Application of Barcode Technology in Library Management at the Department of Information Technology

ICTU Student 191
Thai Nguyen University of Information and Communication Technology
Thai Nguyen University, Thai Nguyen, Vietnam
student191@ictu.edu.vn

***Abstract*—This thesis explores the application of barcode technology in library management at the Department of Information Technology. It details the development of a library management program that incorporates barcode technology to reduce manual tasks and improve efficiency. The program includes various functions such as book management, member management, borrowing/returning, and printing book barcodes. The research highlights the benefits of barcode technology in streamlining library operations and the challenges faced in implementing international standards. The program has a user-friendly interface and includes essential functions for library management. The application of barcode technology has significantly reduced manual tasks in library management compared to traditional methods and other programs without barcode support. However, the research also notes the challenges in implementing international standards and the need for further development to meet these standards.**

***Index Terms*—barcode, library management, Visual Basic.NET, information technology, data management, barcode technology**

I. Introduction

The thesis provides an overview of barcode technology, including its history, types, and applications. It then examines the current state of library management at the Department of Information Technology, proposing improvements and the integration of barcode technology to enhance the management process. The study reviews various barcode standards such as UPC, EAN, and Code 39, and discusses their applications in different contexts. The introduction also highlights the importance of barcode technology in reducing manual tasks and improving the efficiency of library operations. However, it also acknowledges the challenges in implementing these standards, particularly in a Vietnamese academic setting [1].

II. Methods

The methods section describes the development of a library management program using Visual Basic.NET. The program includes various forms and functions such as book management, member management, and borrowing/returning. The integration of barcode technology is highlighted as a key feature to reduce manual tasks. The research involved designing and implementing the program, testing its functionality, and evaluating its performance. The development process followed a structured approach, involving requirements gathering, design, implementation, and testing. The program was tested using a sample dataset of books and members to ensure its functionality and usability [1].

III. Results

The developed program has a user-friendly interface and includes essential functions for library management. The application of barcode technology has significantly reduced manual tasks in library management compared to traditional methods and other programs without barcode support. The program was tested using a sample dataset of books and members, and the results showed a substantial reduction in the time required for book management and member management tasks. The program was also tested for its ability to print book barcodes, and the results were satisfactory. However, the research also noted that the program faced challenges in implementing international standards, particularly in terms of barcode format and data encoding [1].

IV. Discussion

The research discusses the advantages of barcode technology in library management, such as improved efficiency and reduced errors. However, it also notes the challenges in implementing international standards and the need for further development to meet these standards. The study highlights the importance of standardization in ensuring the interoperability of barcode systems and the seamless integration of barcode technology into existing library management systems. The research also suggests that further development is needed to address the challenges in implementing international standards, particularly in a Vietnamese academic setting. The study recommends that future work should focus on developing a more comprehensive library management system that can meet international standards and enhance the functionality of the program [1]. Earlier ICTU undergraduate work by Đỗ Thành Kiên addressed library management system [10].

V. Conclusion

The thesis concludes that the application of barcode technology in library management has improved efficiency and

Supervisor: Lê Anh Tú, Thai Nguyen University of Information and Communication Technology.

reduced manual tasks. Future work will focus on further developing the program to meet international standards and enhancing its functionality. The research highlights the importance of barcode technology in improving the efficiency of library operations and the challenges in implementing international standards. The study also emphasizes the need for further development to address these challenges and ensure the interoperability of barcode systems in library management [1].

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