FACTORS AFFECTING THE USE OF ICT BY SECONDARY VOCATIONAL TEACHERS IN NANYANG TECHNICAL COLLEGE,CHINA

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FACTORS AFFECTING THE USE OF ICT BY SECONDARY VOCATIONAL TEACHERS IN NANYANG TECHNICAL COLLEGE,CHINA

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BY

YUE WANG

HAS BEEN APPROVED BY THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT
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The aims of this study are as follows: (1) the ICT ability level of teachers at Nan Yang Technical College, and their satisfaction level with the ICT environment; (2) the factors affecting the ICT ability of teachers at Nan Yang Technical College; and (3) the development of ICT ability of teachers. The data was collected from 185 Chinese teachers from a technical school engaged by using the questionnaires and analyzed by mean, standard deviation and one-way ANOVA. The research found the following: (1) the overall ICT application ability of teachers at Nan Yang Technical College was is at a good level (M=3.56). The satisfaction of teachers with the construction of school ICT infrastructure (M=3.13, SD=0.83) and the utilization of information resources (M=2.89, SD=0.77) at the Neither level; (2) there are significant differences in ICT application abilities among teachers of different age groups; and (3) infrastructure should be improved, and learning activities should be carried out based on individual factors of teachers to enhance the application abilities of teachers and information and communication technology.

Keyword : ICT application ability, Current situation evaluation, Influence factor

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YUE WANG

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1
INTRODUCTION

Background of the Study

The concept of education Information was put forward in China in the 1990 s with the construction of the information highway. The emergence of ' Internet + education ' has put forward new requirements for teachers ' professional quality. As (Zhao Lingyun&Hu Zhongbo, 2022) have summarized, teachers in the information age ' is no longer a simple emphasis on imparting in the traditional sense, but to have new information utilization and integration of competitiveness and professional skills.

With the concept of "educational Information" deeply rooted in people's hearts, the state and education departments at all levels attach more importance to the process of educational Information in universities and primary and secondary schools, as well as the cultivation of teachers' information technology application abilities. With more financial investment, the software and hardware environment has been greatly improved, and teachers' information technology training has also been well done. The educational concepts, ideas the content and methods of education have undergone profound changes due to the impact of Information. However, for secondary vocational schools, due to the serious shortage of student resources in previous years, they have made enrollment and employment related work a top priority in their schoolwork. Each school does not attach enough importance to educational Information, and the government and education departments have not given enough attention. The cultivation of information technology application abilities of secondary vocational teachers has not been able to attract the government The attention of industry regulatory authorities and schools.

As an important component of the national education system, secondary vocational education still has a long way to go in terms of Information. In recent years, with the increasing attention paid by the country to the Information of vocational education, departments at all levels have successively introduced policies and plans to

support the development of vocational education, providing guidance and guidance for the development of vocational education Information.

Since the eighteenth session National Congress of the Communist Party of China, the state has put forward new requirements for accelerating the development of modern vocational education. In 2010, the State Council officially issued the " National Medium and Long-term Education Reform and Development Plan (2010-2020) " (hereinafter referred to as the " Outline "). The " Outline " clearly states that it is necessary to develop and strengthen the application of information technology. Improve teachers ' application of information technology, update teaching concepts, improve teaching methods, and improve teaching effectiveness(The State Council,2010).The Outline also pays special attention to the development of vocational and Technician education, emphasizes the important position of vocational and Technician education in the whole national education system, and undertakes the important task of training Technician and applied talents for the country(The State Council,2010). As an important part of vocational education, secondary vocational and Technician education should be committed to improving the quality of running schools and improving the soft power of schools while strengthening the hardware and software construction of schools. As the construction of information ability, secondary vocational teachers can strengthen the construction of disciplines, optimize the curriculum and training mode, strengthen the quality construction of teachers and the construction of curriculum resources, improve teachers ' education and teaching ability, and promote teachers ' professional development.

In 2014, the State Council promulgated the " Decision on Accelerating the Development of Modern Vocational Education " and proposed that by 2020, a modern vocational education system with Chinese characteristics and world level should be formed to meet the needs of development, the deep integration of production and education, the connection between secondary vocational education and higher vocational education, the communication between vocational education and general education, and the concept of lifelong education(The State Council,2014).In 2015, the

Chinese Ministry of Education issued the " Action Plan for Innovative Development of Vocational Education (2015-2018), " emphasizing the use of information technology to promote the development of vocational education Information, and pointing out the direction for the development of vocational education (The Chinese Ministry of Education,2015). In 2018, the Chinese Ministry of Education successively released two important related documents - the Action Plan for Teacher Education Revitalization (2018-2022) and the Action Plan for Education Information 2.0, which respectively require the full use of new technologies such as cloud computing, big data, virtual reality, and artificial intelligence to promote the construction and application of teacher education information teaching service platforms, and promote the deep integration of information technology and education(The Chinese Ministry of Education,2018).

The extensive application of information technology at all levels of society has had a profound impact on human society, from the Industrial society to the information society. The application of information technology has also promoted the development of school education and teaching, resulting in profound changes in teaching models. As the most important component of higher education, vocational and Technician education has also undergone structural changes. Education Information has broad application space in the field of secondary vocational education. It can change the educational concept of secondary vocational schools, make teacher pay more attention to improving their own abilities, and establish a student-centered education concept. Enrich the educational and teaching resources of vocational schools, attract students' interest in learning, and improve the quality of teaching. The construction of information technology capabilities in the college can also promote the transformation of secondary vocational colleges into application-oriented schools, cultivating a group of high-quality talents with both theoretical and practical abilities.

Overall, the application of information and communication technology in education cannot be separated from the continuous improvement of teachers' ICT capabilities and the continuous development of school information construction. After years of development, how about the development of Information technology in local

schools? Are the hardware and Software facilities complete and updated in time? How about Teachers' ICT application capability? What factors affect teachers' ICT Application capability? How to help teachers improve ICT application Ability? The research hopes to understand the current situation of ICT development in Nan Yang Technician College by investing, analyzing these problems, find some problems and defects. And help schools and teachers improve ICT development.

Significance of the Study

With the rapid development of information technology both domestically and internationally, the government is vigorously improving teachers' information capabilities and promoting the development of secondary vocational and Technician education. This article analyzes the standards for evaluating teachers' ICT abilities both domestically and internationally, as well as the factors that affect teachers' ICT abilities. Based on the actual situation in Henan Province, this study takes Nan Yang Vocational and Technician School as a case study object to conduct in-depth research on the current situation of teacher information capacity construction in Nan Yang Vocational and Technician College. Analyzed the factors that affect the information ability of teachers at Nan Yang Technician College, understood the achievements and shortcomings of the school's information technology construction, and put forward specific suggestions for the development of information ability of teachers at Nan Yang Technician College. Specific suggestions were proposed for the evaluation and development of ICT abilities of secondary vocational and Technician teachers in Henan Province, providing detailed reference for the construction experience of local education management departments and similar schools.

