Research on Experimental Teaching Information Collection Method of Visual Communication Specialty in Hybrid Universities Under Intelligent Terminal

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Abstract. In order to enhance the efficiency of information collection in experimental teaching of visual communication specialty and improve students' art design ability, this paper proposes a method of information collection in experimental teaching of visual communication specialty in hybrid Universities under intelligent terminal. The delay model of experimental teaching information collection is established, and the user delay under different modes is obtained. According to the residual value of all the information in the experimental teaching information processing node, the dynamic weight of each experimental teaching information is calculated, and the residual load capacity of the experimental teaching information processing node is estimated to achieve the balanced distribution of the experimental teaching information of visual communication specialty, This paper constructs the experimental teaching information collection mode of visual communication specialty in compound university to realize the experimental teaching information collection. The experimental results show that the method can meet different reliability requirements, has high acquisition accuracy and the effectiveness of redundant information filtering, and can promote the further improvement of students' art design ability.

Keywords: Intelligent terminal · Mixed colleges and universities · Visual communication major · Experimental teaching information · Collection method · Art design

1 Introduction

In recent years, with the continuous implementation of the enrollment expansion plan of colleges and universities in China, the improvement of teaching quality in Colleges and universities has gradually become the focus of extensive social discussion. The reason why we want to further improve the teaching quality of colleges and universities is that from the perspective of social employment demand, many college students still have some prominent problems of difficult employment, and the fundamental way to solve this problem is to improve the teaching quality of college education and make it more scientific and reasonable for effective education and teaching, And further close

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to the rigid needs of social talent demand [1]. In improving the quality of teaching in Colleges and universities, many colleges and universities have done a lot of work, and measuring the quality of college work also needs to be processed and analyzed through the standardized process, which involves the collection and processing of teaching related data, because only the real data can effectively reflect the real teaching situation of the school.

In the past, in the process of collecting experimental teaching information of visual communication specialty in hybrid universities, although it also includes measuring the quality of teaching and so on, due to the low degree of informatization, many hybrid universities use office software such as Excel or word to collect experimental teaching information of visual communication specialty, which leads to the slow submission of experimental teaching information data of visual communication specialty, Moreover, the possibility of human intervention in the form is large, which is easy to lead to the inconsistency of the data format of the experimental teaching information of visual communication specialty [2]. In addition, the transmission process of the form needs to be issued level by level, and the recovery progress is often relatively long.

The ultimate purpose of information collection of visual communication experiment teaching in hybrid universities is query and statistics. Because of manual collection and statistics of visual communication experiment teaching information data in hybrid universities, it is difficult to achieve effective statistical work only through the existing office software, Sometimes it takes a lot of computing time to get the experimental teaching information data of visual communication specialty in hybrid universities.

At present, the teaching quality of visual communication specialty in hybrid colleges is more diversified. It is necessary for the more comprehensive collection of experimental teaching information of visual communication specialty to reflect the teaching level of visual communication specialty, such as the collection of comprehensive data such as curriculum arrangement of visual communication, teacher-student ratio, cooperation between school and enterprise. Therefore, every region of our country is also exploring and practicing the corresponding evaluation standards of colleges and universities. With the rapid development of information technology, the office efficiency of enterprises and institutions can be effectively improved through software system platform. For the current mixed university to solve the visual communication professional experimental teaching information collection related problems, can also be solved through information. As long as the application of advanced technology, design in line with the design of business needs, so that the system has a high performance and key problem solving ability, it can be widely recognized.

The early 21st century is the beginning of the research and development and application of information acquisition software system for experimental teaching of visual communication major in mixed universities. With the synchronous development of computer operating system, computer network technology and computer hardware technology, all walks of life and units began to use relevant software systems one after another, Its purpose is to help enterprises solve problems such as office efficiency [4]. For China's colleges and universities, this stage is just at the time of expanding the enrollment plan, which increases the management pressure of colleges and universities at the same time. Many colleges and universities have new tentative choices in score processing, course

