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Design Research about Fragment Mobile Learning Resources Based on Interactive Concept Map Approach

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Abstract: The quality of mobile learning resources directly affects the efficiency of mobile learning, this paper applies interactive concept map theory to design fragment mobile learning resources. The effectiveness of design theory of fragment mobile learning resources based on concept map is verified by using empirical research. Experimental results show that the fragment mobile learning resources based on interactive concept map is more efficient comparing with the traditional learning resources.

Keywords: Concept map, Mobile learning, Fragment learning resources

1. Introduction

With the rapid development of mobile computing technology and wireless network technology, mobile learning has become a hotspot in educational technology research. The mobile Learning is a way for learning that happens at any time, any place through the mobile computing devices. The design of the mobile learning resources needs to combine the principles and characteristics of the mobile learning in order to meet the demands that mobile learners can learn anytime, anywhere with the 'mobile' mode and the fragmentation of learning time. So, how to transform the systematic knowledge into the mobile learning resources, and how to learn with the fragmentary time will become the focus of researchers.

This paper applies concept map theory to fragment mobile learning resources design, and aims at designing learning resources which meet the characteristics of mobile learning context and learning time fragmentary characteristics. Through questionnaires and empirical research, the effectiveness of concept-mapping-based fragment mobile learning resources design is verified .

2. Design theory of mobile learning resources based on interactive concept map

This paper uses interactive concept mapping theory to split systematic knowledge into several fragment resources in accordance with the knowledge point, which is divided into small pieces of useful information. Target knowledge point will divide into several sub-knowledge points through concept map, and each sub-knowledge point corresponds to a fragments theme for fragmentary knowledge units learning. The fragment resources present a loose knowledge logic relationship, and with modular feature, it is a relatively complete learning topic of fragments, the logic relationship of sub-knowledge point cannot be too closely but still reflects some degree of knowledge associated. Learners can easily, quickly and effectively retrieve the required learning resources, in order to provide a guarantee about achieving interaction and sharing of high quality mobile learning resources, the design framework of fragment mobile resources is shown in Figure 1.

Mobile learners to choose the most appropriate resources during learning, and they can also interact and communicate with other learners online in the learning process, and evaluation and feedback on this fragment resources, eventually integrated into the optimal fragments resources, and added to the mobile learning resource library. Therefore, in the concept-mapping-based fragments mobile learning resources design, the content of mobile learning resource is not fixed but ongoing optimization and improvement according to the learners' feedback and evaluation.

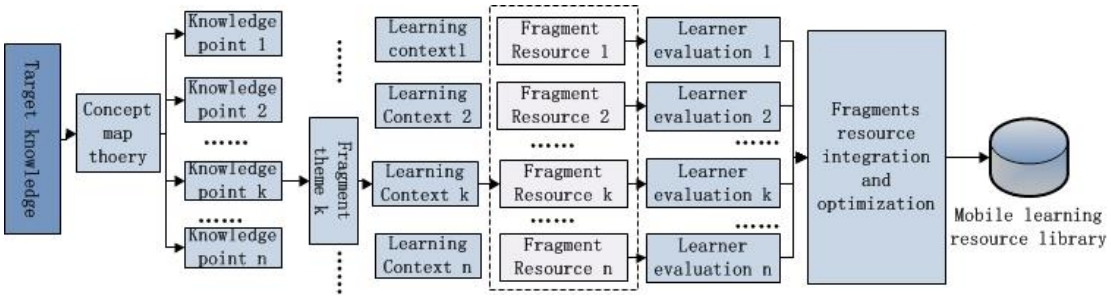

Figure 1. Design Framework of Fragments Mobile Learning Resources Based on Concept Map

3. Experimental Design and Data Analysis

This paper selects a secondary vocational schools in Zhejiang Province as an experimental unit of study on the effectiveness, while select 40 students who major in garment specialty as sample (18 boys and 22 girls) for 4 weeks. They use the same smartphones as the mobile learning device and use adaptive mobile learning system based on episodic resource which installed on the mobile terminal device to carry out learning. Examination papers a perfect score is 100 points, 50 choice questions and 50 cent blanks, and the 40 interns of the experimental group and the control group must be required to participate. Through the analysis of experimental data, we could evaluate the learning effectiveness of learners, and then investigate 40 learners' level of "clothing sales" knowledge.