Purpose of the study

1.To study the ICT ability level of teachers at Nan Yang Technician College and their satisfaction with the infrastructure and use of ICT.

2.To explore the factors affecting the ICT abilities of teachers at Nan Yang Technician College in China.

3.To explore the development of information and communication technology capabilities of Chinese secondary vocational teachers.

Research question

1.What is the level of ICT ability and satisfaction with ICT infrastructure construction and use among teachers at Nan Yang Technician College in China?

2.What factors affect the ICT ability of teachers at Nan Yang Technician College?

3.What factors contribute to the development of teachers' ICT abilities?

Scope of the Study

The aim of this study is to investigate the influencing factors on the information and communication technology abilities of vocational school's teachers through a questionnaire. Through literature review and analysis of research conditions, this study identified the influencing factors as: personal factors include basic personal information, including gender, age, years of teaching, educational level, teaching major Environmental factors include satisfactions with infrastructure environmental construction and satisfactions with the use of information resources. Three aspects of data were collected through questionnaires: 1. Basic personal information of teachers. 2. The ICT ability of teachers. 3. The satisfaction of teachers with the construction of infrastructure environment and the utilization of information resources. The evaluation of teachers' ICT abilities is divided into five dimensions and two aspects. They are five dimensions: Technological literacy, planning and preparation, organization and management, evaluation and diagnosis, learning and development; Two aspects: utilizing information technology to optimize classroom teaching and transforming students' learning methods (The Chinese Ministry of Education,2014). The average score of each dimension and overall score is used as the evaluation standard for teachers' ICT ability. By analyzing the ICT ability scores of teachers, we aim to understand whether there are significant differences in ICT ability among teachers with different personal factors. Then, a structural equation model is established based on the

scores of teachers' satisfaction with environmental factors to explore whether environmental factors have a predictive effect on teachers' ICT ability, in order to understand whether good environmental factors promote the improvement of teachers' ICT ability.

The research object is all the teaching staff of a technician college in Nan Yang, China. They teach culture and technology majors, totaling 185 people. They were asked to fill out questionnaires as data support for the study.

Definition of Terms

Definitions of terms used in this study are defined as follows:

Teacher's ICT abilities refers to teachers' ability to apply modern information technology to teaching and promote students' growth and self-development. Specifically, it can be divided into two aspects: teachers utilizing information technology to optimize classroom teaching and helping students transform learning methods. Each aspect is further divided into five identical dimensions: Technological literacy, planning and preparation, organization and management, assessment and diagnosis, and learning and development.

The ICT ability level of teachers refers to the level indicator divided based on the scores of the teacher ICT ability questionnaire. According to the average standard developed by Srisa-ard (1996), the average is used as a representative of the ICT level of teachers. Interpret the level as very good (4.21-5.00), good (3.41-4.20), moderate (2.61-3.40), poor (1.81-2.60), and very poor (1.00-1.80) (Srisa-ard, B.,1996).

The factors that affect teachers' ICT ability refer to environmental and personal factors that affect teachers.

Personal factors include basic personal information, including:

Gender: The gender of the teacher is male or female.

Age: It refers to the actual age of teachers, which are divided into four age groups in the study, namely 20-30 years old, 31-40 years old, 41-50 years old, and 51 years old and above.

Educational level: The highest level of education received by teachers to date, divided into Associate Degree, Bachelor's Degree, Master's degree, Doctoral degree.

Teaching major: It refers to the courses taught by teachers in school, which are divided into two categories in research: cultural majors and Technician majors. Cultural majors refer to basic disciplines, including language, mathematics, physical education teachers, etc. The Technician major is the chosen major for students, which is related to their profession, such as manufacturing engineering, electromechanical engineering, vehicle engineering, etc.

Environmental factors include:

Infrastructure environmental construction: It refers to the operation of the school's supporting information equipment, online resources, exams, teaching and other systems, as well as the speed, security, and stability of the school's network. The research is represented by teachers' satisfaction with infrastructure construction.

The use of information resources: It refers to the teaching resource library provided by the school, electronic resources provided by the library, and search tools for information resources within the school. The research is represented by teachers' satisfaction with the use of information resources.

