An Analysis Report of Mobile-learning Researches in Last Five Years

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Abstract: Electronic devices are develops a lot in recent years; mobile-learning which can be used in multi-environment is accepted by more educational experts. 1891 articles related to 'mobile-learning are founded in CNKI database; This report will use quantitative content analysis research method, focusing on 203 articles published at six significant journals, which are 'Open Education Research', 'Modern Educational Technology', 'Modern Distance Education', 'Distance Education Journal', 'China Educational Technology' and 'Distance Education in China', and then prospects the development of mobile-learning in the future. This report is used as literature review which is one part of final achievements of the research project called 'Research on learning achievements of mobile learning under data mining'.

Keywords: Mobile-learning; Quantitative Content analysis research method; Research objective; Research method

1. Introduction

In the 21st century, the conception of Mobile-learning is introduced to China, which not only brings new learning experiences to learners, but also makes a challenge to traditional mode of tutoring in teaching. From the perspective of academy, the category and contents of Mobile-learning mainly include three aspects as follows: Firstly, confine Mobile-learning as an assistant measure, integrating these fragment of time by mobile device, the purpose is to maximize learner's learning effect; Secondly, Mobile-learning emphasizes the positive correlation between space mobility and study needs; Thirdly, Mobile-learning is in conformity with the relationship of cognitive process and context. The main point is that you can learn anywhere and anytime. Combining domestic and foreign researches, the author suggests that Mobile-learning is a brand new learning experience that can satisfy our pursuit of knowledge through using pieces of time with mobile devices and internet technology. Mobile-learning attracted widespread attention since December 2011 when Department of Higher Education made a notice of establishing a project of "Mobile Education". In order to review the development of domestic Mobile-learning, the author will try to explore research status and development tendency of domestic Mobile-learning according to domestic papers indexed in CNKI.

2. Information Sources and Research Methods

This paper collects titles and abstracts of papers about Mobile-learning research, analyzes Mobile-learning research methods systematically, and also the tendency of Mobile-learning research, which means to enhance Mobile-learning research in domestic teaching technology.

1.1. Information Source

Using "Mobile-learning" as a key word, there are 203 papers can be found from 2010 to October 2014 through ChinaInfo. These papers separately published in six influential journal including Modern Educational Technology, Chinese Audio-visual Education, Distance Education in China, Open Education Research, Distance Education Journal and Modern Distance Education.

1.2. Research Methods

In order to make a comprehensive analysis on the research status and tendency in recent years, the author uses a special method in the research of education technology which is content analysis method. Content Analysis is an objective and quantitative analysis method, which is widely used in variety of research. This method is very remarkable because it is obvious, objective, systematic and quantitative in nature.

Reeves TC classifies educational technology research with two separate aspects: research objectives and research methods. Therefore, based on Reeves TC's Classification framework (As shown in table 1), the author analyzes all the 203 papers related to Mobile-learning from ChinaInfo, with using content analysis method.

Table 1. Classification framework of educational technology research in Reeves TC

Object Classification	Introduction of The Object	Method Classification	Introduction of The Method
Theoretical Research	Emphasize logic analysis and explicate phenomenon	Qualitative Research	Contains qualitative data

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			collection by using developed theory like case study, journals, interviews etc.
Experimental Research	Judge how education works by verifying Communication assumptions, Learning Theory, Performance Theory and other relative technologies.	Quantitative Research	Statistic analysis, experimental, quasi-experimental, and other relative methods etc.
Explanatory Research	Describe how education works by explaining phenomenon that is relative to human communications, performance and technology applications.	Critical Research	'Textual' deconstruction and spread technology by searching binary opposition, potential procession, deprive minorities' rights.
Post-modern Research	Assumptions about human communication, technology application of learning and performance, in order to verify potential process and enhancing minorities' rights.	Literature Analysis	Mainly contains other integration and analysis. For example, frequencies and meta-analysis.
Development Research	Invent new approaches with advanced theory and technology, in order to improve communication, study effects and performance.	Mixed method	Usually combines Qualitative Research and Quantitative Research.
Evaluation Research	Emphasis specific programs, productions or methods. Normally used in certain situation, as to describe, enhance or evaluate its validity and value.		