Table 1 shows the knowledge and capabilities of experimental group and control group in clothing sales both have been improved through internships. However, the correlation coefficient of the experimental group which learn fragment mobile learning resources was 0.191(>0.065), greater than the control group. It can clearly be seen, using fragment mobile learning resources for learning have a greater impact on the learning achievements.

Table 1. Paired-sample t-test about test score before and after the experiment

	N	Resource Type	Pre-test	Post-test	Std. Deviation	correlation
Control group	20	Traditional resources	63.75	70.60	0.483	0.065
Experimental group	20	Fragments resources	61.95	91.10	0.514	0.191

For the experimental group and the control group post test score conduct an independent samples T-test,the result as is shown in Table 2, we found that the use of fragments mobile learning resources does improve learners' academic performance, and the difference was significant (p=0.021< 0.05).

Table 2. Independent-sample t-test about test score before and after the internship

		Levene's Test for squality of Variances		T-test for Equality of Means						
									95% confidence Interval of the difference	
		F	Sig	t	df	Sig.(2-tailed)	Mean differen ce	std.Error differen ce	lower	upper
Post score	Equal variance assumed	5.759	.021	-54.694	38	.000	-25.500	.466	-26.444	-24.556
	Equal variance not assumed			-54.694	32.216	.000	-25.500	.466	-26.449	-24.551

Fragment mobile learning resources require short learning time, and have fuzzy logical relationship with other fragment resources. Learners do not need to recall and review other relative knowledge points before learning. Learners are more willing to learn fragment learning resources in the fragmentary time, and the learning efficiency is better, and the understanding level of knowledge points

are also more profound. To some extent, the fragment mobile learning resources, have more learning values.

4. Discussion

In this paper, according to the mobility and the fragmentation of the mobile learning, using the concept map theory to carry out the design work of fragments mobile learning resource, thereby, satisfies the internal demand of mobile learners. An empirical study about 'clothing sales' for learning purpose is carried to analyze the impact of learning effectiveness between the traditional learning resources and fragments learning resources.

The analysis result of the "clothing sales " practice shows that the fragment learning resources was more in line with the mobility features of practice activities, suitable for learning sub-knowledge point in a short time. Mobile learners in "clothing sales "experiment process will be subjected to interference from many factors, which lead to their lack of fixed, quiet study time. So the bantam feature of fragment mobile learning resources is welcomed by learners. During learning process, the learners only need to focus on the little sub-knowledge point module in a short time, feedback and evaluate the resources. In the traditional learning, there are a lot of lengthy learning resources, in addition, learners are susceptible to external interference, so they always forget their own learning process easily. Besides, the traditional learning resources was a whole complete systematic knowledge which imply a strong internal logic, so it requires for learners' highly concentrated attention to complete the entire resource of learning, otherwise it will cause forget, while it is impossible to provide a long and undisturbed learning time. The fragments mobile learning resources overcome the drawbacks of the traditional learning resources, it divides the complete systematic knowledge points into the weak logical fragment resource, the learning time of each fragment resource is not more than 5 minutes, so that the learners can learning anytime, anywhere in the fragmentary time.

5. Conclusions and future work

This paper apply the theory of the concept map into the design of fragment mobile learning resources, which improves the learning effectiveness and practical operating capacity of learns. In the future, the design of fragment mobile learning resources should be based on validation studies, and need pay more attention in the way of resources build. For learners, it will motivate learners' learning interest and learning initiative and improve students ' learning effectiveness. This will be the future research content.

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