"Three Education" Reform of Public English for Higher Vocational Education Empowered by Information Technology

--Taking Shanghai Technical Institute of Electronics & Information as an Example

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Abstract. This paper explores the practical problems of the "Three Education" Reform in the context of information technology changes, and builds up the "Three Education" Reform model of public English for higher vocational education with "teacher competence + textbook content + teaching method innovation" as the main line of information technology empowerment. The new model of "Three Education" Reform was explored. The model takes teacher reform as a guide, textbook reform as a carrier, and teaching method reform as a medium to promote the match between vocational education personnel training objectives and job competencies, achieve a basic match between teaching and production processes, narrow the gap between the education, industrial and talent chain, and truly realize the application of learning.

Keywords. Information technology, empowerment, "Three Education" reform, public English for higher vocational education, job competence

1.   Introduction

Public English is an important part of the talents training in higher vocational education. It is comprehensive, large-scale, and responsible.[1] Based on the long-term public English teaching reform, this paper explores and creates a long-term public English teaching reform with the goal of improving students' future vocational English application ability, and explores the reform of teachers as a pioneer, teaching materials as a carrier, and teaching methods as a medium to promote the better match between vocational education personnel training objectives and job competency, to realize the basic matching of teaching and production processes, to narrow the gap between the education chain, the industry chain and the talent chain, and to truly realize the application of learning.

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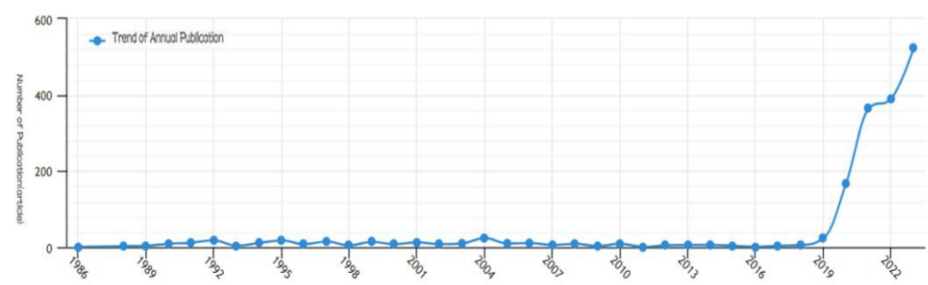
Figure 1 Current research status of reform on "Three Education"

The authors typed in the keyword "Three Education" Reform in CNKI and found that this keyword was first proposed in 1986 and started to receive substantial attention in 2019 greatly(see Figure1), which is inevitably related to the promulgation of the 20 Articles of Vocational Education Reform.
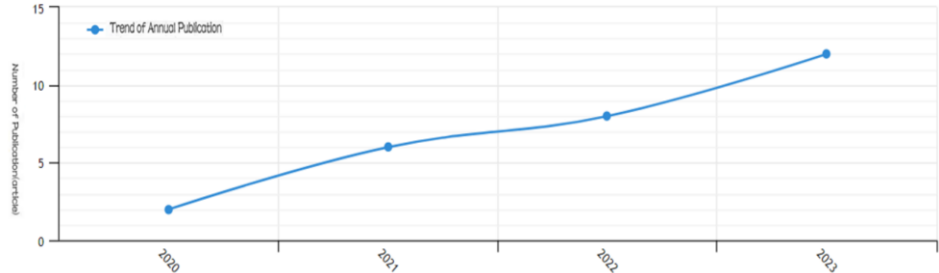

Figure 2 Current Situation of the Research on the "Three Education" Reform of public English in Higher Vocational Education

In CNKI, the authors typed in the keywords of "higher education" and "three education" reform and found that the research on higher education started in 2020, far behind other types of research on "Three Education" Reform. With the help of Figure 2, the authors think about what the driving force for the reform of "Three Education" Reform is and how the future can be transformed in terms of teachers, teaching materials and teaching methods.

