THE INFLUENCING FACTORS OF VOCATIONAL EDUCATION

INFORMATIZATION-A CASE STUDY OF SHANDONG

UNIVERSITY OF ENGINEERING AND VOCATIONAL

TECHNOLOGY

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6317195916

AN INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER'S DEGREE OF BUSINESS ADMINISTRATION GRADUATE SCHOOL OF BUSINESS SIAM UNIVERSITY

2023

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This Independent Study has been Approved as a Partial Fulfillment of the
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Title:	The Influencing Factors of Vocational Education Informatization-A Case Study of Shandong University of Engineering and Vocational Technology
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ABSTRACT

With the advancement of information technology, the reform of vocational education creates a new opportunity to advance the reform of all elements of vocational training and encourage its development. Shandong University of Engineering and Vocational Technology's education informatization faces challenges such as limited infrastructure building, inefficient resource use, and need to optimize the informatization environment. This paper aimed to study the influencing factors of vocational education informatization of Shandong University of Engineering and Vocational Technology.

The objectives of the study were: 1) To explore whether infrastructure development affects the vocational education informatization of Shandong University of Engineering and Vocational Technology; 2) To explore whether informatization resource management affects the vocational education informatization of Shandong University of Engineering and Vocational Technology; 3) To explore whether informatization management environment affects the vocational education informatization of Shandong University of Engineering and Vocational Technology.

This study adopted the quantitative research method. In this study, a total of 399 questionnaires were distributed, with 336 valid questionnaires and the validity rate was 84.21%. The population was the students of Shandong University of Engineering and Vocational Technology. Based on the educational equalization theory and educational communication theory, this paper found that: 1) Infrastructure development has a significant positive effect on vocational education informatization of Shandong University of Engineering and Vocational Technology; 2) Informatization resource management has a significant positive effect on vocational education informatization of Shandong University of Engineering and Vocational Technology; 3) Informatization management environment

has a significant positive effect on vocational education informatization of Shandong University of Engineering and Vocational Technology. For recommendations, vocational education informatization should focus on the following aspects: 1) Strengthening of infrastructure development; 2) Enhancement of informationized resource management; 3) Optimization of information management environment.
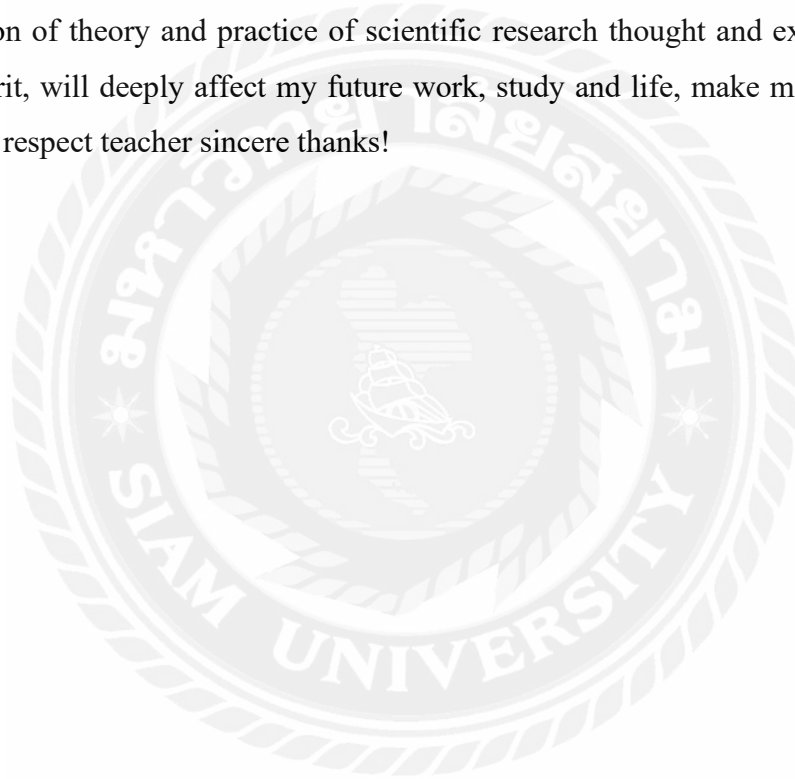
Keywords: influencing factors, vocational education, informatization

ACKNOWLEDGEMENT

On the occasion of the completion of my master's thesis, I would like to extend my high respect and deep thanks to my teachers who have guided me, the leaders who care for me, those who care about me and all the people who have helped me in the process of studying for my master's degree.

This thesis is successfully completed under the careful guidance and kind care of the supervisor. Teacher profound knowledge contain rigorous doing scholarly research attitude, seeking truth from facts of scientific research style, confident work enthusiasm, the combination of theory and practice of scientific research thought and explore the innovative spirit, will deeply affect my future work, study and life, make me lifelong benefit, in this respect teacher sincere thanks!

DECLARATION

I, Zhu Yanping, hereby certify that the work embodied in this independent study entitled "The Influencing Factors of Vocational Education Informatization-A Case Study of Shandong University of Engineering and Vocational Technology" result of original research and has not been submitted for a higher degree to any other university or institution.

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Feb 1, 2024

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Chapter 1 Introduction

1.1 Background of the Study

Since the 1960s, with the rapid development of information technology, every aspect of individual's life has been radically changed, the more typical information technology is mobile Internet technology, multimedia technology, big data, etc., which promotes the society to develop gradually in the direction of intelligence, knowledge and information. In the 1990s, the development of information technology popularized to the world's education sector, and the trend of education informatization characterized by extensive application of information technology has appeared in the international education sector (Crawford, 2020). The trend of education informatization characterized by the wide application of information technology has emerged in the international education sector.

Along with China's economic development and social progress, it has promoted the development of various undertakings in China, especially the cause of higher vocational education, accompanied by the steady growth in the number of its institutions, enrollment, employment of the number of students in the society, has made a significant contribution to the development and growth of China's educational undertakings, and has also brought a greater impetus to support China's economic and social development. Faced with the current new technology, new environment and other new situations, through education informatization to reduce the education gap, reduce the gap between urban and rural education, promote the popularization of high-quality education resources, and better promote the implementation of nationwide education equity (Ivergard, 2020). Under the guidance of various policies, the overall work of informatization in higher vocational education has also been advanced in an orderly manner, and the level of informatization has been improved to a certain extent. However, there are still a lot of deficiencies in the construction process and application of informatization in China's higher vocational education, and the ability and level of education informatization service have yet to be improved, especially in the face of the sudden crisis, which has disrupted the normal teaching and learning activities of the school and exposed some real problems in China's education development, and the sudden crisis has brought more enlightenment to the reform of China's higher vocational education and especially to the enhancement of its education informatization service (Dyer & Shepperd, 2019).

Vocational education, as an important part of China's education, serves to cultivate professional and practical skilled talents for the society and enterprises. With the rapid development of the current society, the needs of enterprises for professional talents show a sharp rise in the status quo, the traditional education has been unable to meet the needs of vocational training, so the innovation of vocational education model has become the focus of the current vocational education and difficulties (Doolin, 2018). With the advancement of information technology, the reform of vocational education

provides a new opportunity to promote the reform of all aspects of vocational training and promote the development of vocational training (Zhang et al., 2020). China's Ministry of Education has put forward a number of opinions on deepening the reform of vocational education and training to comprehensively improve the quality of personnel training, and actively advocates the continuous improvement of teachers' teaching informatization ability as well as the comprehensive level of informatization. Under the information technology environment, it is necessary to commit to promoting changes in the leading position of teachers in the education process, teaching concepts, teaching concepts, teaching content, learning methods, teaching evaluation and other aspects. The unfolding of vocational information technology education and the organic integration of information technology and vocational courses is the current trend of effective practice of educational reform (Wang & Du, 2021).