selection management, book use, etc., that is to introduce the corresponding score management system, course selection management system, book management system and other software systems, At this stage, the system mostly appears in C/S mode, that is, the operation mode of direct interaction between client and server is realized through LAN deployment. With the continuous development of computer technology, the growing maturity of Internet technology, and the increasing complexity of enterprise business, the management system of colleges and universities is constantly enriched and improved. On the one hand, the needs of business are considered in the type, It further enriches the types of the system; On the other hand, advanced technology architecture mode is adopted in technology application. At present, China's colleges and universities have a relatively high degree of education informatization in running schools. From the level of education departments, students' diploma information can be identified and viewed through xuexin.com. From the inside of the school, although most of the original teaching systems are retained, they are mostly through technology upgrading and system business integration [5]. However, at present, with the requirements of our country's education authorities for colleges and universities in the new situation of personnel training, colleges and universities pay attention to the management and teaching quality on the one hand, and actively prepare historical data and data on the other hand, so that the school itself or the higher authorities can have a comparison of the current school running state, and the ultimate goal is to promote the improvement of its school running quality. At present, some provinces in China have begun to brew and study such systems, and strive to collect and summarize the teaching information of colleges and universities in time, so as to ensure the first-hand regional teaching quality.

According to the national conditions and current development status of each country, there are great differences in the level of information education in foreign countries. Developing countries generally lag behind developed countries, some underdeveloped countries even have some problems in universal education, and the construction of education informatization is even less [6]. The development of educational informatization in developed countries such as the United States and Germany benefits from their advanced information technology level and educational teaching mode. Their computer software and hardware levels are at least 10 years ahead of those in developing countries. The development of educational informatization in developed countries also benefits from their advantages in educational resources.

With the terminal innovation of communication and network technology, it is easy to produce too much redundant information when collecting experimental teaching information of visual communication specialty in hybrid universities, resulting in the consequence that the information collection is not accurate enough. Therefore, this paper proposes a method of information collection for experimental teaching of visual communication specialty in hybrid universities under the intelligent terminal.

2 Design of Experimental Teaching Information Collection Method

In order to solve the problem of low collection rate of traditional experimental teaching information collection methods, this paper proposes a hybrid experimental teaching information collection method of visual communication specialty in colleges and

universities under intelligent terminal. The overall framework of this method is as follows:

Firstly, from the perspective of a pair of primary users and a pair of secondary users in the experimental teaching system of visual communication specialty in hybrid colleges and universities, an experimental teaching information acquisition delay model is established to obtain the user delay under different modes.

Secondly, according to all the information residual values of the experimental teaching information processing node, the dynamic weight of each experimental teaching information is calculated, the residual load capacity of the experimental teaching information processing node is estimated, and the balanced distribution of the experimental teaching information of visual communication specialty is completed.

Finally, the experimental teaching information collection model of visual communication specialty in hybrid colleges and universities is constructed to realize the experimental teaching information collection.

2.1 Calculate the User Delay in Different Modes

In the process of collecting experimental teaching information of visual communication specialty in hybrid universities, with the support of intelligent terminal, the delay model of experimental teaching information collection of visual communication specialty in hybrid universities is established to obtain the user delay in different modes. The specific steps are as follows:

Considering that there are a pair of primary users and a pair of secondary users in the experimental teaching system of visual communication specialty in hybrid universities, it is assumed that λ_p and λ_s represent primary users and secondary users, the Poisson distribution of the experimental teaching information of visual communication specialty obeys the parameters, L_p and L_s represent the corresponding packet length, pU_s represents the sending node of the primary user, and pU_D represents the receiving node of the primary user, R_p and R_{PS} denote the channel rate at which the secondary user sends the experimental teaching information node SU_S of visual communication specialty, R_{SP} and R_S denote the channel rate at which the secondary user sends the experimental teaching information node SU_S of visual communication specialty to the primary user receiving node pU_D and the secondary user receives the experimental teaching information node of visual communication specialty, respectively. If the secondary user participates in the process of collecting the experimental teaching information of visual communication specialty for the primary user, the equivalent packet transmission rate of the primary user represented by R_{CP} can be calculated

