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A Study on the Strategy of Vocational English Digital Teaching Materials Development in the Context of Internet+– Taking the Integrated Course of English as an Example

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Abstract. The advent of the age of intelligence has created a more urgent need for the digitisation of teaching materials in higher education institutions. The evaluation of English digital teaching materials is an extremely important and special window for the country to conduct cultural exchanges. [1] However, there are difficulties in digitising teaching materials in higher education institutions. The low importance attached to the construction of digital teaching materials, the lack of relevant teacher training, the insufficient investment in hardware funding, the low utilisation rate of resource libraries and the lack of effective inter-school communication and resource sharing have led to some repetitive development and waste. The relatively weak knowledge base, learning ability and willingness to learn of higher vocational students have always made the preparation of digital teaching materials for higher vocational English difficult. The author reconstructs the strategy of writing digital teaching materials for Integrated English Course based on three major dimensions: teaching materials, application of information-based learning software, and Internet+ exam, and explores five sub-dimensions: production team, a la carte lesson plan writing, cross-application of information-based learning software, knowledge base construction, and Internet+ exam. The use of digital teaching materials over two academic years has effectively improved the students' ability to systematically learn theoretical knowledge and intelligently apply information software.

Keywords. Higher education, Internet+, comprehensive English course, digital textbook, textbook development strategy

1. Introduction

With the development of computers, the Internet and other information technology, digital technology is increasingly used in school education as an effective supplement to classroom teaching through various new teaching modes such as MOOC, flipped classroom and online classroom etc. National Medium and Long-term Education Reform and Development Plan (2010-2020) places special emphasis on "integrating education

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informatization into the overall strategy of national informatization development[...]promoting the modernisation of education content, teaching methods and... and accelerating the popularisation of terminal facilities and promote the construction of digital campuses".[2] According to the results of the 9th National Reading Survey published by China Publishing Network in 2012, the digital reading exposure rate of Chinese citizens aged 18-70 grew to 38.6% in 2011. [3] More and more teaching content is being moved digitally to the Internet, providing teachers, students and researchers with richer, more convenient and more vivid teaching resources, of which the need for digital construction of teaching materials has become more urgent. However, after analyzing the status quo of usage of digital teaching materials in our classrooms, it was found there exists great gaps among various majors.



Figure1 General Trend of Digital Teaching Materials Research Analysis



Figure2 General Trend of Digital Teaching Materials Research in English Analysis

General Trend Analysis



Figure 3 General Trend of Digital Teaching Materials Research in Vocational English Analysis

Analyzing the trend of digital teaching materials researches in the CNKI (China National Knowledge Infrastructure) in Figure 1, it was found it has shown powerful growth in China, covering 481 items. However, when we input "digital teaching materials in English" into the system, which tells us that there are only 56 items concerned about it in Figure 2. When we narrow down the topic into "digital teaching

materials in Vocational English", the result shows only 7 items in Figure 3. Therefore, it was found the current research on Digital Teaching Materials in Vocational English still needs great attention, and it shows many gaps where we need to narrow down so as to improve vocational English teaching and research in a real sense.

The evaluation of English digital teaching materials is an extremely important and special window for the country to conduct cultural exchange. [1] At present, the theories and research results related to digital teaching materials in China are not perfect, and the development of digital teaching materials is basically at a preliminary stage, mainly in the form of electronic lesson plans, electronic teaching materials, related audio and video databases, online homework, question and answer platforms and other interactive platforms. The problems currently faced include the low level of attention paid by schools, the lack of relevant teacher training, insufficient investment in hardware, low utilisation of resource libraries, and the lack of effective inter-school communication and resource sharing, leading to some repetitive development and waste.

In addition, the knowledge base, learning ability and willingness to learn of students in vocational colleges are relatively weak, and the three-year teaching time further limits the teaching to more theoretical combing of students and more biased towards market application-based training. Students are less likely to concentrate in class but prefer video and audio digital materials to paper-based ones. At present, the digitalisation process of higher education textbooks in China has just started, and there is no perfect digital textbook that can perfectly combine with the paper version, not to mention replacing it. Therefore, in view of the characteristics of the current higher vocational education in China and the actual needs of the curriculum reform, how to design a set of digital teaching materials to meet the actual needs is a difficult task that higher vocational educators have to consider seriously.

