

East African Journal of Information Technology

eajit.eanso.org

Volume 5, Issue 1, 2022

Print ISSN: 2707-5346 | Online ISSN: 2707-5354

Title DOI: <https://doi.org/10.37284/2707-5354>



EAST AFRICAN
NATURE &
SCIENCE
ORGANIZATION

Original Article

E-Book Mobile Application: A Case of Kabale University Mukombe Library, Uganda

Clare Ninsiima^{1*} & Patricia Kyomugisha¹

¹ Kabale University, P. O. Box 317, Kabale, Uganda.

* Correspondence ORCID ID: <https://orcid.org/0000-0002-6966-0731>; email: cninsiima@kab.ac.ug.

Article DOI: <https://doi.org/10.37284/eajit.5.1.867>

Date Published: **ABSTRACT**

05 December 2022

Keywords:

*E-book,
Mobile application,
Android,
Mukombe library,
Kabale University,
Uganda*

Globally, many academic e-books are available in user-friendly forms like PDF and HTML that can be accessed on laptops, iPads, and smartphones, even though some e-books require a special e-book reader. However, university students find it difficult to access e-books because some of the university libraries have few computers that hold the downloaded e-books, which are stored in a folder, and little effort has been made as a result; there is low usage of e-books. The project's goal was to investigate how e-book applications work and how students at Kabale University can access e-books via mobile phone or tablet. The objectives of the project were to investigate the existing e-books application, design and develop the e-books application, and test and validate the developed application that enables students at Kabale University to access e-books simultaneously. The literature review helped me read a number of pieces of literature about e-book applications. They were information sources about the E-books application such as the internet, books, journals, and newspapers, among others. The use of existing information from the library helped to develop a model to predict the E-book application and testing of the application using Android smartphones. It was concluded that the implementation of the e-book's application was done using Android to enable users to access the books on their mobile phones or tablets. The study recommends that the administrator of the system should be taken through the tasks in order to be able to upload books ready for the application.

APA CITATION

Ninsiima, C. & Kyomugisha, P. (2022). E-Book Mobile Application: A Case of Kabale University Mukombe Library, Uganda. *East African Journal of Information Technology*, 5(1), 202-215. <https://doi.org/10.37284/eajit.5.1.867>

CHICAGO CITATION

Ninsiima, Clare and Patricia Kyomugisha. 2022. "E-Book Mobile Application: A Case of Kabale University Mukombe Library, Uganda". *East African Journal of Information Technology* 5 (1), 202-215. <https://doi.org/10.37284/eajit.5.1.867>.

HARVARD CITATION

Ninsiima, C. & Kyomugisha, P. (2022) "E-Book Mobile Application: A Case of Kabale University Mukombe Library, Uganda", *East African Journal of Information Technology*, 5(1), pp. 202-215. doi: 10.37284/eajit.5.1.867.

IEEE CITATION

C. Ninsiima & P. Kyomugisha "E-Book Mobile Application: A Case of Kabale University Mukombe Library, Uganda", *EAJIT*, vol. 5, no. 1, pp. 202-215, Dec. 2022.

MLA CITATION

Ninsiima, Clare & Patricia Kyomugisha. "E-Book Mobile Application: A Case of Kabale University Mukombe Library, Uganda". *East African Journal of Education Studies*, Vol. 5, no. 1, Dec. 2022, pp. 202-215, doi:10.37284/eajit.5.1.867.

INTRODUCTION

An electronic book, often known as an e-book, is a book that has been published digitally and is viewable on a computer screen or other flat-panel electronic device [1]. Many books that are accessible in printed form can also be read online [2]. Extinct works are also made accessible through e-books [3]. E-books can be made entirely of electronic text, or they can also include elements like audio or video [4].

According to Blummer and Kenton [5], after e-books were accessible in university libraries in the late 1990s, librarians used surveys, focus groups, and interviews to learn more about how readers were using the format. Armstrong, Edwards, and Lonsdale [6] defined e-books as "any piece of electronic text regardless of size or composition (a digital object) but excluding journal publications made available electronically (or optically) for any device (handheld or desk-bound) that includes a screen" or screen reader. Since they first appeared in academic libraries in the late 1990s, e-book collections have been gradually growing.

According to McLuckie [7], many academic e-books are available in user-friendly forms like pdf and HTML that can be accessed on laptops, iPads, and smartphones, even though some e-books require a special e-book reader. But according to Walters [8], one of the main drawbacks of e-books was that there was no universal format, which hampered their "cross-platform compatibility".

Additionally, Walters [9] found that e-books and e-journals are frequently subject to licenses that impose limitations on viewing, printing,

downloading, and transferring through digital rights management (DRM). Some licenses additionally place limitations on the types of users, the number of copies circulated for each eBook, and their use for course reserves and interlibrary loans [9].

Similar to e-books, aggregator subscription packages, title-by-title purchases, short-term loans, patron-driven, evidence-based acquisition methods, and more are available for purchase [10]. Although suppliers normally offer three lease choices, such as annual access, perpetual access, and pay-per-use, libraries still choose to lease rather than buy e-books [11]. However, not all online booksellers provide all of these choices [8].

At Kabale University Library, e-books are accessed from the library computer, which contains a folder that holds the downloaded books (e-books) [12]. Students physically go to the library to access the E-books, and this makes it difficult to access them.

