The Teaching Resource Development Analysis of Micro Learning Resource and MOOC in Information Teaching

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Abstract
Based on the reality of the informatization development constructed by the higher education, this paper uses the structural characteristics of MOOC and Micro Learning Resource, and combines the practice results of MOOC and Micro Learning Resource in the classroom teaching to summarize the effect and the degree it can have on the higher education informatization construction. In the empirical analysis, 58 undergraduates from different majors of W University in Guangxi province are selected to take part in the campus English writing course in the spring of 2016, while through the form of MOOC and Micro Learning Resource in the course writing instruction and assessment results are done. The analysis results show that the teaching resource development of MOOC and Micro Learning Resource in informationized teaching is very effective, and the new information technology has obvious advantages in teaching.

Keywords: Resource development; Informationized teaching; Spss; Reliability

1. INTRODUCTION
In 2008 professional experts at first proposed the concept of MOOC to make it spread rapidly around the world, especially in recent years with the most rapid development (Vernon, 2013). Well run MOOC platforms come one after another, and more and more excellent educational institutions and business organizations come to join MOOC development team, while the people through MOOC platform to learn become more and more. Since the concept of MOOC was firstly put forward in 2013, it has been widely recommended and applied in China. Because of its rich educational resources and simple form, it has been widely recognized by educational experts and learners (Yuan, 2014).

2. THEORETICAL RESEARCH AND ADVANTAGE ANALYSIS OF MOOC AND MICRO LEARNING RESOURCE
2.1. Concept of MOOC and Micro Learning Resource
MOOC is also “Massive Open Online Course”, and is a kind of online course development pattern that emerges in the last ten years. MOOC is based on the connectionism theory and the open education of network learning. These courses are the same as the traditional university courses to enable students to grow from beginners to senior talents in a gradual manner. The scope of the course not only covers a wide range of technological subjects such as mathematics, statistics, computer science, natural science and engineering, but also includes the social sciences and arts, and the vast majority of courses on MOOC platform are free. At present among universities in some countries MOOCs have realized cross-registration and credit inter-recognition for students, while MOOC was also considered of its introduction into graduate courses to improve the curriculum quality and teaching level.

Micro Learning Resource refers to the use of information technology in accordance with the laws of cognition to show structured digital resources of the fragmented learning content, process and extension materials. The core component content of Micro Learning Resource is the teaching video of certain knowledge or certain teaching link, but also includes teaching design, material courseware, teaching reflection, practice test and student feedback, teacher comments and other auxiliary teaching resources related to the theme of the courseware, which based on certain organization relations and presentation forms jointly create semi-structured and thematic resource unit application micro-environment. Therefore, Micro Learning Resource is not only different from teaching cases, teaching courseware, teaching design, teaching reflection and other teaching resources of the traditional single resource type, but also is a kind of new teaching resources inherited and developed based on it.
2.2. Research on the application of MOOC in the teaching resource development

In China, the government and the colleges have vigorously developed MOOC, which not only further promotes the joint building and sharing work of boutique resources in the field of higher education, promoting the construction of public service platform for national digital educational resources and the exploration of national education cloud service model, but also contributes to construct flexible personalized learning environment which can adapt to different learning needs of social groups, promoting the construction of informationized support service system for lifelong learning and learning society. MOOCs after several years of development have had a considerable degree of application, while figure 1 is the online teaching platform model for MOOC.