Xiaotang, Cheng, published in 2010 by Foreign Language Teaching and Research Press, whose Integrated English Course for English majors in vocational colleges is widely used at present and edited by Professor Cheng Xiaotang. This textbook not only provides a systematic paper version of the teaching content, but also provides an accompanying MP3 material. Therefore, there is still room for further research and exploration on how to improve the quality of English teaching materials in higher education institutions under the background of Internet+ and how to make effective use of the new form of teaching materials, so that higher education students can actively participate in learning and truly promote teaching and learning.

2. Diachronic analysis of digital teaching materials both at home and abroad

Computer Internet information technology originated in Europe and the United States, where the research and practice of digitising textbooks is more mature. In the United States, the digitisation of textbooks is at its highest level, with scholars predicting as early as 2009 that paper textbooks in the USA might disappear (New York Times). After more than a decade of research and practice, the high cost of paper-based textbooks in the USA has prompted most USA schools to adopt paperless e-textbooks, and even two USA airline libraries have been forced to close and implement a completely electronic reading model. As of 2015, South Korea has fully digitised its textbooks; Germany is also actively promoting the pace of digital teaching; Malaysia, Indonesia, Turkey, Singapore and Portugal are also actively promoting the use of Kindle e-textbooks at primary and secondary school level, among others. The advantages of e-textbooks for students cannot

be overstated, and the profound changes and impact it has brought to publishers, libraries and others continue.

At present, the reviews of digital English textbooks in most Western countries are extremely optimistic, and they have not only experienced the advantages of convenience, speed and intuitiveness brought by new media and the Internet in digital English textbooks, but also improved the general education level of Western countries to a great extent. [1] A reading article in English IV dated 16 June 2018[4] describes the teaching application and commercial development of digital textbooks in the USA model of student feedback and dissatisfaction with publishers requiring students to pay high prices to complete assignments, showing a side-by-side look at the commercial promotion model of digital textbooks by USA publishers.

With the development of computer multimedia technology, domestic research on digital teaching materials began with electronic teaching materials in the late 1990s, and research on various types of electronic textbooks, e-textbooks and other "electronic" series increased. In the 21st century, the development of network information technology has brought about various kinds of "digital" research, among which the research on digital teaching materials has gradually become a hotspot since 2010, and various digital resource libraries have been established.

Zhong Cenzen's^[5] study pointed out that domestic research on digital teaching materials up to February 2016 mainly involved three major fields: education, publishing and technology, and was dominated by educational technology; although preliminary research has been developed, the amount of high-level literature and the depth of research still needs to be improved. Her research also found that the affiliations of digital teaching materials researchers were mainly focused on teachers with a background in educational technology research at universities, for example, Zhu Zhiting's team at East China Normal University focused on the development of e-textbooks and e-schoolbags; Huang Ronghuai at Beijing Normal University focused on the systematic study of the generation, development, design and development of e-textbooks; Sun Zhong and others at Capital Normal University designed and built models to develop digital teaching materials and Sun Zhong from Capital Normal University designed models to develop digital teaching materials and resources, and explored issues such as teacher development and student technology acceptance in a digital environment. Research on digital teaching materials has also been a hot topic for publishers in recent years. For example, People's Education Publishing House has conducted in-depth research on digital teaching materials from the perspective of educational publishing, from its own products such as English online teaching materials and digital teaching materials.

In terms of content, domestic and international research on the digitisation of teaching materials has focused on four main areas: basic research[6], design and development research[7], teaching application research[8] and business model research[9].

Li Yang[10] from Jiaotong University Press analyses the trend of digital publishing of higher vocational textbooks, giving the advantages and disadvantages of digitalization, and the great challenges and problems faced by higher vocational textbooks. Wu Lin and Yang Fangyong[11] continue to discuss the inevitable trend of digitization of higher vocational English textbooks and how to better solve the problems such as copyright, using higher vocational English audio-visual textbooks as a model.

3. Status quo of foreign language teaching materials publication in high vocational colleges

Digital materials should be designed to cater to students and be able to be easily presented in the classroom to capture their attention. A digital textbook has to choose the most appropriate means of presenting the project content to organise learning resources for learners to choose from according to their learning preferences. The project team will focus on designing adequate teaching and digital resources to gradually transform the previous teacher-centred English classes in higher education into a student-centred, taskcompletion oriented, student-led and self-motivated learning atmosphere. The two main areas of focus will be the following.

1. How to develop teaching resources and digital teaching materials for higher vocational education in the light of the characteristics of higher vocational education?

2. How to realize the deep integration of digital teaching materials and higher vocational teaching resources and the mutual promotion between them?