2. Development History and Research Status Analysis of Mobile-learning in China

2.1. Development History of Domestic Mobile-learning

The conception of "Mobile-learning" was firstly introduced in China by Professor Keegan in 2000. "Mobile-learning" is represented as the "Future of Education". In December 2001, Ministry of Higher education made a notice of establishing a project of "Mobile-learning" theory study, this project was widely concerned in China. In May 2002, Peking University launched a project of campus wireless network. Afterwards, this kind of network quickly spread on other campus. Peking University set up the first place of wireless local area network in August 2003.In the following year September, Intel Corporation together with Chinese Education Research Net schemed a plan, which was predicted to promote mobile technology and wireless technology applied in 100 top universities in China. Wireless Summit Forum was held in September 2005, Peking University, Hong Kong University and Taiwan University shared their thoughts about schoolyard wireless network; those three universities ideas were very representative and progressive at that time. Afterwards, the first website of Mobile-learning named http://www.mlearning.rg.cn was founded in 2006. In May 2007, Nokia released first interactive online platform Mobiledu. In June 2008, the first book about Mobile-learning written by Professor Huang Ronghuai was published, named 'Mobile-learning: Theory, status, Trendency'. One month later, Xiamen branch of China mobile and Xiamen Institute of Software Technology set up the first 3G Campus network in China. The first forum of china mobile education industry was convened in2009. Therefore, all above shows that Mobile-learning have made a great progress in the past ten years.

2.2. Research Status of Mobile-learning

The author analyzed 203 the papers relative to "Mobile-learning". These papers mainly come from Modern Educational Technology (59), Chinese Audio-visual Education (55), Distance Education in China (41), these above take up to 76% in total (Figure 1).The quantity is largely increased in recent years, and reached peak at 47 in 2013 especially. It indicates that Mobile-learning attracts more and more attention now.
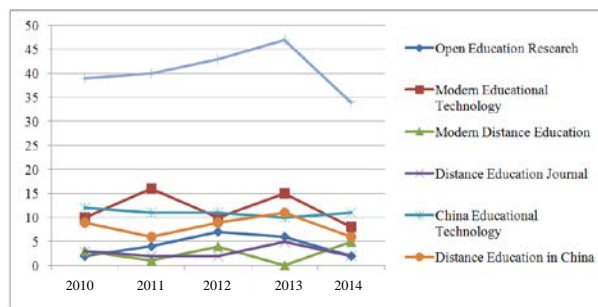

Figure 1. Analysis of domestic education technology in six leading publications

Referring to the Reeves TC's framework, the author also classifies 203 papers with two aspects (see Figure 2): theoretical research and development research, although these two researches have appears turning-point in 2012, both of them grow rapidly comparing to other research forms. Besides, evaluation research, empirical research, explanatory research are general stable. There is no post-modernity research founded until now.

The line graph (Figure 2) shows that Qualitative research would be definitely most popular among all the research methods, but it might gradually decreases in the next few years; Secondly, people paid more attention to Qualitative research, although it is not much by now, it will be worldwide trend in the future. Literature research and

mixed research methods are not broadly used so far, might only applied as literature reviews. Critical research can hardly find in those papers till now.
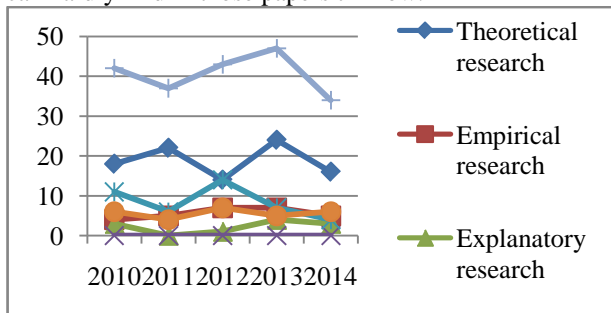

Figure 2. Classification of research Objects and Research Method from 2010 to 2014
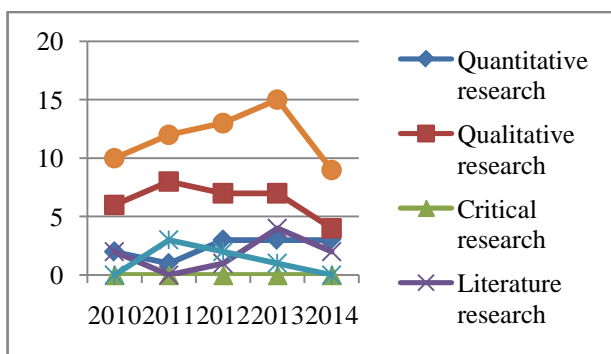

Figure 3. Research method

It can be concluded as follows (from Figure 3): First of all, theoretical research (46.31%) and development research (20.69%) account for 67% in total; What's more, the number of evaluation research and empirical research are roughly the same; At last, the same as critical research, there is no post-modernity research embodied in database up to now. Since 2001, the concept of 'Mobile-learning' has been gradually changed, and it has moved to the next stage which is empirical process, because it is closely related to the education development particularly distance education. In addition, 'Mobile-learning' is considered as a life-long learning, meanwhile, mobile devices rapidly spread all over the world either in working or study. In this respect, they do provide teaching with possibility and convenience. Otherwise, how to design and develop those massive learning modes and learning resources becomes new focus in high-speed net work environment nowadays.

