

# Study on Information Demands in Heuristic Teaching for Learners

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**Abstract**—To make the heuristic teaching more effectively carried out, exploring the information demands of learners is an indispensable step. The results show that: the main motivation for the information demand is still to learn knowledge; there are a variety of ways to get information, but the dominant ways are the Internet and the guidance of teachers; at the same time, the efficiency of the information obtaining is remained to be improved, etc. According to the results, we put forward the hierarchical model of learners' information demands. And based on this model, in order to improve the teaching effect, we put forward several suggestions for the knowledge and information guidance to the learners in the heuristic teaching with the help of the personalized learning support service.

**Keywords-heuristic teaching; information demands; system dynamics method; hierarchical model of learners' information demands.**

## I. INTRODUCTION

The National Medium and Long Term Education Reform and Development Plan Outline (2010-2020)"(exposure draft) has pointed out that "Improving the quality should be taken as the core mission of education reform and development." This Outline stressed that "The human resource is the first resource of the China's economic and social development, and education is the main way to develop the human resource. With student-oriented, teacher-dominated, give full play to the initiative of students to promote student growth and success, and take it as the starting and ending points of all the school affairs." And so, it's visible that the focus of the current education research work should be how to help students change from accepting knowledge passively into obtaining and applying knowledge actively, and then to improve the quality of teaching. And the heuristic teaching is exactly the effective solution to achieve the goal above.

It's found in the previous studies and researches that the key of the heuristic teaching is to provide proper question scenarios, sufficient learning materials, and timely support from the teachers, good informative teaching environment etc. for the students, and especially need to fully understand the students' learning demands and provide personalized guidance and help according to the demands. Otherwise, the heuristic teaching will only encourage part of the students who have good basic knowledge, but cannot achieve the expected effect for other students. Besides, the satisfaction of the students' learning demands or not will directly affect

the students' learning enthusiasm and initiative, thus influencing the teaching effects of the heuristic teaching. Therefore, this paper mainly takes the professional learning of normal school students as an example to carry out the empirical research, and explores the information demands of learners in the heuristic teaching. This study is the beneficial exploration of the theory and practice research related to the heuristic teaching. And it will also be of great significance in promoting the education development of our country, cultivating innovative talents, etc.

## II. ANALYSIS OF THE FACTORS AFFECTING THE LEARNERS' INFORMATION DEMANDS

### A. The factors affecting the learners' information demands

Through investigation and interviews, this paper categorizes the factors that affect learners' information demands as the internal factors and the external factors, and see table 1 for more details.

#### 1) The internal factors of learners

In the heuristic teaching, learners' individual differences lead to the unique individual characters of the information demands, and they affect the information demands' breadth, depth, forms and other aspects of quality and quantity. Firstly, the learners' knowledge structures and information literacy are different, so the information they can absorb and use in the class is different. If a learner has a reasonable knowledge structure or better information literacy, he would have the ability to obtain a wealth of information. Then the quantity of the information demands gets larger, also the requirements of information demands' contents, methods, and quality get higher. Instead, if the learners' knowledge structures are not reasonable enough, along with worse information literacy, then they would rely more on the teacher when they receive information, the period of receiving information gets longer, and the quantity of information gained smaller, thus the enthusiasm for information demands would decrease. This also disobeys Confucius' discipline of "Not enlighten the students until they have really tried hard but even so fail to understand. Not instruct them until they have something to say and make themselves understood." Secondly, learners' way of thinking, psychological factors and their own personalities also affect the various aspects of information demands. The so-called way of thinking, is a characterization of the scope of different structures, characters and types in people's thinking activities; and is the relatively stable thinking

pattern by which the thinking object used to reflect the object. It can be seen from the definition that the learners' different thinking ways determine the differences of information demands. The learners' series of psychological performances, such as the conformity, psychology of

creation, psychology of seeking new, psychology of seeking knowledge, psychology of close pursuing and psychology of selecting etc. have an impact on their information demands. Likewise, the learners' information demands are influenced by their personalities.