To address the aforementioned issue, the designed E-book mobile application allows students to read the e-books they require wherever they are, without having to go to the library, as long as they are connected to the internet. It saves much time and provides the reader with constant access to the books. Furthermore, e-books provide the reader with the exclusive opportunity of reading valuable, rare books [13].

Sadly, students at Kabale University find it difficult to access e-books because Kabale University Library has one computer that holds the downloaded e-books, which are stored in a folder. The computer can be used by only one student at a time. As a result, there is low usage of e-books at

Kabale University [14]. It is from this background that we proposed the development of an e-book application for Kabale University students for easy use and simultaneous access to books [15].

In addition, the overall objective of this study is to come up with an e-book application that helps students access books electronically. This study was

guided by the specific objectives, to carry out an investigation on how e-book applications work and are designed, to design and develop an e-book application for Kabale University students, and to test and validate the designed application [16].

Conceptual framework Measurement of Variables

Figure 1: Conceptual framework

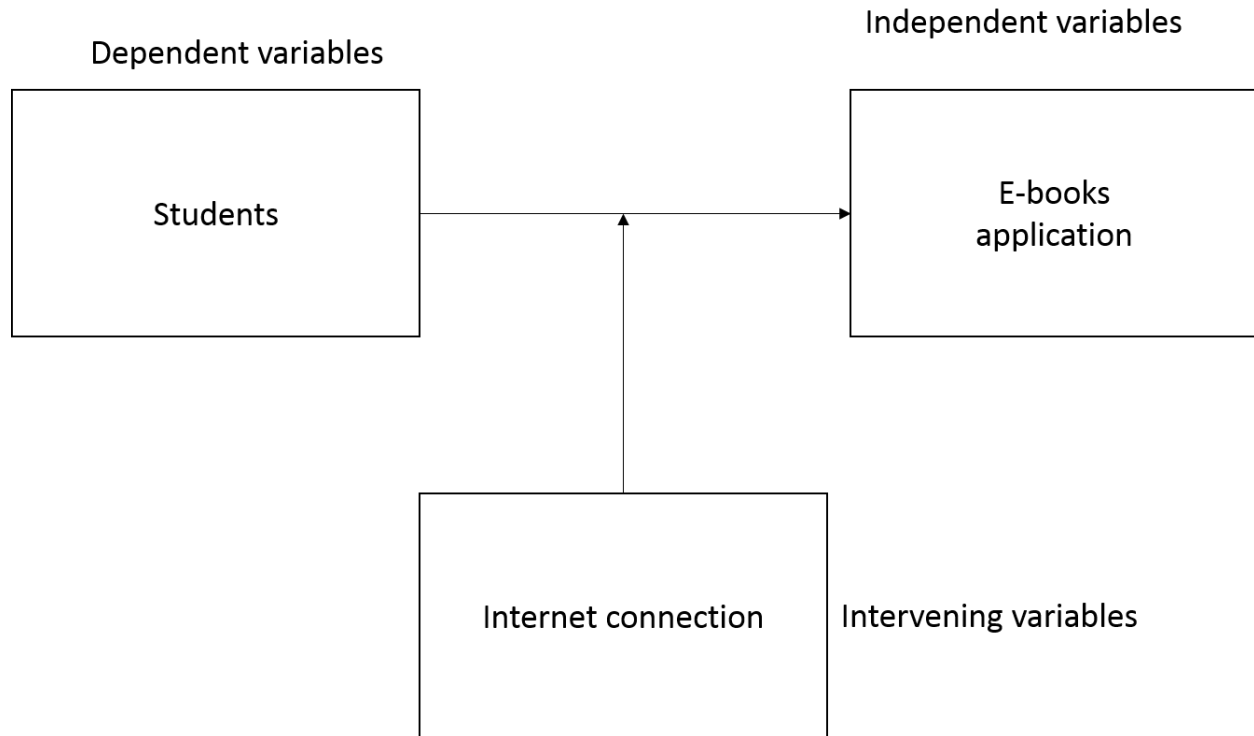


Figure 1 above shows that the students depend on the E-book application and an internet connection. If there is no Internet connection, the student cannot access the books.

LITERATURE REVIEW

During the investigation and analysis of existing systems, a literature review was used to read a number of pieces of literature about e-book applications. They were informative sources like the internet, books, journals [17], and newspapers, among others, about the E-Books application. The information obtained from such documentation was necessary for the identification and analysis of the requirements needed to accomplish the implementation of the application [18].

Existing Information

To design an e-book application, the information gathered during the literature review above and the existing information from the library were used to develop a model to predict the e-book application [19]. Using data flow, system flow diagrams were used to illustrate how the different activities and events affect the different users.

Quick Design:

“To achieve objective two.”

This was done to specify the proposed system’s structural elements. To create a model that reflected the answer, data acquired during the analytical phase was employed. The design elements for the

complete application, the application software, the database, and the user interface were all covered. The inputs, outputs, processes, data, objects, object interactions, networks, and devices of the proposed e-books application are graphically represented. Entity diagrams and flow charts are used to depict the application's models and structural elements.

Build Prototype:

The larger system's initial functioning model was developed. It was necessary to use it to evaluate the viability of the idea, determine the necessary processing steps, and contrast various design and interface options.

Software Tools

Because of the ideal working environment, they offer during the development of the application, such as the availability of tutorials for new users of the software, the software tools listed below were used to create the application. For the establishment of a universally recognised standard design platform, the software tools come highly recommended. The software tools included:

Android studio has a better workspace distribution, which helps to make a friendly environment for app development.

