Innovation and Effect Evaluation Algorithm of Library's Refined Reading Promotion Activities in the 5G Era

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Abstract: With the rapid development of 5G technology, various types of reading promotion methods are becoming more and more diverse. While constantly seeking the depth of publicity content and publicity, university libraries also pay more and more attention to the optimization and innovation of publicity methods. In the 5G era, there are various ways of reading promotion, but due to the lack of a scientific and effective evaluation mechanism, it is impossible to provide readers with accurate reading services, so as to achieve the expected results. Through the disadvantages of traditional reading promotion activities, a new refined reading promotion model in the 5G era was introduced, and the types of reading promotion models, their elements and the necessity in the new era were explained. By comparing the traditional reading promotion with the reading promotion in the 5G era, the comparison was mainly made in terms of promotion content score, promotion effect, and user experience. The results found that the diversity has increased by 12 points, the legibility has increased by 11 points, the promotion effect has also been greatly improved, and the user experience rating has also been improved. It also illustrated the necessity of the current implementation of the library's refined reading promotion activities in the 5G era.

Keywords: Effectiveness Evaluation Algorithm, Reading Promotion Mode, Library Fine Reading, 5G Era

1. Introduction

Reading is the fundamental way for people to acquire and understand and improve themselves, and it is also the fundamental way for people to realize the spread and protection of civilization. It can not only improve the fairness and quality of knowledge, but also improve people's overall literacy. Reading work, as the name suggests, refers to a task of the library or other institutions, and the purpose is to develop learners' reading habit, cultivate students' reading interest, improve students' reading ability, and encourage them to read.

Libraries (Figure 1) are gradually realizing the impact of the rapid development of the 5G era on readers. As the reading needs of library users continue to increase, the library must carry out reading publicity in a targeted manner, combine its own characteristics, and make full use of its own service advantages. In the library work, it is a very necessary work to carry out reading publicity work. Therefore, it is necessary to analyze the development trend of libraries in the 5G era from the perspective of the 5G era.

This paper mainly compares the traditional reading promotion and the reading promotion mode in the 5G era, mainly in the three aspects of promotion content scoring, promotion effect, and user experience. By modeling the evaluation model, the analysis hierarchy process is used to score. The results show that the reading promotion model in the 5G era can make more refined arrangements for people's reading, and is more in line with the current era.
2. Related Work

The research on the effectiveness evaluation of reading promotion activities carried out by Chinese libraries is relatively lagging behind, so some scholars have discussed this. An information-rich society progresses and develops with the development of science itself, for which Solfema S proposed a community reading garden that helps keep information up to date. It can help people improve their ability and application comprehension through reading gardens [1]. With the rapid development of information technology and mobile Internet, social media content has become extremely rich and open, and users are increasingly reliant on social reading. The reading motivation of users has changed a lot from traditional reading to digital reading to social reading. Wang H borrowed the "reading motivation" of "satisfaction" theory to examine the reading effect of "readers" on "social media". The results showed that the reading motivations of social media users mainly include entertainment, self-presentation, information acquisition, social promotion and social interaction [2]. Dali K positioned the practice of collaborating with readers in academic libraries as a pluralistic practice and examined it through the lens of designing the concept of pluralism. Diversity was designed to propose and explain a differentiated approach to reading promotion on campus, drawing attention to the wider and multiple meanings of diversity in the context of reading activities, and specific suggestions on how to promote reading practices and new directions in academic libraries were also made [3]. These scholars have all done research on reading promotion, but less in library management.