Research framework

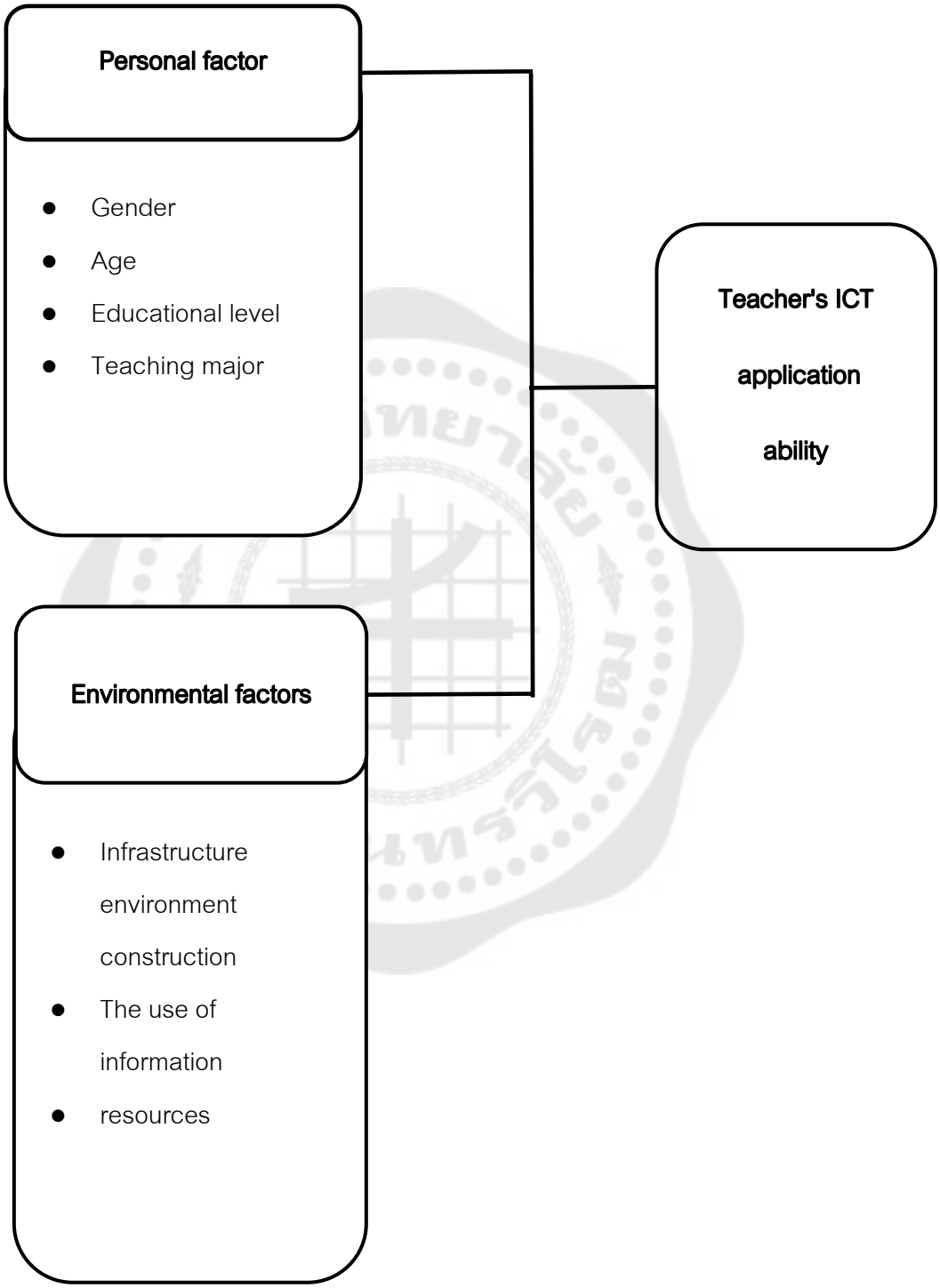

Figure 1 Research framework diagram

CHAPTER 2
REVIEW OF THE LITERATURE

Teachers ' information technology application ability

Education Information has become the focus of education reform in various countries. Therefore, countries also attach great importance to the research of teachers ' ICT application ability standards and use this as the basis for evaluating teachers ' ICT application ability. In order to make teachers use ICT more correctly and reasonably, the United Kingdom issued the " ICT Teacher Ability Training Standard in Subject Teaching " in 1998, which mainly includes teachers ' ICT ability and teaching evaluation methods. In 2010, the British Educational Technology and Communication Agency issued the " 21st Century Teachers ' Handbook, " which elaborates the requirements for the development of ICT competence of teachers in the 21st century from three dimensions: learning and teaching, planning and management, evaluation and reporting; At the same time, it also puts forward the professional standards for the cultivation of ICT competence of teachers in the 21st century from three levels: skills and practice, knowledge and understanding, value and quality(Jiang Yanhong, 2011).

The National Educational Technology Standards for Teachers (NETS-T) was issued in June 2000, which was led by the International Educational Technology Association (ISTE). The standard starts from six types of Technician standards and performance indicators, including: six dimensions of ability and quality, corresponding to four working stages (general preparation stage, professional preparation stage, teaching practice stage, one-year post-service teaching stage) 23 indicators (ISTE,2000). In 2008, ISTE revised the 2000 version of the NETS-T standard, which covers five competency dimensions and twenty competency indicators. The ability includes promoting and stimulating students ' learning and creativity; design and develop learning experience and assessment tools in the digital age; demonstration of work and learning in the digital age; promote and demonstrate civic literacy and sense of responsibility in the digital age; participate in professional growth and leadership

development (ISTE,2008). It has shifted from focusing on teachers ' mastery of technology-related knowledge and skills to how teachers can improve students ' ability to learn effectively in the digital age.

In 2002, Australia promulgated the " Teacher Professional Standards " (Pilot 2002), a total of twelve standards, one of which relates to teachers ' information technology teaching application ability, including a total of four dimensions, 16 indicators covering the information technology curriculum integration, improve teaching and learning strategies and promote students ' learning content (Wang Wei,2005).

In 2011, the UNESCO launched the second edition of the " Teacher Information and Communication Technology Competency Framework. " This framework takes the three teaching methods of deepening Technician literacy knowledge and knowledge creation as the first-level framework, and understands ICT in education; The six major educational focus areas such as curriculum and evaluation, teaching methods, information and communication technology (ICT) organization and management of teachers ' professional learning are the second-level framework, and a teacher 's ability system containing 18 modules is constructed ;The Technician literacy of each module under the three methods and the syllabus and examination specifications under the knowledge deepening method are described in detail (UNESCO, I.,2011).

In 2004, China promulgated the first standard for teachers " ICT Educational Technology Competency Standards for Primary and Secondary School’s teachers " it put up normative requirements for teachers ' ICT application ability and provided a basis for information technology training and evaluation in various places (The Chinese Ministry of Education,2004). Since the ' standard ' promulgated in 2004 does not match the speed and scale of the development of the political and economic system at that time, in order to improve the ICT application ability of teachers, the Chinese Ministry of Education promulgated the ' Opinions on Implementing the National Primary and Secondary School’s teachers ' Information Technology Application Ability Improvement Project ' in 2013, it put up new requirements for curriculum reform and transformation of education methods(The Chinese Ministry of Education,2013). Drawing on the

experience of various countries and the actual situation of their own countries, China promulgated the " Information Technology Application Ability Standard for Primary and Secondary School's teachers (Trial) " (hereinafter referred to as " Ability Standard ") in 2014. The " Ability Standard " divides the information technology application ability into five dimensions: Technician literacy, planning and preparation, organization and management, evaluation and diagnosis, learning and development, and describes the index system of the ability standard from two aspects: applying information technology to optimize classroom teaching and changing learning methods (The Chinese Ministry of Education,2014).

Design of ICT Ability Questionnaire for Teachers

The questionnaire design of this study is based on the "Information Technology Application Ability Standards for Primary and Secondary School's teachers (Trial)". The evaluation of information technology application ability is divided into five factors: Technological literacy, planning and preparation, organization and management, evaluation and diagnosis, learning and development; The evaluation is carried out from two aspects: teachers use information technology to optimize classroom teaching and teachers help students change learning methods (The Chinese Ministry of Education,2014). The ability of applying information technology to optimize classroom teaching in teaching is the basic requirement, which mainly includes the ability of secondary vocational teachers to apply information technology to explain, inspire, demonstrate and guide and evaluate teaching activities; The ability to apply information technology to transform learning methods in teaching is a developmental requirement. It is mainly aimed at the ability of secondary vocational teachers to apply information technology to support students to carry out activities such as autonomy, cooperation and inquiry under the condition that the school has a network learning environment and corresponding equipment (Li Li ,2016).

The questionnaire questions are designed around the specific requirements and standards for five different dimensions of teachers in the "Information Technology Application Ability Standards for Primary and Secondary School Teachers (Trial)" (The

Chinese Ministry of Education,2014) (see Appendix). The ratings for these questions were designed using the Likert five component scale method. The rating range is from 1 to 5 points. After evaluation and statistics, the average score will be used as the score for the teacher's level of information and communication technology skills.

The factors affecting the information technology ability of teachers.