Hypertext pre-processor is commonly referred to as Hypertext Pre-processor (PHP). It supports Open

Database Connectivity (ODBC), the open database connection standard, so you connect to any other database supporting this world standard.

My Structured Query Language (MySQL) was used for database design because it is open-source software that can be supported on all platforms. SQL was used because it supports relational database systems whose advantages include the ability to provide faster access to data than flat files. PhpMyAdmin was used to provide an interface with MySQL. PhpMyAdmin provides ease for the use and manipulation of MySQL.

Java is used to implement methods in android studio.

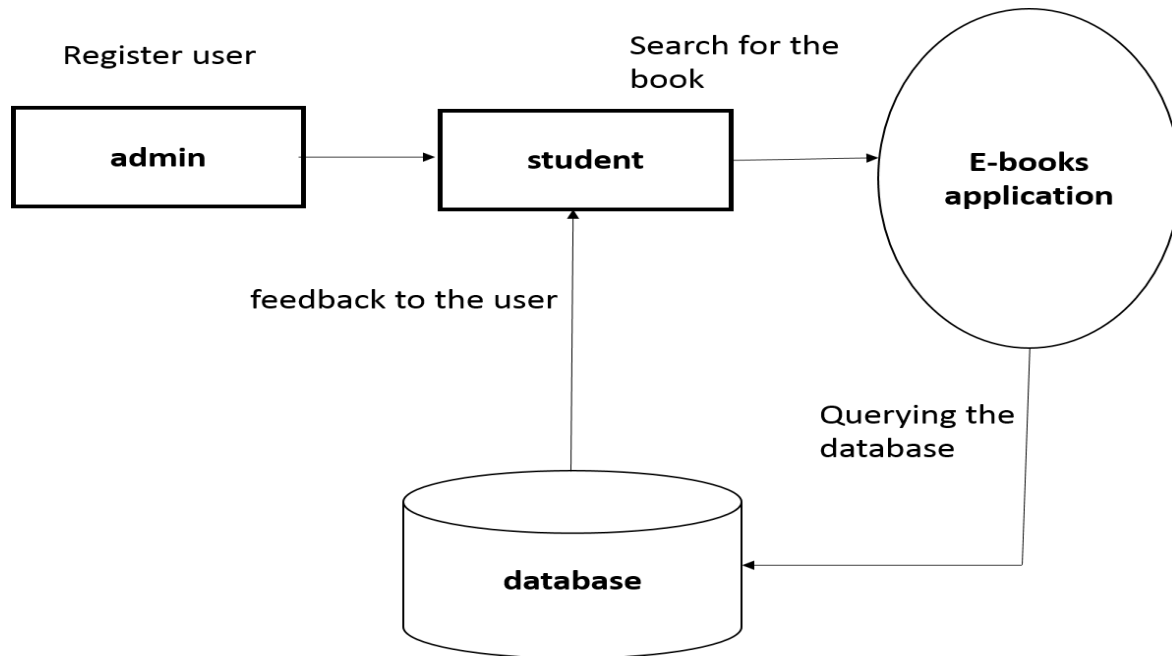
Evaluate and Refine Requirements:

"To achieve objective three."

The prototype built was tested with respect to the information needs and processing requirements of the proposed system. It is a stage where validation controls are applied so that no wrong or unauthorised entries are entered into the system. The prototype was then modified accordingly so as to meet the required standards.

E-books Application

At this level, after thorough testing of the prototype, the actual development of the proposed application was then affected, as shown below;

Figure 2: Modules that were used**Target Population**

The E-books Application was designed for Kabale university students. Specifically, for students in the faculty of computing library and information science, because this category can access library resources easily and can easily access E-materials using smartphones.

Sampling Techniques

A random sampling technique was used to select the population [20]. Random sampling was used because it helps to capture information from the available population at the time of research [21].

Sample Size

In this study, 89 students were selected and this helped to gather the required information on the use of E-books application. The selected students helped to get more detailed information about my study at Kabale University. This included year one students, year two and year three students taking Information Communication and Technology.

Testing

The prototype of the system was tested at the different stages of the system's development using different techniques and these include:

Unit Testing

This involved carrying out tests to verify the functionality of specific sections of code and components of the system to ensure that they perform what they are supposed to do.

Integration Testing

Different parts of the system were brought together to analyse how well they work once integrated; this also helped the developer to know whether the combined units of the system work according to their intended objectives. The Android interface, Desktop interface and central database were integrated together and tested as an integrated module.

System Testing

This involved testing the entire prototype of the system that had been integrated to ensure that it met the intended requirements.

This is mainly based on its ability to respond in real-time under the different statuses of the E-books Application.