In the aspect of the library, there are also many scholars conducting research. Libraries are the most visited places as a place to find reference materials. The number of library visitors that conduct the event would affect the comfort level of each user's circulation. To determine user circulation in library reading rooms, Widiana N used descriptive qualitative methods. The analysis was performed by comparing the measurement results with the circulating standards. The results showed that the circulation of the library reading room is not close to the standard distance [4]. Wiley D L looked at many changes, upgrading library technology and exploring new ways of self-publishing, collaborating with people, and innovation in libraries. Nearly all libraries have upgraded their tech game, including Wi-Fi internet access and e-books, and maybe even makerspaces and hacker festivals, mostly through reading to raise the library's tech standards [5]. The development of new information technologies changes and affects library services. Liu C took the interactive experience space "Tsinghua Impression" as an example, analyzed the application of many new technologies in the construction of library information resources and information services, and explained how to use multimedia, touch screen, 3D and other technologies to strengthen collection and service. It mainly discussed the new information technology to promote library service innovation and provide reference for library service innovation [6]. Adzobu P studied the impact of university graduate students' use of smartphones to access library electronic resources. Based on quantitative research methods, a survey research design was adopted. The results of the study showed that several characteristics of innovation, complexity and compatibility have a significant impact on the adoption of graduate students' smartphones [7]. Relevant scholars have discussed library reading, but they have not evaluated the effect of library promotion activities in the 5G era. In this regard, this article discusses them.

3. Overview of the Evaluation of Library Reading Promotion Activities in the 5G Era

3.1 Concept Definition

This paper mainly defines the concept of 5G, reading promotion, and reading promotion mode, as shown in Figure 2.
5G is a new concept, and it is a popular word on the Internet, which is called "fifth media" [8]. At present, the international concept of 5G is still inconclusive, and there are different opinions on the concept and definition of 5G. People from all walks of life have different definitions and understandings of 5G. 5G is a new type of information technology network medium, based on digital technology, and the Internet is an important medium for information transmission. It is an online community established in the era of Web 2.0. 5G connects various electronic and mobile communications, making communication among the public more innovative and convenient. It transmits information through a computer or a digital device with computer characteristics. 5G is the support of new technologies such as digital media, the Internet, and instant communication. It uses the medium of binary digital format storage, processing, transmission and information to enable users to interact and communicate. There are various business forms of 5G, including social media such as WeChat, various APPs, mobile clients, Internet and other electronic books [9-10].

The concept of reading promotion: in China, the concept of "promotion of reading" is defined as "reading promotion", which means that libraries and other related departments, in order to improve people's reading interest, develop their reading habits, and improve their reading ability, so as to promote the whole country reading activities. Reading promotion is a new and intrusive library service that targets all citizens, focuses on specific groups, and is characterized by activities and fragmentation. The purpose is to make people who don't like reading enjoy reading and those who have difficulty in reading to overcome the obstacles of reading. Simply put, it is a related behavior carried out by a person or a social group in order to promote people's reading, that is, to promote reading activities that are beneficial to both individuals and society. The "reading" of the university library is the "reading" with the university library as the main content. The library is a special cultural symbol, and it shares the same characteristics with other types of libraries, but also has its own characteristics [11].

Definition of the library reading promotion model in the 5G era: the library is an important part of the school and an important institution for talent training and scientific research services in colleges and universities. The construction and development of the library must be consistent with the construction and development of the school, and the school-running quality of the library is an important symbol to measure the overall quality of the school. The library has various functions such as education and information. Libraries should play an important role in cultivating talents, serving the society, and innovating culture. The task of the library is to establish a literature information system in colleges and universities, provide literature and information services for teaching, scientific research, and discipline construction, provide various materials for schools and convenience for all students in the school, continue to expand and deepen services, and actively participate in school personnel training, informatization construction, and campus culture construction; it is necessary to give full play to the advantages of information resources and professional services to serve the society [12].

The traditional university library takes book distribution as the main service mode. It is promoted by holding "famous lectures", "book promotion", "book exhibition", "reading motto", "reading knowledge contest", "masterpiece appreciation" and other activities [13].

