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A Mobile Application for Teaching and Learning Critical Thinking About Health Choices Among Youth in Rwanda: A Digital Tool for Youth Friendly Center Counsellors

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Abstract. Mobile health applications can help to disseminate educational health interventions and be widely used. However, mobile health applications not carefully developed will likely not be adopted by the intended users. This paper describes the methodology used to develop a mobile health application for teaching critical thinking about health to youth attending youth friendly centres in Rwanda. The app includes the adapted content of a children's "health choices book". We adapted the book into audio podcasts to fit the context of young adults. The application was developed following a framework for developing mobile health applications. The framework follows three theories: health belief model, the theory of planned behavior and technology acceptance model. We developed an Android based application which can be freely accessed in the Play store. The content in the app explains the need for critical thinking, the 10 audio podcasts, the support, and chat window where users share their experience of using the app. The app will be piloted in two youth centers in Rwanda.

Keywords. critical thinking, health claims, mobile health, youth centers, Rwanda

1. Introduction

Misleading health information promoted by rumours, anecdotal evidence, preconceptions about treatments and diseases can potentially be a public health threat [1]. As cities evolve with technology and ICT use, young people become increasingly exposed to reliable and unreliable health information from social and mass media. These varying sources of information can lead young people in risky health choices which pose their lives in danger. Most of youth lack critical thinking skills to make reliable decisions about their health especially treatment choices.

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Making good decisions about health depends on critical thinking skills, people's ability to obtain, process and understand information needed to make informed decisions [2,3]. We must teach young people to figure out how to evaluate other people's arguments before they come to own conclusions [4], However, existing structures in formal and informal education settings lack the capacity to teach critical thinking about health and there are few learning resources to help teach those skills [5,6]. To respond to this need, the Informed Health Choices (IHC) network is developing and evaluating resources to enable young people to think critically about health claims in primary and secondary schools [7-9]. Building on this work, we have adapted the children's book developed by IHC network [8] into audio podcasts that fit the audience of youth and young adults. To disseminate these podcasts, we have developed a mobile health application with the adapted content to be accessed and used by youth centers in Rwanda. The purpose of this paper is to describe the development of a mobile application for teaching and learning critical thinking about health among youth in Rwanda, an app targeted for youth centers.

2. Methods

This was a multidisciplinary collaboration to develop a smart phone application. The development was drawn on the constructs of three conceptual theories: Technology Adoption Model (TAM) [10-11], the health belief model [12] and the theory of planned behavior [13-15]. Building on these theories, we used a conceptual framework for adoption of mobile health application proposed in the literature [16]. The figure 1 below describes the conceptual framework used to develop the mobile application for critical thinking about health.

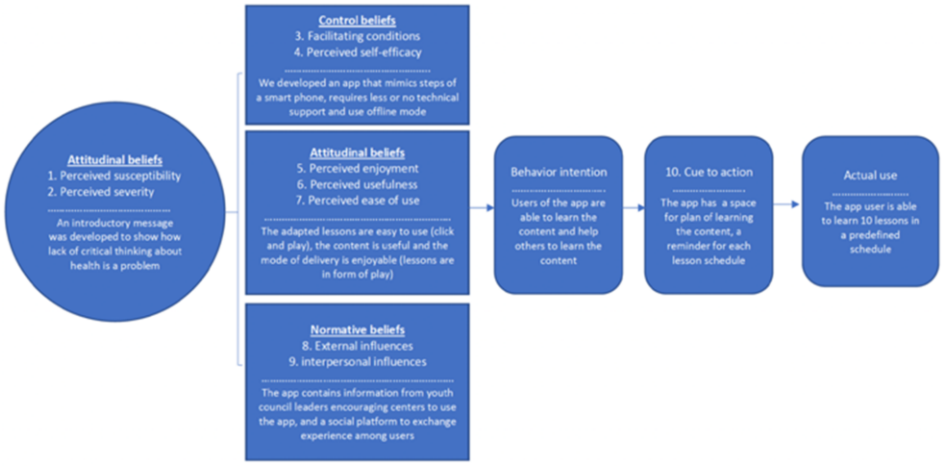

Figure 1: A conceptual framework for developing a mobile application of teaching and learning critical thinking about health in youth centres

