



## Application of Computer-Aided Smart Library Systems in Promoting Digital Media Literacy Through Cooperative Learning

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**SUMMARY:** *This research has carried out assessment on a framework of collaborative learning which gets support from the Superstar mobile library application, in a course about university digital library. We have employed a design that is pretest-posttest for one single group. Fifty-one new students who just enter the School of Arts of Zhoukou Normal University were selected through the method of cluster random sampling. One assessment form which has validity 1.00 and reliability 0.71 was utilized by us to measure the ability of people to seek information, and the lesson plans were checked through experts. The result showed that the students' after-test marks were obviously higher than their before-test marks,  $t(34)=15.19$ ,  $p < 0.05$ . Furthermore, these scores also have exceeded the 70% standard,  $t(34)=47.21$ ,  $p < 0.05$ . Therefore, the combination that is made of collaborative learning and the Superstar mobile library app has enhanced the information-seeking skills of students.*

**KEYWORDS:** *cooperative learning, superstar mobile library application, searching for information ability, computer application.*

### 1 Introduction

In the present education situation, university library services carry out work inside connected information environments. Data inquiry and information extraction have already become basic components of digital library construction, and are also important key points in the management work of university libraries [1-3].

Along with the merging of computer systems into the work of libraries, works such as store management, information sharing, and reader services have changed to give first place to faster search getting, broader reachability, and more correct giving of service. In the process of this digital transformation, the university libraries have the need for both information-centered management strategies and networked service modes to meet the present reading and learning demands [4-6].

Therefore, library information technology courses are designed by people to let students can use digital retrieval resources proficiently and put these resources into their academic study activities. Via the bringing in of library information systems into classroom teaching, these courses aim at promoting students' information-finding abilities, studying effects, and academic scores [7, 8].

Based on my prior teaching experience, I have also observed in the classroom that students have varying levels of information-seeking and information-retrieval abilities; therefore, not all students are equally proficient in independent study and learning. Strong

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grasp of search ability is good; therefore, most students are able to conduct research efficiently, and some students struggle with research. It is the outcome of a student's study and also of teaching. That is to say, a good student cannot be without their own efforts and talents, but they are also not independent of the teacher's instruction [9, 10]. First, clarify the students' needs for retrieval efficiency and the accuracy of the results through research, and then dynamically adjust the course content. Regularly check whether the system's response speed and results are in line with expectations, and continuously improve the operation mode of the system through learning. This system has developed a new teaching model by combining the basic functions of traditional literature retrieval courses with software such as book apps. Due to insufficient data sharing and interaction capabilities among different systems, user behaviour data cannot be circulated across platforms; therefore, key data, such as borrowing records and browsing preferences, fail to be synchronized in real time and negatively affect the accuracy of personalised recommendation systems. Different systems have used different technical standards, so their data formats and interface protocols are not the same; thus, there are information silos. For example, if the library management system is not connected to the reader service system, the creation of user data and recommendation accuracy will be directly affected. The old mode of management has not set up a single data-management standard, and thus the users' data are spread throughout various departments and systems. For example, scientific research data and circulation data are stored in different modules, and cross-module queries need to be manually aggregated, thus reducing timeliness [11, 12].

Cooperatively learn together and help others in all ways. Students actively participate in cooperative learning and need to take part in the group activity to some extent. Group skills for listening, discussing and compromising are needed for the cooperative learning groups to be effective. Cooperative learning is an organised and regular type of study that involves 2-6 students of different abilities working together in a small group to learn by cooperation and mutual help, reaching a common goal for the group, raising the overall quality of education for all students, improving the group's performance, and receiving group rewards. Cross-temporal experimental operation guidance can be realised via a remote online experimental teaching platform to reduce the dependence on hardware for experimental teaching. Similar technologies can be used in literature retrieval courses to reduce the demand for physical resources by providing remote access to library resources and virtual experimental environments, etc. Cooperative learning theory also believes that students learn better when they work together, help and teach one another, and are held individually responsible for their own study. Rather than a teacher-centred model that requires teachers to spend a lot of time motivating and controlling the students, teachers in cooperative learning encourage students to move freely and interact with one another. Research in both cognition and neuroscience has also found such active participation [13-16].