$$R_{CP} = \frac{pU_S \oplus pU_D}{SU_S[R_S + SU_D]} * R_{SP} \tag{1}$$

According to the above, the model of information collection delay of experimental teaching for visual communication specialty is established by using formula (2) (Fig. 1)

$$q(R_{CP}) = \frac{SU_S * R_{PS}}{R_{SP}} SU_D \tag{2}$$

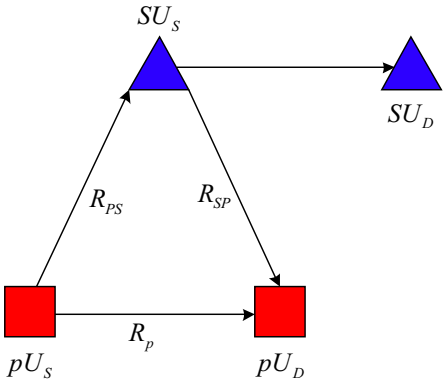


Fig. 1. Network virtual model

In the non acquisition mode, the primary user has the priority to use the experimental teaching information of visual communication specialty in hybrid universities. When the primary user no longer uses the experimental teaching information of visual communication specialty, the secondary user can use the visual communication information, And when the primary user needs to use the visual communication professional experimental teaching information, the user should give up the right to use the visual communication professional experimental teaching information to the primary user in time

$$E\|T_{NC-P}\| = E\left[X_{NC-P}\right] + \frac{\lambda_P E\left[X_{NC-P}^2\right]}{2(1-\rho_{NC-P})} \tag{3}$$

In the above formula, $E\left[X_{NC-P}\right]$ represents the average service time of the primary user in the non acquisition mode, λ_P represents the utilization rate of the experimental teaching information of the visual communication specialty of the primary user, and ρ_{NC-P} represents the ratio of the utilization rate of the experimental teaching information of the visual communication specialty of the primary user to the departure rate of the primary user in the non acquisition mode.

Then the average delay of stimulating users can be obtained by using formula (4)

$$E\|T_{NC-S}\| = \frac{E\left[X_{NC-S}\right]}{(1-\rho_{NC-P})} + \frac{\lambda_S E\left[X_{NC-S}^2\right]}{2(1-\rho_{NC-P})\left(1-\rho_{NC-p}-\rho_{NC-S}\right)} \tag{4}$$

In the above formula, $E\left[X_{NC-S}\right]$ represents the average service time of secondary users, ρ_{NC-S} represents the ratio between the utilization rate of experimental teaching information of visual communication specialty of secondary users and the departure rate of primary users in non acquisition mode, and λ_S represents the utilization rate of experimental teaching information of visual communication specialty of users.

In the process of the utilization of professional experimental teaching information in the acquisition mode, the secondary user provides information service for the main user until the main user is listed as empty. Since the visual communication professional experimental teaching information allocation protocol [7] between the main and secondary

user, the main user will not interrupt the professional experimental teaching information and formula (5) can get the average delay of the main user in the acquisition mode, namely:

$$E\|T_{BE-P}\| = \frac{E\|T_{NC-P}\| \times E\|T_{NC-S}\|}{E\|X_{BE-P}\| \otimes E\|W_{BE-P}\|} \tag{5}$$

In the above formula, $E\|X_{BE-P}\|$ represents the average service time of the primary user and $E\|W_{BE-P}\|$ represents the average waiting time of the main user.

The average delay of the secondary user is obtained by formula (6), namely:

$$E\|T_{BE-S}\| = \frac{E\left[X_{BE-S}\right] \oplus E\left[W_{BE-S}\right]}{E\left\|T_{BE-p}\right\|} \tag{6}$$

In the above formula, $E\left[X_{BE-S}\right]$ represents the average service time of secondary users, and $E\left[W_{BE-S}\right]$ represents the average waiting time of secondary users.

To sum up, it can be explained that in the process of collecting experimental teaching information of visual communication specialty in hybrid universities, from the perspective of the existence of a pair of primary users and a pair of secondary users in the experimental teaching system of visual communication specialty in hybrid universities, a delay model of experimental teaching information collection of visual communication specialty in hybrid universities is established to obtain the user delay under different modes, And take it as the basis of experimental teaching information collection of visual communication specialty in hybrid universities.