The reading dissemination mode of university libraries from the perspective of 5G (hereinafter referred to as "reading promotion mode") refers to the use of digital magazines, digital newspapers, television, the Internet, mobile phone windows, and touch media to communicate text, audio, pictures and video content, etc. It has a unique mode of dissemination, promotion, preservation and memory of its content, as shown in Figure 3 [14].
3.2 Types of Reading Promotion Models

With the rapid development of the mobile phone era, the traditional paper media reading mode is gradually being replaced, which has brought a profound impact on the reading consciousness of the majority of college students [15]. Reading in the 5G era has become an important way for library readers to obtain book resources and information retrieval, and an effective tool for college students to expand their horizons and build a knowledge system. In reading promotion, 5G technology is often applied to reading promotion, information storage, etc., thus forming a variety of reading promotion methods. The promotion model in the 5G era is shown in Figure 4.

The promotion model of mobile library: the mobile library mainly focuses on promoting digital content [16]. It can integrate various platforms, break through the content bottleneck, provide readers with a steady stream of information, and make readers' reading everywhere.

The promotion method of e-reading machine: an e-reading machine is a kind of electronic reading machine, which is a short-term borrowing service of e-books provided for registered users according to the contract with the e-book supplier. Domestic e-book manufacturers come from various industries, basically forming three major e-reading machine production groups. Compared with the traditional reading promotion methods, electronic readers have the advantages of protecting eyesight, low power consumption, easy portability, large storage capacity, networking, easy downloading, and personalized design.

Social media reading promotion model: generally speaking, microblogs on social networks are called social media, such as blogs, wikis, social networking sites and so on. With the advent of the "2.0" era, the social network has an increasingly prominent position in the library. Before, there was no fixed mode for the dissemination of social media. Now, since Weibo is already the largest media for Chinese users, it is easy to use. The message delivery speed is fast, the user participation is high, and the content is more grassroots, so the most prominent social network is social networking, and many social networks are real-name systems, such as WeChat. The school library can quickly get the reading users of the school by using such a social network, so social media has been widely used in the reading promotion work of the school library recently.

Social group reading promotion model: the starting point of the social group model is to bring different users together and make them more connected, so that they can be moved from a relatively closed circle of friends to a group, creating a more open society network to exchange and share information [17]. In foreign countries, group reading based on social network is a hot topic in the world in recent years. The "reading promotion" is to use the social structure within the group to organize the people in the group according to certain goals, tasks and forms. Relative to the traditional reading promotion, social network, readers, peers, promoters and reading resources are the basic elements of network marketing. They complement each other and are indispensable. Social network is a necessary condition for social communication. It builds an open and equalized cooperation network, allowing users and promoters to form an equal communication link. The "decentralized" book environment has subverted the passive participation of readers in the previous book behavior, making the salesman become the friend and supporter of the reader, and then form an understanding of the propaganda behavior mentally, and finally participate in the sharing of books in the interactive session.

Cloud service digital reading promotion model: the library uses cloud computing technology to transmit digital reading resources to the reader interaction platform through cloud services, thus achieving the efficient popularization of digital reading [18]. Information interaction is carried out by
smart phones, etc., and users' interest in reading is aroused. The reading promotion of cloud services is to analyze readers' preferences through big data, so as to make better use of library resources. Libraries are comprehensive hubs for education and research, possess a large number of digital reading resources, and can purchase a large amount of electronic data. Through cooperation with digital resource providers, a large number of open network resources are collected and constructed. Relying on a standardized, compatible and localized platform application system, it provides support for the promotion of digital reading with perfect functions and service models.

3.3 Elements of Library Reading Promotion Model

From the perspective of 5G, the library's reading promotion mode is the basic tool and means of library promotion activities. It uses new information technology, new information technology and special facilities to design appropriate content and form of activities. In this way, it has an impact on the reading promotion target, and adjusts it through feedback to achieve the best publicity effect. From the perspective of 5G, people can see the four basic elements that libraries have in the 5G era, as shown in Figure 5.

The main body of reading promotion: the university library is an important work of the library, and as the main body of its work, the library is the leading force. The university library is the school's "second classroom", an academic organization for teaching and research, and an important position for promoting quality education in colleges and universities. From a 5G perspective, the role of the university library itself is critical.