In December 2021, the Central Committee on Cyber Security and Information Technology issued the "14th Five-Year Plan"[2] clearly proposed educational and teaching changes to promote the integration of information technology, intelligent technology and education and teaching. This policy facilitated the informatization reform of foreign language education. In the newly published "English Curriculum Standards for Higher Vocational Education (2021 Edition)"[3] by the Ministry of Education, "information technology" was mentioned 6 times, "informatization" was mentioned 2 times, and "information literacy" was mentioned 2 times respectively. It is easy to find that the strategic status of information technology and high-vocational English teaching integration is in a constantly improvement.

2. Research Design

In social production, the replacement of production tools and the change and reorganization of the production process will inevitably lead to the optimization and adjustment of the industrial structure; industrial changes will also lead to the transformation and upgrading of the economic structure[4]. The talent training

characteristics and career framework of higher vocational education determine the construction of English subjects. On the one hand, it must be based on job characteristics[5]. English as a discipline should make full use of the advantages of information technology to provide strong technical support for construction and development[6]. By analyzing papers from core domestic journals on "Three Education" Reform in the past five years included in China Knowledge Network (CNKI), this study sorted out the hot spots and trends of research on the integration of information technology and foreign language courses, and drew up an interview outline based on this. It mainly sorts out the research questions: *(1) What are the actual pain points and difficulties of the "Three Education" reform of higher vocational public English? (2) What are the effective ways to achieve teacher development, textbook transformation, and teaching innovation through information technology?* The interviewees were mainly 14 experts related to the foreign language community and 6 enterprise experts.

Through the questionnaire *Wenjuanxing*, an anonymous survey of front-line teachers and students taught in each faculty by means of a web-based survey, a focus group discussion was used to conduct a face-to-face discussion on the front-line situation of teaching operations, management and safeguarding. A total of 175 questionnaires were returned. The respondents were reasonably distributed, the relevant survey data and the questions responded to were credible, and the situations and questions responded to by teachers and students were representative. With the purpose of analyzing the status quo of teachers, textbooks and teaching methods in higher vocational colleges in China, our team has designed this questionnaire, which is divided into several sub-branches concerned with the above three main points. All the answers come from various schools and colleges both in Shanghai and other provinces, whose statistics can provide relatively reliability for our research. With the help of analytical tools, we have concluded the targeted answers.

3. Results and Analysis

3.1 Main Problems in Teacher Reform: Poor Awareness of Informatization and Lack of Knowledge of Informatization
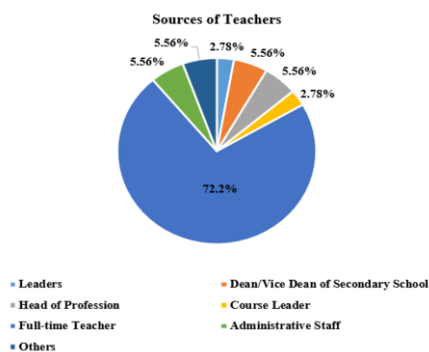

Figure 3 Sources of Teachers

Figure3 shows us that teachers come from different levels, and teaching ability is the core of their professional competence, which varies in level. The National Vocational College Teachers' Teaching Competency Competition focuses on the competing teachers' ability to complete teaching design, implement classroom teaching, evaluate the achievement of

objectives, and reflect on improvements for some of the teaching content in a particular course. Therefore, this survey focused on asking teachers to self-evaluate their abilities in these four areas.

Project	Dean/Vice Dean of Secondary School	Head of Profession	Course Leader	Full-time Teacher
Complete Teaching Design	4.21	4.18	4.36	3.96
Implement Classroom Teaching	4.29	4.27	4.43	4.18
Attain Evaluative Goals	4.22	4.19	4.33	4.15
Conduct Reflective Improvements	4.21	4.20	4.36	4.18

Table 1 Self-evaluation of Teachers' Teaching Competencies (Full Score:5)

Table 1 shows that the course leader has the highest self-rating in all aspects of competency, followed by the Dean/Vice Dean of Secondary School and the lowest by the full-time teacher, indicating that this aspect of competency needs to be strengthened.