Through the data investigation, it can be found that MOOC in the application mainly reflects the seven advantages(Wang, 2013): (1) MOOC resources are easy to access and use, and as long as the learners have a terminal connected to the Internet, they can conveniently take the online learning, so the learning style has been widely recognized. (2) MOOC has broken the traditional education resource barriers, and the alliance of the top universities at home and abroad and active participation of commercial organizations make the construction and
application of MOOC platform achieve rapid development to realize the sharing of a large number of high-quality educational resources. (3) MOOC cost is low, while the vast majority is free, covering a wide range of subjects and people, with rich learning resources, which cannot only reduce the operation cost for universities, but also can save the expenses for the learners, so that more people can receive qualified higher education, and it also has certain reference significance for the solution of the education fairness problem. (4) MOOC promotes the occurrence of effective learning, and the key of MOOC resource design from presenting the content into the design of learning activities hands the control of learning to students, emphasizing more the dominant position of students and playing the role and value of peer coaching among students. (6) MOOC has broken the traditional mode of education, and provides possibilities for the implementation of the fragmentation learning, flipped classroom, mixed teaching, while the initiative and creativity of learners have been greatly developed, while the traditional education mode of "teacher centered and textbook centered" has been broken. (7) Teachers can easily get a large number of high-quality teaching resources on MOOC platform, which provides spaces and opportunities for the second development and application of teaching resources.

2.3. The application and advantage analysis of Micro Learning Course in teaching resources
Since in 2011 in China the concept of Micro Learning Course was proposed for the first time, Micro Learning Course as a new form of educational information resources has been widely recognized by its "prominent theme, small contraction, good interaction, wide application" and other characteristics. The concept of Micro Learning Course spreads rapidly in the field of education, while related practice and applications transcend rapidly. Micro Learning Course greatly complements the deficiencies of the traditional classroom teaching, whose learning time and plan can be independently set, and the curriculum resources can also be chosen on one's own. Students can through Micro Learning Course carry out the learning preparation, review, to implement the autonomous learning. Micro Learning Course can not only be used for online teaching, hybrid teaching, distance learning, but also provides students with the resources of independent learning, so that students at any time can consolidate the knowledge of learning. The micro teaching model of Figure 2 is a kind of Micro Learning Course teaching model of teaching-resource inclusion type, and this model is a relatively complete and detailed Micro Learning Course model, and through the analysis on teaching objectives, learning objects, teaching content, teaching links, it can judge whether the teaching resources can be applied to classroom teaching, in which the teaching resources include electronic documents, electronic materials, the acoustic data and graphic information etc.. The advantages of Micro Learning Course platform reflected in the teaching-resource development mainly include the following aspects (Hu, 2011): (1) the theme is prominent, and the direction is clear. The teaching content of Micro Learning Course is more concise; the teaching subject is more prominent, and the teaching direction is more clear. Its design and production are around certain teaching theme. (2) Resources are diverse, and situations are true. Micro Learning Course has "integrated" the classroom teaching design, teaching materials and courseware, teaching reflection, students' feedback evaluation and teachers' interactive reviews and other resources, to create the "micro teaching resources environment" closely combined with specific teaching activities of the real situation. (3) "Small contraction" is easy to use. Micro Learning Course has the advantages of short time, small capacity, fine design and good application effect and flexible and convenient uses. (4) Semi structure is easy to expand. Micro Learning Course has a strong generative and dynamic nature, and its resource elements can be modified, expanded and generated, and can be continuously updated and enriched with the change of teaching requirements and application environment, for the dynamic updates.

3. THE RESEARCH STRATEGY OF MICRO-COURSE AND MOOC IN INFORMATION TEACHING RESOURCE EXPANSION

3.1. Analysis of information – based technology platforms
In the process of helping students to improve their English quality, English writing pays more attention to transforming students' English knowledge and skills obtained from the outside into a stable inner quality, and students’ initiative and personalized learning can promote internalization of students’ English knowledge and skills. As one of popular applications of mobile devices, WeChat can provide strong support for the development of mobile learning with rich features (Fan, 2015), which is good for students’ personalized self-learning.
The English writing course uses the mixed learning form of micro-course (online and offline) and MOOC based on the WeChat platform, and the support of WeChat platforms for the English writing teaching is manifested in three aspects: (1) the WeChat has a good educational platform function that is mainly embodied in the support of mobile learning, mixed learning, ubiquitous learning and fragmented learning. By publishing learning materials in the WeChat official accounts and sharing them through the Circle of Friends, group push and subscription push are realized. (2) WeChat has a good educational communication function, so we can send text, pictures, voice, video, and video chat for exchange and discussion between teachers and students. Also, group learning and collaborative learning are realized through group chat features, and the teaching resource sharing is also implemented in the WeChat platform. (3) WeChat has a good educational social function (friend adding and Circle of Friends) can facilitate friend adding and learning group establishment by teachers and students to realize release and sharing of learning resources and reflections and support teaching evaluation.

