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Research Article

The Application of Multi-modal Food Industry Teaching Mode to Mobile Learning under Cloud Environment

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Abstract: Applying multi-modal food industry teaching mode to mobile learning, enriching the food industry teaching content and food industry teaching methods can play a key role in reforming food industry teaching. In this study, it takes the definition of multi-food industry teaching model under cloud environment as the breakthrough point, with the interpretation of the connotation of mobile learning, discussing the implementation of multi-modal food industry teaching model in mobile learning.

Keywords: Cloud environment, food industry, multi-modal

INTRODUCTION

Modal refers to the interactive way that human beings interact through the senses with the external environment (such as people, machines, objects, animals, etc.) (Jin *et al*., 2012). Commonly it referred to the following five modes namely, seeing, listening, touching, smelling, tasting. Multi-mode refers to the following aspects including vision, auditory, posture, space (Table 1) and other various semiotic resources that can be used to construct the meaning (Pan and Shang, 2012). Multi-modal discourse is a kind of communication phenomenon by means of language, image, sound, movement and other means and symbolic resources. Students can conduct a comprehensive study through various sensory comprehensive ability training. Therefore, during the food industry teaching process, teachers should properly use multi-modal food industry teaching mode, trying to fully mobilize the initiative of students, so as to stimulate students interest in learning and effectively improve students' learning efficiency (Li *et al*., 2013).

With the rapid development of mobile Internet, mobile learning begins to rise increasingly, the portability of mobile devices can make the learners choose their own learning environment (Bateman, 2008; Godhamgaonkar *et al*., 2013); the fast interactive feature of mobile devices can make learners easily interact with the outside world, so as to eliminate the obstacles during the process of learning and improve learning efficiency as well (Pankaj and Basak, 2013; Vineet and Manish, 2013). The separation of teachers and students in mobile learning can make the learners stay in a dominant position, who also can stand complete the task of learning by themselves (Shih and Mills, 2007).

Table 1: Diagram of composing multi-modal elements

	Name of component	Examples
Multi-modal elements	Language components	Vocabulary, modality
	Visual component	Color, background, vector
	Auditory components	Voice, music
	Attitude components	Action, feel, physical control
	Space components	Ecological space, geometric space

MATERIALS AND METHODS

Learning that is based on cloud environment (such as micro-class, mobile terminals, video communication and other social learning communication software), is the existence of the common problems during the process of teachers' food industry teaching and students' learning, which can take a variety of forms of organization to have interaction, discussion and experience sharing, so as to achieve solving the network practical problems. The specific learning mode can be shown in Fig. 1.

With the development of multimedia technology, the food industry teaching mode of teachers has undergone a lot of changes, in addition to language food industry teaching, writing on the blackboard and other traditional food industry teaching methods, more and more modern multimedia tools are used during the process of food industry teaching. For example, a variety of modes of audio and video, are used in the food industry teaching process. At the same time, between the various media such as audio and video resources modal, they can have interaction for each other, which can play a key role in the auditory mode and promote the students to understand knowledge better. For example, PPT course-ware can highlight the focus food industry teaching problem, which can make knowledge more intuitive and clearer. In some degree, it is the effective supplement to the textbook; on the

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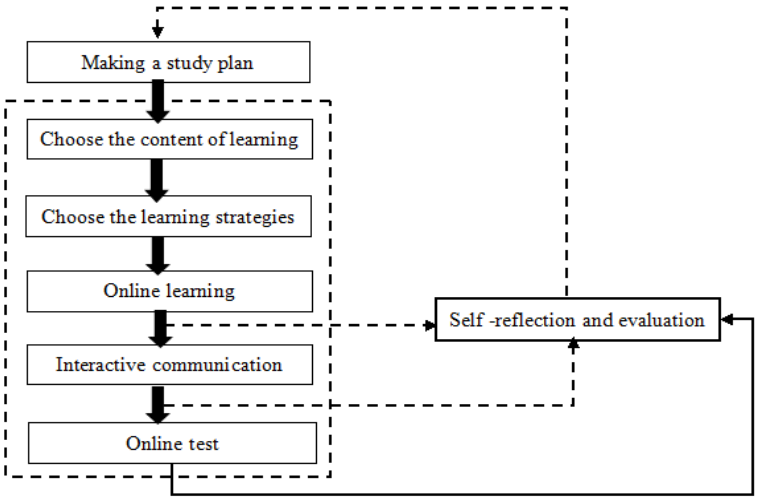