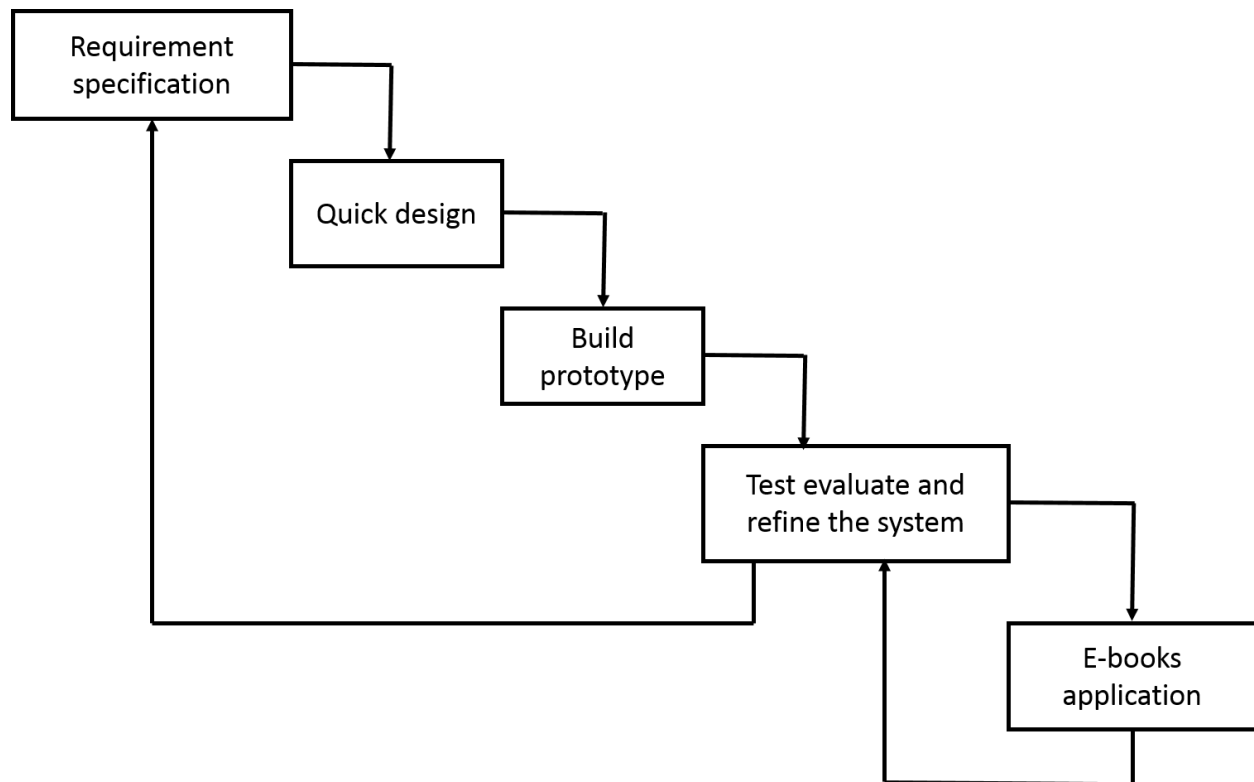
MATERIALS AND METHODS

Rapid Prototyping

Rapid prototyping was the methodology used. After considerations of time and cost were made with

respect to this project, rapid prototyping was thought to be the most convenient [14]. The structure of the phases covered in the system development process is illustrated below [15]. The phases were looped through several times to increase the level of detail and accuracy, as shown in (Figure 3) below.

Figure 3: Rapid prototyping



Requirements Specifications and Analysis:

“To achieve objective one. “

The project was initiated after the feasibility study was completed and the scope was defined. In order to suggest changes and lay out the prerequisites and order of importance for the solution, it needed to study the problem domain [16]. The primary goal of requirements gathering was to understand and document the information and processing requirements of the proposed e-book application. Reviewing existing data and the literature were two of the fact-finding approaches used.

PRESENTATION OF RESULTS

Description of the Designed System

E-book mobile applications run on Android smartphones and tablets. It helps access books using their phones as long as one is connected to the internet. When a user is interested in any book, the application queries the database that holds all the e-books for all departments and summarises them in a table, which in turn forms the database that the e-books application queries. This table comprises four fields (book ID, book name, category, and date).

When this table has been populated with the e-books, it is hosted on the Kabale University Library's server. This ensures that the original database that stores all the results is kept secure from public access. This is where the administrator of the application queries the Kabale University Library database server in order to upload the books for access by the e-books application. A download link has been designed to help users of the application be able to download the book.

User Requirements

Through the existing information found in the library, users wanted an application with the following attributes:

- A user-friendly application, one can easily learn and use.
- A secure application where the rights of the administrator and the users are clearly defined.
- Reduction in time to process book requests, which leads to a reduction in data usage.
- A consistent application: refers to clear step-by-step navigation through the application.

Functional Requirements

The functional requirements are the activities and services the system must provide. The application shall perform the following functional requirements:

- The application shall have a user authentication module; students are required to provide a registration number and password for authentication.
- Allow the administrator to upload books to the database containing the e-book records.
- Allow students to download any book.
- Allow students to access the e-books simultaneously.

Non -Functional Requirements

Non-functional requirements are a description of other features, characteristics and constraints that define a satisfactory system.

- Quick response to user search requests.
- The application shall be available 24/7.
- Only registered students access the e-books.

Hardware Specifications

The system requirements for the application's hardware, software, and architectural design are described in this section.

The application should run on the following hardware specifications.

- 2GB RAM minimum 8 GB RAM recommended.
- 120 GB of available disk space minimum.
- 500 MB for IDE +112 GB for Android SDK and emulator system images.
- It requires running on an Android phone with a minimum of 4.0.3 Android version.
- Processor Intel core5

Software Specifications.

- Windows 10 and higher versions 64Bit.
- Android Studio version 2.3.3.
- Android Gradle version 4.4.1.
- The system required a wamp server because it acted as a local server during the design of the system.

System Architecture

The application is a client-server architecture with individual hosts accessing the hosted database by requesting books. The application is inbuilt for categories of users where there is a need for

authorisation and session validation before the resources can be accessed.

the database. The tables below make up a data dictionary for the E-books mobile application database.