Shandong University of Engineering and Vocational Technology carries out a series of activities to promote the deep integration of information technology and education and teaching. Shandong University of Engineering and Vocational Technology in the process of overall education informatization, teaching informatization weak problem is more prominent. The educational informatization of Shandong University of Engineering and Vocational Technology has problems such as insufficient infrastructure construction, inefficient utilization of resources, and the informatization environment needs to be optimized. Therefore, it is of great significance to explore the influencing factors of vocational education informatization in Shandong University of Engineering and Vocational Technology and put forward countermeasures for vocational education informatization in combination with the influencing factors.

1.2 Questions of the Study

The prerequisite for the realization of information management is the construction of education management information system, which is also the key content of the education management information construction program, education management information construction to obtain good results is the main form of the system has a perfect function, complete type, and in the specific application of practice to maintain good operating results, which is also the main characteristics of the establishment of a perfect education management information construction (Liu & Wang, 2021). Shandong University of Engineering and Vocational Technology education informatization needs to strengthen the connection with all kinds of learning infrastructure, help students, resources and life management to realize the informatization, which is the most important component of the digital campus construction, and can play a significant role in improving the level of campus information management. Shandong University of Engineering and Vocational Technology in the informationization of educational resources, there are many deficiencies centered on not yet built a perfect information management system. In the

process of education management informationization, the construction of information management system is crucial, although the school has built office automation system student management information system, but due to the maintenance of the operation of the reason, make it in the specific operation of the process of efficiency is not good. Combined with the above problems this study proposes the following research questions:

(1) Does infrastructure development affect vocational education informatization of Shandong University of Engineering and Vocational Technology?

(2) Does informatization resource management affect vocational education informatization of Shandong University of Engineering and Vocational Technology?

(3) Does informatization management environment affect vocational education informatization of Shandong University of Engineering and Vocational Technology?

1.3 Objectives of the Study

The process of vocational education informatization has uneven development, low application effect and imperfect guarantee system. Shandong University of Engineering and Vocational Technology develops informatization teaching means and improves the awareness of education informatization is a long way to go for the school, and it must plan and prepare from a long-term perspective. In the process of education informatization, researchers have analyzed the teacher informatization in education informatization and the process of developing education informatization. It is generally agreed that education informatization helps to promote the education process. The following objectives are proposed in the light of the problems existing in the process of informatization of vocational education in Shandong University of Engineering and Vocational Technology:

(1) To explore whether infrastructure development affects the vocational education informatization of Shandong University of Engineering and Vocational Technology.

(2) To explore whether informatization resource management affects the vocational education informatization of Shandong University of Engineering and Vocational Technology.

(3) To explore whether informatization management environment affects the vocational education informatization of Shandong University of Engineering and Vocational Technology.

1.4 Scope of the Study

The scope of this study is Shandong University of Engineering and Vocational Technology. Other schools are not included in the scope of the study. In order to have an in-depth understanding of Shandong University of Engineering and Vocational Technology's vocational education informatization, it is first necessary to determine the requirements and standards of the sample. The sample should cover student representatives of different grades, majors and educational backgrounds to ensure the comprehensiveness and representativeness of the survey results (Liu et al., 2021). At the same time, the sample should have a certain degree of informatization awareness and ability, which can objectively reflect the actual situation of campus informatization construction.

As for the content of the survey, it needs to be centered on vocational education informatization construction. It mainly includes the application of informatization technology in teaching and how to use informatization technology to improve the quality and efficiency of teaching; the degree of digitization of teaching resources, including the digitization of teaching resources such as courseware, teaching materials, and exams; the current situation and problems of the campus network facilities, including the situation of network bandwidth, network coverage, network security, etc.; as well as the demand and development direction of the informatization construction, i.e. the future expectations and planning of informatization construction.

Questionnaires are used in the survey method. The questionnaire survey can widely collect the opinions and suggestions of teachers and students, and the observation can intuitively understand the actual situation of campus informatization construction. The study period is from October 1, 2023 to January 1, 2024. The survey period is four months. The study period is from four months. The survey should be conducted at a suitable time during the semester to ensure that as many representatives of students and faculty as possible can be reached without interfering with the order of teaching and learning. The ultimate goal of the survey is to provide reference and support for the development of informatization in Shandong University of Engineering and Vocational Technology, and to lay the foundation for further improving the quality of education and service level. By gaining a deeper understanding of the current status and problems of the current informatization construction, targeted suggestions and measures can be provided for the future development of informatization in the university.

1.5 Significance of the Study

Through the research on the informatization of education management in Shandong University of Engineering and Vocational Technology, a large amount of basic data has been obtained and certain research results have been achieved, thus

providing certain data support and theoretical support for the promotion of management network informatization in the school. This paper takes the influence factors of educational network informatization as the research content, which enriches the research perspective to a certain extent. Then, according to the data analysis obtained from the questionnaire survey, the development status quo of network informatization in Shandong University of Engineering and Vocational Technology is understood, and relevant research is carried out on the basis of this, which can supplement the literature research content of informatization education management informatization and add more empirical cases of relevant research (Yu, 2021).

In the practical sense, effectively promoting the construction and development of vocational schools in the education management network can improve the level of school education management in the context of the network era to deliver more information technology talents for the community, but also play an important role in the professional training of teachers, and thus promote the smooth implementation of the school network informatization reform of the extensive use of education information technology, which has led to sweeping changes in the field of education, students, teachers and education management. The extensive use of information technology in education has led to drastic changes in the field of education, with students, teachers and education administrators, as the basic constituents of school education, undergoing significant changes in their status, role and function in the application of information technology (Zhao, 2022).

The implementation of network informatization of education management requires bidding farewell to the traditional education management mode, integrating teachers and students with resources, so as to realize the purpose of integrated management. This requires schools to make changes in the management system, business process redesign and optimization, and schools and schools to change the way of information transfer, communication and sharing of educational information resources also become more frequent and convenient. Under the promotion of new management concepts, school management can be realized to the network management development and traditional education to the transformation of intelligent education. In this process, it is also necessary to have advanced management concepts, and the combination of the two can realize the updating of the school's education model, the smooth operation of business and the reconstruction of the organizational model, so as to better integrate the various resources of modern education, and ultimately to realize the informatization of the school's educational management and enhance the competitiveness of the school (Liu et al., 2021; Yu, 2021). Therefore, in practice, strengthening the school education management network informatization can provide more convenient data and information support for the relevant administrative departments to make effective decisions, and can also better contribute to the modernization of information technology in education.

1.6 Conceptual and Operational Definition

Infrastructure Development: Infrastructure development involves the configuration and construction of hardware facilities, network equipment and related equipment on campus. The operational definition may include the assessment of the campus network coverage, bandwidth size, network stability, and the quantity and quality of computers, projectors, and other informatization equipment on campus.

Informatization Resource Management: Informatization resource management includes the effective management and utilization of informatization resources such as teaching resources, teaching information system, student information system and so on. The operational definition may include the assessment of the digitization degree of teaching resources, the convenience of the management system, and the updating and maintenance of informatization resources.

Informatization Management Environment: The informatization management environment refers to the degree of support and management mechanism for informatization construction on campus. The operational definition may include assessing the degree of importance attached to informatization construction by school leaders, the formation and operation of the informatization management team, and the relevant policies and regulations formulated.

Vocational Education Informatization: Vocational education informatization refers to the application and promotion of informatization technology in the field of vocational education. The operational definition may include assessing the application of informatization technology in the teaching and learning process, the level of informatization literacy of teachers and students, the degree of digitization of teaching resources, and other aspects.

Chapter 2 Literature Review

2.1 Literature Review

2.1.1 Education Informatization

Educational management informatization is a series of activities such as organizing, planning, controlling and coordinating the process of implementing educational informatization. The purpose of educational information management is to effectively improve the efficiency of educational information management, and its functions are realized in order to effectively use the rights granted by the state. In order to comply with the trend of informatization of education in the world, it is necessary to give full play to the leading role of each educational subject, and to establish a mechanism of information interoperability as well as autonomy and independence for educational management (Gong, 2020). More specifically, through the internal organizational adjustment of the education system, the use of information technology and scientific management methods, in the management process to reasonably and efficiently reduce the cost of management, improve the efficiency of management personnel, to achieve the maximization of the management utility, and to achieve the improvement of the level of information technology in education management. From the perspective of educational information management, researchers have mainly based on five aspects of educational management informatization, school management informatization, management of educational informatization and informatization leadership (Liu, 2020).