Super Star Mobile Library application is a typical tool for learning to solve the problems of students' information-searching skills and retrieval-practice ability mentioned above. Students should learn how to find books and read various works of literature with the help of the Super Star Mobile Library application in their daily study. The following are the reasons for the above [17, 18].

1) More conveniently save the students' books and materials from that time to increase efficiency.

2) Strengthen the improvement of students' accuracy in locating books and materials to reduce the error rate.

Exercise and enhance the students' ability to find books and materials and improve their study skills and academic results.

4) A relatively large amount of time will be saved, and this time can be used more

effectively for studying by the students.

Help students learn that what they are studying is how a computer application program works, and that search-book and material apps are examples of such application programs. The name of this APP is "Super Star Mobile Library", and the teacher used this system to manage and show the students, teaching the students how to use this system to find books and other materials. Enable students to operate the system of finding books proficiently.

Super Star Mobile Library App Teaching Method is used.

I will use the courseware PDF that I have made myself to show and explain the contents of the Superstar Mobile Library APP to the students, including download and use methods.

Application:

1. WeChat is paying attention to the public number Superstar Mobile Library.
2. Download APP from "Client Download" in "Common Services" of the platform.
3. Select "Zhoukou Normal University" and link the ID card number.
4. Registration, username and password are all card numbers.

The Necessity of Adopting the APP Teaching Model in Superstar Mobile Library

I will use the courseware PDF I created to show and explain the contents of the Superstar Mobile Library APP to the students, as well as how to download and use it. With the help of the Super Star Mobile Library APP for teaching, students can access books and other materials in the library more conveniently and learn better. Enable students to learn effectively from the book by using the APP for teaching and enhance scientific literacy. Improve the efficiency of book information retrieval, reduce the time it takes to obtain information, and help students find the necessary resources in a shorter period. There is also a full-featured resource centre for students. All the required data will be available in a single query. It has promoted the development and progress of school library services in an effective way.

A Part of Superstar Mobile Library APP

Superstar Mobile Library is an enterprise mobile platform that provides users with a complete self-service experience on their mobile phones or tablets, including access to personal collection information, the latest loans and advisories, and access to over a million electronic books simultaneously; there is also a large amount of newspaper articles and metadata for selecting Chinese and foreign literature to offer convenient mobile reading services.

Develop and Build the Superstar Mobile Library APP

Superstar Mobile Library APP is based on the school's requirements for library service management and the materials needed by students.

Measurement and Evaluation Methods for the Super Star Mobile Library APP

Have the students use the APP themselves, and then I will assess how well they can operate it and whether they are correct. Teachers will grade students as fails, poor, good and excellent. The data produced by this application need to be included in the evaluation system through scientific means to ensure the objectivity of the evaluation results. If a unified data collection standard is not set, there may be training biases in the model, and thus the evaluation results will be unfair. The Quality of the input data will affect the work of the evaluation system directly. If there are any differences, missing values or format errors in the data generated by intelligent systems, the evaluation model will be inaccurate.

Super Star Mobile Library is a professional mobile platform for users; on mobile devices such as mobile phones and tablets, they can self-service their personal collections, access the latest lent materials and advice, view more than one million electronic books at the same time, and obtain metadata for choosing Chinese and foreign literature to enjoy convenient and rapid mobile reading services. The functional architecture of the computer-aided smart library

system is shown in Figure 2.