Data Dictionary

A data dictionary is a file that contains an index of data, providing a lookup for the data items held in

Table 1: Data dictionary showing the description of entities.

Entity	Description
Student	A person who will be able to access the mobile application and can enter data download a book
Administrator	The person who will be able to access the administrator dashboard and edit, delete and add books

Table 2: Data dictionary showing the description of the process.

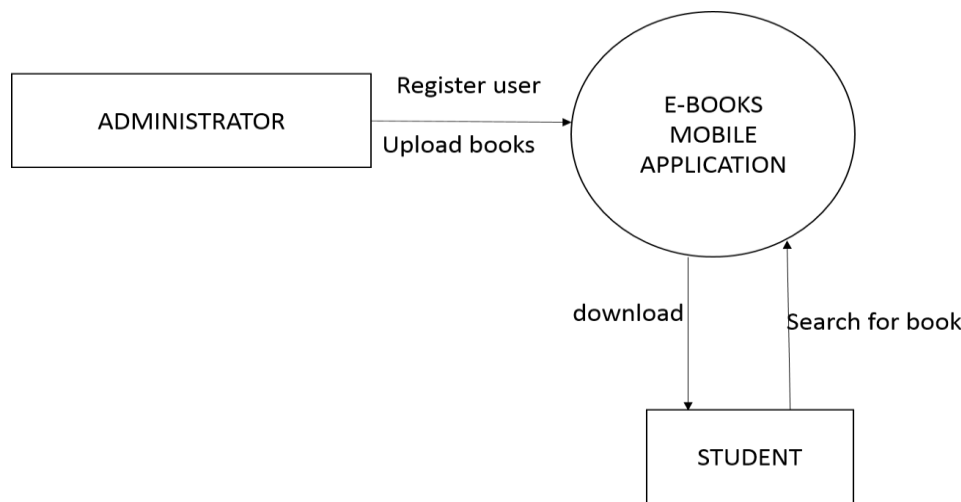
Process	Description
System authentication	The process through which application users and administrators are authenticated before they access the system.
Upload, delete and edit information	Data definition and data manipulation languages through which e-book administrators can use to manage information

Table 3: Data dictionary showing the description of data storage.

Date store	Description
students and information details	Shows information about the students and other information that is stored in the system.

Data Flow Diagram

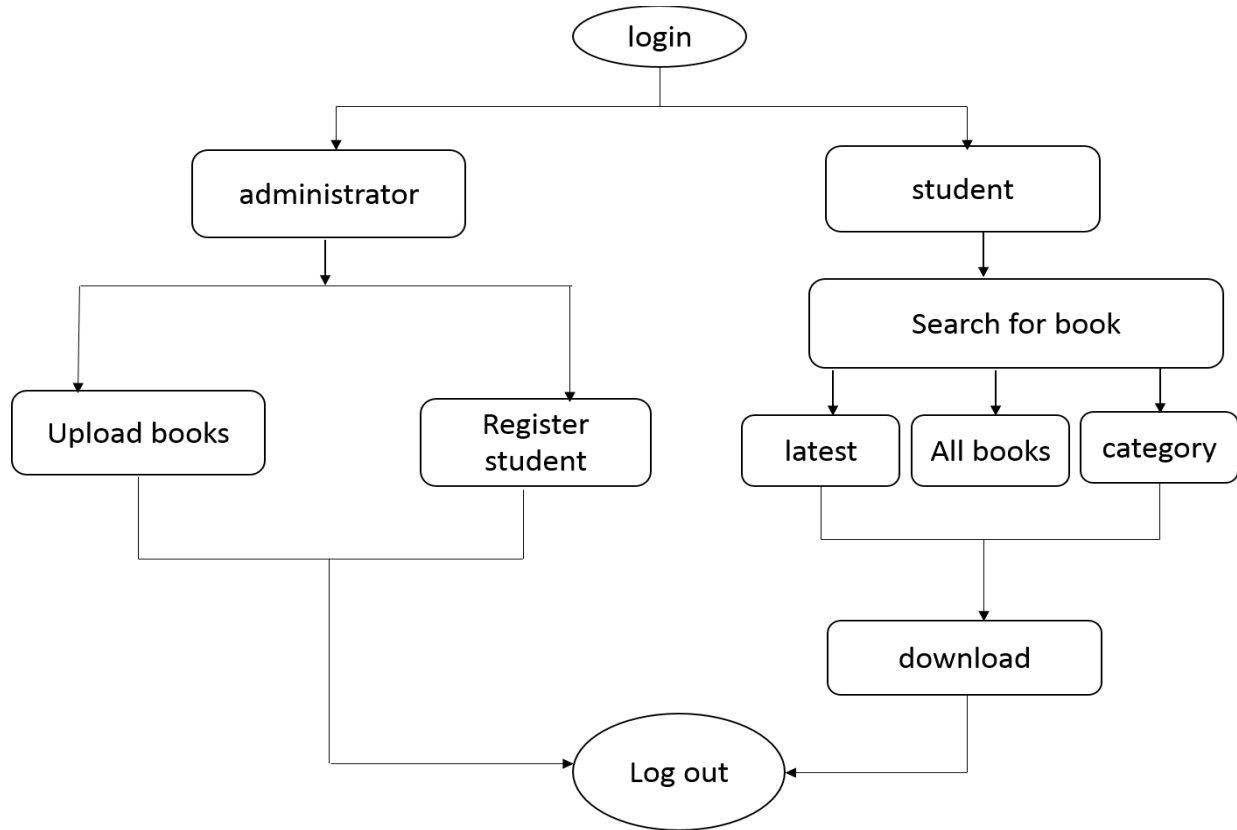
Figure 4: Context-level data flow



System Flow Chart

Below are graphical illustrations that show the flow of events in the system for the administrator and the student.