Although qualitative research is absolutely the most popular research method, the proportion of the quantitative research and literature research are also considerable, representing 13.30% and 4.43% separately. Unfortunately, critical research can hardly found so far. Overall, statistics of "Mobile-learning" are rarely limited, however, if we look forward in the future, wireless communication technique is becoming mature, and cost of mobile-

learning devices is tend to be decreasing, more and more people would pay more attention to. The Research method classify of 'Mobile-learning' is shown as Figure 5.
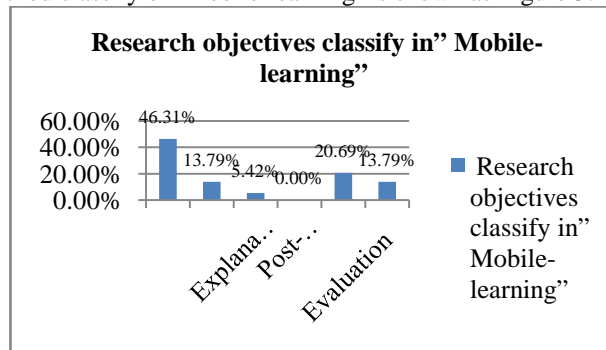

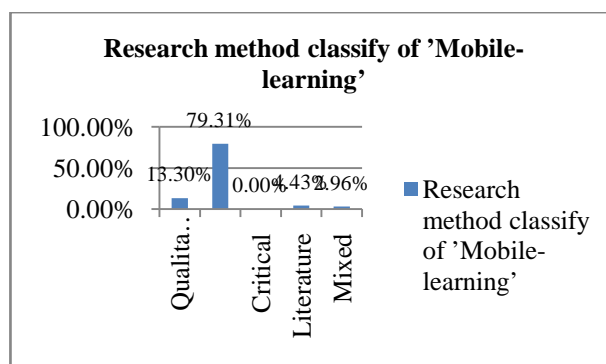**Figure 4. Research objectives classify in" Mobile-learning"**

Figure 5. Research method classify of 'Mobile-learning'

3. Development Tendency of Domestic Mobile-learning

In China, along with lifelong education system has been building up, learners are prefer to study with an easier and more interesting way, The author can draw a conclusion from 203 papers' analysis. On the one hand, from the perspective of research objective, theoretical research is decreasing gradually. On the other hand, qualitative research is still a principal research method, but quantitative research and mixed research are playing a more and more important role in academic field.

According to the research objectives, mobile-learning research might be likely to develop into opportunities and application direction. Theoretical research is still thought as majority method of Mobile-learning. As for 94 theoretical articles, which mainly consisted of literature analysis, learning resource innovation and Mobile-learning environment; While, development research cares more about technical support and the construction of resource. The target is to establish feasible learning platform by using mobile devices, the price of these devices are more reasonable and competitive, which include smart phones, tablet computer, laptop and so on. Above all, it just cor-

roborates the developing thread of domestic Mobile-learning.

The research indicates that learners are more interested in getting information via mobile and other web resources to provide them with teaching services. Mobile-learning still has great potential in primary education in China. Besides, Mobile-learning is generally composed of several elements, such as teachers, information resources, terminal devices and techniques, learners and learning environment etc. Therefore, it is necessary to concern the relationship among all elements and their characteristics of themselves respectively. For example, comparing to traditional education system, the form of mobile learning is lack of emotional communication to some extent, because it largely depended on the devices own limitation and compatibility. Furthermore, although mobile learning is highly independent learning mode, only rely on learners are hardly insure their thinking activities stay lasting and intensive. Thirdly, how to display the information resource may also influence learning activities, which may result in misunderstanding of knowledge. As far as we know, the research is staying in the beginning stage, neither research range or research depth is needed to be improved. At present, it only limited in certain subject or major. By the end, as a very new learning mode, it is still need to be discussed its key points, whether it is used for students to check subject content, or to search the study guide, examination nation and homework of course, even just as a communication tool to associate with teachers and students. In brief, although we would pay more attention on development and design of Mobile-learning, a more significant thing is how can Mobile-learning to serve education itself well.

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