In the 1990s, the concept of "education informatization" came to us after the emergence of the information highway. In the 21st century, education informatization has become a key synonym for education modernization. However, there is still no authoritative concept of education informatization. The word "informatization" was firstly mentioned, and has been widely used in all aspects of education. At the same time, the term "education informatization" began to appear frequently in the documents of various government departments. The application of information technology and network technology in education is an effective way to realize "Internet + education" (Lorsanova, 2019).

The systematic project of education modernization can only be carried out by actively integrating information technology into the field of teaching and learning, and continuously innovating and exploring information resources, so that innovative talents adapted to the information age can be cultivated according to the expectations, and the modernization of education can be pushed forward in a step-by-step manner. The definition of education information technology is to make full use of educational resources in the field of education and then supplemented by the optimization of the

teaching process. Modern information technology to expand the field of education concept, organization, education environment and other links, the development of information technology is a systematic project that cannot be ignored. Information technology in the new era is still an important part of the education system, the integration of modern intelligent technology and education teaching is a prerequisite for the realization of the development of information technology in education (Bazhenova, 2020).

Education informatization includes two aspects: one is to improve the quality of information as the purpose of education, and the other is to make effective use of information technology in teaching management and scientific research. From this, we can see that no matter what the definition is, it is a re-conceptualization of education informatization, which lays the foundation for a better understanding of the connotation of education informatization (Gong, 2020; Liu, 2020). By comparing the characteristics of the development of education informatization policy, it is found that education informatization is a dynamic and predictable development in the field of education with the development of science and technology and the process of continuous integration with it. Information technology is infiltrated into all levels of education, and intelligent education is carried out, with the main purpose of changing the shape of education and the demand for talents, and innovating the form of teaching and learning, so as to meet the requirements of the Ministry of Education for improving the quality of education.

2.1.2 Education Informatization Service

"Education informatization service" is developed by the extension of education services, with the promotion of the concept of informatization and the development of technology, education services and informatization are gradually and organically combined, and under the background of rapid development of education informatization, the education informatization service comes into being. For the definition of education informatization service, there is no unified concept. Scholars analyze it from different dimensions. From the perspective of service, it is pointed out that education informatization service is the process of using information technology to improve the level of education and training, promote the improvement of students' performance, and increase the quality of education by using information technology infrastructure, through the use of digital resources, advanced tools and so on (Dneprovskaya, 2018). Education informatization service belongs to a specific presentation of education service, more show service, is a necessary supplement to education and teaching, is conducive to promoting the development of education both definitions are in the context of education service, emphasizing the concept of informatization service.

Education informatization service is the use of information technology, as well as the implementation of information technology in the educational environment, to

promote the growth of students, school education and social education and its unity and correspondence, in order to meet the development of education and society from the above research found that the definition of education informatization service can be carried out from two aspects: First, the concept of service, education informatization as the main body of the service, emphasizing the attributes of its services, specifically including information technology products and services, such as information technology hardware and software, equipment maintenance, network infrastructure, etc. (Liu et al., 2019); the second is the education informatization as a service object, highlighting its role is to promote the enhancement and optimization of education informatization. Faced with the current education informatization into a new stage, the need for more service support, engaged in education informatization services facing new changes in the environment, and gradually produced a number of new forms, such as system services, operation and maintenance services, consulting services, etc., which have contributed to the upgrading of education informatization services (Yan & Yang, 2020).

This paper combines the above viewpoints, comprehensive education informatization and the combination of service concepts, the definition of education informatization services: according to the direction and requirements of the development of information technology, Internet technology, etc., the government, schools, cooperating enterprises and other participating bodies, based on the scientific model, method, etc., such as building the informatization environment, increasing the number of digital resources, strengthening the training of teachers, and providing service programs and other initiatives to promote the process of education informatization, the needs of service recipients are met (Koroleva, 2016). It is a dynamic process of realizing the reform and upgrading of education and the innovative development of the education field at the same time that the needs of the service recipients are satisfied.

2.1.3 Educational Communication Theory

(1) Definition of Educational Communication Theory

Dissemination refers to the conveyance of information to the addressee in a specific way under a suitable medium. In the field of education, it is a typical information dissemination behavior to disseminate the relevant content to the teaching object through the medium of teaching based on the specific teaching purpose. Educational communication is essentially the use of multimedia technology through a variety of teaching forms of educational information transfer, information sharing, so as to achieve the purpose of education and teaching (Fendo & Pudchenko, 2018). Educational communication includes communication between people and their own internal communication. Educational communication between people is well understood, between teachers and students, between teachers, between students can

carry out educational communication behavior; but the internal communication of people themselves is the process of mutual communication between the sensibility of me and the rationality of me, is a person in the perception of the phenomenon seen after the processing of its reasoning, so as to produce the concept of the word, which is the formation of their own thought process. Teaching classroom, whether it is the communication between people or their own internal communication is happening at the same time, the object of teaching in the teacher to receive the dissemination of educational knowledge, first of all, to produce a total acceptance of the information, followed by the subjective thinking of the information dispersion, and finally their own absorption of the information, to become their own knowledge (McBeath, 1987).

The importance of the medium of communication in the theory of educational communication has led to the theory that the medium is the message. That is, the medium through which the teaching communication passes is what is really valuable for research. In the context of informationized education, the medium of instruction in educational communication has changed and can be said to have been upgraded. From the basic multimedia equipment upgraded to informationized teaching equipment, changes in the medium of teaching also brought about changes in the teaching mode of teachers to improve the receptive capacity of the target audience in order to adapt to the new form of educational communication changes (Latour, 2022). It is worth noting that in order to achieve good teaching results, communication between teachers and students is very important, with emphasis on the student side, to avoid the lack of information conveyance and communication. The information communicated by education should be within the cognitive scope of students to avoid the situation of incomplete understanding of information and reduce the interference of misinformation. The infrastructure of educational informatization in schools creates a good environment for educational communication, and the mastery of the informatization ability of the communication target is closely related to the level of teachers' informatization. Teachers who want to achieve the best teaching results should take the initiative to explore more ways to use the communication media, and to explore the novel teaching forms of informatization equipment, so as to attract the attention of the students and carry out an efficient classroom. The theory of educational communication for the development of secondary education informatization is that the medium of educational communication is the information infrastructure, the development of educational informatization is the first step to solve the communication media information infrastructure construction, in order to successfully carry out a reasonable planning for the teaching program (Fendo & Pudchenko, 2018; Latour, 2022).

(2) Infrastructure Development

Vocational schools to promote the process of education information management, the first step is to improve the network infrastructure, the establishment of perfect network facilities is the basis and premise of campus information management. The construction of a complete campus network in the network planning should realize

strong data and communication processing capacity, fast operation speed; internal network security and reliability, able to resist network attacks, stable network operation; network design is easy to expand and manage; backbone network has a high bandwidth to meet the growth of data traffic (Delcker & Ifenthaler, 2020).

Research on the impact of infrastructure construction on vocational education informatization based on educational communication theory. The construction of a sound infrastructure, such as network facilities and computer equipment, can improve the efficiency of information resource acquisition and dissemination, making the informatization content of vocational education more accessible to students and teachers, thus enhancing the accessibility of educational resources. Good infrastructure can promote the two-way dissemination and interaction of educational information, and the communication and interaction between teachers and students and among students are more convenient and frequent, which is conducive to the sharing and exchange of knowledge and improves the interactivity and efficiency of teaching. The construction of infrastructure can improve the efficiency of information processing and management, simplify the educational management process, make the deployment of educational resources more flexible and efficient, and help to improve the overall teaching quality and efficiency of vocational education. Good infrastructure provides technical support and guarantee for the innovation of education informatization, promotes the innovation and reform of education teaching mode, and promotes the development and progress of vocational education informatization. Infrastructure construction based on the theory of educational communication plays an important role in promoting and facilitating the informatization of vocational education, and is of great significance in improving the quality of vocational education and promoting teaching reform and innovation (Chetty et al., 2018).