Many scholars have studied the influencing factors of ICT application ability. For example, (Afshari,2009) believe that age, teaching age, gender, and educational experience are the main key factors affecting teachers ' ICT ability. Among them, (Simonson.M,2009) found that teachers ' beliefs and attitudes affect ICT application ability. (Hew, K.F,2007) conducted a research review of articles published between 1995 and 2006 on the influencing factors of ICT, and concluded that six aspects of resources, knowledge and skills, systems, evaluation, beliefs, and subject culture are key influencing factors. (Peeraer.J,2012) has found that training has no significant effect on teachers ' ICT application ability. (HMirzajani,2016) found that teachers ' life experience and school infrastructure environment have a significant impact on teachers ' ICT application ability.

Many scholars in China are also constantly exploring and studying the influencing factors of teachers' ICT application ability. (Li wen,2018) to the backbone of primary and secondary school’s teachers as the research object, using the combination of quantitative and qualitative analysis, it is concluded that teachers ICT application ability factors divided into internal and external factors, internal factors are: self-efficacy, technology, external factors are: system, training, application environment three aspects, and puts forward the construction of "accurate" training, set up the correct concept of science and technology advice . (Chen Qi,1997) believes that information technology is used in education by the environment, individual teachers, student groups and ICT The impact of these four aspects. Southwest University took 1423 teachers from 9 provinces and municipalities directly under the Central Government as the research object to explore the factors of ICT application ability in China. The research results show that ICT use effort expectation, performance expectation and community influence

have a certain influence on teachers' willingness and behavior to use ICT(Li Yi,2016). Through the analysis of the current situation of ICT application ability of teachers in Qiandongnan Prefecture, (Yang Dongmei,2017) found that education policy, teaching ability, training effect, hardware and software equipment have exerted influence effect on teachers' ICT application ability to different degrees. According to the empirical research, eight aspects, including teachers 'attitude, such as the ability of electronic lesson preparation, network teaching and research ability, teacher-machine ratio, resource utilization ability, training, network communication ability, and vitality ratio, have an impact on teachers' ICT application ability (Zhang Yi,2015).

In summary, teachers' ability to apply information and communication technology is influenced by various factors. Mainly divided into environmental factors and personal factors. Based on previous research findings and existing research conditions, this study identifies the factors that affect teachers' ICT abilities as follows: personal factors include basic personal information, including Gender,Age,Years of teaching,Educational level,Teaching major. Environmental factors include satisfaction with infrastructure environmental construction and satisfaction with the use of information resources.

Historical Background of Nan Yang Technician College

Nan Yang Technician College was founded in 1958 and is a public vocational college approved by the People's Government of Henan Province. It is a national key vocational college, a national high-level talent training base, and a vocational skill level evaluation institution in Henan Province.

The college implements two-level management of teaching, including the Department of Manufacturing Engineering, Department of Mechanical and Electrical Engineering, Department of Vehicle Engineering, Department of Information Engineering, Department of Economic and Trade Services, and Department of Public Education. The college offers three levels of Technician education: technician, senior technician, and intermediate technician. The enrollment age of students is 15 years old. The college adopts a teaching method that combines theory, practical training, and

practice. Cultural knowledge and professional skill knowledge are learned simultaneously, and skill training is combined with practical operation. Regular job practice is conducted. We have established long-term and close school enterprise cooperation relationships with large and medium-sized enterprises such as Nan Yang Petroleum Equipment Group, Nan Yang Explosion Prevention Group, Nan Yang Zhongguang Group, Xibao Group, and Xixia Water Pump Factory.

The college currently has 226 faculty members, 185 lecturers in cultural and Technician fields, and 41 administrative staff. Among them, cultural teachers include information technology teachers, language teachers, mathematics teachers, physical education teachers, mental health teachers, English teachers, physics teachers, etc. The recruitment requirement for teachers is a full-time undergraduate degree or above, using a combination of open registration, written examination and interview recruitment method, and selecting the best candidates for admission. The college has 18 main buildings, including teaching buildings, experimental buildings, libraries, office buildings, student apartments, restaurants, etc. Each classroom is equipped with a multimedia system for teachers to use. There are 22 classrooms equipped with computers for students to use when learning information technology related content. The school has a digital learning resource center for online education, high-quality courses, online courses and other resource learning platforms. The library has a collection of 60000 books and 180000 e-books. The school invests approximately 150000 yuan annually in information technology construction, including infrastructure construction, system maintenance, personnel training, information resource procurement, software construction, etc.

CHAPTER 3
METHODOLOGY

Participants of the Study

The participants of this study included all 185 lecturers from Nanyang Technician College, who were engaged in teaching cultural or technical majors.These teachers were asked to answer the three parts of the questionnaire. All participants were selected through convenient sampling and were able to provide the data required for the survey. All teachers have obtained the Certified teacher issued by the China Education Bureau.

Research Instruments

Questionnaire design

The questionnaire covers three parts.

1.The basic information of the survey object (gender, age, professional background, courses taught, current teaching situation, online time, etc.),

2.Teachers' information technology application ability.

Based on the ‘Standard for Information Technology Application Ability of Primary and Secondary School’s teachers (Trial)’ (The Chinese Ministry of Education,2014), a questionnaire on the ICT proficiency level of teachers was developed. Specific standard details can be found in Chapter 2. According to the standards, teachers' information and communication technology capabilities are divided into five dimensions: technical literacy, planning and preparation, organization and management, evaluation and diagnosis, and learning and development (The Chinese Ministry of Education,2014). Develop 5 corresponding questions based on the standards of each dimension, totaling 25 questions. The ratings for these questions were designed using the Liker five component scale method. Teachers rated them based on their own situation, with scores ranging from 5 to 1 from high to low.

3.Satisfaction of teachers with the school's ICT environment.

The questionnaire includes the satisfaction of teachers with the construction of infrastructure environment and the satisfaction with the use of information resources. Set survey questions around the relevant requirements of each dimension. The design of the problem adopts the Liker five component table method. The items are set with 5 options of "very satisfied, satisfied, neither, dissatisfied, very dissatisfied", and quantitative analysis is conducted with 5 points, 4 points, 3 points, 2 points and 1 point.

Questionnaire improvement

1.After the preliminary formulation of the questionnaire, expert methods were used to invite 5 experts in the field of secondary vocational education and researchers related to educational information to rate each question in the questionnaire. Analyze the scoring results and delete any questions that do not meet the standards to ensure the validity of the questionnaire.

2. Based on the Questionnaire Star platform, an online questionnaire survey and data collection were conducted on 30 teachers from various secondary vocational education schools in Nan Yang City through website links and QR code distribution. The overall reliability coefficient of the questionnaire was analyzed, and questions with low reliability coefficients were excluded to ensure the reliability of the questionnaire.

Data Collection Procedures

Experts from Henan Province, China are requested to review the questionnaire to determine its relevance. Five experts rated each question in the questionnaire. Experts believe that the effective score is 1, the neutral score is 0, and the irrelevant score is -1.

A pretest was conducted on the questionnaire. Based on the Questionnaire Star platform, an online questionnaire survey and data collection were conducted on 30 teachers from various secondary vocational education schools in Nan Yang City through website links and QR code distribution to test the reliability of the questionnaire.