Main Issues Facing Current Teachers' Development

Project	Dean/Vice Dean of Secondary School	Head of Profession	Course Leader	Full-time Teacher
Excessive Workload	70.02	48.06	40.82	44.86
Insufficient Support Facility	5.08	9.34	15.06	18.32
Unreasonable Evaluation and Assessment Mechanism	15.66	13.56	35.28	13.41
Insufficient Guidance on Career Development	8.31	18.56	13.55	15.06

Table 2 Main Issues Facing Current Teachers' Development (%)

Table 2 shows that in the four areas of Excessive Workload, Insufficient Support Facility, Unreasonable Evaluation and Assessment Mechanism, and Insufficient Guidance on Career Development, all categories of teachers identified excessive workload as a major problem for a teacher's development.

Informatization of English teaching first requires higher vocational English teachers to master basic knowledge of computer applications, information communication, and network technology. In response to the question "Are teachers more aware of independently driving and using informatization tools to assist higher vocational English teaching?", 70% of experts from higher vocational colleges reported that since the English teaching force has been relatively stable in the past ten years, it is difficult for most higher

vocational English teachers to break through traditional educational concepts and teaching models. Their awareness of informatization is weak, and in-service information-based training is not well-targeted. Although expert lectures and seminars help higher vocational English teachers master information knowledge, the training is not systematic enough. At the same time, there is a lack of encouragement mechanisms, and teachers' belief in the promotion role and value of information technology in English teaching is uncertain. It is impossible to effectively apply information technology to one's own teaching. So teaching is difficult to carry out, and the improvement of teachers' informatization skills is difficult to achieve.

The content of this questionnaire survey is focused on three dimensions: teachers, teaching materials and teaching methods, including self-evaluation of teaching ability, the main problems encountered by teachers in their current development, the direction of development, and the most urgent need for training in these areas; in terms of teaching materials, the survey mainly investigates the evaluation of the quality of the used teaching materials, the main problems of teachers' participation in the construction of teaching materials, and the dimensions of key support for the construction of teaching materials in the future. In terms of teaching methods, the survey was conducted to find out the main teaching methods currently in use, the current status of professional teaching and the main problems of current teaching methods.

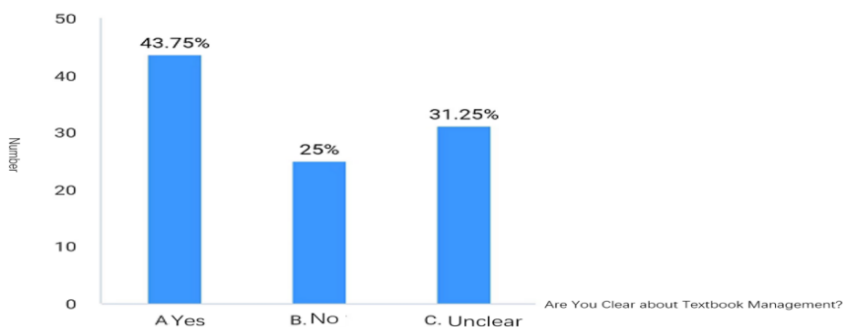## 3.2 Main Problems in Textbook Reform: Lagging Content and Single Form of Resources

Figure 4 Teachers' Awareness of Textbook Development

With regard to the main body of textbook development, 31.25% of teachers in Figure 4 do not know much about textbook development and 25% have even never participated in textbook development. This situation greatly limits teachers' motivation to develop teaching materials.
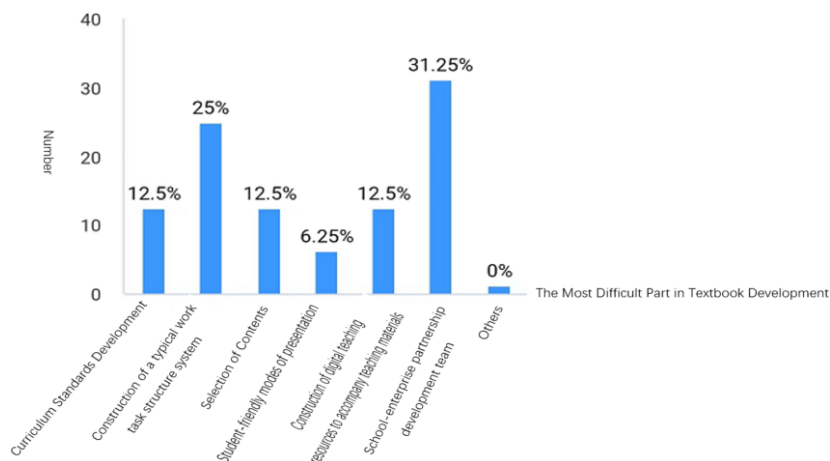
Figure 5 Focus in Textbook Development