2.1.4 Educational Equalization Theory

(1) Definition of Educational Equalization Theory

The term equilibrium was first used in economics. Equilibrium can be summarized as a state of relative stability of the values of interacting variables in an economic organization in the process of change, and this state of stability can be defined as: equilibrium. This definition was later applied in the field of education, where it was argued that the stability that exists within the educational system is manifested among the various elements, so that a state of unity within education can be achieved (Assari, 2018).

With the rapid development of economy and social sciences under the social trend, vocational education to achieve educational equilibrium will certainly be included in the agenda of educational goals. The construction development and practical use of education informatization has made breakthroughs on the way to achieve the goal of

education balance issued by China's Ministry of Education. Schools should improve the quality of education and promote the balance of education by improving their own informationization construction (Assari & Bazargan, 2019). The theory of education balance is mainly manifested in the construction of education informatization: first, innovative teaching mode. The new information technology breaks the limitation of time and space, and spreads the teaching resources across the territory and time. Realize the sharing of high-quality educational resources, and realize the educational balance of teaching resources. Secondly, it is to improve the quality of teachers. The quality teaching resources on the shared education platform created by education informatization (Koroleva, 2016). Teachers for the production of courseware provides novel ideas, the collision of ideas of teachers from different regions, inspired teachers to create classroom teaching, but also draw on novel forms of teaching, to achieve a balanced sharing of the teaching model. Thirdly, it highlights students' individuality. Balanced education mainly emphasizes the balance of quality, education and teaching can not only take the teacher as the main body, but also should take into account the actual needs of students, the diversity of information for students to access resources to improve the convenience. Teachers focus on the personalized development of students in order to implement personalized teaching for students under the premise of effectively achieving balanced education. Therefore, the construction of education informatization is closely related to the balanced development of education, and the construction of the relevant elements of education informatization is of great help to improve the quality of education and realize the balance of education (Latour, 2022).

(2) Informatization Resource Management

Informatization resource management based on educational communication theory has a significant impact on vocational education informatization. Good informatization resource management can provide more convenient and efficient information acquisition and dissemination channels, help students and teachers obtain the required educational information resources, and promote knowledge dissemination and sharing. Informatized resource management can provide customized learning resources and services according to students' individual needs, meet the learning needs of different students, and promote the development of personalized learning and teaching mode (Kun-fa et al., 2019). Through informatized resource management, comprehensive monitoring and management of the teaching process can be realized, including curriculum design, teaching evaluation and other aspects, which is conducive to enhancing the quality and efficiency of teaching, promoting teaching reform and improving teaching standards. Informatized resource management can support learning and promoting the sharing and utilization of educational resources. Informatized resource management based on the theory of educational communication has an important role to play in promoting the informatization of vocational education, which helps to improve the quality of teaching, promote the reform of teaching and foster the innovative development of education (You & Wu, 2019).

(3) Informatization Management Environment

The information management environment based on educational communication theory has a significant impact on the informatization of vocational education. Information dissemination efficiency is improved. A good informatization management environment can provide efficient information dissemination platforms and tools to help teachers and students acquire, disseminate and share educational information more conveniently, thus improving the efficiency and speed of information dissemination. Learning experience improvement. Through the informatization management environment, students can be provided with more diversified and rich learning resources and learning environments, which can enhance the learning experience and participation, and promote active learning and the cultivation of students' independent learning ability (Gao et al., 2020). Optimization of teaching management. The informatized management environment can realize comprehensive monitoring and management of the teaching process, including curriculum design, teaching evaluation, student tracking, etc., which is conducive to improving the quality and efficiency of teaching, and promoting the reform of teaching and the innovation of teaching mode. Resource sharing and cooperation. A good informatization management environment can promote information sharing and cooperation among teachers, students and between schools and external resource institutions, realize the sharing and optimal allocation of educational resources, and promote the in-depth development of education informatization. Cultivation of innovation ability. The informatization management environment provides teachers and students with innovative platforms and tools, which helps to cultivate their sense of innovation and innovation ability, and promotes the innovation and reform of education and teaching mode. The informatization management environment based on the theory of educational communication has an important role in promoting vocational education informatization, which helps to improve the quality of education, promote the reform of teaching and facilitate the innovative development of education (Lytvyn et al., 2019).

2.2 Research Relevant

From the content of the study, a number of scholars have conducted research on the current development status of education informatization and team building of teachers, with a view to realizing the sustainable development of education informatization. Strengthening the concept of informatization, enhancing infrastructure construction, and developing software resources are the suggestions for future development put forward by scholars in their research on education informatization (Antonyan, 2021).

Scholars' research perspectives have shifted to the level of information technology application, favoring practicality In view of the current research status of education informatization, future research should focus on three aspects: first, strengthening the

in-depth integration of information technology and teaching within the curriculum; second, as the main body of the research, it is very important for teachers and students to be equipped with information literacy; and third, it is essential to study the reforms in the field of education and the in-depth connection of education informatization. The research methodology pursues diversification and specialization, ensures the reliability of the research conclusions, and both applies and expands the research theories accordingly (Kornilov & Rusinov, 2021).

Europe and the United States are the forerunners in the development of educational informatization, and the formation of information competence of future subject teachers in the educational process is well grounded, revealing that good informational competence of future teachers is an important part of the reform of the educational system. The study of teachers' information literacy and teaching informatization in the sphere of knowledge is conducive to the formation of informational competence of future teachers. The introduction of first-class technologies in the process of training future informatization teachers will allow to train competent industry specialists with a personality for social development. In addition, the formation of informational competence of students helps them to understand economic, legal and social aspects of information, to observe ethical and legal norms in the process of realization of access to and use of information (Wang & Wang, 2018).

The purpose of informatization of education is to provide a comfortable educational environment for teachers in order to concentrate on innovative forms of teaching and improve their training. Due to lack of adequate training and lack of confidence of rural teachers in the use of technology, it is recommended that the training of teachers in computerization be strengthened and large-scale teacher training be conducted online. This not only saves money, but also provides more diverse access to resources (Delcker & Ifenthaler, 2020). Education informatization should start with training teachers, requiring them to gradually develop an information-oriented learning atmosphere and actively promote the development of education informatization. Global information space, the efficient development of education informatization is an inseparable and important part of this process. The combination of information technology and education has become a field of activity related to the interests of mankind, a hallmark of the twenty-first century, and a basis for solving the problems faced by mankind. In the information society, where information has the highest value and a person's information literacy becomes a determining factor in professional activity, the requirements of the education system have changed and the status of information technology has increased significantly (Assari & Bazargan, 2019).

Education informatization, as an important educational policy to promote educational equity, is still to be improved in terms of specific construction. In view of this, this study utilizes the theory of educational communication and the theory of educational balance based on the reference to the existing effectiveness and reflection on the existing development (Yan & Yang, 2020). Combined with literature analysis

and questionnaire survey method to explore the influencing factors of education informatization in Shandong University of Engineering and Vocational Technology. It further studies the value embodiment of the school in the process of education informatization construction, so as to enrich the empirical research in the process of education informatization towards the construction of vocational education, and tries to provide new theoretical references for the rapid development of education informatization in vocational education on the basis of this (Kun-fa et al., 2019).