Figure 5: System flow diagram



Data Outputs (System forms and Screen Shots)

The implementation of the E-books mobile application generated the following screenshots.

Figure 6: Admin login page

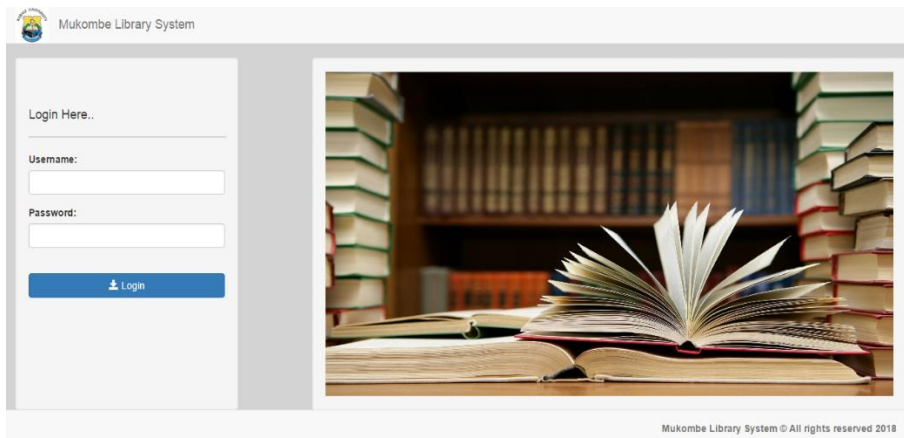


Figure 7: Admin home pages

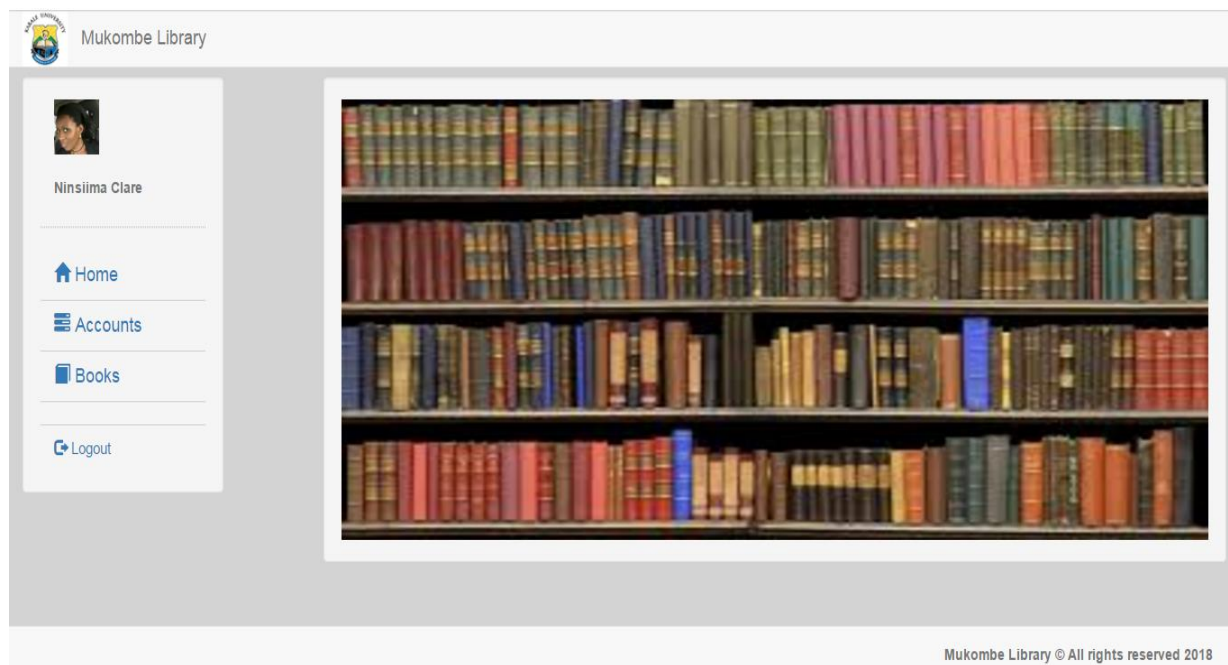


Figure 8: Student registration page

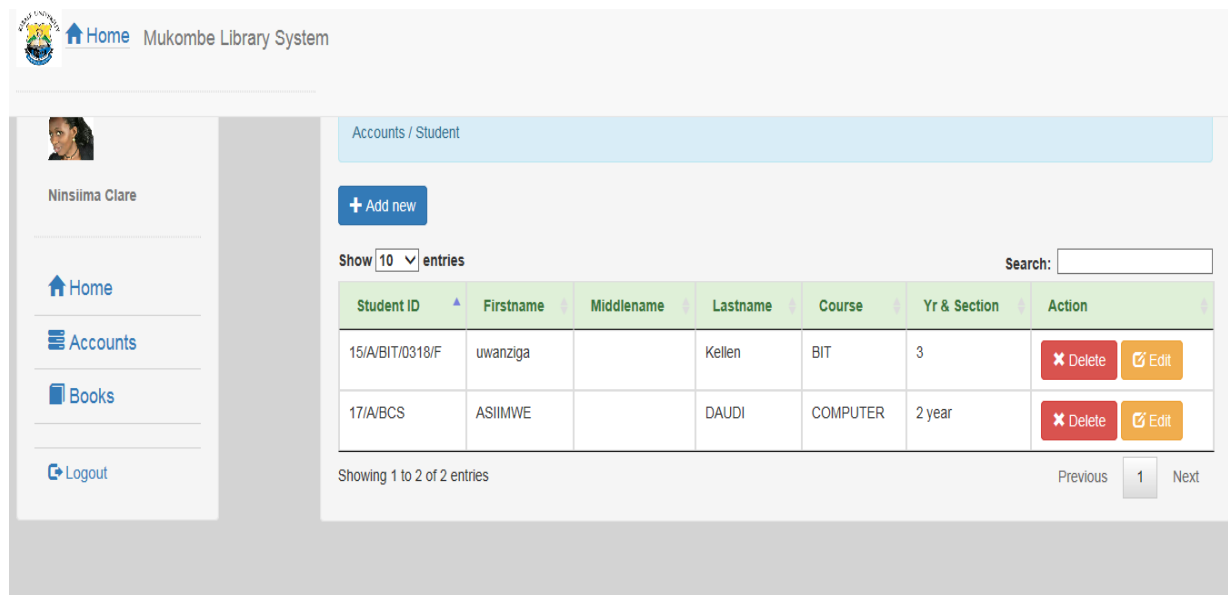


Figure 9: An interface showing the latest books