2.2 Balanced Distribution of Experimental Teaching Information of Visual Communication Specialty in Hybrid Universities

In the process of balanced distribution of experimental teaching information of visual communication specialty in hybrid universities, the proportion of each dimension of experimental teaching information of each experimental teaching information processing node in its own information is calculated [8], On this basis, the ratio of the allocated experimental teaching information in each dimension to the total allocated experimental teaching information in each node is obtained, and the residual value of experimental teaching information in each node is obtained, According to the residual value of all information in the information processing nodes of the experimental teaching of the visual communication specialty, the dynamic weight of each experimental teaching information of the visual communication specialty is calculated, and the residual load capacity of the experimental teaching information processing nodes of the visual communication specialty is obtained, so as to complete the balanced distribution of the experimental teaching information of the visual communication specialty [9]. The specific steps are as follows:

Suppose c represents the number of experimental teaching information processing nodes of visual communication specialty, and $R(r_1, r_2, \ldots, r_m)$ represents the m dimensional information of each experimental teaching information processing node of visual communication specialty

$$\gamma(g) = \frac{R(r_1, r_2, r_m \ldots) \otimes c}{m \otimes \theta(\iota)} \odot \mu(K) \times o(f) \tag{7}$$

In the above formula, $\theta(\iota)$ represents ι disjoint subsets of selected task form in task set, $\mu(K)$ represents K dimensional experimental teaching information of information processing node of visual communication specialty, and $o(f)$ represents the experimental teaching information of visual communication specialty required by each task.

Suppose r_{ij} represents the experimental teaching information allocated by the information processing node of visual communication specialty, $\mu(g)$ represents the balance of experimental teaching information of visual communication specialty, $j(g)$ represents the load of experimental teaching information of visual communication specialty, and $\hbar(y)$ represents the amount of experimental teaching information allocated to the y dimension by the i information processing node.

Assuming that $\phi_{(f,j)}$ represents that the f experimental teaching information processing node of visual communication specialty has been allocated to the j experimental teaching information, the residual value of each experimental teaching information processing node of visual communication specialty is obtained, and the dynamic weight of each experimental teaching information of visual communication specialty is calculated

$$RS = \frac{\phi_{(f,j)} \otimes W'}{E''} \otimes \frac{\eta(S) \otimes V(\sigma)}{\varsigma(s)} \tag{8}$$

In the above formula, W' represents the dynamic weight of the residual experimental teaching information, E'' represents the residual value of the experimental teaching information of visual communication specialty, η represents a constant, ϕ represents the load weight of the node, $V(\sigma)$ represents the impact of the same experimental teaching information of visual communication specialty on the residual load capacity of the node, and $\varsigma(s)$ represents the balance of the experimental teaching information of visual communication specialty after the node is connected to task s.

Assuming that ϕ represents the total number of request tasks, the remaining load capacity of the experimental teaching information processing node of visual communication specialty is obtained

$$\psi(\varpi) = \frac{\phi(\overline{\gamma})\mu''(x)}{\vartheta(E)} \oplus \nu(d) \times N''' \times \wp(\iota) \tag{9}$$

In the above formula, $\mu''(x)$ represents the number of task sets requested by the outside world, $\vartheta(E)$ represents the number of experimental teaching information required by each task in each dimension, $\nu(d)$ represents the capacity of experimental teaching information in each dimension, N''' represents the number of tasks in each set in the task set, and $\wp(\iota)$ represents the information in the experimental teaching system of visual communication specialty.

Assuming that $\theta(f)$ is a random non negative positive integer, the balanced distribution of experimental teaching information for visual communication specialty can be completed

$$\mu(S) = \frac{\theta(f)(\psi)\psi(w)}{\gamma(g)} \tag{10}$$

To sum up, it can be explained that the principle of balanced distribution of experimental teaching information of visual communication specialty in mixed universities is used

to complete the balanced distribution of experimental teaching information of visual communication specialty in mixed universities.