Put the perfect questionnaire into the formal survey and use the online questionnaire distribution tool to conduct a questionnaire survey on 185 teachers in Nan Yang Technician College. Collect and organize data.

Data Analysis

Questionnaire Question Data Analysis Section

1.Analyze each questionnaire question based on the expert rating results, and a score greater than 0.5 indicates that the effectiveness of the question meets the standards.

2.Reliability is the degree to which the stability and consistency of measurement results are displayed. Reliability analysis of pretest using SPSS 20.0 software to determine Cronbach's α The coefficient is used to test the homogeneity reliability of the scale. Cronbach's α If the coefficient exceeds 0.6, it is acceptable, and if it exceeds 0.7, it reaches a good level.

Survey Data Analysis Section

1.The first part mainly conducts frequency analysis, using SPSS 20.0 statistical software to analyze the ICT ability scores of teachers. According to the average standard developed by Srisa-ard (1996), the average value is used as a representative of teachers' level of information and communication technology. Explain the level as very good (4.21-5.00), good (3.41-4.20), moderate (2.61-3.40), poor (1.81-2.60), and very poor (1.00-1.80) (Srisa-ard, B.,1996). At the same time, the average value is also used as a representative of the satisfaction level of teachers with the school's ICT environment. Explain the satisfaction level as very satisfied (4.21-5.00), satisfied (3.41-4.20), neither (2.61-3.40), dissatisfied (1.81-2.60), and very dissatisfied (1.00-1.80) (Srisa-ard, B.,1996).

2.The second part starts from the personal factors of teachers. Use SPSS 20.0 to analyze the data and use one-way ANOVA to analyze whether there are differences in information and communication technology scores among teachers of different age groups, genders, teaching majors, and educational levels. If the SIG value

is less than 0.05, it indicates a significant difference, and if the SIG value is greater than 0.05, it indicates that the difference is not significant.

3.The third part is to explore the mutual influence relationship between the infrastructure environment, the use of information resources and the ICT application ability mainly based on the data in the questionnaire and the previous literature exploration results, and establish a measurement model, and use the model to predict the mutual influence among the three.

Use path analysis to measure the interrelationships between variables. Basic steps: (1) Establish a path model, (2) Model identification, (3) Model revision, and (4) Model evaluation.

Use Amos software to model standardized path maps. Analyze the standardized regression coefficients of each factor. If the coefficient value is less than 1, it indicates that the adaptability of the path model is good. If the coefficient value is greater than 1, it indicates an unreasonable explanation and requires modification.

By observing the p-value and standardization coefficient, it is determined whether there is a direct linear impact on the path (X ->Y). If $p<0.05$ and the standardization estimation coefficient value is higher (closer to 1), it indicates that there is an impact relationship between variables.

There are various fitness indicators used to evaluate structural equation models, including chi square, chi square/degree of freedom, RMR, RMSEA, NFI, RFI, IFI, TLI, CFI, AGFI, and GFI. When the model meets more than one indicator, it indicates a good fit of the model (Breckler, 1990). According to (Hau Kit Tai, Wen Zhonglin, Cheng Zijuan,2004) selected indicators such as RMSEA, NFI, TLI, CFI, GFI, and AGFI to evaluate the fitting degree of the established model. The matching requirements for each indicator are:

(1) RMSEA. The closer the value of RMSEA is to 0, the better the fitting effect of the model; According to (Steiger ,1990), when RMSEA<0.10, it indicates that the model has a good fitting effect; When RMSEA<0.05, it indicates that the fitting effect

of the model is very good; When RMSEA<0.01, the fitting effect of the model is very good.

(2) NFI. The closer the value of NFI is to 1, the better the fitting effect of the model. When NFI is $\geqslant$ 0.90, the model usually has a good fitting effect.

(3) TLI. The closer the value of TLI is to 1, the better the fitting effect of the model. When TLI is $\geqslant$ 0.90, the model fitting effect is usually good.

(4) CFI, also known as the comparative fit index, is an ideal relative fit index, as the size of the sample has little effect on it and can better reflect the situation of the model. Its value ranges from 0 to 1, and the closer it is to 1, the better the fitting performance of the model. A CFI value of $\geqslant$ 0.90 usually indicates a good fitting performance of the model.

(5) GFI, also known as Goodness of fit index, is in the range of 0 to 1. The closer it is to 1, the better the fitting effect of the model is at this time. The value of GFI is greater than or equal to 0.90, and the model is generally acceptable at this time.

(6) AGFI. The closer the value of AGFI is to 1, the better the model fitting effect. When AGFI $\geqslant$ 0.90, the model fitting effect is usually good.

Reliability and validity analysis of survey questionnaires

The validity of the questionnaire was evaluated by means of expert review.The invited experts include two leaders from the Information Technology Department of Nan Yang Education Bureau, one professor from the Information Technology Department of Nan Yang University of Technology, and two professors from the Education Department of Nan Yang Normal University. There are 5 experts scored 57 questions of the questionnaire. The experts thought that the effective score was 1, the neutral score was 0, and the irrelevant score was - 1. The score of 57 questions is shown in the table below.

Table 1 Expert rating of questionnaire questions

Questionnaire title	IOC
1.1 Technology Literacy	
1.1.1 I am proficient in using office software and related teaching software to meet the needs of daily teaching tasks.	1
1.1.2 I believe that applying ICT skills is a necessary skill for me, otherwise it will affect the development of students.	0.8
1.1.3 I have found that using information technology is beneficial for supporting student-centered learning.	0.8
1.1.4 I always think about how to better apply information technology to teaching.	1
1.1.5 I am very willing to try new teaching models in the information environment.	0.8
1.2 Planning and Preparation	
1.2.1 I am able to handle digital educational resources that effectively support classroom teaching.	1
1.2.2 Before class, I habitually check the teaching equipment and resources that will be used and prepare solutions for any problems that may arise during the teaching process.	0.6
1.2.3 I am able to reasonably select information technology tools for teaching design and solve related teaching problems based on course objectives.	1
1.2.4 I am trying to utilize information technology (such as animation, audio and video, etc.) Make teaching difficult and important points simple and easy to understand.	1
1.2.5 I help students broaden their thinking by providing them with information-based learning materials.	0.8

Table 1 (Cotinue)