As seen in Figure 5, students and teachers agree that schools should focus on supporting school-enterprise collaboration in developing teaching materials that are closely aligned with production practices. Students pay more attention to the development of information technology and industrial upgrading situation, timely and dynamic update and revision of teaching materials. Although the 1+X certificate is now starting to be piloted and its teaching materials are presented in a basic mountain of loose-leaf and workbook style materials, it is clear that teachers and students are more unfamiliar with these two types of materials.

As the main carrier of teaching content and an important support for teaching models, textbooks are the concrete implementation and embodiment of the essence of teaching reform. However, with the continuous introduction of new policies for vocational education, the development and updating of English textbooks for higher vocational education has been slow. In response to the question of "Can higher vocational English textbooks effectively reflect the characteristics of the types of vocational education?", 90% of enterprise experts said that current higher vocational English textbooks do not reflect the current situation, demand and future development trends of corresponding occupations. They are outdated with the actual current production situation. On the other hand, although the new concept of "paper textbooks+code scanning digital resources" textbooks can be found in some English textbooks, there are still problems in the application process. The content and organization of the textbooks are not suitable for the academic conditions of higher vocational students whose thinking cognitive development is mainly based on image-oriented ones. In addition, both teachers and students are not used to using apps or textbook resource service platforms, therefore, the unique value of the new type of textbook is not sufficiently highlighted.

3.3 Major Problems with Pedagogical Reform: Weak Interactive Teaching and Outdated Assessment Methods
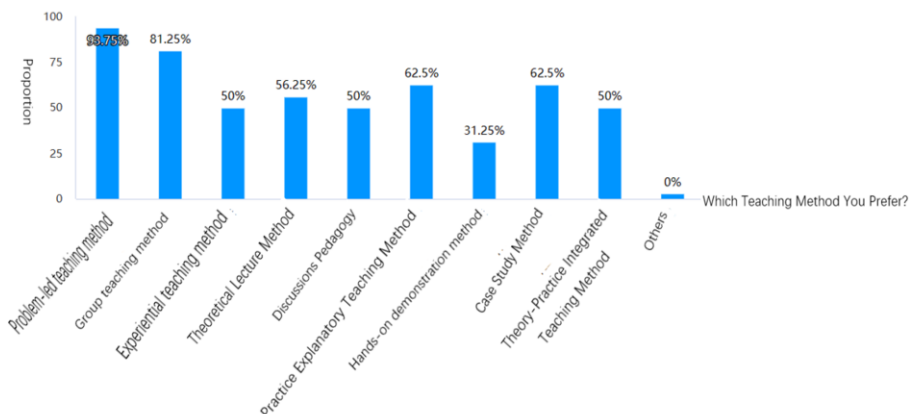

Figure 6 Teaching Method Orientation

Combined with Figure 6, 93.81% of teachers use Problem-led teaching method. Why are teachers reluctant to carry out teaching methods that incorporate the development of the times? The main constraint to the further development of the various current confidence teaching methods lies in the creation of the teaching environment and the construction of practical training conditions. For the improvement of teaching methods, higher education institutions often hope to rely on training to achieve this in practice. However, in reality, prominence of reflexive teaching after training needs to be improved.

For a long time, China's higher vocational English has continued to pay attention to helping students improve their basic knowledge of language. The classroom is dominated by "knowledge teaching". The one-sided nature of this understanding has caused the traditional teacher-dominated teaching model to fall into a situation where classroom teaching subjects are unified, teaching structure modeled, teaching goals and teaching organization forms are unified, and teaching methods are fixed.