TABLE I. ANALYSIS OF THE FACTORS THAT AFFECT LEARNERS' INFORMATION DEMANDS

The factors that affect learners' information demands					
	Knowledge structure	Information literacy	The way of thinking	Psychology factors	Personalities
The internal factors	Natural science and social science knowledge	Use of information tools and access to information	Creative thinking	Conformity	Introvert
	General knowledge and special knowledge	Information processing and generating	Variable thinking	Psychology of creation	Outgoing
	Basic knowledge and professional knowledge	Information creation	Multiple thinking	psychology of seeking new, psychology of seeking knowledge, psychology of close pursuing and psychology	Rational
	Traditional knowledge and modern knowledge	information collaboration and information immune	Difference thinking	Psychology of selecting	Sentimental
The external factors	The information-based teaching environment	Teachers	Teaching methods	Others	
	Excellent network course	Timely feedback	lecture-type	Companion relationship	
	Teaching website	Channels of answering questions	Problem-exploration method	Learning atmosphere	
	Digital library	Evaluation method	Practical method	.....	
	Multi-media classroom	.....	.....		
	.....				

## 2) The external factors

Among the influential factors of learners' information demands as shown in Table I, the Information-based teaching environment is the primary factor, in which includes the soft and hardware like the information-based teaching environment, excellent network course, teaching website, digital library, and multi-media classroom, etc. Then, the learners are enlightened and instructed by the teachers in the heuristic learning, so the teacher is another external factor that affects the learner's information demands. Teachers' timely feedbacks to the learners' questions can effectively promote the learners' initiative information demands, so the teachers should offer multiple channels to answer questions like answering questions in the class, in BBS, and according to IM etc. to increase the learners' interest of initiative learning. The same, the evaluation method of the teacher is also an important external factor influencing the learners' information demands, thus the teachers' evaluation to the learners' course study can be made synthetically from the levels of knowledge, ability and emotion. Last, Heuristic teaching is

a teaching principle or education thought rather than a specific teaching method, so the teaching methods used in the heuristic teaching also affect the learners' information demands. Of course, external causes like learning atmosphere and companion relationship are the influencing factors too.

## B. Analysis of learners' information demands from the perspective of System Dynamics

System Dynamics is created in 1956 by Professor Jay W. Forrester from Massachusetts Institute of Technology. It mainly researches the dynamical features of the system behaviors changing over time. The understanding of the issues in this method is based on the close mutual dependence between internal mechanism and system behavior, and gradually discovers the cause and effect of generating changes in morphology. Therefore, this method can study the complex systems issues qualitatively and quantitatively, such as certain socio-economic issues. The paper introduces this method and qualitatively and quantitatively studies various factors affecting the learners'

information demands as shown in Table1, and then forms the system flow chart of learners' information demands