Object of reading promotion: in general, the target of reading promotion is the general reader or service target. Its function and role determine or affect the target group and the subject's choice of the target; at the same time, according to their own knowledge, preferences, habits, needs and other factors, it would also affect the way of reading. The object of reading propaganda has the characteristics of wide variety and uncertainty. The reading promotion objects of the library are college students, teachers and scientific researchers. These objects have common characteristics. The demand for professional knowledge is relatively large, and at the same time, due to the differences in grades, professional knowledge structure, information literacy and other aspects, it has diversified characteristics.

The content of reading promotion: the main content of reading promotion includes various reading materials, paper resources, literature and periodicals, newspapers, electronic resources, reading concepts, reading methods, etc. These are the basis of reading promotion. The goal of the library's reading promotion model is that there is a large demand for information resources and a wide range of disciplines. Especially in the construction of digital information resources, whether the professionalism, real-time and diversity of resources can meet the reading needs of readers all affect the reading experience.

The carrier of reading promotion: the medium of reading promotion is an effective means of communication. For the research on reading promotion, it is necessary to figure out the problem of "how to promote". Promoters should start from reality and think about how to spread the content to be promoted to readers quickly and accurately in the most appropriate and reasonable form of activity.
3.4 Necessity and Feasibility of Library Reading Promotion Model Evaluation

With the development of Chinese libraries, a lot of work has been done in terms of scale, content, form, and resources. However, its effectiveness is still inconclusive. At present, scholars have made some achievements in the evaluation of reading promotion. Therefore, it is very meaningful to build a complete evaluation system of reading promotion model and use multi-level and multi-dimensional evaluation methods to evaluate it.

Necessity: (1) it plays an important guiding role in the rational distribution of library resources. In the library's reading promotion work, the library's human, material and financial resources are huge. Whether the selection of reading promotion methods can achieve the expected results, whether readers can improve their reading level, and whether they can improve their reading habits remains to be evaluated. Therefore, it is necessary to establish a scientific, reasonable and scientific reading promotion evaluation index system, and establish a corresponding evaluation mechanism; (2) it is of great significance to improve the reading and promotion work of the library. Libraries are the "palaces" of universities, regional literature resource banks, and readers' learning. Reading promotion takes readers and users as the ultimate goal. Therefore, evaluating it is not only an evaluation of library work, but also an evaluation of library work. From this point of view, it is an evaluation of library work.

Feasibility: (1) drawing on the evaluation principles of input and output in economics, in the economic field, whether it is a material production sector or an immaterial production sector, the general laws of "input" and "output" must be observed. Library is the core of information resources in colleges and universities, and the reading and publicity services it provides can be regarded as a productive activity. When the library uses a variety of reading promotion methods to carry out reading promotion activities, it is essentially an investment in literature resources, terminal equipment, etc. However, since it is difficult to quantitatively measure the effect of reading promotion, it is necessary to carry out a reasonable analysis of the factors affecting the reading promotion model, and formulate a set of the most scientific evaluation indicators based on these. These indicators are quantified to achieve an assessment of the reading promotion model; (2) the entropy weight method-AHP evaluation model can combine subjective and objective with qualitative and quantitative. At present, the reading promotion model of Chinese libraries is mainly judged from an objective and objective perspective, while the entropy weight method fully considers the subjectivity and operability of AHP when comprehensively judging the rationality and weight of the index system.

3.5 Evaluation Model Construction

This paper mainly adopts the entropy weight method. The index selection of this method is objective and easy to operate, while the entropy weight method is based on mathematical statistics, which has strong objectivity and can better explain the results. Using the weighted method, some indicators that do not have much influence on the evaluation results can be effectively excluded. In this paper, the entropy weight method is used to screen the evaluation indicators and determine their weights. When the difference between the evaluation target and an evaluation index is large, the entropy is lower, and the more information the evaluation index carries, the higher the weight value, and vice versa.

In the decision-making process, the amount and quantity of information that people obtain would directly affect the accuracy and reliability of decision-making. Therefore, entropy is the best way to measure different decision procedures and effects. Taking the amount of information as the starting point, obtaining information means eliminating uncertainty. Therefore, the amount of information is the core of information theory, and its scale can be expressed by a probability distribution function:

\[ H = -K \sum_{i=1}^{n} P_i \log P_i \]  

Among them, \( H \) is the information entropy and \( P \) is the probability at random time.