4. Reform Path of Information Technology Empowers Higher Vocational Public English "Three Education"

The reform of the "Three Education" of higher vocational public English is a closed-loop whole. Teachers are the leading factors in classroom teaching. Improving teachers' ability to teach is the key to realize the quality improvement, A-level cultivation value enhancement and competence empowerment. Teaching materials are the support and basis for teaching content and an important carrier for curriculum reform. Therefore, accelerating the reform and innovation of teaching materials is an important measure to update teaching content, promote teaching reform, and improve the quality of talent training. The core of teaching method reform is classroom teaching mode innovation, upgrading online classrooms through informatization means, connecting "physical classroom, virtual classroom, cloud classroom" three classrooms in real time, breaking the space and time boundaries of traditional classrooms, realizing classroom goals workplace, classroom effect visualization, curriculum management data, and practice

multi-modal teaching "smart classroom". Using the four-semester "Practical English" course offered throughout the school as an example, the author explores the path of information technology empowering the reform of the "Three Education" of senior public English.

4.1 "Empowering" Teachers to Build an Informatization Practice Community for English Teachers
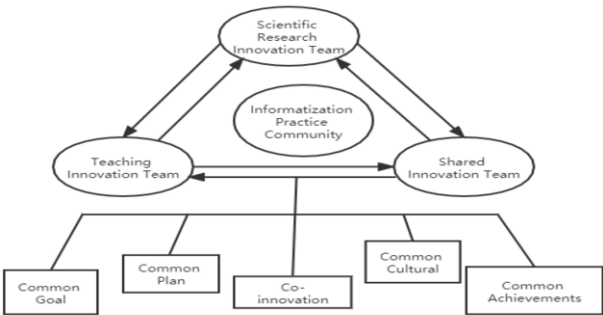

Figure 7 "Empowering" teachers

Oriented the ideas of "empowering scientific research, teaching, and service with information technology", information practice community can be built up by composing three different teams which are scientific research and innovation team, teaching innovation team, and shared innovation team(Figure 7). The meaning, organizational form and characteristics of the information technology practice community should be defined. It is a must to clarify the main relationships and driving factors among three parties from building teams, cooperative projects to communities of practice. The ultimate goal of information practice community is to rely on actual team projects and implement paths can be completed by common goal, common plan, co-innovation, common culture and common achievements[7] in order to stimulate teachers' endogenous motivation and innovation potential. In this way, the team can grow up along with individuals development[8]. Teams building-up principle can be flexible according to project needs. Being a role model in leading informatization education reform, the team assumes the responsibility to push all English teachers improvement in informatization teaching competence. Let's take a STIEI implementation case as an example. "Practical English" course leader firstly designed the general goal for three teams of scientific research, teaching and sharing, then set up sub-projects nominated sub-project leaders and selected members. The sub-project tasks were both differentiated and integrated with each other. The members could be integrated into different project teams at the same time according to the needs of the project. The purpose of establishing an Informatization and Foreign Language Courses Integration Research and Innovation Team is to motivate team-members to improve the awareness of using information technology by doing the scientific research projects. The purpose of building up Teaching Innovation Team for Ideological and Political Team is to guide team-members for teaching ability improvement via information technology teaching competition standards. The purpose of founding Shanghai Higher Vocational Education English Course Sharing Course Building and Innovation Team is to enhance the social service effectiveness by users' evaluation of testing the teaching ability.

4.2 "Empowering" Textbooks to Create Three-dimensional Textbooks in a New Form of "Integrating Existing, Introducing High Quality, and Creating Characteristics"

To create directions for content optimization of English teaching materials for higher vocational education from the perspectives of industrial upgrading orientation, teaching content updating and types of course resources (Figure 8) we dig deeper into the elements of language thinking and politics to redevelop multi-modal English teaching resources by tanking wisdom, creating animated micro-lessons and teaching video materials to improve existing textbook resources such as electronic lesson plans, audio, test question banks, etc., to meet personalized teaching needs. According to the upgrading of industrial structure and the school's professional cluster construction plan, we cooperate deeply with enterprises to jointly develop new forms of teaching materials, introduce workplace scenarios and develop work tasks, so that students can immerse themselves in professional scenarios to enhance students' interest in learning English and expand teachers' innovative teaching thinking. [9]