2.3 Construction of Experimental Teaching Information Collection Model of Visual Communication Specialty in Hybrid Universities

The experimental teaching information collection model of visual communication specialty in hybrid universities is mainly based on the intelligent terminal technology background, through the selective energy perception of the experimental teaching information of visual communication specialty. The intelligent terminal is used to make the model parameters balance the total network energy consumption. At the same time, based on the expected delay requirements, the optimal route with great probability to effectively collect the experimental teaching information of visual communication specialty is selected, and the performance of the experimental teaching information collection model of visual communication specialty is maximized according to the service level agreement [10]. By mapping the requirements of service level agreement, acquisition accuracy and energy consumption control to the network flow of WSN, it can be solved. Figure 2 shows the mapping diagram of WSN.

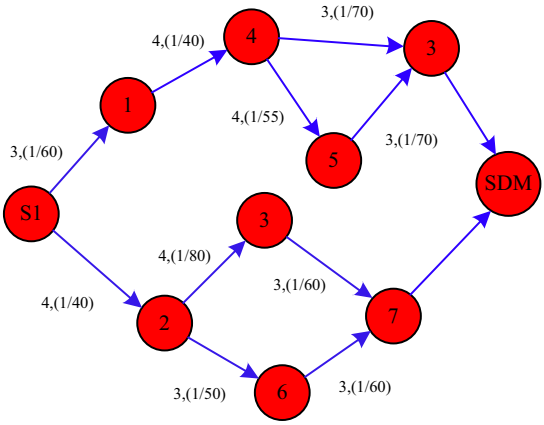


Fig. 2. Diagram of network flow

Each node in Fig. 2 above represents a sensor. The initial information source is node s and the target node is SDM. In the original Ping stage of the placement process, all nodes can create the area view of the nearest node, and the view will not be updated until the next maintenance or update password appears [11]. The update frequency of all nodes is an important factor to be considered when creating the acquisition model. Because the frequency is a controlled factor, it can be set through the most suitable level of the network. If a pre-set fixed frequency is used to maintain and update the window in the model setting stage, the optimal processing strategy of the model will not face the whole level, but all sub graph levels.

The edge in Fig. 2 represents the connection of two nodes, the volume of each connection shows the connectivity of the receiving node, and the expenditure of each edge is equivalent to the reciprocal of the battery volume of the receiving node. For example, the edge volume of node 4 to node 8 shown in the figure is 3, so the connectivity of node 8 is 3. The expenditure on the edge represents the percentage value of the remaining battery capacity of node 8 (the remaining battery capacity of node 8 is 70%). Therefore, after combining the heuristic algorithm of connectivity and cost function, the routing selection can balance the energy consumption and improve the routing reliability of experimental teaching information collection of visual communication specialty [12].

Figure 3 shows a class of simple energy improvement goals of routing clustering.

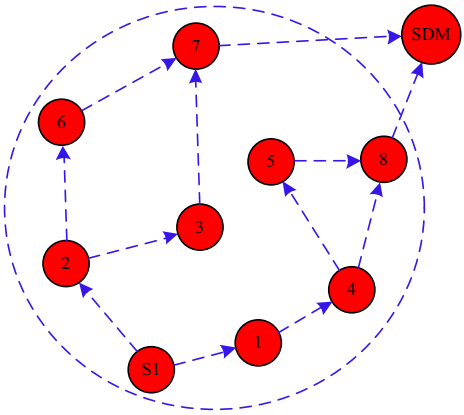


Fig. 3. Route selection

The experimental teaching information of visual communication specialty, which comes from the expected node and finally arrives at the target SDM through node 1, node 4 and node 8, will be clustered through the selected route. The above nodes present the maximum value of the current energy feasibility, because the remaining power of the route will gradually reduce, which is less than other feasible routes, and its feasibility will also decline with the extension of time, eventually making the route infeasible. In a certain stage, the routing process with the least energy consumption will break the balance of different routing energy, so as to maximize the life expectancy of WSN.