The mobile application was developed targeting Android users. It is built on Android studio (Version 2021.2.1.15 for windows) capabilities. The current version supports the Android handheld devices as most of the targeted users use Android version. However, the application will be upgraded to support both Android and iOS users by using the flutter framework and Visual Studio Code functionalities. The application was developed as a free access app without user login credentials. We engaged end users of the app prior

to the development of the app and explored with them how the content can be adapted to be useful, easy to use and be enjoyable.

3. Results

The content of teaching critical thinking about health is based on the key concepts for teaching people to assess trustworthiness of health claims [16]. The content was primarily developed for primary school children in Uganda, piloted for their use in Rwanda and Kenya. The content includes concepts about health treatment and effects: claims (what people say about treatments that can be true or wrong); bad reasons for believing a claim; comparisons (effects of treatments based on comparisons); fair comparisons; the role of chance; and advantages and disadvantages of using a treatment. The content in the mobile application described in this paper was adapted to fit the context of out of school youth who are older than school children. The target group to learn the content is out of school youth over 18 years who attend youth friendly centers in Rwanda and their counsellors (nurses) who work at youth centers. We adapted the content (book) into audio podcasts (translated in Kinyarwanda) that is relevant to youth. The content of podcasts teaches youth to be aware of what people say about treatments that could be true or false and assess their basis. In addition, the content teaches youth to believe treatments claims that were tested in fair comparisons and lastly to weigh the advantages and disadvantages of treatments before making choices. We engaged youth, youth centers, and their stakeholders to understand their needs and preferences before adaptations. The details of youth discussions are reported in a separate paper. The audio podcasts were piloted in two youth centers before developing the mobile application.

The mobile app targeted the youth counsellors in youth friendly centers in Rwanda and youth who can access Android smart phones on their own. Youth friendly centers in Rwanda are places in the community where young people usually gather for sports, information education sessions and skills development. The centers have full time health professional counsellors (nurses and lab scientists) who support youth to access health information and education. The app could be used in two ways. First, the counsellors can pass it on to youth who have their own smart phones. Second, the counsellors can use the app and teach youths who attend the center using his/her smart phone or can be extended to public sound system. The use of the app would stimulate critical thinking about health. For example, in one podcast Sandra presents how he relied on experience of a grandmother and used home remedy to treat her burn. Using the claimed home remedy, the burn got more worse. She went to the hospital and learnt from the doctor that she used unreliable treatment based on experience of grandmother. The doctor denounced using treatments based on personal experience. Based on this information, she learnt that personal experience is not a reliable basis for treatment hence stimulating critical thinking on what people say about treatments. Lastly, this information can help youth to reflect on their decisions and make reliable health choices.

4. Discussion

This paper shares the early-stage development of a mobile application for teaching critical thinking about health for counsellors working at youth friendly centers in Rwanda (Phase one conducted in January to June 2022). The second phase will be to pilot, and

user test the application in two youth friendly centers in Rwanda by engaging counsellors and youths to use the developed app (July to December 2022). The development of a mobile applications engaged a multidisciplinary team who contributed to develop the app. The team included a public health professional (MM) and clinical medicine professional (MU) who reviewed the adapted health-related content. The communication professionals (IV, HP) who contributed to communication of the content and software developers (ME and ME) who contributed to the development of the application. The application development was guided by the health belief model which aimed to explore the behaviors related to the uptake of app. In addition, we followed the theory of planned behavior which predict the intention to engage in a behavior (in this case use of the application). Lastly, we followed the Technology Acceptance Model which guided the key consideration for development of an application that will likely be accepted by the targeted users. The findings will inform how youth attending youth friendly centers can learn to think critically about health, a skill needed in their life.

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