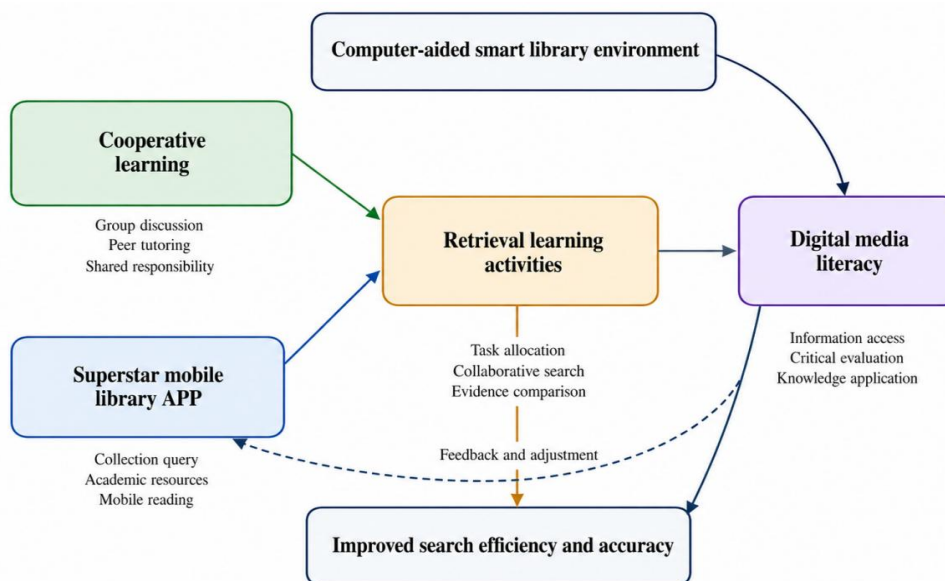


Figure 1: Research Framework of Large Model Empowered Smart City Data Governance

### Superstar Mobile Library

Usage:

1. WeChat Official Account: Super Star Mobile Library
2. Download the APP from "Client Downloads" in "Common Services" on the platform.
3. Select "Zhoukou Normal University" and bind the ID card number.

Registration, username and password are all card numbers.

At the top left of the APP page, several modules can be viewed simultaneously, such as the bookshelf, collection queries, academic materials, videos, audio books, public classes, newspapers, etc. At the bottom taskbar are "Scan" and "Subscribe" bars, and a small "1" in the middle can be clicked to switch to the second page.

"Shelf" is empty if you have not downloaded the book, and a list of downloaded books will be shown below. Click on the book you wish to view to adjust its display settings, such as brightness, paper color, and bookmarks, etc.

APP use guide: "Collection query" log in with your student ID, then you can view the school's collection resources at any time and anywhere, and make some records; you can directly borrow books from the library without having to queue for book search.

APP Use Guide:

"Academic resources" offers a wide range of books, newspapers, periodicals and other sections, and all the latest published books are available for free reading.

Click "newspaper" to see a list of newspapers; if none of the above are suitable, you can click the add button in the top right corner to add more options.

In addition, there are also videos, audiobooks, open classes and other featured resources, and many personalised readings can be chosen from after subscribing.

Collaboratively learn the steps of management and use the Superstar Mobile Library app.

(1) Use cooperative learning to understand the theoretical knowledge of library education and literature retrieval.

(2) Use cooperative learning combined with superstar mobile library APP to learn the theoretical knowledge of library literature retrieval

(3) When learning and mastering theoretical knowledge, then the cooperative learning

combined with superstar mobile library APP applied to the actual operation.

(4) In practice, after practical exercise to master the combination of superstar mobile library APP to retrieve library materials operating skills.

A relatively direct explanation includes one classroom activity. First, students are demanded to utilize the traditional basic search method. At the same time, they must use the basic search functions together with the famous mobile library app. After this step, students will carry out this hands-on practice by their own selves. After that step, they are able to share and make comparison of each other's experiences. Furthermore, we encourage students that they independently carry out reflection on the differences between using basic search methods and doing searches inside the application in a cooperation-based way. Through practice, students can understand the reasons behind it and learn to search more efficiently, etc. It is a good way to learn by doing, to develop thinking through practice, and then to make a final summary. Library staff need to learn how to operate intelligent tools, improve their data management skills, build a network of cross-domain knowledge, and rapidly learn large model training and other fields. However, the technology update cycle is typically on the order of months or quarters. The library service system has a long update cycle and is generally upgraded as a whole once a year. Adding hardware facilities, such as automated retrieval systems, will require considerable modifications; at the same time, new technologies can be incorporated in a modular way to update software applications, such as metadata generation and literature review assistance tools, gradually.

Due to the above-mentioned reasons, this researcher therefore has had interest in and acknowledged the necessity of applying and innovating the progress of library information technology in teaching work. This target will be attained through the execution of cooperative methods in combination with a first-class mobile library program to cultivate information-seeking abilities. The results that this research obtains will serve as the reference for teaching of the Library Information Technology course. The conceptual framework of the computer-aided smart library-supported cooperative learning is shown in Figure 1.