In the basic English stage, the second development of the Higher Vocational Public English Course can adopt the mode of revising and integrating the content of existing textbooks, electronic lesson plans, test paper banks, micro-learning video resources, etc. By introducing idiomatic golden sentences and telling Chinese stories in English language practice project activities, increasing the explicit thinking and political content and implicit thinking and political elements, focusing on cross-cultural communication and cultivating students' thinking and discernment skills, while introducing FIF speaking, I-Test in the workplace English stage, the teaching materials can be used to create new forms of special teaching materials, focusing on the construction concept of the professional university clusters, and designing the content of the teaching materials around the shaping of artisanal values, the transfer of language knowledge and the cultivation of workplace skills, so as to help students tell Chinese stories in English. Driven by information technology, the language knowledge system has changed from a single subject to cross-border integration, the way knowledge is presented from flat to crossover and three-dimensional, the composition of teaching resources from single static to multiple dynamic, and the mode of thinking from one-dimensional to multi-dimensional and multi-quality. [10]
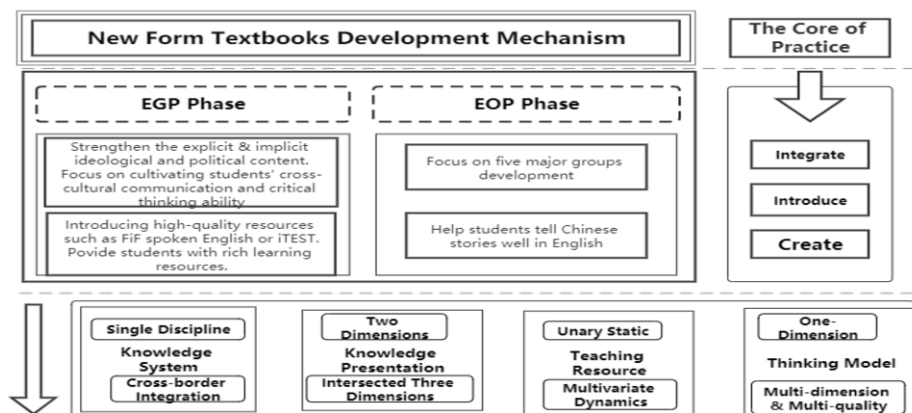

Figure 8 "Empowerment" textbook

The most important feature of the new digital, informative and three-dimensional teaching materials is their "multi-dimensional presentation", i.e. the development of modular teaching resources in various forms through professional virtual simulation and various advanced technologies. For example, by scanning the QR(Quick Response) code on the textbook, you can access online resources such as application scenarios, practical cases and technological trends related to the project content. It is even possible to obtain verifiable results output through open source program input based on interactive electronic teaching materials, allowing students to visualise the technical features and application effects of the job. Through this new type of teaching material, students are helped to gain immersive learning and experience, especially in the mode of practical application of various job-related technologies, so that they can experience the requirements of the digital transformation of industry for the competence of future complex jobs in a whole process and in all aspects.

4.3 "Empowering" Teaching Method, Exploring Effective Implementation Strategies for "Increasing Knowledge, Intelligence and Ability" in English Language Teaching
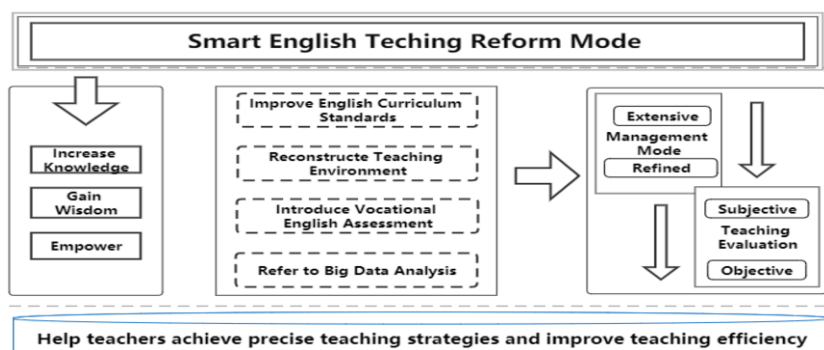