2.3 Conceptual Framework

The research model is finally constructed by combing Educational Equalization Theory and Educational Communication Theory through literature review and related studies. In the model, vocational education informatization is the dependent variable, and infrastructure development, informatization resource management, informatization management environment are the independent variables. Hypotheses are made for the relationship between the variables and the model is constructed. The model framework is shown in Figure 2.2
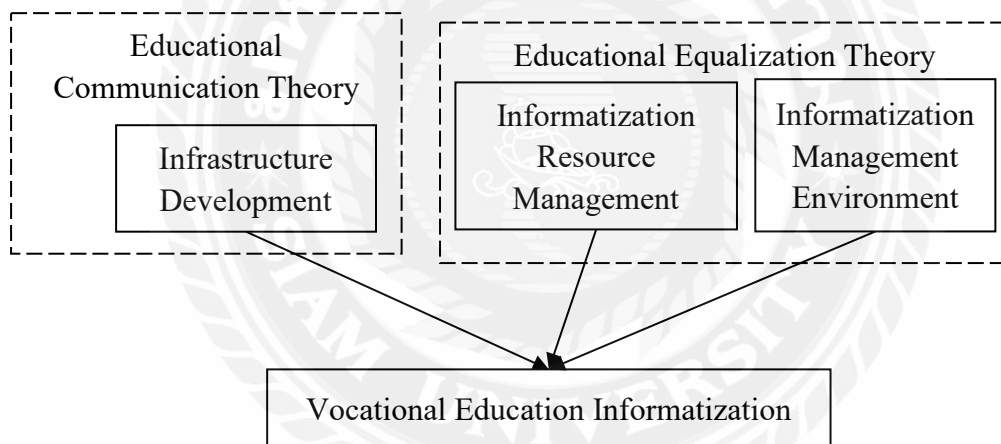

Figure 2.2 Conceptual framework

Chapter 3 Research Methodology

3.1 Introduction

The main research of this study is about the factors influencing the vocational education informatization for Shandong University of Engineering and Vocational Technology. Research variables such as infrastructure development, informatization resource management, informatization management environment are proposed in the research process. Measurement questionnaires for each variable were designed based on the classical scales of the research literature. The reliability and validity of each variable was measured and correlation analysis can only be done if it passes the reliability test and validity test. The first part is the basic information about the individual samples, which includes basic questions about the gender, age; the second part is test of the individual samples according to the variables of infrastructure development, informatization resource management, informatization management environment. A five-point Likert scale was used for the test, with scores ranging from 5 to 1 for strongly agree, agree, neutral, disagree, and completely disagree.

3.2 Research Design

This study adopts quantitative research. According to Educational Equalization Theory and Educational Communication Theory, the study mainly focuses on Vocational Education Informatization, with a total of 14 questions in the questionnaire, which is based on a scale. Factors affecting Vocational Education Informatization are divided. The first part is the survey of basic information, including the gender and occupation. The second part is the influencing factors, infrastructure development involves 3 items, informatization resource management involves 3 items, informatization management environment involves3 items. See Table 3.1.

Table 3.1 The Measurement Items

Variable	Measurement item	NO.
Infrastructure Development	1 In your school/institution, do you think the current network facilities meet your teaching and learning needs?	Q1
	2 Do you think the computer equipment in your school/institution is sufficient to support you in your teaching and learning activities?	Q2
	3 You are satisfied with the other infrastructures (e.g. labs, multimedia equipment, etc.) provided by your school/institution?	Q3
Informatization Resource Management	4 Do you find the online course resources provided by the school/institution abundant and easy to access?	Q4
	5 You are satisfied with the availability of e-library and databases provided by the school/institution?	Q5

Variable	Measurement item	NO.
	6 You think the personalized learning support provided by the school/institution is effective?	Q6
Informatization Management Environment	7 Do you think the school/institution's instructional management system (e.g., student information management system, online assignment submission system, etc.) is easy to operate?	Q7
	8 Do you think the teaching support and training provided to teachers by your school/institution is adequate?	Q8
	9 In your school/institution, do you feel that there is an information management environment that encourages innovation and collaboration?	Q9
Vocational Education Informatization	10 You find the level of informatization of vocational education in your school/institution satisfactory?	Q10
	11 In your school/institution, do you feel that the informatization of vocational education has had a positive impact on teaching and learning?	Q11
	12 Do you have a firm attitude towards the promotion of informatization in vocational education in your school/institution?	Q12

3.3 Hypothesis

The independent variables in this study are infrastructure development, informatization resource management, informatization management environment. The dependent variable is vocational education informatization, and the model is constructed based on the analysis and the relationship between the variables. The relationship between variables is set through hypotheses. Therefore, hypotheses are formulated:

H1: Infrastructure Development has a significant positive effect on the vocational education informatization of Shandong University of Engineering and Vocational Technology.

H2: Informatization Resource Management has a significant positive effect on the vocational education informatization of Shandong University of Engineering and Vocational Technology.

H3: Informatization Management Environment has a significant positive effect on the vocational education informatization of Shandong University of Engineering and Vocational Technology.

Combined with Educational Equalization Theory and Educational

Communication Theory, the hypothetical model of the influencing factors of vocational education informatization for Shandong University of Engineering and Vocational Technology, and the interrelationships among the variables are confirmed. See figure3.1.
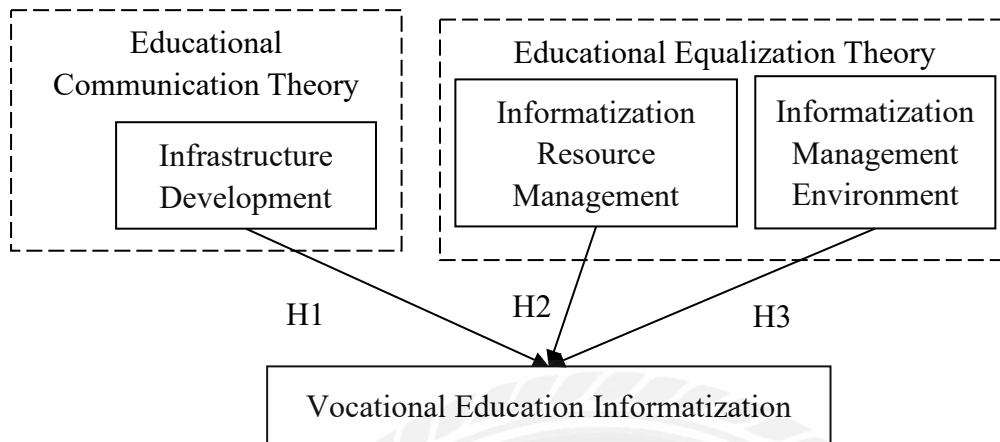

Figure 3.1 Hypotheses

3.4 Population and Sampling

The scope of this study is Shandong University of Engineering and Vocational Technology. According to the statistics of Shandong University of Engineering and Vocational Technology, there are 240,000 students. Combined with the reliability of sample extraction of 99.9%, the sample size was calculated.

$$N = \frac{r^2 * \rho(1-\rho)}{\beta^2}$$

In the formula, N represents the sample size, s value for the standard normal distribution of the quartile, for the confidence level generally take the value of 95%, at this time $\rho = 1.96$. r for the sample standard deviation, the sample standard deviation of the estimated value of the standard deviation of the general use of 0.5, to determine the error tolerance β (i.e., the maximum permissible value of the difference between the sample mean and the overall mean), $\beta = 0.05$. The calculation gives the sample size for this sample survey as 398.89, so the number of people to be sampled is 399.

3.5 Data Collection

For the research on the factors affecting t vocational education informatization for Shandong University of Engineering and Vocational Technology, the survey targets students of Shandong University of Engineering and Vocational Technology, including students of various disciplines.

The questionnaire was distributed by means of electronic questionnaires, and the link to the questionnaire could be sent through the school's e-mail system or online survey platform. Students fill in the questionnaire by clicking on the questionnaire link, and the data are stored directly in the electronic database to ensure the security and integrity of the data. The collected data were cleaned and organized, including checking the recovery of the questionnaires, the completeness and logic of the data. The study period is from October 1, 2023 to January 1, 2024.The duration of the survey is four months. After counting, 399 electronic questionnaires were distributed and 336 valid questionnaires were recovered, with a recovery rate of 84.21%.

3.6 Data Analysis

3.6.1 Reliability

In this paper, the Cronbach's Alpha factor was analyzed using SPSS software on the questionnaire using the scale questions. Usually, the coefficient factor is greater than 0.9 to identify a high degree of consistency in the questionnaire; if the Cronbach's Alpha coefficient is 0.7-0.9, it means that the internal consistency is good; if the Cronbach's Alpha coefficient is less than 0.7, it means that the inconsistency of each question item is high in the scale, and the scale needs to be revamped.