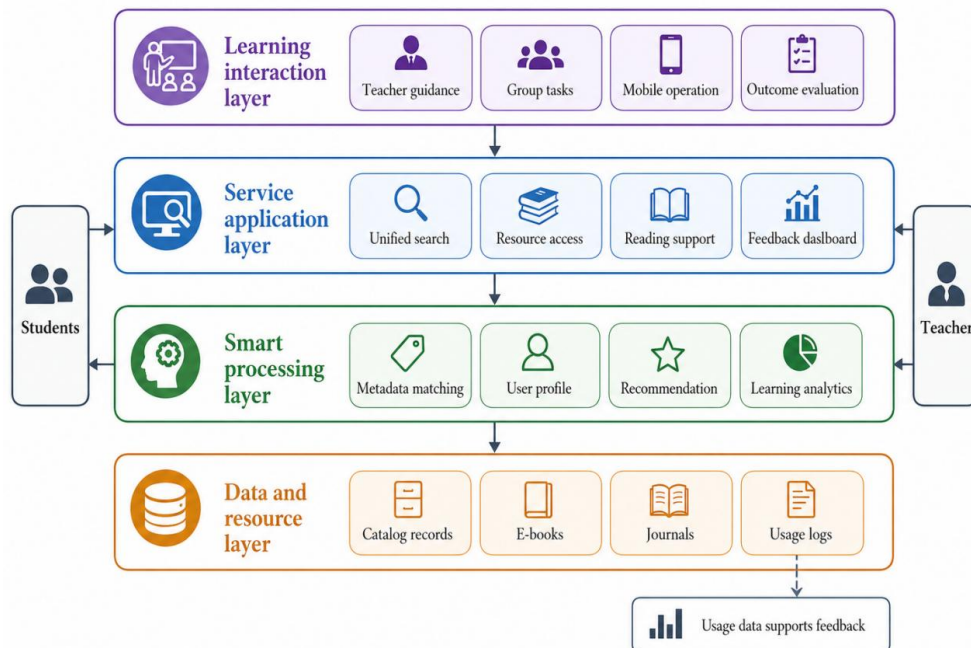


Figure 2: Conceptual Framework of Computer-Aided Smart Library-Supported Cooperative Learning

## 2 Research boundaries

### 2.1 Research objectives

1) To compare students' searching for information skills before and after learning with the help of cooperative learning and the Superstar mobile library application.

2) To compare students' information-seeking skills after learning through cooperative study with the Superstar mobile library application to the 70% standard set previously.

### 2.2 Research methodology

#### 1) Population and Samples

The subjects of this study were 110 first-year students of the School of Arts at Zhoukou Normal University in the second semester of 2021.

Fifty-one freshmen from the school of arts at Zhoukou Normal University were selected as the sample through cluster random sampling in this study.

#### 2) Research Tools

The two instruments in this study were: 1) a form for assessing information-seeking skills and 2) lesson plans.

##### 2.1) Information Seeking Skills Assessment Form

The goal of using the information-seeking ability evaluation table was to collect data concerning the degree of students' participation in or application of information-seeking abilities. The grade level of this evaluation table was composed of five ranks: never, not often, sometimes, mostly, and always. I have delivered the first manuscript of the evaluation table to my dissertation guiding teacher. The person in charge of guiding was given the work of checking whether the content and the words used are suitable. After that, both the draft version and the version which had been pre-validated of the assessment form were given in front of three experts. We requested the experts to carry out validity examinations and put forward proposals. These proposals related to the guarantee that every entry matched the working definition and that the text phrasing was suitable. The validity degree of the information-seeking skill evaluation form was determined by people to be 1.00. Following that, the draft version of the assessment form was employed in a preliminary investigation, which people usually call a pilot study. The reliability of this form we then have carried out investigation. Our research team discovered that the draft version of the assessment form possesses a reliability score of 0.71, which therefore indicates that it has high quality and is suitable for being used in data collection.