Figure 9 "Empowering" teaching

Through the active use of the online features platform, Practical English course began to build various video resources for the course in 2019 and was put on the *Xueyin Online Platform* in early 2020 to begin the first phase of the course operation, which has run for six periods so far, with a cumulative page view of more than 3.7 million, 216 course resources, 73 video resources with a total duration of 591 minutes and 36 animated virtual simulation videos. Almost 7500 students all over the country have selected the online course and the interactive activities are up to 5910. The course makes full use of information technology to incorporate the full range of "listening, speaking, reading, writing and translating" skills into the course (Figure 9), enhancing the instantaneous interaction of language learning and helping students to become the main body of English learning. By making full use of the various data generated in the course for course management, teachers can intelligently track students' learning progress and process data, analyse students' learning behaviour and attitudes, provide timely evaluation and feedback on students' learning effectiveness, and realize data-based process, developmental and value-added evaluation. By improving the English curriculum standards, reconstructing the "physical, resource and social" teaching environment, introducing vocational English assessment, and leveraging the platform's big data analysis, the teaching management mode is gradually shifting from crude and empirical to refined

and intelligent [11], and teaching evaluation is gradually shifting from teachers' subjective and single analysis to objective and multiple precision. This helps teachers to achieve precise teaching policy and improve teaching effectiveness.

5. Reflection and Anticipation

The multidimensional and technically complex nature of jobs in the context of digital transformation requires a series of reforms for teachers, teaching materials and pedagogy, with the "Three Education" Reform as the starting point. These include the establishment of a diverse and integrated teaching force, new teaching materials that interact with online and offline resources, and pedagogical reforms that focus on the acquisition of skills by students.

The core of high-quality development of vocational education lies in achieving the goal of matching the quality of talent training with the needs of industrial jobs. As the main employer of technically skilled personnel, how can enterprises be guided to participate in vocational education in a deep and multi-dimensional manner through institutional planning and construction, and rely on the construction of mechanisms to increase the dominance and voice of enterprises in participating in vocational education, including the setting of talent training programmes, monitoring the process of talent training and evaluating the quality of talent training.

In fact, the "Three Education" Reform is linked to a comprehensive and in-depth reform of the teaching philosophy, teaching mode and teaching methods of vocational education. In the following research, we will also explore the joint effect of the "Three Education" Reform factors, such as guaranteeing conditions, system construction and institutional guarantee. In this way, we will continue to improve the quality of higher vocational education personnel training, and promote the digital transformation and upgrading of regional industries while developing vocational education with high quality, so as to promote the development of regional economy with high quality.

6. Conclusion

Based on "teachers", "teaching materials" and "teaching methods", the "Three Education" Reform with "teacher informatization ability improvement system construction, multi-modal English textbook resource creation, and precise measures for intelligent English teaching" as the main line requires innovation and practice in information-based teaching concepts, textbook content and forms, teaching methods, evaluation systems, etc. The development of students' language foundation, listening competence, workplace ability, and cross-cultural communication skills need to be systematically improved and developed. Large-scale English learning services require the support of information technology. For outstanding students, we need to build a platform for them to show their English proficiency, guide them to participate in influential English skills competitions, and ensure the development of high-quality talent cultivation. The construction of teaching materials requires the production of fine products from school books to the publicly published and to national planned ones, combined with the advantages of enterprises. The course construction needs to be a long period of hard work in terms of teaching resources construction, online open course construction and application, and teacher teaching capacity enhancement to create golden courses and highlight the

effectiveness of the teaching reform, while increasing the social service capacity enhancement, using the language advantage to explore serving large-scale international exhibitions, increasing the number of volunteer services, leading quality higher education institutions to build courses with teachers, providing online English course learning for remote areas in the west, and increasing the frequency of inter-school exchange and learning services to play a demonstration and leading role.

Acknowledgment

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