At present, under the background of Internet+, although the digital development and publication of foreign language teaching materials in colleges and universities have made certain achievements, the overall system is not yet perfect. There are many problems. [12]

3.1 Content homogenization

The three sets of Integrated English textbooks used by the first author's vocational college in recent years were found to have been developed to support the paper-based textbooks through the feedback of the teachers who taught them. This "copy" model limits the use of digital resources and does not reflect their advantages of personalisation, interactivity and information diversity. [13]

3.2 Monotonous format

Compared to the UNIPUS APP software of the Foreign Language Teaching and Research Press, Soochow University's Suda English Online, and Sichuan Foreign Studies University's English 84, English digital teaching materials in higher education institutions with mobile social software developed for foreign language corners are still rare, mobile APP content is not rich, and the development of digital teaching materials is relatively backward. With the increasing popularity of Internet+ learning methods, digital English teaching materials can be developed from multimedia courseware, online test banks, independent learning platforms, teaching websites and other aspects.

3.3 Disconnection between teaching and learning

Most of the current English e-textbooks in higher education institutions are matched with paper-based textbooks, but there are still shortcomings in the design of achieving the dimensions of teacher-student and student-student interaction. It is not uncommon to lose sight of this. This affects the consistency of teaching and learning to a large extent.

As such, technology brings with it the power to destroy and destroy the century, and young students are always most interested in and receptive to the latest technological products and applications. Therefore, using technology to motivate higher education students to learn English in the classroom is what the digital higher education English textbook hopes to accomplish. The digitisation of higher-level English textbooks can better suit the learning characteristics of higher-level students, stimulate their interest in learning and provide a useful complement to teachers' lectures. Therefore, the project team intends to document, summarise and make recommendations related to the construction of digital English textbooks for higher-level English by completing the elesson plan and related digital resource library for Book 1 of the Comprehensive English Course.

3.4 Designing ideas of e-teaching materials for integrated course of Englush in a vocational college in Shanghai

Respondents of the first author's experiment are Chinese students who come from Shanghai Technical Institute of Electronics & Information. As the e-learning programme and digital resource library of the Integrated English Course are intended to be reconstructed in three dimensions: teaching materials, information-based learning software applications, and Internet+ examinations, Figure 4 illustrates details.



Figure 4 Strategies for writing digital materials

Integrating Diversified Information Technology Teaching Tools, Constructing Digital Teaching Materials Compiling Strategies is a relatively ideal tool which combines textbooks with online learning and offline learning. With the aid of the technical company, the teacher is equipped with the opportunity to release digital materials with detailed instructions for online learning in advance. In addition, the teacher can supervise online learning without any limitation, which reminds students what they need to do at various time and space. Ultimately, in order to narrow down the

gap between online and offline learning, the teacher, who has gained the latest information on students' performance online, can carry out his/her class purposefully. By doing so, class efficiency, to great extent, can be improved greatly.



Figure 5 Digital Materials for Integrated English Course

(1). Build a stable production team to work together to complete the task of digital development of this higher education textbook (see Figure 5). The teachers in this team are from a vocational college in Shanghai specialising in English and a teacher from Chaoxing company who is also an Internet+ professional team. The team includes front-line teachers who are familiar with image processing techniques, video editing techniques; software development skills; and the content of the Integrated English Course textbook. Teachers adopt a variety of digital representations and design different digital media formats so that students can selectively watch and learn according to their own preferences.

(2). Working together to complete the e-learning programme. The team members follow the task flow to decompose the digital meal and then reorganise it, setting up a search catalogue to facilitate students' query and retrieval of delayed knowledge points, thus allowing students to quickly and efficiently search for their preferred type of viewing media in order to maximise their independent learning.

(3). Cross-application of information-based learning software allows students to truly experience learning.

For example, for teaching Unit 6 *Job and Fun*, teachers can pre-assign the prereading topics in the micro-assist software. Create a group --> issue a task notice for students to complete the basic elements of the job interview (professional + moral) through pre-study --> check the students' pre-study assignments --> analyse the easy points in the students' assignments. During the course teaching the teacher is able to more effectively target the text and really have the material in his head and the students in his mind.

The development of Internet+ digital teaching materials also helps with classroom management. The mode of roll-call and sign-in at the author's university is still rather traditional. The time spent on roll-call in a class is quite a lot. The micro-assist software combines teaching materials, courseware, audio and video in one learning APP software.

It saves time and efficiency by giving students a 1-minute roll call and sign-in in class. Teachers can also follow up on student attendance in real time through the Chaoxing screen casting function. It effectively ensures classroom attendance and in-class teaching.