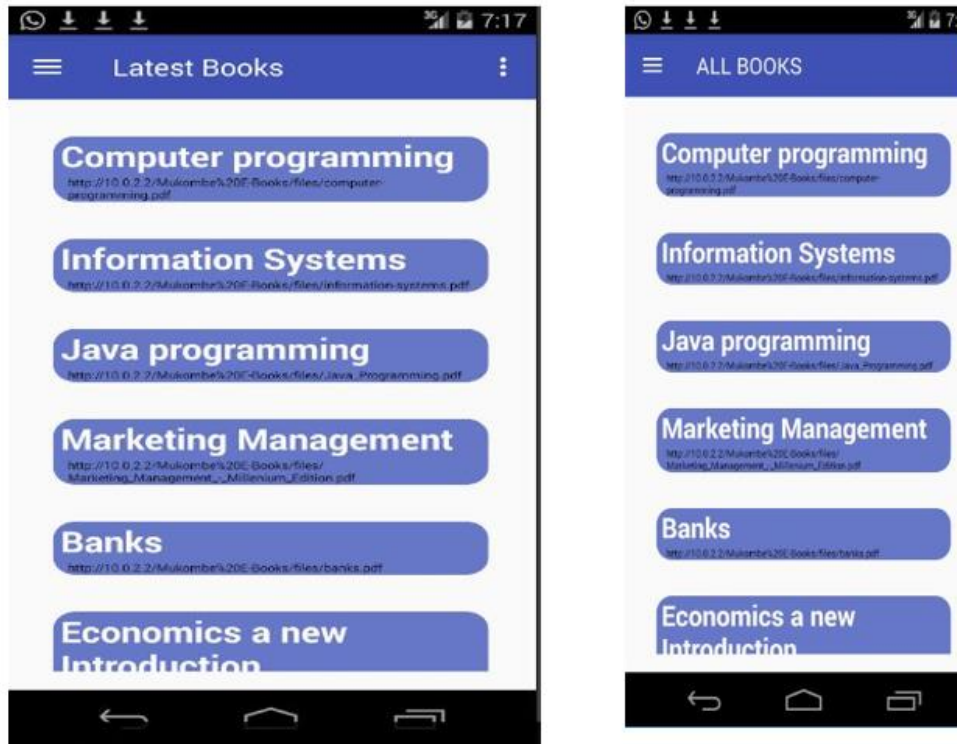


Figure 9: Interface showing categories

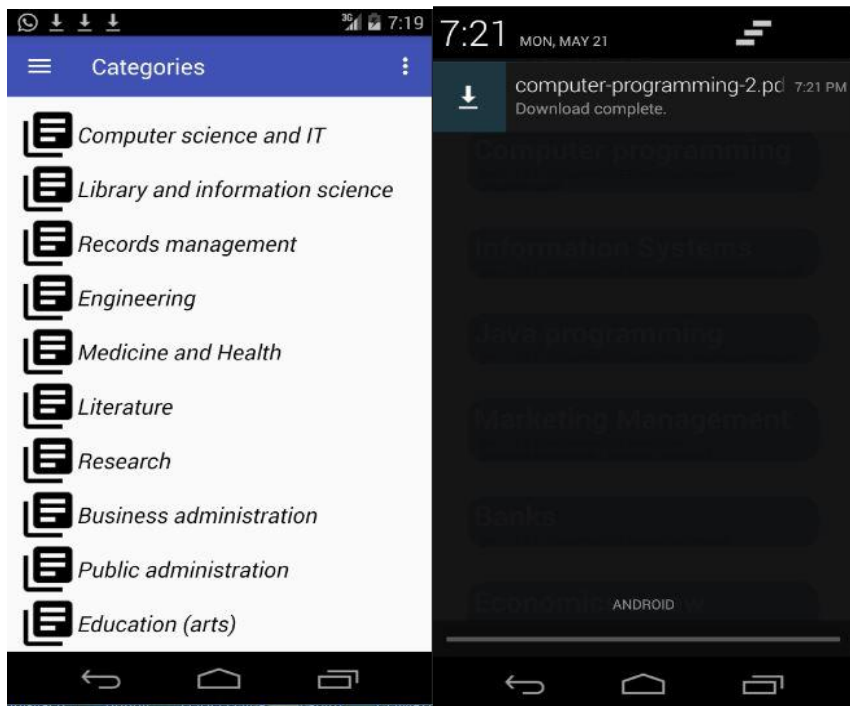


Figure 11: A downloaded e-book



CONCLUSION

The implementation of the e-book's application was done using Android to enable user's access the books on their mobile phones or tablets. The project was able to achieve its objectives, and we hope to design another application for other institutions.