##### 2.2) Lesson Plans

Our lesson plans were made with the core of collaborative learning and they were combined with the superstar mobile library application. The total time length of these plans is 12 hours. According to what is shown in the last draft lesson-plan list, three experts have conducted an evaluation on their suitability with regard to learning objectives, content, learning activities, materials and assessments. After that, according to the suggestions put forward by the experts, modifications were carried out on the lesson plans.

### 2.3 Experimental design

The design of this study was a one-group pretest-posttest design, as shown in the figure below. A pretest-posttest design was used to study changes in the students' ability to search for information through cooperative learning in the presence of a Super Star mobile library application.

Table 1: pre-post test

Group	Pretest	Treatment	Posttest
Experimental group	O <sub>1</sub>	X	O <sub>2</sub>

O<sub>1</sub> is the measurement of the search-for-information skill before the experiment.  
 X is the treatment group for cooperative learning with a star mobile library application.  
 O<sub>2</sub> is the name of the research work on information-seeking behaviour.  
 The workflow of sampling and statistics is shown in Figure 3.

Experimental Workflow for Cooperative Learning with Superstar Mobile Library APP

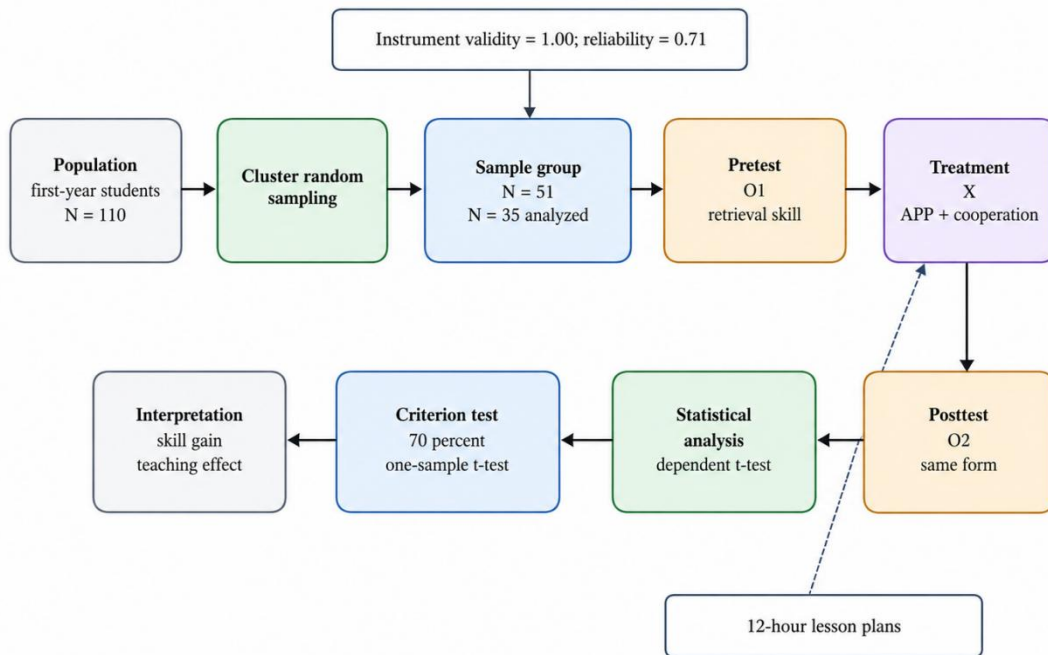


Figure 3: Research Framework for Large Model-Empowered Smart City Data Governance

## 2.4 Data collection

The Steps for collecting data were as follows:

1. The pretest for the samples was conducted to measure their skill in information seeking using a constructed evaluation form.
2. Superstar Mobile Library App can be used to conduct cooperative teaching with these materials.
3. Finish giving the instructions, and then have the students take the same test they did in the pretest to assess how much they have learned.

## 2.5 Data analysis

Based on the above research objectives, data were analysed using a statistical package program as follows: 1) To compare the level of information-seeking skills before and after learning in the cooperative teaching method combined with the Superstar mobile library application, a paired-sample t-test was employed. 2) To compare the level of information-seeking skills with the set criterion of 70%, a one-sample t-test was used.

### 3 Research Results

Based on the above results, descriptive statistics and a t-test will be used to analyse how participants' progress has been affected by the introduction of this. The results are as follows.