3.2. The application of large data and artificial intelligence in teaching

A strong support for language teaching practice can be provided by the study of large data and artificial intelligence, after which frequently wrong sentences of students in English writing can be found and summed up, which makes teaching research more in-depth but no longer stay in a large-quantity and low-quality level, and make teaching level more improved. The English writing correction platform based on the large data and artificial intelligence is able to improve the work efficiency and quality of teachers, facilitate teachers to quickly
check the students’ grammatical errors, spelling errors and phrase errors in compositions as well as provide amendment advice. At the same time, large data and artificial intelligence technology have played a positive role in students’ writing training.

3.3. Innovative teaching model

In the empirical study, the intelligent online service system (such as Correcting Net) is used in teaching of the English writing course of W university in Guangxi, which helps the teacher to improve the composition – correction efficiency, and helps the students to improve their English writing ability effectively. Correcting Net is an online system with the computer for automatic correction of English compositions, by which teachers can automatically scan a variety of parameters of compositions to make more accurate and objective judgment and comment, which is the same as doctors use CT machines. Through the comparative analysis of the student’s compositions and mass standard corpus, it can give scores and general comment for short compositions with less than 1000 words in 1.2 seconds. Especially, it can note spelling, grammar, vocabulary and phrase errors in each sentence, and give some suggestions one by one, so errors in the composition can be found clearly. Course teachers believe that specific feedback and suggestions are more important than writing scores, because they make the students know how to correct them.

3.4. Strengthening of scientific research

Second language and foreign language writing teachers stress that which ways will make teaching more effective. In terms of composition evaluation and correction, automation cannot bring a good teaching effect, but the education mode completely out of the science and technology automation is an obstacle of the teaching development. Only by the organic combination of teaching conditions, teaching system and teacher investment, the ecological direction of the college English writing teaching reform can be carried out well, so as to improve the teaching effect.

4. RESEARCH ON THE CASES OF MOOC AND MICRO LEARNING COURSE RESOURCE DEVELOPMENT

4.1. Data origin

One of the frontier problems in teaching is the important role of teaching information feedback and its profound influence. The expansion of teaching resources for the implementation of teaching work has great promoting role (Wang, 2014), and at present, apply MOOC and Micro Learning Resource to the teaching through the mobile learning platform to achieve that teaching resources unable for uses in conventional classroom can be applied and achieve good effect in teaching. Teaching mode under the informationized environment has important significance for the improvement of teaching quality and education level (Zhu, 2014). In this paper, we will carry out the investigation and data analysis on the influence produced by the teaching resource development of Micro Learning Resource and MOOC.

58 undergraduates from 3 different majors from W University in Guangxi Province, have taken part in the English writing course in the spring of 2016, and during the course have attempted to use the form of MCCO and Micro Learning Resource based on WeChat platform for the writing instruction to carry out the teaching activities through the resources development provided by the teaching platform, and have taken four times of English thesis writing trainings.

4.2. Data model

In mathematical statistics, the standard deviation is used to express the precision, and standard deviation is represented by $\delta$, with the expression

$$\delta = \sqrt{\frac{\sum_{i=1}^{N}(x_i - \mu)^2}{N}}$$

The above is used in the condition of applying large amounts of data (usually for the determination of more than 30 times), then the measured average value is close to the true value, expressed by $\mu$, and the numerators in the radical respectively represent the square sum of the deviation of measured data and $N$ is the frequency of measurement. Variance represents the average value of square sum of each deviation, expressed by $\delta^2$. We know that only when the number of measurements is infinite or at least 30 times, the average value is called the
true value. However, the usual measurement times is always limited, so the average value calculated in this way is not true value, then, according to the above formula to calculate the standard deviation will be unreasonable.