The establishment of information collection model of experimental teaching for visual communication specialty balances the energy consumption, while the information collection of experimental teaching for visual communication specialty can be combined with SLA to maximize the number of experimental teaching information selection for visual communication specialty and balance the energy consumption based on a reasonable degree. If the increase of the boundary points does not exceed the reasonable threshold, the experimental teaching information collection model of visual communication specialty will select the route with the maximum connectivity. For example, if the threshold is set to 35%, there will be two routes to access the next node. If the power difference between the two routes is less than 35%, then the model will enforce the selection of the route with the highest connectivity.

The information collection model of visual communication experiment teaching is not only realized by a simple maximization strategy, but also by an ideal route selection method. As long as it is in a reasonable energy balance target area, it will maximize the amount of information collection of visual communication experiment teaching until it exceeds the preset threshold, Then it is converted to the next more matching route, where the termination condition of the conversion is that the energy threshold difference between the maximum route and the secondary route can be converted into the maximum route. If the delay of experimental teaching information collection of visual communication specialty is regarded as the incentive object and integrated into the intelligent terminal, the closer to the SDM, the larger its volume, which reflects the approximation with the target node from the side. Therefore, as long as the reasonable performance consumption threshold between routes is not exceeded, the experimental teaching information of visual communication specialty can be effectively collected through the intelligent terminal [13].

3 Experimental Comparative Analysis

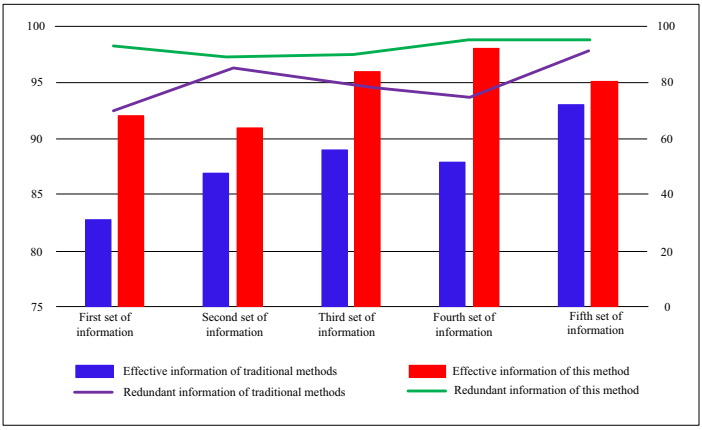
3.1 Experimental Environment and Data Information

In order to test the feasibility of the design of experimental teaching information collection method of visual communication specialty in hybrid Universities under the intelligent terminal, simulation is set to verify. The experimental environment is i5-3337U1.8 GHz, memory 8G, Windows 7–64 bit system, Matlab 2013 version.

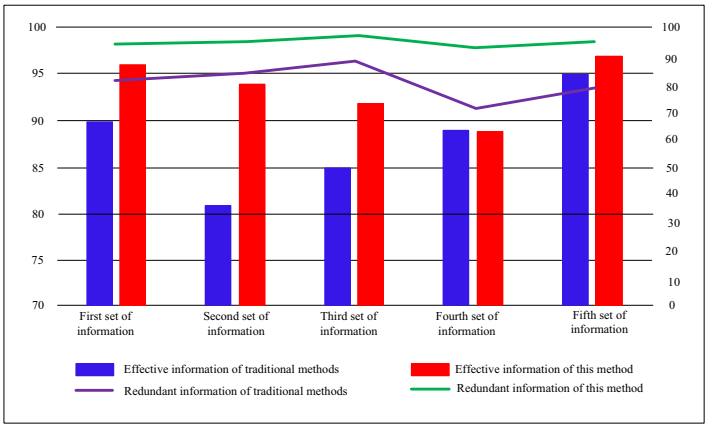
In the above experimental environment, four Chinese search engines are used to collect the experimental teaching information of the same visual communication major, and the amount of feedback displayed is different. The experimental information is shown in Table 1.