#### 3.1 The results of the first research objective

Here the result of comparing students' scores on their information-seeking capabilities before and after they carried out learning by using the Superstar mobile library application is given. The below table displays the descriptive statistics and t-tests which were completed by a statistics software tool. The goal of this table is to answer the research question of whether students' information-seeking abilities have been improved after the use of group learning with the Superstar mobile library app, when compared with the condition before such group learning.

*Table 2: Descriptive statistics and t-test of the statistical package program analysis.*

Group	N	Pretest scores		Posttest scores		t	p
		$\bar{X}$	S.D.	$\bar{X}$	S.D.		
Experimental group	35	83.54	3.06	94.43	3.06	15.19	0.000

As shown in Table 2, the mean scores of the pretest and posttest for students' search for information skills were 83.54 (SD = 3.06) and 94.43 (SD = 3.06), respectively.

In addition, the purpose was to observe the various pre- and post-results of cooperative study which is helped by the Superstar mobile library app, therefore with the aim of promoting students' information-searching abilities. From the result that the table shows, after the in-class cooperative study that uses the Superstar mobile library application, the post-test scores of students' information-finding abilities are obviously higher than the pre-test scores at the 0.05 statistical significance level ( $t_{34} = 15.19, p < 0.05$ ). The average score values of this research have steadily gone up after the pre-test was done.

#### 3.2 The results of the second research objective

After students have already carried out learning activities under the support of cooperative learning and the Superstar mobile library application, a comparison work on their scores for information-seeking skills has been conducted by us. The result of this comparison conforms to the beforehand set up norm of 70%. The following table holds the descriptive statistics and t-tests which are done by one statistical software. The aim of the above table was to respond to the research question: Whether cooperative learning and the Superstar mobile library application can promote students' information-seeking abilities?

*Table 3: Descriptive Statistics and t-tests of the Statistical Package Program Analysis*

Group	N	Full score	Criteria score	$\bar{X}$	S.D.	t	p
Experimental group	35	100	70	94.43	3.06	47.21	0.000

As shown in Table 3, the mean scores of students' searching for information skills after learning together with the Superstar mobile library application were 94.43 out of a maximum of 100, with a standard deviation of 3.06; this was statistically higher than the threshold of 70% at the 0.05 level of significance ( $t_{df} = 47.21, p < 0.05$ ). Figure 4 shows the pretest-posttest improvement and the posttest advantage above the 70% criterion.