The average value is not equal to the true value, and the difference between the measured value and the average value is not equal to the difference between the measured value and the true value. In order to represent the precision of the limited number of times, use the symbol S replacing $\delta$, the calculation formula of standard deviation of the finite measurement times is:

$$S = \sqrt{\frac{\sum (x - \bar{x})^2}{N - 1}}$$

Use the average value $x$ instead of the true value $\mu$, and use $N-1$ instead of $N$. N-1 is called "degree of freedom" in mathematical statistics, which shows that there are only N-1 variables in N measurements. Degree of freedom can also be understood as the number of data available for comparison. For example, for the twice measures a and b, there is only one comparison between a and b, and for three times of measurements, it can have two kinds of comparisons (meaning the comparison between any two data and between the average value of these two data and the third data), and so on. There are N−1 measurements only able for comparison for N measurements. If there are several independent factors that affect the measurement results at the same time, the variances of the different sources are respectively $\delta_1^2$, $\delta_2^2$, ..., $\delta_n^2$, and according to the sum and rules of the variance, the total variance $\delta^2$ should be the sum of the variances:

$$\delta^2 = \delta_1^2 + \delta_2^2 + \cdots + \delta_n^2$$

The variance is used to detect the distance between the random variable and the mean in the statistics, describing the distance between the weight vector $W$ and all vectors of the user factor matrix $R$, defined as:

$$\chi^2 = \sum_{j=1}^{m} \sum_{i=1}^{n} (r_{ij} - w_j)^2 / n$$

Define closeness threshold $\tau$ for the operation of variance. If the variance value $\chi^2 > \tau$, it proves that $W$ and $R$ are close to make $W$ multiplied by a constant greater than 1, and amplify $W$, while in order to make $W$ not too large, usually choose constants between 1.05-1.1; repeat the operation in the above step until $\chi^2 \leq \tau$, it shows that each dimension vector of $W$ and $R$ is rather close, meaning $W$ meets the suitable threshold range, avoiding the invalid operation for the value being too large or too small.

The variance analysis is to decompose the total variance into the components of each variance, and then use the significance test to analyze and make the appropriate conclusion. The variance analysis includes: (1) single-factor variance analysis; (2) bi-factor variance analysis; (3) bi-factor variance analysis with repeated test; (4) tri-factor variance analysis. In this paper, the single-factor variance analysis is discussed.

4.3. SPSS analytic result

As to whether there is a certain basis for the investigation of Micro Learning Resource and MOOC in the informationized teaching resource development, whether the results of the investigation are real and effective, and whether the analysis results of the data are true or not, the reliability and validity of the survey concerns the quality of the survey. This paper uses SPSS13.0 software to deal with research and social survey result data to carry out Cronbach coefficient and split half reliability analysis on training results of 58 undergraduates from 3 majors from W University in Guangxi province in English writing courses to verify the effectiveness of the investigation results of Micro Learning Resource and MOOC for informationized teaching resource development. It is necessary to note that, for the objective and reasonable data analysis, all the data calculated by using SPSS software are all from the case study data.

Calculate ALPHA coefficients and Split-half coefficients of all the samples by SPSS software, which were used as the internal consistency reliability index and the split half reliability index of the survey data. The results of the data analysis are shown in table 1 and table 2.
<table>
<thead>
<tr>
<th>Composition topics</th>
<th>Batch number</th>
<th>Single length</th>
<th>Total No. of sentences</th>
<th>The error rate of 1000 words</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Characterization</td>
<td>12489</td>
<td>215</td>
<td>140</td>
<td>11.21‰</td>
</tr>
<tr>
<td>2. Environment description</td>
<td>14640</td>
<td>252</td>
<td>119</td>
<td>8.13‰</td>
</tr>
<tr>
<td>3. Film evaluation</td>
<td>11356</td>
<td>195</td>
<td>91</td>
<td>8.01‰</td>
</tr>
<tr>
<td>4. International situation</td>
<td>20662</td>
<td>356</td>
<td>124</td>
<td>6.00‰</td>
</tr>
<tr>
<td>Total</td>
<td>59147</td>
<td>255</td>
<td>474</td>
<td>8.34‰</td>
</tr>
</tbody>
</table>