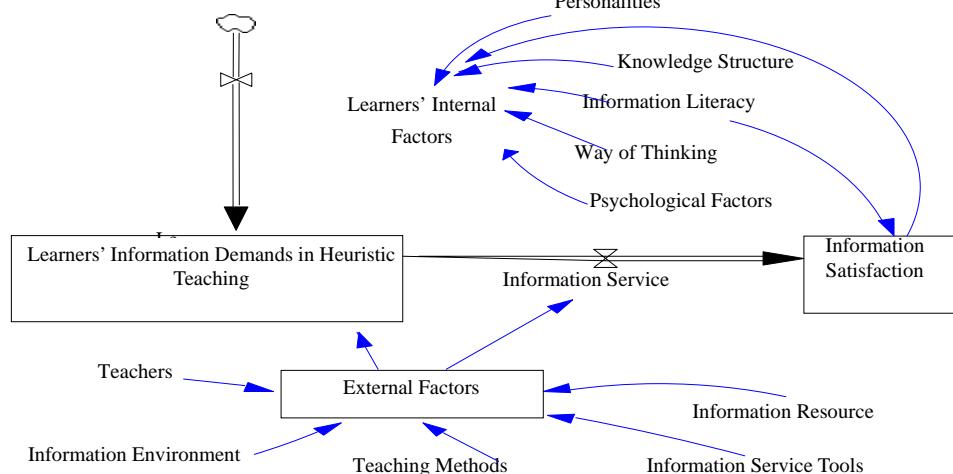


Figure 1.The system flow chart of learners' information demands dynamic models

### III. COUNTERMEASURES TO SATISFY LEARNERS' INFORMATION DEMANDS AND IMPROVE TEACHING QUALITY

#### A. Establish a hierarchical model of learners' information demands in the heuristic teaching

The above survey about learners' information demands in the heuristic teaching shows that the heuristic teaching needs to attract the active participation of the learners. But the learners commonly have the feeling of "should learn but fear of it" and feel that learning is a hard and tiring thing. The result turns to be that the heuristic teaching usually needs to be pushed by the teachers rather than the long-term and initiative behavior of the learners. This would be contrary to the original purpose of the heuristic teaching, namely go against the goal of improving the learners' initiative, enthusiasm and cultivate their innovation ability with heuristic teaching.

Superficially, the problems above are caused by the learners' lacking of initiative-learning awareness. But research deeply, then the key problem which hinders learners' independent study is that teachers cannot provide effective real-time knowledge service. And this requires the innovation in the methods of heuristic teaching. With the wide use of information technology in the learning process, the teachers can complete the teaching with the help of the computer, such as initiatively sending some learning content coordinated with the course schedule. The computer cannot replace the teacher completely, but it can release some of the teacher's burdens to let the teacher guides the students better and assist in the carrying out of learning activities of heuristic teaching.

#### B. Knowledge and information guide based on the hierarchical model of learners' information demands

It can be learned from the above phenomenon and analysis of the learners' information demands that although

dynamic models, as shown in Figure1.

the knowledge spreads rapidly currently, the learners' information demand satisfaction is not high; and most of the learners are still in a fuzzy state about their information demands, let alone systematically organize and obtain useful information demands. How to satisfy the information demands' diversification of compositeness, timeliness, pertinence, universality, comprehensiveness and information demands methods is the issue this papers needs to research deeply and put into practical use. I think we can tap the potential of the learner's information demands according to the learner's personality and dynamic information, combining with the expert system to determine the useful information demands to make it manifest. Subsequently provide appropriate information to meet the learner in order to stimulate his/her divergent thinking, and make the learner's cognitive structure develop towards a more favorable direction.

In the heuristic teaching, it can make the teacher and the learner master the information demands of different levels more clearly according to the established hierarchical model of learners' information demands, and it's in favor of strengthening the knowledge and information guidance to the learners. Take an example, for the basic knowledge like basic concepts, basic principles from the curricular, the teachers can use the questioning method and discussing method to guide the learners to master them; for the theories, the teachers can use the discovery method to build the environment and scenarios for the learners to discover knowledge; for knowledge in practical application, the teachers can use the practice method to provide related practice information like the company's information for practice, the practice process and the information about the skills required in the practice etc.

### *C. Strengthen the personalized learning support services of knowledge and information*

In the heuristic teaching, the learners' information demands have both dominant ones and recessive ones. The dominant ones can be satisfied more easily by the means of the teachers and the Internet; the recessive ones are to be tapped according to other information like every learner's personality information and dynamic information etc. and then make it manifest to be satisfied.

At the same time, the learners' information demands are in all directions, multi-leveled and periodical. How to satisfy the learners' proper information demands in the proper time; how to satisfy different learners' information demands in the same period; how to provide the latest information according to the learners' information demands; how to quickly satisfy the learners' real-time information demands, the solutions to all these problems rely on the support of the Internet, that is to strengthen the personalized learning support services of knowledge and information. Actively push learning support system is such a support service that can provide individualized curriculum learning materials for learners, and help to support the information demands of learners in the heuristic teaching.

All in all, in the heuristic teaching, in order to rapidly satisfy the learners' information demands, it not only needs the teachers to strengthen the knowledge and information guide, but also needs to provide personalized learning support services. Put the advanced ideas and strategies to practical use in the service of learners' information demands;

dig the active function of both the dominant knowledge and the recessive knowledge; achieve better heuristic teaching by satisfying the learners' information demands.

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