Fig. 1: Learner's autonomous learning model under mobile cloud environment

other hand, the teacher's explanation with sound video voice can strengthen and stimulate the students' sense of hearing, while cooperative learning can improve the student's learning efficiency. At the same time, mutual cooperation, text color contrast pattern can reflect the interaction of various visual symbols, which is no longer a single text symbols.

The meaning of mobile learning: Mobile learning refers to a new learning form through using wireless mobile communication network technology and wireless communication devices to access to educational information, education resources and accept education services. Its goal is to hope the learners can study at any time and any place in any way they want. Mobile learning is combined with traditional food industry teaching, which can assist traditional food industry teaching. The appearance of mobile learning can make learning more flexible and efficient, learners are not limited by time and space, who can learn whenever and wherever possible. Mobile learning is a kind of learning in the form of mobile way. The elements such as learners, learning resources and learning environment are all mobile, learners can choose different learning contents in different way for different purposes whenever and wherever possible; as for mobile learning, its content is interactive, namely the interaction between human-and computer as well as the interaction between people and people; mobile learning adopts the digital learning model, so as to distinguish the traditional learning mode.

Multi-modal network model: In Multi-modal network, the vertices represent events, directed edges represent tasks, the weights on the edge represent the duration of the task. The node without predecessor node was called the entrance node and the node without the successor node was called the exit node. There are multiple entrance (exit) nodes in some task graph and they can be connected to an entrance (exit) node by the edge with the weights of 0. The directed edges described the sequence between the tasks. The node cannot be executed before receiving the message from the successor nodes and a return message from the predecessor nodes.

To define the Multi-modal network model by the undirected graph G = (V, E, W), in which V can be presented as a set of vertices, E can be presented as the edge of graph, W can be presented as the weighting set, namely the network distance that related to the edge. For any v∈V, v refers to the road-intersection in the network or the boundary point of network graph. The edge (v, v') ∈ E refers to the Multi-modal in the network and the weight w ∈ W refers to the length of a road, namely $|(v, v')|$, due to the undirected graph, the distance of the Multi-modal is a two-way, that is to say $|v, v'| = |v', v|$.

Resource object descriptive modeling: When define the space object set P, it is always on the edge E of the Multi-modal graph G for any p∈P. P was defined as a 3-tuple (p.l, p.d, p.a), respectively indicating the location of resources, description text and capability information. The size of the space object set was represented with $|P|$. For the distance from object p to the two end points, it can be represented with $|p, v|$ and $|p, v'|$ respectively, where v and v' is the two end points on the edge of (v, v') where object P are located. In the Multi-modal network graph G, the distance between object p and p' was represented with $\|p, p'\|$. Meanwhile, in the set of edges E, (v, v') and (v', v) is the same and the distance of $|p, v|$ equals $|v, v'| - |p, v'|$. Therefore, the distance from P to another endpoint can be achieved once you know the distance from P to the endpoint.

We assume that the data mining workflow has a total of 15 tasks, 10 data sets, 5 data centers, the dependence relationship between tasks and the call relations between data and tasks, as shown in Fig. 2.