Option	Total	Percentage	
Chaoxing	77	17.46%	
Zhike Pigai	18	4.08%	
Wei Zhujiao	126	28.57%	
Xiexie Weike	15	3.4%	
Rarely Use	205	46.49%	
Number of valid completions	441		

Table 1 Information-based Teaching Software that Your Teachers Use in Their Homework Assignments



Figure 6 Highly-frequency of words list in Digitalized Teaching Platforms

Through the research, we found that on the question of whether teachers follow informative teaching software in the after-class homework assignment, 46.49% (see Table1) of students gave feedback that teachers hardly use it. However, on the question of whether you are willing to exchange your learning experience with the teacher of General English after class through the information technology platform? When asked this question, I found that 78.68% of students were still eager to implement the Internet+ learning model. (see Table1) However, many of our professional course teachers' information technology application ability is insufficient, and this is very much out of line with the background of our times. Ministry of Education of the People's Republic of China promulgated the Construction Plan for Modern Vocational Education System (2014-2020) in 2014: broadband and campus network to cover all vocational colleges by 2015, digital resources to cover all majors by 2020, and information technology application to reach the world's advanced level: accelerating the construction of digital professional curriculum system, extensive use of computer policy teaching in professional courses, digital practical training, and remote real-time education and other technologies[14]. Finally, the analysis of the word frequency of WorditOut shows that the third ranking word frequency is information technology. (see Figure 6) Although Internet+ exams change traditional paper-based exams that students have some difficulty adapting for a while. However, big data tells us that this is an irreversible trend of the times. The authors suggest that teachers should continue to strengthen their professional training in informatisation in order to cope with the coming of the intelligent era with ease.

(4). Jointly building a library of relevant digital resources

Based on the research and practice of our predecessors, the project team has decided to start from five aspects:1. making full use of and integrating the digital teaching resources already developed, such as *Integrated English Course*, Book 1, a high-quality resource sharing course; 2. developing the compatibility of digital resources running on different terminals and optimising the content of digital resources; for example, constructing knowledge maps, setting up knowledge points; 3. adding project-based scenarios and case studies to the digital resource library; 4. enhancing the fun of the digital resource library by adding digital games to create a good digital learning environment; 5. increasing the openness and inclusiveness of digital teaching materials.

(5). Internet + Examinations

In the process of implementing the digital construction of the Comprehensive English Course, the College of English Language and Culture, where I work, made 2 attempts to change the previous paper-based mid-term examination mode to a mobile phone terminal examination. Members of the team of professional course teachers produced numbered test questions in advance, and then the head of the teaching and research department entered the questions in the Chaoxing Learning App software and did the testing before the exam. Throughout, the students' examinations were basically smooth.

Option	Total	Percentage
Time saving, Efficient; Worth Recommending	287	65.08%
Not much different from the traditional exam format	171	38.78%
Improving the validity of machine reading of subjective questions in order to better popularize information-based examinations	303	68.71%
Others (Your Suggestions)	147	33.33%
Number of valid completions	441	

 Table 2 Viewpoints on Mid-term Exams Held in An Information-based Format for Online Integrated

 English Course

As can be seen from the above Figures (see Table 2), 500 questionnaires were sent out, with 441 participants and an effective rate of 88.2%. How do you feel about the adoption of the information technology mode for the mid-term examinations of General English? 65.08% of the students think: it saves time and is efficient; it is worth promoting. However, we should also see our own shortcomings. 68.71% of the students think that the validity of the machine reading of the subjective questions is low. This is closely related to the system set-up. Subjective questions require extra time for teachers to mark and increase their workload. If Chaoxing could improve the technical aspects of the system, it might be more effective in improving the validity of the IT examinations.

4. Conclusion

From the construction of the e-lesson plan and digital resource library for the restructured Comprehensive English Course in three dimensions: teaching materials, information-based learning software applications, and Internet+ examinations, we can see that the construction of digital teaching materials cannot be separated from the feedback from teachers of professional courses, corporate tutors, and even students. The team has now completed the first volume of the digital textbook, and work on the other three volumes is progressing in an orderly manner. Further research is needed to determine whether the research on this topic can be useful for the construction of digital teaching materials for small language majors. In conclusion, the improvement of the digital higher vocational Integrated English Course textbook needs to combine excellent digital resources and advanced new planned teaching methods to improve the effectiveness of higher vocational English classroom teaching and to write more reasonable digital textbooks to further promote the development of higher vocational English teaching.

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