Table 1. Data information table

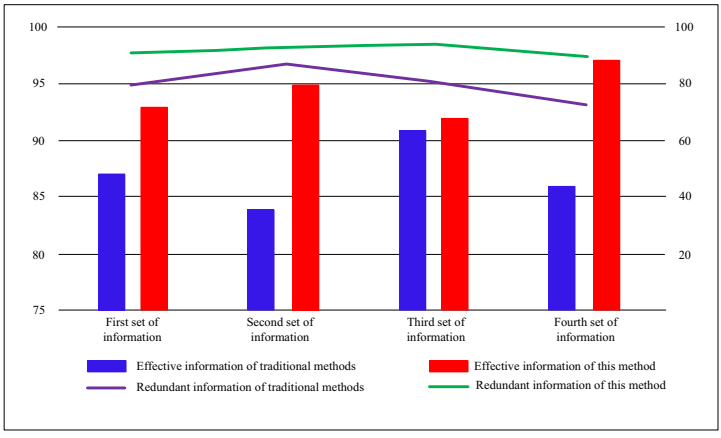
Category	Search engines	Training information	Test information
Text message	Baidu	20	100
	Sogou	20	100
Audio-visual materials	Baidu	20	100
	Sogou	20	100
Machine readable information	Baidu	20	100
	Sogou	20	100



(a) collection results based on text information category



(b) collection results based on the category of audio-visual data



(c) collection results based on machine-readable information category

Fig. 4. Schematic diagram of information collection results comparison

3.2 Experimental Architecture and Analysis

20 keywords used for training in each category in the information table of visual communication experiment teaching were uploaded to the designed model, and all the information feedback from search engine was combined according to the location arrangement method to create meta set. If the search results have the same URL, the information feedback from the search engine is repeated about the keyword. If multiple search engines' feedback information coincides, the search results ranking is top selected, and the quadratic of the repetition times is taken as the weight value.

10 keywords in each category are randomly selected from the results, and 1000 available information and 1000 conditional redundant information are selected from the results of the classification of each keyword. The simulation is carried out for the 200 network information. The following Fig. 4 shows the comparison of the traditional information acquisition model and the designed model.

As can be seen from the Fig. 4 above, the average collection rate of experimental teaching information of visual communication specialty in hybrid Universities under the intelligent terminal is 94.08%, while the traditional collection method is only 87.67%. The reason is that the method designed in this paper constructs the experimental teaching information collection model of visual communication specialty in hybrid universities. Therefore, in the process of filtering redundant information, the recognition rate of traditional collection methods will fluctuate greatly, while under the intelligent terminal, the experimental teaching information collection method of visual communication specialty in hybrid universities fluctuates more gently and has a more stable identification performance.

Integrate all the information together. Under the same experimental environment, collect the experimental teaching information of visual communication specialty in hybrid universities by using traditional methods and this method respectively, and compare the information collection time of different methods. The specific comparison results are shown in Table 2.

Table 2. Data collection time/s

Number of experiments	Traditional method	Method of this paper
5	1.96	1.48
10	2.33	0.42
15	1.89	0.38
20	2.58	0.57
25	2.47	0.54
30	2.67	0.61
35	2.58	0.51
40	1.96	0.46

By analyzing the data in the above table, it can be seen that compared with the traditional methods, the experimental teaching information collection time of visual communication specialty in hybrid colleges and universities in this method is shorter and more efficient, which can realize the rapid and accurate collection of experimental teaching information of visual communication specialty in hybrid colleges and universities.

4 Concluding Remarks

In the current experimental teaching information collection process of visual communication specialty in hybrid colleges and universities, the user delay calculation and balanced distribution of teaching information under different modes are not taken as the research focus, which leads to the problem of low information collection rate. Therefore, this paper focuses on solving the problems existing in traditional methods, This paper puts forward the research on the experimental teaching information collection method of visual communication specialty in hybrid colleges and Universities under the support of intelligent terminal, calculates the user delay under different modes, and constructs the experimental teaching information collection model of visual communication specialty in hybrid colleges and universities by evenly distributing the experimental teaching information of visual communication specialty in hybrid colleges and universities. The experimental teaching information collection of visual communication specialty is realized. The results show that the information collection method designed in this paper has higher collection efficiency and can promote the further improvement of students' art design ability. The key research direction in the future is to comprehensively improve the comprehensive performance of the designed information collection method and provide an effective basis for more ideal construction.

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