The application in place enables students of Kabale University to download e-books as long as he/she is connected to the internet and also generate the reports for administrative review.

Recommendations

The administrator of the system should be taken through the tasks in order to be able to upload books ready for the application.

Considering the benefits that electronic books offer over paper-based books, we recommend that Kabale University should put in place the e-books application because it adds to its standards in technology and the application improves the students' reading skills.

REFERENCES

- [1] C. Carter and B. Veale, *Digital Radiography and Pacs E-Book*, 4th ed. London, England: Mosby, 2022.
- [2] P. Prabhasawat, W. Pinitpuwadol, D. Angsriprasert, P. Chonpimai, and M. Saiman, "Tear film change and ocular symptoms after reading printed book and electronic book: a crossover study," *Jpn. J. Ophthalmol.*, vol. 63, no. 2, pp. 137–144, 2019.
- [3] V. Kuberkar, *Acquisition of e-books in engineering college libraries*. Tilak Maharashtra Vidyapeeth, 2020.
- [4] H. Alsadoon, "Obstacles to using E-books in higher education," *Int. j. educ. lit. stud.*, vol. 8, no. 2, p. 44, 2020.
- [5] B. Blummer and J. M. Kenton, "A systematic review of E-books in academic libraries: Access, advantages, and usage," *New Rev. Acad. Libr.*, vol. 26, no. 1, pp. 79–109, 2020.
- [6] C. Armstrong, L. Edwards, and R. Lonsdale, "Virtually there? E-books in UK academic libraries," *Program*, vol. 36, no. 4, pp. 216–227, 2002.
- [7] A. McLuckie, "E-books in an academic library: implementation at the ETH Library, Zurich," *Electron. libr.*, vol. 23, no. 1, pp. 92–102, 2005.
- [8] W. H. Walters, "E-books in academic libraries: challenges for acquisition and collection management," *portal Libr. Acad.*, vol. 13, no. 2, pp. 187–211, 2013.
- [9] W. H. Walters, "E-books in academic libraries: Challenges for sharing and use," *J. Librariansh. Inf. Sci.*, vol. 46, no. 2, pp. 85–95, 2014.
- [10] K. Corlett-Rivera and T. Hackman, "E-book use and attitudes in the humanities, social sciences, and education," *portal Libr. Acad.*, vol. 14, no. 2, pp. 255–286, 2014.
- [11] D. Haugh, "How do you like your books: Print or digital? An analysis on print and e-book usage at the Graduate School of Education," *J. Electron. Resour. Librariansh.*, vol. 28, no. 4, pp. 254–268, 2016.
- [12] A. Iroroavwo Edwin and A. Benjamin, "Awareness and Use of Electronic Resources by Undergraduate Students at Kabale University, Uganda," 2020.
- [13] F. Egert, A.-K. Cordes, and F. Hartig, "Can e-books foster child language? Meta-analysis on the effectiveness of e-book interventions in early childhood education and care," *Educ. Res. Rev.*, p. 100472, 2022.
- [14] S. T. Wu, C.-Y. Huang, C.-C. Weng, C.-C. Chang, B.-R. Li, and C.-S. Hsu, "Rapid prototyping of an open-surface microfluidic platform using wettability-patterned surfaces prepared by an atmospheric-pressure plasma jet," *Acs Omega*, vol. 4, no. 15, pp. 16292–16299, 2019.
- [15] H. Hofmann *et al.*, "Occupational Therapy is Making" Clinical Rapid Prototyping and Digital Fabrication', in *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 2019, pp. 1–13.
- [16] A. Vogelsang and M. Borg, "Requirements engineering for machine learning: Perspectives from data scientists," in *2019 IEEE 27th International Requirements Engineering Conference Workshops (REW)*, 2019, pp. 245–251.
- [17] T. Benson and N. Ayiga, "Classifying the Involvement of Men and Women in Climate Smart Agricultural Practices in Kayonza Sub-County, Kanungu District, Uganda," 2022.
- [18] B. Turyasingura and P. Chavula, "Climate-Smart Agricultural Extension Service Innovation Approaches in Uganda," 2022.
- [19] A. Agarwal, K. Jain, and A. Dev, "Modeling and analysis of data prediction technique based on linear regression model (DP-LRM) for cluster-based sensor networks," *Int. J. Ambient Comput. Intell.*, vol. 12, no. 4, pp. 98–117, 2021.
- [20] B. Turyasingura, S. Alex, H. Hirwa, and F. S. Mohammed, "Wetland conservation and

management practices in Rubanda District, South-Western Uganda', 2022.

- [21] B. Turyasingura, N. Ayiga, and B. Benzougagh, 'Re-thinking on land degradation and its impacts on livelihoods of the farmers in Kanungu District, Uganda', 2022.