The reliability analysis of the scale part of the questionnaire yields a coefficient of 0.8 or more, indicating that the questionnaire has a high degree of credibility and its statistics can truly reflect the detailed status of the use of educational informatization. This study analyzed the aspects of infrastructural development, informatization resource management, informatization management environment in Shandong University of Engineering and Vocational Technology. SPSS software was used to analyze the validity, and the significance <0.05, two conditions are satisfied simultaneously to prove that this questionnaire is suitable for factor analysis to examine its effect, and it can be analyzed for the content of each dimension.

The Cronbach's alpha coefficient of infrastructure development is 0.822, the Cronbach's alpha coefficient of informatization resource management is 0.858, the Cronbach's alpha coefficient of informatization management environment is 0.885, and the Cronbach's alpha coefficient of Vocational Education Informatization is 0.838. All of them are in the range of 0.8~0.9, which indicates that the reliability of this paper's questionnaire is better, and then the validity can be further analyzed. This indicates that the reliability of the questionnaire of this survey study is very good, as shown in Table 3.2.

Table 3.2 Variate Reliability Test

Variate	Cronbach's Alpha	N of Items
Infrastructure Development	0.822	3
Informatization Resource Management	0.858	3
Informatization Management Environment	0.885	3
Vocational Education Informatization	0.838	3

3.6.2 Validity

The questionnaire validity test was done by KMO and Barlrtt's ball test. According to the test standard of KMO value, if the value of KMO is less than 0.5, it means that the validity of the questionnaire is not good: when the value of KMO is closer to 1, it means that there are more common factors between the items of the questionnaire, and it is more conducive to analyzing and testing of each factor.

(1) Infrastructure Development

The variable Infrastructure Development was factor analyzed using SPSS. The data analysis yielded a significant Sig value and a KMO value of 0.720 indicating that the results of this study could be factor analyzed. Factor analysis was conducted on the question items. The factors were extracted using Principal Component Analysis during the analysis process. Finally, the factor loading matrix was obtained to get the Classroom questioning factor loading table, as shown in Table 3.3. From the data in the table, it can be seen that Infrastructure Development extracted only one common factor, which explains73.758% of the variance, indicating that the ability to explain the variance is strong. The loadings of each measurement item are greater than 0.8, indicating that the explanatory power is better and each measurement item has better convergent validity.

Table 3.3 Infrastructure Development Factor Analysis

Variable	Items	1
Infrastructure Development	Q1	0.858
	Q2	0.854
	Q3	0.864
% of Variance		73.758%
Cumulative %		73.758%
KMO		0.720
df		3
Sig.		0.000

(2) Informatization Resource Management

The variable Informatization Resource Management was factor analyzed using SPSS. The data analysis yielded a significant Sig value and a KMO value of 0.718, indicating that the results of this study could be factor analyzed. Factor analysis was conducted on the question items. The factors were extracted using Principal Component Analysis during the analysis process. Finally, the factor loading matrix was obtained to get the Informatization Resource Management factor loading table, as shown in Table 3.4. From the data in the table, it can be seen that Classroom questioning extracted only one common factor, which explains 77.939% of the variance, indicating that the ability to explain the variance is strong. The loadings of each measurement item are greater than 0.8, indicating that the explanatory power is better and each measurement item has better convergent validity.

Table 3.4 Informatization Resource Management Factor Analysis

Variable	Items	1
Informatization Resource Management	Q4	0.870
	Q5	0.911
	Q6	0.867
% of Variance		77.939%
Cumulative %		77.939%
KMO		0.718
df		3
Sig.		0.000

(3) Informatization Management Environment

The variable Informatization Management Environment was factor analyzed using SPSS. The data analysis yielded a significant Sig value and a KMO value of 0.739, indicating that the results of this study could be factor analyzed. Factor analysis was conducted on the question items. The factors were extracted using Principal Component Analysis during the analysis process. Finally, the factor loading matrix was obtained to get the Informatization Management Environment factor loading table, as shown in Table 3.5. From the data in the table, it can be seen that Informatization Management Environment extracted only one common factor, which explains 81.270% of the variance, indicating that the ability to explain the variance is strong. The loadings of each measurement item are greater than 0.8, indicating that the explanatory power is better and each measurement item has better convergent validity.

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Table 3.5 Informatization Management Environment Factor Analysis

Variable	Items	1
Informatization Management Environment	Q7	0.893
	Q8	0.893
	Q9	0.919
% of Variance		81.270%
Cumulative %		81.270%
KMO		0.739
df		3
Sig.		0.000

(4) Vocational Education Informatization

The variable Vocational Education Informatization was factor analyzed using SPSS. The data analysis yielded a significant Sig value and a KMO value of 0.723, indicating that the results of this study could be factor analyzed. Factor analysis was conducted on the question items. The factors were extracted using Principal Component Analysis during the analysis process. Finally, the factor loading matrix was obtained to get the Vocational Education Informatization factor loading table, as shown in Table 3.6. From the data in the table, it can be seen that Vocational Education Informatization extracted only one common factor, which explains 75.531% of the variance, indicating that the ability to explain the variance is strong. The loadings of each measurement item are greater than 0.8, indicating that the explanatory power is better and each measurement item has better convergent validity.

Table 3.6 Vocational Education Informatization Factor Analysis

Variable	Items	1
Vocational Education Informatization	Q10	0.882
	Q11	0.872
	Q12	0.852
% of Variance		75.531%
Cumulative %		75.531%
KMO		0.723
df		3
Sig.		0.000

Chapter 4 Findings

4.1 Introduction

A total of 336 valid questionnaires were collected in the study and the validity rate of the questionnaires was 84.21%. The collected data were analyzed by descriptive statistics and the data conformed to normal distribution. Correlation was verified based on the hypothesized relationship between the variables that do not make sense. Pearson correlation analysis was used to determine the correlation and significance between each variable. Finally, the conclusions of the study were drawn based on the analysis.

4.2 Description of Statistical Variables

This study took the students of Shandong University of Engineering and Vocational Technology as the research object, and adopted the stratified random sampling method to survey the students of the school, covering all the students of the school. A total of 399 questionnaires were distributed to teachers of all majors, and 336 valid questionnaires were recovered, with an effective recovery rate of 84.21%.

The target population of this study is students, so only two variables, gender and grade level, were selected for the statistical characteristics of the student population sample. In the survey on gender there were 155 males or 46.1% of the total number of students surveyed, and 181 females or 53.9% of the total number of students surveyed, which is basically a balanced ratio of males and females in the survey sample. In the grade survey in the first year of university students for 52 people accounted for 15.5%, the second year of university for 91 people accounted for 27.1%, the third year for 100 people accounted for 29.8%, the fourth year of university for 86 people accounted for 25.6%. basically in line with the uniform distribution. See Table 4.1.

Table 4.1 Distribution of Basic Characteristics of Samples (N = 336)

Items	Options	Frequency	Percent%
Gen	Male	155	46.1
	Female	181	53.9
Grand	1	52	15.5
	2	91	27.1
	3	100	29.8
	4	86	25.6
	Others	7	2.1
	Total	336	100

Descriptive statistics were analyzed for each question item for each variable. The main measurements were the maximum value, minimum value, mean and average of each question item and standard deviation of the variable. The analysis reveals that the maximum value of each question item is 5, the minimum value is 1 and the mean value is above 4.2. See Table 4.2.

Table 4.2 Descriptive Statistics

Various	Items	Min	Max	Mean	Std. Deviation
Infrastructure Development Informatization Resource Management	Q1	1	5	4.31	0.952
	Q2	1	5	4.21	0.934
	Q3	1	5	4.25	0.988
Infrastructure Development Informatization Resource Management	Q4	1	5	4.30	0.960
	Q5	1	5	4.21	1.038
	Q6	1	5	4.24	0.991
Infrastructure Development	Q7	1	5	4.26	0.936
	Q8	1	5	4.23	0.985
	Q9	1	5	4.21	0.994
Vocational Education Informatization	Q10	1	5	4.38	0.820
	Q11	1	5	4.36	0.849
	Q12	1	5	4.33	0.826

4.3 Results of the Study

The existence of a correlation between variables is analyzed by Pearson correlation coefficient (r), which ranges from -1 to 1. The closer the value of r is to 1 or -1, the stronger the correlation is; the closer it is to 0, the weaker the correlation. According to Table 4.3, the correlation coefficients, r, range from 0 to 1 and are significantly correlated at the 0.01 level, and there is a significant correlation between the two variables (P<0.01).