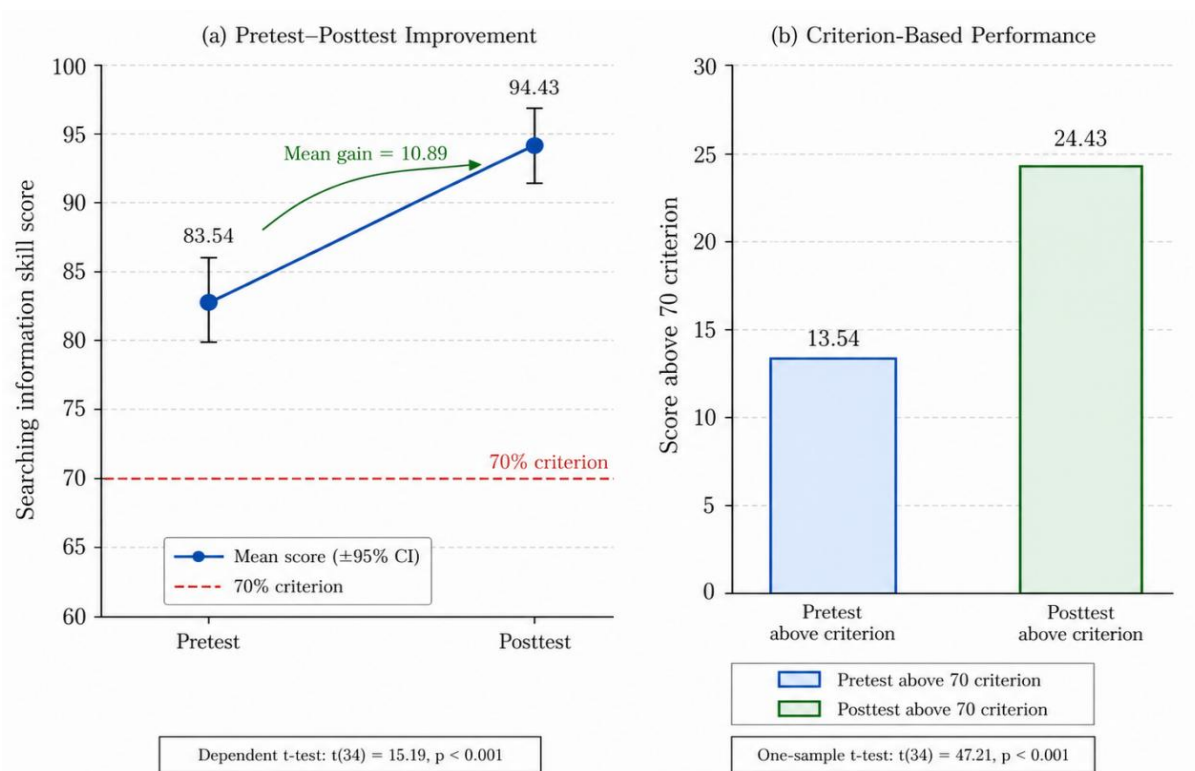


Figure 4: Comparison of Pretest, Posttest and Criterion-Based Skill Scores

## 4 Discussion

Intelligentisation of libraries is a type of intelligent building that applies intelligent technology to the construction of libraries, and it is an organic combination and innovation of intelligent buildings and highly automated management of digital libraries. Smart Library is an idea that does not have to be in a physical space. Some libraries have only started digitisation by scanning books and building online directories; intelligent technologies have not been introduced to optimise service processes yet. A problem of poor resource utilisation efficiency occurs in the university library. The old mode of management leads to the fragmentation of scientific research data and cannot meet individualised demands; at the same time, a lack of intelligent applications fails to provide modern scientific research with fragmented and instantaneous access to knowledge. Someone once said that intelligent management of libraries aims to achieve intelligent services and management via the Internet of Things, and this includes cloud computing and intelligent devices; thus, our traditional notion of libraries is changing [19, 20].

Collaboratively use the intelligent retrieval function of the Superstar Mobile Library application to enhance one's retrieval ability.

The Superstar Mobile Library, which is a platform based on mobile, lets students get many different resources including collected works, borrowing information, electronic books, news papers, and both domestic and international book document data through mobile phones or tablet computers. Its resource quantity and looking abilities assist targeted taking out and perusing [21, 22]. Because this APP may be used at any moment on condition that an internet connection exists, it reduces the requirement for artificial library searches, raises the efficiency of book enquiries and borrowings, and improves students' searching abilities [23, 24].

By making use of this platform, the cooperative teaching is arranged in an order that includes pre-class, in-class, and post-class activities. Before the class begins, teachers have already made preparation for teaching resources, PPT documents, and the network study circumstance. In the classroom, under the leading of teachers, students carry on discussions, explorations, cooperative works, and memory recall exercises. When the class is finished, students carry out the consolidation of their knowledge and put into use the retrieval skills that they have already learned. This teaching model therefore combines theoretic teaching with actual APP utilization and evaluates whether students' efficiency in book-finding and information-taking abilities have promoted after study supported by the platform.

In order to fully grasp the research situation of the practical ability of library literature retrieval and determine the reasonableness of the topic selection for this paper, "book literature retrieval" was entered into CNKI as the keyword, and the attention given to this study was statistically analyzed. Based on the data, universities and local libraries have allocated more resources to the collection of books and documents (accounting for 51.5% of all research areas); this aligns with the nature of library education and document retrieval courses and their related links. Research on methods for literature collection in university libraries accounts for 5.0 per cent of all the research results in this paper. In conjunction with the research on the superstar mobile library APP, it can be seen that it also has some merits and is highly suitable for the development of university libraries. If the content of the course does not align with the practical application scenarios of intelligent APP systems, it will be difficult for students to apply what they have learned in class to actual situations, and thus their learning results will not meet the demands of their future jobs. A drop in the students' desire to learn and participate, as well as purely theoretical teaching that fails to connect with their real lives, can quickly make them lose interest.