Questionnaire title	IOC
1.3 Organization and Management	
1.3.1 I will arouse students' interest by using information technology to design different forms of teaching activities (such as games, competitions, etc.)	0.8
1.3.2 When individual students perform technical operations in the classroom, I will arrange other students' activities reasonably.	1
1.3.3 I can guide students to continuously focus on digital resource content by designing questions, prompts, assigning tasks, and other means.	0.8
1.3.4 In the information technology classroom, I will adjust the equipment or the relative position of teachers and students to ensure that each student obtains good audio-visual effects.	1
1.3.5 I listen to students' suggestions when using devices or software in an information technology environment.	0.6
1.4 Assessment and Diagnosis	
1.4.1 I am able to establish electronic student learning records to provide support for the evaluation of students' comprehensive qualities.	1
1.4.2 I am able to learn and master the operation of the new evaluation system.	0.8
1.4.3 I understand multiple evaluation methods and am able to design evaluation plans based on learning objectives.	0.8
1.4.4 I will use different evaluation tools (such as electronic portfolios) to evaluate students' learning process.	1
1.4.5 I am able to apply information technology to organize and analyze students' learning process information, identify teaching problems, and propose targeted improvement measures.	0.6

Table 1 (Cotinue)

Questionnaire title	IOC
1.5 Learning and Development	
1.5.1 I believe that information technology can promote one's professional development.	1
1.5.2 I actively participate in special forums, online community activities, and often pay attention to the application trends of new media in education and teaching.	1
1.5.3 I often use information technology tools to exchange experiences with experts and peers, obtain guidance and assistance.	0.8
1.5.4 I can actively participate in school-based training activities supported by information technology.	0.8
1.5.5 I can learn related to the subjects I teach in an information-based environment.	1
2.1 Satisfaction with infrastructure construction	
2.1.1 Stability of campus network	0.8
2.1.2 Security of Campus Network	1
2.1.3 Access speed of campus network	0.6
2.1.4 Informatized office environment	1
2.1.5 Information based teaching environment	0.8
2.1.6 Multimedia teaching equipment	1
2.1.7 Online teaching platform	0.8
2.1.8 Teaching resource management platform	0.8
2.1.9 Online examination platform/system	1
2.1.10 Virtual simulation training platform	1
2.1.11 Research project collaboration and exchange platform	0.8
2.1.12 Research project knowledge sharing platform	0.8
2.1.13 Information tools to support scientific research projects	1

Table 1 (Cotinue)

Questionnaire title	IOC
2.1.14 Timeliness of information provided by the system	0.8
2.1.15 Response time of the system	1
2.1.16 Video conferencing equipment	0.8
2.1.17 Campus Announcement System (BBS)	1
2.1.18 Email system	0.6
2.1.19 Network storage space	1
2.1.20 Campus One Card	0.8
2.2 Satisfaction with the use of information resources	
2.2.1 Provided teaching resource editing software	1
2.2.2 Provided teaching resource library	0.8
2.2.3 Online test question bank provided	0.8
2.2.4 Online teaching resources	1
2.2.5 Virtual simulation training resources	1
2.2.6 Tools and software provided to support scientific research projects	0.8
2.2.7 Provided scientific research resource library	0.8
2.2.8 Scientific research information provided	1
2.2.9 Research collaboration opportunities provided	0.6
2.2.10 Opportunities for applying for scientific research projects provided	1
2.2.11 Information on the provision of electronic resources in libraries	1
2.2.12 On campus information resource search tool	0.8

According to the results of the data, the scores of all questions are greater than 0.5. Therefore, the effectiveness of these 57 questions is in line with the standard.

The reliability coefficient of the questionnaire was analyzed through pretest data. By distributing a questionnaire to 30 randomly selected teachers from Nan Yang Industrial Vocational and Technician College, a pretest survey was conducted to

analyze the reliability coefficient of the questionnaire. Use Cronbach's α after obtaining data. The coefficient is used to test the homogeneity reliability of the scale. The scores of the questionnaire questions are shown in the table below:

Table 2 Reliability analysis of the pretest questionnaire

Questionnaire content	Number of questions	α
Teacher's ICT application ability	25	0.81
Satisfaction with infrastructure environment construction.	20	0.86
Satisfaction with the use of information resources.	12	0.85

According to Table 2, the ICT application ability questionnaire for teachers includes 25 questions, and the reliability coefficient of the questionnaire is Alpha=0.81; The questionnaire on teachers' satisfaction with infrastructure includes 20 questions, and the reliability coefficient of the questionnaire is Alpha=0.86; The teacher satisfaction questionnaire with information resources includes 12 questions, and the reliability coefficient of the questionnaire is Alpha=0.85. According to the comparison, the reliability coefficient Alpha of the three questionnaires is greater than 0.8, indicating that the questionnaire has high reliability. The reliability coefficient of the scale meets the standard, and the questionnaire is available.

CHAPTER 4
FINDINGS

This chapter analyzes the collected data to answer three research questions. The research questions are: 1. What is the level of ICT ability and satisfaction with ICT infrastructure construction and use among teachers at Nan Yang Technician College in China?2. What factors affect the ICT ability of teachers at Nan Yang Technician College?3. What factors contribute to the development of teachers' ICT abilities? This section explains the ICT application-level questionnaire scores of teachers at Nan Yang Technician College and analyzes the differences in the impact of personal and environmental factors on teachers' ICT scores. The results shown below start with the basic information of the respondents, and then are based on the research questions.

Basic Information of the Respondents

The first part of the survey questionnaire investigates the basic information of teachers, including the Gender; Age; Years of teaching; Educational level; Teaching major. Distribute 185 questionnaires online to all teachers of Nan Yang Technician School. A total of 172 questionnaires were collected, with a recovery rate of 92.97%. The collected general information data is expressed in percentage (%) and then subjected to descriptive analysis. The results are shown in the table below:

Table 3 Basic information of teachers

Items	N	Percentage (%)
Gender:		
Male	73	42.44
Female	99	57.56

Table 3 (Cotinue)

Items	N	Percentage (%)
Age:		
20-30 years old	43	25.00
31-40 years old	53	30.81
41-50 years old	54	31.40
51 years old and above	22	12.79
Educational level:		
Associate Degree	12	6.98
Bachelor's Degree	146	84.88
Master's degree and above	14	8.14
Teaching major:		
Cultural majors	62	36.05
Technician majors	110	63.95
Total	172	100

According to Table 3, there are 99 female teachers and 73 male teachers among the surveyed teachers, with female teachers accounting for 57.56% more than male teachers accounting for 42.44%. In terms of the age of teachers, there are 43 teachers aged 20 to 30, accounting for 25%; 53 teachers aged 31 to 40, accounting for 30.81%; 54 teachers aged 41 to 50, accounting for 31.40%; There are 22 teachers aged 51 and above, accounting for 12.79%.

In terms of the education level of teachers, the majority of them have a bachelor's degree, with 146 people accounting for 84.88%. 12 teachers with a college degree account for 6.98%; 14 teachers with a master's degree or above accounted for 8.14%. In terms of the courses taught by teachers, there are 62 teachers majoring in

culture, accounting for 36.05%; There are 110 Technician teachers, accounting for 63.95%.

Findings of the Study

The following section presents the results of data analysis, answering three research questions from the results. The data was collected from two main research tools: Teacher ICT application ability questionnaire and satisfaction questionnaire. Among them, descriptive analysis is used to understand the level of teachers' ICT application ability, difference testing is used to understand the impact of personal factors on teachers' ICT application ability, and structural equation model SEM is used to analyze the impact of environmental factors on teachers' ICT application ability.