Pearson's correlation coefficient is a statistical measure used to reflect the degree of linear correlation between two variables. The correlation coefficient is denoted by r, where n is the sample size, and n is the observed and mean values of the two variables. r describes the degree of linear correlation between the two variables, and the larger the absolute value of r, the stronger the correlation is. Based on the results of the above analysis, it can be seen that there is a 99% significant correlation between the variables. And the correlation coefficient is greater than 0, so all are positively correlated.

Table 4.3 Correlation Between Variables (Pearson Correlation Matrix)

	Infrastructure Development	Informatization Resource Management	Informatization Management Environment	Vocational Education Informatization
Infrastructure Development	1			
Informatization Resource Management	.627**	1		
Informatization Management Environment	.623**	.624**	1	
Vocational Education Informatization	.592**	.602**	.550**	1

NOTE：*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

According to the table, the Pearson correlation coefficients of infrastructure development, informatization resource management, informatization management environment are all greater than 0.5, less than 0.9, and P<0.01, indicating that there is a correlation between each variable and it is positive. It indicates that there is a correlation between each variable, and it is positive.

The Pearson correlation coefficient between Vocational Education Informatization and Infrastructure Development is 0.592, and P<0.01, indicating that there is a correlation between Vocational Education Informatization and Infrastructure Development, and it is a general correlation.

The Pearson correlation coefficient between Vocational Education Informatization and Informatization Resource Management is 0.602, and P<0.01, indicating that there is a correlation between Vocational Education Informatization and Informatization Resource Management, and it is a general correlation

The Pearson correlation coefficient between Vocational Education Informatization and Informatization Management Environment is 0.550, and P<0.01, indicating that there is a correlation between Vocational Education Informatization and Informatization Management Environment, and it is a general correlation

The Pearson correlation coefficient between Informatization Management Environment and Infrastructure Development is 0.623, and P<0.01, indicating that there is a correlation between Informatization Management Environment and Infrastructure Development, and it is a general correlation.

The Pearson correlation coefficient between Informatization Management Environment and Informatization Resource Management is 0.624, and P<0.01, indicating that there is a correlation between Informatization Management Environment and Informatization Resource Management, and it is a general correlation.

The Pearson correlation coefficient between Infrastructure Development and Informatization Resource Management is 0.627, and P<0.01, indicating that there is a correlation between Infrastructure Development and Informatization Resource Management, and it is a general correlation.

Therefore, according to the results of data analysis, Infrastructure Development has a significant positive effect on vocational education informatization for Shandong University of Engineering and Vocational Technology. Hypothesis H1 holds. Informatization Resource Management has a significant positive effect on vocational education informatization for Shandong University of Engineering and Vocational Technology. Hypothesis H2 holds. Informatization Management Environment has a significant positive effect on vocational education informatization for Shandong University of Engineering and Vocational Technology. Hypothesis H3 holds.
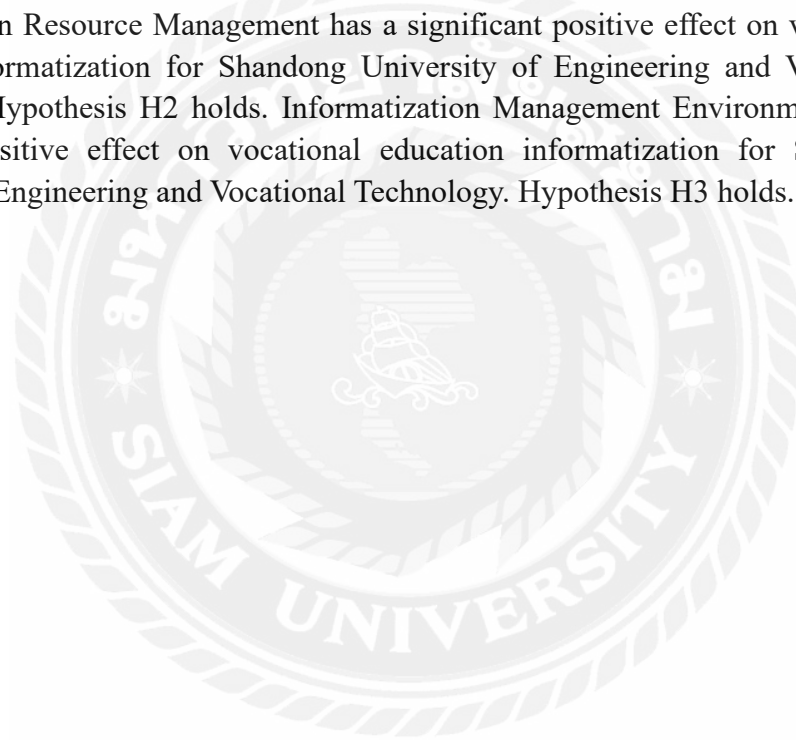
Chapter 5 Conclusion and Recommendation

5.1 Conclusion

A total of 336 valid questionnaires were surveyed during the study. By analyzing the questionnaire data, the reliability and validity of the data meet the requirements. Therefore, correlation analysis was carried out and according to the data results of correlation analysis there is a correlation between the variables. According to educational equalization theory and educational communication theory, it was finally concluded that infrastructure development, informatization resource management, informatization management environment have impact on vocational education informatization.

5.1.1 Infrastructure Development Has a Significant Positive Effect on Vocational Education Informatization

The Pearson correlation coefficient between vocational education informatization and infrastructure development is 0.592, and P<0.01, indicating that there is a correlation between vocational education informatization and infrastructure development, and it is a general correlation. This finding indicates that there is a correlation between vocational education informatization and infrastructure development and that this correlation is general. Specifically, the Pearson correlation coefficient is 0.592, which means that there is a strong linear correlation between these two variables. p<0.01 indicates that the level of statistical significance is less than 0.01, which means that, at this level, we can be fairly confident that this correlation is not due to random factors.

Explaining this finding may involve specific research, but in general, the development of vocational education informatization may be affected by infrastructure development. For example, if a region has a high level of infrastructure development, such as broadband network coverage and high penetration rate of electronic devices, vocational education institutions in this region are more likely to implement informatized teaching, provide online learning resources, etc. Therefore, the result of this study may imply that the improvement of infrastructure development can promote the development of vocational education informatization, thus improving the quality and efficiency of vocational education.

5.1.2 Informatization Resource Management Has a Significant Positive Effect on Vocational Education Informatization

The Pearson correlation coefficient between vocational education informatization and informatization resource management is 0.602, and p<0.01, indicating that there is

a correlation between vocational education informatization and informatization resource management, and it is a general correlation. The findings of this study indicate that there is a correlation between vocational education informatization and informatization resource management and that this correlation is general. Specifically, the Pearson correlation coefficient is 0.602, which means that there is a strong linear correlation between these two variables. $p<0.01$ indicates that the level of statistical significance is less than 0.01, which means that, at this level, we can be fairly confident that this correlation is not due to random factors.

Interpreting this finding may involve specific research, but in general, there may be a close relationship between the development of vocational education informatization and information resource management. Informational resource management involves the effective management and utilization of information technology, data, and other resources, while vocational education informatization involves the application of information technology to the field of vocational education, including the digitization of teaching resources and the construction of online learning platforms. Therefore, the results of this study may imply that good informatization resource management helps support the development of informatization in vocational education, which in turn improves the quality and efficiency of vocational education.

5.1.3 Informatization Management Environment Has a Significant Positive Effect on Vocational Education Informatization

The Pearson correlation coefficient between vocational education informatization and informatization management environment is 0.550, and $p<0.01$, indicating that there is a correlation between vocational education informatization and informatization management environment, and it is a general correlation. The findings of this study indicate that there is a correlation between vocational education informatization and informatization management environment and that this correlation is general. Specifically, the Pearson correlation coefficient is 0.550, which means that there is a strong linear correlation between these two variables. $p<0.01$ indicates that the level of statistical significance is less than 0.01, which means that, at this level, we can be fairly confident that this correlation is not due to random factors.