Assuming that there are \( n \) sample units, there are \( m \) possible evaluation results for each sample, and the evaluation feature vector is expressed by \( X_{ij} \), then a corresponding matrix can be obtained:

\[ X = \begin{bmatrix} x_{11} & \cdots & x_{1m} \\ \vdots & \ddots & \vdots \\ x_{n1} & \cdots & x_{nm} \end{bmatrix} \]  

Data standardization processing: the standardization process includes positive index normalization and negative index. The positive index is used in this paper. In the processing of the positive index, the
higher the value of the obtained positive index, the better the obtained positive index, which can be expressed as:

\[ r_{ij} = \frac{x_{ij} - \min x_{ij}}{\max x_{ij} - \min x_{ij}} \]  \hspace{1cm} (3)

\( r_{ij} \) is the normalized data, and \( x_{ij} \) is the statistical raw data evaluation index score. \( i \) is the evaluation item number, and \( j \) is the evaluation index number.

The \( j \) evaluation weight \( P_{ij} \) for the \( i \)-th item can be expressed as:

\[ P_{ij} = \frac{r_{ij}}{\sum_{i=1}^{n} r_{ij}} \]  \hspace{1cm} (4)

The entropy value of \( e_j \) for the \( j \)th indicator is calculated.

\[ e_j = -k \sum_{i=1}^{n} P_{ij} \ln(P_{ij}) \]  \hspace{1cm} (5)

Among them, there are:

\[ k = \frac{1}{\ln(n)} \]  \hspace{1cm} (6)

The weight of \( h_j \) for the \( j \)th indicator is calculated.

\[ h_j = \frac{1-e_j}{\sum_{j=1}^{m} (1-e_j)} \]  \hspace{1cm} (7)

The score for the \( i \)th sample is calculated.

\[ s_i = \sum_{j=1}^{m} (h_j P_{ij}) \]  \hspace{1cm} (8)

The weights for the target layer can be expressed as:

\[ C = [C_1, \ldots, C_m] \]  \hspace{1cm} (9)

Then, the evaluation model is constructed by the analytic hierarchy process. The basic analytic hierarchy process model is shown in Figure 6.

![Analytic hierarchy model](image)

Figure 6: Analytic hierarchy model

By comparing the evaluated indicators in pairs, an appropriate scale is selected, and its expression is as follows:

\[ B = (a_{ij})_{n \times n} \]  \hspace{1cm} (10)

\( B \) is the corresponding matrix, and \( a \) represents the same level.

The weight vector and eigenvector of the number of layers are tested. If the matrix conditions are met, the eigenvector can be regarded as a weight vector, and the value of the largest feature \( \gamma_{max} \) can be calculated through the weight vector. The calculation steps are as follows.

First, the elements of each row in the matrix are multiplied.

\[ M_i = \prod_{j=1}^{n} a_{ij} \]  \hspace{1cm} (11)

Second, the \( n \)th root of the product of each row is calculated.

\[ W_i = \sqrt[n]{M_i} \]  \hspace{1cm} (12)

Then, the obtained feature vector is processed uniformly to obtain the corresponding weight value, which can be expressed as:
\[ W_i = \frac{W_i}{\sum_{j=1}^{n} W_j} \]  

After a consistency check, the accepted relative weights can be obtained. Among them, CI is the identity index of a single sequence, and its calculation formula is as follows:

\[ CI = \frac{y_{\text{max}} - n}{RI} \]  

\[ CR = \frac{CI}{RI} \]  

RI is a deterministic value called the average stochastic consistency index. The corresponding values of RI are shown in Table 1.