The data in Table 1 can reflect the contents of 5 aspects: (1) writing training during four times gets the real and effective data of 59 thousand words to provide a large amount of data for the experiment; (2) under the support of MOOC and Micro Learning Resource teaching resources, students' single composition length continuously increases, meaning that students have made progress through training; (3) the mistake appearing in every thousand words in the composition shows a decreasing trend to further mean that the training effect is good; (4) the third composition is film evaluation, with writing words decreased, but error rate every thousand words also shows a downward trend; (5) through the analysis of intelligent online service system, students and teachers for themselves and the teaching have a better understanding and the combination of the teachers' artificial evaluation and analytic modification of big data not only innovates English learning modes, but what is more important it improves the quality of teaching and students' learning quality, in which the increases of writing length indicates that students' communicative ability increases, and the decrease of the error rate indicates that the accuracy of students' English writing increases.

<table>
<thead>
<tr>
<th>Subscale Name</th>
<th>Item No.</th>
<th>Cronbach(a coefficient)</th>
<th>Split half reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphic teaching materials</td>
<td>64</td>
<td>.6248</td>
<td>.5482</td>
</tr>
<tr>
<td>Audio text teaching materials</td>
<td>52</td>
<td>.5156</td>
<td>.4657</td>
</tr>
<tr>
<td>Video data</td>
<td>54</td>
<td>.3965</td>
<td>.3152</td>
</tr>
<tr>
<td>Latest network teaching method</td>
<td>47</td>
<td>.4823</td>
<td>.4069</td>
</tr>
</tbody>
</table>

The above table is the reliability test table of the informationized teaching resource development for the improvement of students' writing level, of which N is 80. Through the SPSS data analysis results it can be seen that the ideal reliability index is ideal, and at 0.1 level, a coefficient of some subscales reaches the minimum standard of 60, and it is not accurate enough only through the analysis of a coefficient standard, and further observation analyzes the reliability indexes of the report, while each coefficient level has little difference at 0.1 level, meaning that the evaluation on class teaching effect of teaching development resource of Micro Learning Resource and MOOC has high stability and reliability.

For the investigation of the reliability from the beginning of the dimension analysis, consider the relationship between the components and the total respective amount and the relationship between the random test items and components. Carry out the frequency statistics of the sample data to respectively calculate the average validity of the survey data 7.73, 7.52, 6.85. Apply three-factor analysis for variance analysis (5 scores qualified), and seen from the analysis of analytic values, teaching resource development in the informationized teaching of Micro Learning Resource and MOOC has high validity, and new informationized teaching resources has very obvious advantages in teaching.

5. CONCLUSION

The relationship between Micro Learning Resource, MOOC and teachings is mutually interactive On the one hand, they are the products of gradual informatization in higher education; on the other hand, they are also the booster for the gradual combination of higher education and information technology. At present, the advantages and functions of information technology are becoming more and more prominent, which has become an important part of information technology and modernization reform in colleges and universities. However, what we have to admit, there are teaching defects in MOOC and Micro Learning Resource, such as MOOC has high teaching quality, but has no hierarchy and in different schools among different students, it needs to be further improved to play a greater role; efficient mode of flipped classroom in college classroom teaching has
not yet formed; college teachers have insufficient teaching application of Micro Learning Resource, and it also is an extremely important work to arouse the enthusiasm of the teachers; Micro Learning Resource development and sharing still has a large space. This paper finally uses the SPSS software to analyze the reliability indexes of Micro Learning Resource and MOOC, which are rather ideal, and have high stability and reliability, but for how Micro Learning Resource and MOOC meet the needs of different people, it still needs further researches.

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REFERENCES

Fan Wenxiang, Ma Yan, Li Kai et al. (2015). “The research of the flipped classroom practice supported by WeChat under the mobile learning environment”, Open education research,(3),90-97.