumbo, A. (2015). Challenges of implementing e-learning in Kenya: A case of Kenyan public universities. *International review of research in open and distributed learning*, 16(1), 120-141. doi:<https://doi.org/10.19173/irrodl.v16i1.1816>
- UNESCO. (2022). *Mobile Learning*. Retrieved from UNESCO: <https://en.unesco.org/themes/ict-education/mobile-learning>