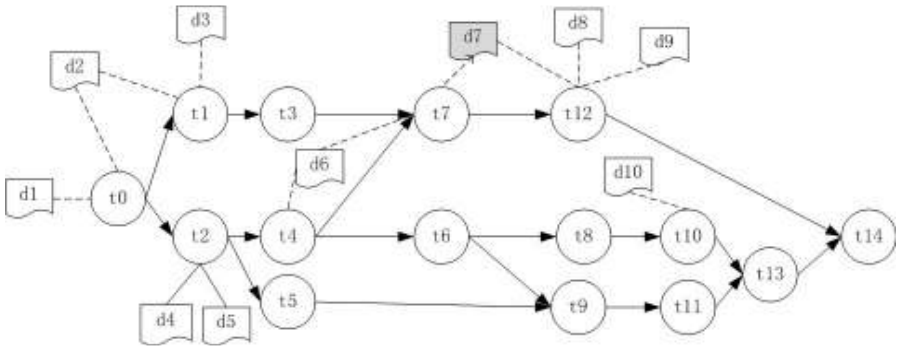

Fig. 2: Data mining workflow

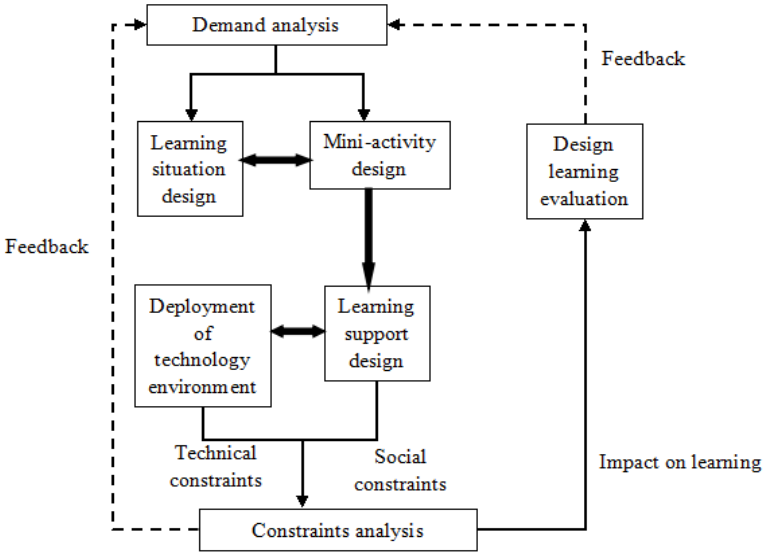

Fig. 3: Designing model for mobile learning activity

RESULTS AND DISCUSSION

The designing process of mobile learning should be through the ideas and methods of food industry teaching design, which also should play the advantages of mobile technology, pay more attention to the mobile learning experience of learners. It is a complex problem to deal with people, technology and education, which is repeatedly intertwined problem during the period of the designing process. Based on the above consideration, it can construct the designing model for mobile learning activity, which can be shown in Fig. 3.

Needs analysis is the first step to design mobile learning activity, which purpose is to determine whether to carry out specific tasks needed in the form of mobile learning or not. After the requirement analysis, design learning activities and mini-activity. The scenes of mobile learning can be including background, users, goals, events, activities and some other factors. It is not right to classify mobile learning scenes from a single dimension. Mini-activity can consist of one or more sub-activities, in order to improve the learners' knowledge and skills. Completing the design of mini-learning activities, trying to give the corresponding learning scenes, then it can officially enter the stage that can provide the necessary technical support and service for learning. When it can provide a kind of technical environment, at the same time, it must consider how to provide support services during the process of the building model. Constraint analysis then is followed after environmental design and supporting services, which can be combined with the characteristics of mobile learning and put its focus on the analysis of the social constraints and technological constraints during the practical designing process. As for social constraints, they mainly refer to the obstacles that can affect the interaction and collaboration; as for technical constraints, they mainly refer to the lack of technical support system and tools necessary, or lack of skills. Finally, the analysis of constraints can affect the learning effect, which can affect the evaluation of learning. The continuous feedback between learning evaluation and constraints analysis can refine and improve the previous demand analysis during the whole process of designing.

CONCLUSION

Mobile cloud computing can help schools to build their own private cloud, which can integrate the learning resources of the schools, so as to provide cloud services for students and teachers whose major are food industry as much as possible, trying to improve the utilization rate of resources and reduce the cost at the same time. Cloud computing scalability can make private cloud realize interoperability among the schools, so as to achieve a wide range of resource sharing. It can play an active role in solving the current problems during the process of education informatization. With the continuous development of mobile Internet, mobile information technology has been got a lot of concerns from different areas with lots of successful cases. Education informatization is a kind of mobile information technology, which will be the trend of development in the future. Mobile learning and autonomous learning will be an important part of learning in the future. The application of mobile cloud computing has huge space in the field of education.

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