<table>
<thead>
<tr>
<th>n</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>RI</td>
<td>0</td>
<td>0.45</td>
<td>0.95</td>
<td>1.13</td>
<td>1.26</td>
<td>1.37</td>
<td>1.51</td>
<td>1.58</td>
</tr>
<tr>
<td>CR</td>
<td>0.024</td>
<td>0.031</td>
<td>0.029</td>
<td>0.046</td>
<td>0.052</td>
<td>0.053</td>
<td>0.062</td>
<td>0.068</td>
</tr>
</tbody>
</table>

By judging the CR, if it is less than 0.1, it means that the corresponding weight value of each level is feasible, and can be calculated by this method.

4. Comparison of Traditional Reading Promotion and Reading Promotion in the 5G Era

This article mainly compares the two kinds of reading promotion through questionnaire survey, mainly in three aspects: promotion content score, promotion effect, and user experience. The number of people surveyed was 200 people, divided into 2 groups of 100 people in each group, and the recovery rate was 100%. In order to ensure the accuracy of the data, three experiments were carried out in this paper. For the sake of brevity, the reading promotion in the 5G era is referred to as the new reading promotion in the following text.

In terms of promotion content, the investigators rate it, and the promotion content mainly includes content diversity and readability. Promotional content can also illustrate the difference between the two approaches. The scores of the two on the promotion content are shown in Figure 7.

![Figure 7a: Traditional reading promotion](image1)  
![Figure 7b: New type of reading promotion](image2)

**Figure 7: Comparison of promotion content scores**

It can be seen from the two sets of data that the average scores of traditional reading promotion in terms of content diversity and readability are 74 and 69, respectively. However, in the new reading promotion, the mean scores of the two are 86 and 80, respectively. The new reading promotion model improved by 12 points in diversity and 11 points in legibility. It also shows that the new reading promotion activities are more easily accepted by people, and people are also willing to accept more vivid cultural information promotion.

In terms of the effect of promotion, by explaining the familiarity of reading users in different reading promotions, book promotion activities and famous lecturers are selected as experimental objects in traditional reading, and digital TV and network are selected as experimental objects in new reading. The comparison chart of their promotion effect is shown in Figure 8.
Through two sets of data, it can be found that in traditional reading promotion, after book promotion and famous lecturer promotion, the familiarity of respondents is 38% and 25% respectively. However, in the new reading promotion, the familiarity of the respondents through digital TV and the Internet is 75% and 80% respectively. From the two sets of data, it can be seen intuitively that the effect of new reading promotion is much better than that of traditional reading promotion. It also shows that in the 5G information age, the way people receive information is mostly digital media.

The difference between the two can also be explained from the user experience after promotion. The user's experience in reading promotion is mainly judged from the user's post-reading rating. The comparison chart of their user experience is shown in Figure 9.

The user experience is compared in terms of user time and expenditure. In traditional reading promotion, the scores for the two are 65 and 75 respectively. However, in the new reading promotion, the scores of the two are 80 and 85 respectively. Compared with the traditional reading promotion, the new reading promotion has an increase of 15 points and 10 points in the user's time and cost, which also shows that in the new reading promotion, people are more satisfied with the time and expenditure, and can read at any time.

5. Conclusions

This paper mainly summarized the types, characteristics, constituent elements and evaluation influencing factors of library reading promotion models from the perspective of 5G, designed an evaluation index system, and built a hierarchical evaluation model for library reading promotion models from the perspective of 5G based on the AHP method. Standardized empirical research was carried out on this level of evaluation model, and evaluation and analysis were carried out according to the data results. Through the shortcomings of the traditional reading promotion model, a new reading promotion model was introduced, and the two were compared in terms of reading promotion content, effect and user experience. It was found that the new type of reading promotion is more suitable for
people's current lifestyle, and can capture people's reading habits more finely. The insufficiency of this paper is that although the evaluation index of the library reading promotion model is set according to the existing research results on the construction of evaluation index, there may still be factors that are not considered in place. The new information technology media is increasing day by day and constantly updated, and the evaluation indicators also need to be changed in order to make more appropriate evaluations. In the future, various factors of the reading promotion model would be determined, and each factor would be evaluated through better analytical methods, so as to obtain scientific and accurate data, and the operation would be simpler.

References