Descriptive statistical analysis of teachers' ICT ability level and satisfaction with ICT infrastructure construction and information resource utilization

To answer the research question 1. What is the level of ICT ability and satisfaction with ICT infrastructure construction and use among teachers at Nan Yang Technician College in China? Use descriptive statistical analysis methods to analyze the questionnaire. Analyze and calculate the ICT proficiency level of teachers and their satisfaction with ICT environmental factors using mean (M) and standard deviation (SD). The specific analysis content is as follows:

Firstly, the ICT application ability level of teachers in questionnaire development will be described based on five dimensions. The score for each dimension of the teacher is the average score for the questions included in that level, and the overall ICT proficiency level is the average score for all five dimensions of the questions included. The score range is 5-1, and the higher the score, the higher the corresponding level. The analysis results are shown in the table below:

Table 4 Description of the overall level and dimensions of ICT application ability of teachers

Items	(N=172) M	SD	Level
Technology Literacy	3.86	0.65	Good
Planning and Preparation	3.19	0.64	Moderate
Organization and Management	3.35	0.98	Moderate
Assessment and Diagnosis	2.68	0.92	Poor
Learning and Development	3.87	0.62	Good
ICT application capability	3.56	0.61	Good

As shown in the table, overall, the ICT application ability of teachers at Nan Yang Vocational and Technician College is at a good level (M=3.56; SD=0.61). From the five dimensions, only the evaluation and diagnosis dimensions are at a poor level (M=2.68; SD=0.92), indicating that the teacher level in this dimension is relatively low. The Technician literacy dimension (M=3.86; SD=0.65) and the learning and development dimension scored the highest (M=3.87; SD=0.62), both reaching a good level. The dimensions of planning and preparation (M=3.19; SD=0.64) and organization and management (M=3.35; SD=0.098) are at a moderate level.

Secondly, by analyzing the data from the questionnaire, we aim to understand the satisfaction of teachers with the construction of school infrastructure and the use of information resources. Analyze and calculate the level of teacher satisfaction using mean (M) and standard deviation (SD). Respondents were asked to rate satisfaction based on the Likert five points scale, ranging from "very dissatisfied" to "very satisfied". The results are shown in the table below:

Table 5 Teacher satisfaction with school infrastructure construction and information resource utilization

Items	(N=172) M	SD	Level
Infrastructure environmental construction:	3.13	0.83	Neither
The use of information resources:	2.89	0.77	Neither

As shown in the table, it can be seen that teachers are satisfied with school environmental factors, with infrastructure construction (M=3.13, SD=0.83) and information resource utilization (M=2.89, SD=0.77) at the Neither level. The infrastructure construction and information resource utilization of the school are not very good, and further improvement and enhancement are needed.

Differential analysis of the impact of different factors variables on teachers' ICT application ability

To answer the research question 2. What factors affect teachers' ICT application ability? Analyze the questionnaire on teachers' information and communication application abilities, and use independent sample T-test and one-way ANOVA to analyze the differences in the data, in order to understand the impact of personal factors on teachers' ICT abilities.

1.Differential Analysis of Teacher Gender and Its ICT Application Ability

In order to analyze whether different genders have an impact on teachers' ICT application ability, a differential analysis method was adopted. Because there are only two groups of gender, the independent sample t-test method is used for analysis. By comparing the mean values, it can be seen the high and low scores of different genders; By comparing the T-values, it can be seen whether there are significant differences in specific dimensions between different genders. If the overall

test t-value presented in the analysis of variance results reaches a significant level ($p<0.05$), it indicates that the difference between the mean values of the two groups reaches a significant level.

This section will analyze the differences in ICT application abilities of teachers of different genders based on the five dimensions of their ICT application abilities. This questionnaire uses a 5 points Likert scale to rate abilities. The score range is 5-1, and the higher the score, the higher the corresponding level of application ability. The analysis results are shown in the table below:

Table 6 Differential Analysis of Teacher Gender and Its ICT Application Ability

Items	Gender	M	SD	T	P
Technology Literacy	Male	3.88	0.68	0.46	0.32
	Female	3.84	0.63		
Planning and Preparation	Male	3.24	0.67	0.97	0.16
	Female	3.16	0.62		
Organization and Management	Male	3.41	0.62	0.73	0.23
	Female	3.32	1.04		
Assessment and Diagnosis	Male	2.76	1.00	1.23	0.11
	Female	2.62	0.85		
Learning and Development	Male	3.92	0.63	0.98	0.16
	Female	3.84	0.62		
ICT application capability	Male	3.60	0.64	0.89	0.18
	Female	3.53	0.59		

By comparing the overall level and average levels of various dimensions of vocational school's teachers of different genders, it can be found that male teachers are slightly higher than female teachers in terms of overall level and average levels of various dimensions. Through the analysis of sample data, we found that the $p>0.05$ of different genders in various dimensions and overall, so there was no

significant difference in the overall ability of teachers to apply information technology and various dimensions in different gender variables.

2.Differential Analysis of Teacher Age and Its ICT Application Ability

To analyze the impact of different ages on teachers' ability to apply information and communication technology, a one-way ANOVA method was used. By comparing the average values, it can be seen the high and low scores of teachers in different age groups; In the analysis of variance, if the overall test F-value presented in the analysis of variance reaches a significant level ($p<0.05$), it indicates that there are at least two groups with significant differences in mean values. As for which pairs of paired groups have significant differences in mean values, the specific differences between the groups can be obtained by comparing the LSD method afterwards.

This section will analyze the differences in ICT application abilities of teachers of different genders based on the five dimensions of their ICT application abilities. This questionnaire uses a five points Likert scale to rate abilities. The score range is 5-1, and the higher the score, the higher the corresponding level of application ability. The analysis results are shown in the table below:

Table 7 Differential Analysis of Teacher Age and Its ICT Application Ability

Items	Age	M	SD	F	P
Technology Literacy	20-30 years old	4.11	0.47	3.17	0.02
	31-40 years old	3.97	0.57		
	41-50 years old	3.77	0.69		
	51 years old and above	3.74	0.68		

Table 7 (Cotinue)

Items	Age	M	SD	F	P
Planning and Preparation	20-30 years old	3.50	0.48	4.37	0.005
	31-40 years old	3.33	0.55		
	41-50 years old	3.13	0.69		
	51 years old and above	3.01	0.67		
Organization and Management	20-30 years old	4.00	0.74	4.70	0.003
	31-40 years old	3.56	0.86		
	41-50 years old	3.19	1.01		
	51 years old and above	3.18	1.05		
Assessment and Diagnosis	20-30 years old	2.51	0.66	1.67	0.17
	31-40 years old	2.80	0.84		
	41-50 years old	2.71	0.98		
	51 years old and above	2.48	0.93		
Learning and Development	20-30 years old	4.26		3.73	0.01
	31-40 years old	3.97	0.63		
	41-50 years old	3.76	0.62		
	51 years old and above	3.82			
ICT application capability	20-30 years old	3.84	0.41	3.89	0.01
	31-40 years old	3.70	0.54		
	41-50 years old	3.48	0.65		
	51 years old and above	3.43	0.64		