Interpretation of this finding may involve specific research components, but in general, there may be an interactive relationship between the development of vocational education informatization and the informatization management environment. The informatization management environment includes the level of informatization within the organization, the management system, and the informatization policy, which affect the promotion and application of informatization in vocational education. Therefore, the results of this study may imply that a good informatization management environment helps to support the development of informatization in vocational education, thus improving the quality and efficiency of vocational education.

Table 5.1 Hypothesis Testing

NO.	Hypothesis	Result
H1	Infrastructure Development has a significant positive effect on vocational education informatization for Shandong University of Engineering and Vocational Technology.	Established
H2	Informatization Resource Management has a significant positive effect on vocational education informatization for Shandong University of Engineering and Vocational Technology.	Established
H3	Informatization Management Environment has a significant positive effect on vocational education informatization for Shandong University of Engineering and Vocational Technology.	Established

5.2 Recommendations

5.2.1 Strengthen of Infrastructure Development

Based on the findings of the study, Shandong University of Engineering and Vocational Technology upgraded its network coverage. Expand the coverage of broadband network, including both urban and rural areas, to ensure that both vocational education institutions and students have stable access to Internet resources. Promote the construction of networks to improve network speed and stability to support more efficient online teaching and distance learning. Shandong University of Engineering and Vocational Technology provides educational institutions and students with the necessary digital equipment, such as computers, tablets, and smartphones, to support information-based teaching and learning. Carrying out rental or subsidy policies for digital equipment to help economically disadvantaged students obtain the necessary equipment. Shandong University of Engineering and Vocational Technology builds a digital teaching environment. Update classroom facilities with digital teaching equipment such as projectors and interactive whiteboards to improve teaching effectiveness and interactivity. Establish digital libraries and multimedia classrooms, enrich teaching resources, and provide more opportunities for online and independent learning. Strengthen information security. Establish a sound information security management system and strengthen network security technology and protection measures to ensure the information security of educational institutions and students. Strengthen information security awareness training, raise the information security awareness of teaching staff and students, and guard against the risks of network attacks and data leakage. Establish a unified digital management platform to integrate educational resources, teaching information and student data, etc., and improve teaching management efficiency and decision-making support capability. Strengthen the training and skill enhancement of digital management personnel to improve the

level of information management and promote the in-depth development of digital management. Measures such as upgrading network coverage, providing digital equipment, building digital teaching environments, strengthening information security and promoting digital management can facilitate infrastructure development and provide strong support for the development of informatization in vocational education.

5.2.2 Enhancement of Informationized Resource Management

Shandong University of Engineering and Vocational Technology establishes a unified resource management platform. A unified digital resource management platform is established to integrate all kinds of teaching resources, including courseware, video, audio, teaching cases, etc., to realize centralized storage, management and sharing of resources. Classification, standardization and update management of resources are realized through the platform to improve the efficiency and quality of resource utilization. Establish a resource collection mechanism to encourage teachers and teaching teams to actively contribute high-quality teaching resources, including self-made resources and excellent third-party resources. Regularly update and audit the resources, remove outdated and low-quality resources in a timely manner, and maintain the novelty and effectiveness of the resource library.

Shandong University of Engineering and Vocational Technology promotes resource sharing and cooperation. Encourage resource sharing and cooperation among educational institutions and across disciplines, establish sharing mechanisms, and share quality teaching resources and teaching experience. Establish a cooperation mechanism between educational institutions and industrial enterprises to share industrial resources and practice cases, and improve the practicability and applicability of teaching. Establish a personalized learning resource recommendation system to recommend appropriate teaching resources according to students' learning needs and interests, so as to improve learning efficiency and learning interests. Promote and apply intelligent teaching resources management system to realize automated management and intelligent pushing of resources, and improve personalized application and effect evaluation of teaching resources. Shandong University of Engineering and Vocational Technology strengthens resource assessment and quality assurance. It establishes a resource assessment mechanism, conducts quantitative and qualitative assessment of resources, evaluates the learning effect, applicability and quality of resources, and ensures the validity and reliability of resources. Regular resource quality checks and assessments are carried out, and quality sampling and supervision of resource libraries are conducted to ensure the quality and updating of resources. By establishing a unified resource management platform, strengthening resource collection and updating, promoting resource sharing and cooperation, enhancing the efficiency of resource utilization and strengthening resource assessment and quality assurance, and other strategies, informatization resources can be effectively managed and optimized, and the level of informatization of teaching can be improved.

5.2.3 Optimization of the Information Management Environment

Information technology environment management refers to the effective management and maintenance of the information technology environment within the organization to support the application and development of information technology. Establishment of informatization management system. Formulate and implement informatization management policies and systems, clarify the responsibilities and authorities of each department, and ensure that informatization management is carried out in an orderly manner. Establish an informatization management committee or related institutions, responsible for coordinating the management of informatization and promoting the development of informatization. Strengthen the construction of informatization talents. Increase the cultivation and introduction of information technology talents to ensure that there are enough technical personnel to support the construction and management of the information technology environment. Organize regular informatization training and skill enhancement activities to improve employees' informatization literacy and application ability. Continuously optimize and upgrade the information technology infrastructure, including network equipment, servers, storage equipment, etc., to improve system stability and performance. Establish a sound informationization security system, strengthen network security protection and data security management, and prevent information security risks. Actively explore and promote the application of informatization technology in various fields, such as education and teaching, research management, and administrative management, to improve work efficiency and service quality. Continuously pay attention to the development trend of informatization technology, actively introduce and apply new technology to maintain the advancement and competitiveness of the informatization environment. Strengthen the propaganda and cultivation of informatization management awareness, and raise the importance and knowledge of organization members on informatization management. Establish an informatization management performance evaluation mechanism to evaluate and assess the informatization management work to motivate and promote the continuous improvement and enhancement of the informatization management work. Through the above strategies, the informatization environment can be effectively managed and maintained, the application level of informatization technology and management efficiency can be improved, and the development and innovation of the organization can be strongly supported.

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Appendix Questionnaire

Dear Sir/Madam,

Thank you for your participation in this questionnaire survey. The survey will be conducted anonymously, and your relevant information will be kept confidential. Thank you again for your cooperation.

Part Ⅰ:

1. Gender？ A Male   B Female

2. Grand？ A 1   B 2   C 3   D 4   E others

Part Ⅱ: Please judge to what extent you agree with the following statement, please choose the most appropriate option, and mark the corresponding number "√". The questionnaire used Likert scale, ranging from 1 to 5 in which 1 indicates strongly disagree (or strongly disagree), 2 indicates relatively disagree (or relatively disagree), 3 indicates neutral, 4 indicates relatively agree (or relatively agree), and 5 indicates strongly agree (or strongly agree)

Measuring item	Strongly disagree	Disagree	General	Agree	Strongly agree
1.In your school/institution, do you think the current network facilities meet your teaching and learning needs?					
2. Do you think the computer equipment in your school/institution is sufficient to support you in your teaching and learning activities?					
3. You are satisfied with the other infrastructures (e.g. labs, multimedia equipment, etc.) provided by your school/institution?					
4. Do you find the online course resources provided by the school/institution abundant and easy					

to access?				
5. You are satisfied with the availability of e-library and databases provided by the school/institution?				
6. You think the personalized learning support provided by the school/institution is effective?				
7. Do you think the school/institution's instructional management system (e.g., student information management system, online assignment submission system, etc.) is easy to operate?				
8. Do you think the teaching support and training provided to teachers by your school/institution is adequate?				
9. In your school/institution, do you feel that there is an information management environment that encourages innovation and collaboration?				
10. You find the level of informatization of vocational education in your school/institution satisfactory?				
11. In your school/institution, do you feel that the informatization of vocational education has had a positive impact on teaching and learning?				
12. Do you have a firm attitude towards the promotion of informatization in vocational education in your school/institution?				