At present, the development of computer technology has enabled various forms of use for libraries and has expanded the scope of library services. With the start of the Information Age, the old way of operating libraries is no longer convenient for the new demand. A retrieval system has been developed to integrate resources from various fields in learning and application through natural language processing and computer learning technology. The intelligent retrieval system of the digital library has achieved cross-scenario application in education, scientific research, healthcare, etc., and improved retrieval accuracy through data standardisation and algorithm optimisation. An intelligent recommendation system that adapts the retrieval strategy according to the behaviour of users can be used to improve the learning efficiency of knowledge point association and predictive problem pushing.

Many places have begun using computers to improve the efficiency of library management and have added functions such as recording book loans and returns, maintaining library catalogues, classification and retrieval, statistics, etc. A computer system will be built to improve the speed of access and retrieval for all the books in the library. Automated catalogue organisation and organisation have also spared library staff a lot of time and energy. Intelligent recommendation systems are also examples of how computers are used to manage books. Based on analysis of users' borrowing history and interests, recommend relevant books to them through the system for a more personalized reading experience.

Use computers to improve the efficiency of book management and provide more convenient and personalised reading services for readers. With the changes in society at present, libraries need to keep up with technological innovations and provide higher-quality services for the public.

## 5 Conclusion

At present, most of the work in book management is done manually and is prone to errors. With the development of computer technology, the construction and progress of library management systems have gradually been incorporated into the reform of libraries. With the advent of computers, many ways have been introduced to increase the efficiency of library work, make book management and borrowing more convenient, and introduce digital storage and smart services at the same time. Research on the Application of computer technology in library management has both practical applications and a long history. Based on the previous in-depth research and exploration of how to use computer technology in library management, efforts can be made to promote the modernization of libraries, improve both their efficiency and the quality of services offered to readers, and boost all-around development of the library industry.

Teachers can serve as models for the development of students' information-seeking abilities. Students can use their search skills in their studies of all subjects. The purpose of this paper is to explore how to integrate modern computer information technology and the Superstar mobile library application into the teaching of books and literature retrieval courses to foster a new mode of innovative teaching, enhance students' practical skills in books and literature retrieval, and boost their learning efficiency and performance. In addition, instead of models that are more teacher-centered and require teachers to spend a lot of time motivating students and having them stay in their seats, cooperative learning can be beneficial for students' learning when they work together, when they motivate and guide each other, and when they are held individually accountable for their own work. We can continuously explore and innovate teaching methods during this research to improve the efficiency of all teaching activities and outcomes.

## 6 Recommendation

Based on the above research results, the following suggestions are proposed.

Provide strong support for the retrieval and browsing functions of digital libraries through computer technology in this study. A new way of conducting book and literature retrieval courses can be established by integrating modern computer information technology with the teaching functions of Superstar mobile library applications to improve students' practical abilities in book and literature retrieval, thus boosting their learning efficiency and grades. In the course of the research, we will continue to discover and develop new ways of teaching to enhance the effectiveness of all teaching and learning. Search engine and database technology can be used to find the user's required digital resources conveniently, and multi-dimensional retrieval and sorting functions are available. Users can access the resources in the digital library at any time and anywhere in the world over the Internet for convenient online browsing and reading. Computer Technology Can Also Improve the User Experience of Digital Libraries. Intelligent recommendation systems and personalised services can be used to recommend relevant materials in digital libraries according to the browsing history and interests of users to enhance user satisfaction and loyalty.

Computer technology has been introduced to the construction of the digital library to enhance the efficiency of resource management and user convenience; at the same time, it can offer a higher-quality, personalised service experience for all users. In the era of digital transformation, continuous progress in computer technology will keep developing digital libraries and provide convenient and high-efficiency knowledge services for society and science.

## About the Author

Liangzhi Yuan was born in 1987 in Zhoukou City, Henan Province, China. He obtained a Doctoral's degree from Valaya Along korn Rajabhat University, Thailand. I currently work at the library of Zhoukou Normal University in Henan Province, China. My main work and research focus are on book collection and circulation management, as well as the research and development of library professional courses.

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