As shown in the table, it can be seen that from the overall level of information technology application ability, as the age stage increases, the overall level shows a downward trend. From the results of one-way ANOVA, $p=0.17>0.05$ within the evaluation and diagnosis dimension group, indicating that there is no significant difference in age factors under this dimension. However, other dimensions and overall

P<0.05 indicate significant differences among different age groups. After further comparison, the differences between the groups were also significant. Specifically, the overall level of the 20-30 year old group is significantly higher than that of the 41-50 year old group and the group over 51 years old, and there is a significant difference; The overall level of the 31-40 year old group is significantly higher than that of the 41-50 year old group and the group over 51 years old, and the difference is significant; However, there was no significant difference in the overall level between the 41-50 year old group and the 51 year old and above group.

3.Differential Analysis of Teacher's Educational level and Its ICT Application Ability

Similar to the previous method of analyzing age factors, one-way ANOVA was used to test the differences in teachers' education and ICT application ability scores. If ($p<0.05$), it indicates significant differences between groups. This section will analyze the differences in information and communication technology application abilities of teachers with different educational backgrounds from five dimensions. This questionnaire uses the Likert five points scale to rate abilities. The score range is 5-1 points, and the higher the score, the higher the corresponding level of application ability. The analysis results are shown in the table below:

Table 8 Differential Analysis of Teacher's Educational level and Its ICT Application Ability

Items	Educational level	M	SD	F	P
Technology Literacy	Associate Degree	4.04	0.45	1.48	0.23
	Bachelor's Degree	3.85	0.65		
	Master's degree and above	3.83	0.66		

Table 8 (Cotinue)

Items	Educational level	M	SD	F	P
Planning and Preparation	Associate Degree	3.44	0.42	1.75	0.17
	Bachelor's Degree	3.17	0.65		
	Master's degree and above	3.24	0.63		
Organization and Management	Associate Degree	3.80	0.91	1.60	0.20
	Bachelor's Degree	3.34	0.97		
	Master's degree and above	3.23	1.06		
Assessment and Diagnosis	Associate Degree	2.58	0.87	0.85	0.42
	Bachelor's Degree	2.67	0.92		
	Master's degree and above	2.93	0.91		
Learning and Development	Associate Degree	4.10	0.52	2.35	0.43
	Bachelor's Degree	3.86	0.62		
	Master's degree and above	3.93	0.55		
ICT application capability	Associate Degree	3.76	0.42	1.77	0.17
	Bachelor's Degree	3.55	0.61		
	Master's degree and above	3.58	0.64		

As shown in the table, the ICT application ability of teachers with different educational backgrounds is $p>0.05$ in overall and various dimensions, indicating that there is no significant difference in the ICT application ability of teachers with different educational backgrounds. According to the comparative average, it can be seen that the average level of teachers with a college degree is higher than that of

teachers with a bachelor's or master's degree or above. Teachers with a bachelor's degree and teachers with a master's or above degree have similar levels.

4.Differential Analysis of Teacher’s Teaching major and Its ICT Application Ability

In order to analyze whether different Teaching majors have an impact on teachers' ICT application ability, a differential analysis method was adopted. Because there are only two groups of Teaching majors, the independent sample t-test method is used for analysis. By comparing the mean values, it can be seen the high and low scores of different genders; By comparing the T-values, it can be seen whether there are significant differences in specific dimensions between different genders. If the overall test t-value presented in the analysis of variance results reaches a significant level ($p<0.05$), it indicates that the difference between the mean values of the two groups reaches a significant level.

This section will analyze the differences in ICT application abilities of teachers of different genders based on the five dimensions of their ICT application abilities. This questionnaire uses a five points Likert scale to rate abilities. The score range is 5-1 and the higher the score, the higher the corresponding level of application ability. The analysis results are shown in the table below:

Table 9 Differential Analysis of Teacher’s Teaching major and Its ICT Application Ability

Items	Teaching major	M	SD	T	P
Technology Literacy	Technician majors	3.89	0.64	0.47	0.31
	Cultural majors	3.84	0.65		
Planning and Preparation	Technician majors	3.26	0.62	0.95	0.17
	Cultural majors	3.17	0.65		
Organization and Management	Technician majors	3.39	1.02	0.35	0.36
	Cultural majors	3.34	0.98		

Table 9 (Cotinue)

Items	Teaching major	M	SD	T	P
Assessment and Diagnosis	Technician majors	2.68	0.95	0.18	0.42
	Cultural majors	2.66	0.81		
Learning and Development	Technician majors	4.02	0.65	2.04	0.02
	Cultural majors	3.83	0.61		
ICT application capability	Technician majors	3.62	0.60	0.81	0.21
	Cultural majors	3.54	0.61		

As shown in the table, it can be seen that the learning and development dimensions of ICT application abilities of teachers in different teaching subjects have $p=0.02<0.05$, indicating significant differences in ICT application abilities among teachers in different teaching subjects. Teachers in Technician subjects have significantly higher scores than those in cultural subjects. However, there was no significant difference in other dimensions and overall $p>0.05$. According to the comparison of the mean, the average level of teachers teaching Technician subjects is slightly higher than that of teachers with cultural courses.

Based on the previous literature exploration results, this section found that there is a certain impact relationship between primary and secondary school's teachers' infrastructure, information resources, and ICT application capabilities (Li Wen,2018). So, what is the impact relationship between these three aspects in vocational schools? What kind of relationship state does it present? Who influenced who? To conduct analysis, this study adopts the method of structural equation modeling to explore the mutual influence relationship between the infrastructure environment, information resource usage, and CT application ability of teachers at Nan Yang Technician College, establish a measurement model, and use this model to predict the mutual influence among the three.

Analyzing the factors that contribute the development of teachers' ICT capabilities.

To answer the research question 'What factors contribute to the development of teachers' ICT capabilities?' Based on the previous literature exploration results, this section found that there is a certain impact relationship between primary and secondary school's teachers' infrastructure, information resources, and ICT application capabilities. So what is the impact relationship between these three aspects in vocational schools? What kind of relationship state does it present? Who influenced who? In order to conduct analysis, this study adopts the method of structural equation modeling to explore the mutual influence relationship between the infrastructure environment, information resource usage, and CT application ability of teachers at Nan Yang Technician College, establish a measurement model, and use this model to predict the mutual influence among the three.

Model Setting and Establishment

Based on the preliminary exploration of this study and relevant theories, a factor model was established for the impact of environmental factors on teachers' ICT application ability, as shown in the follows.

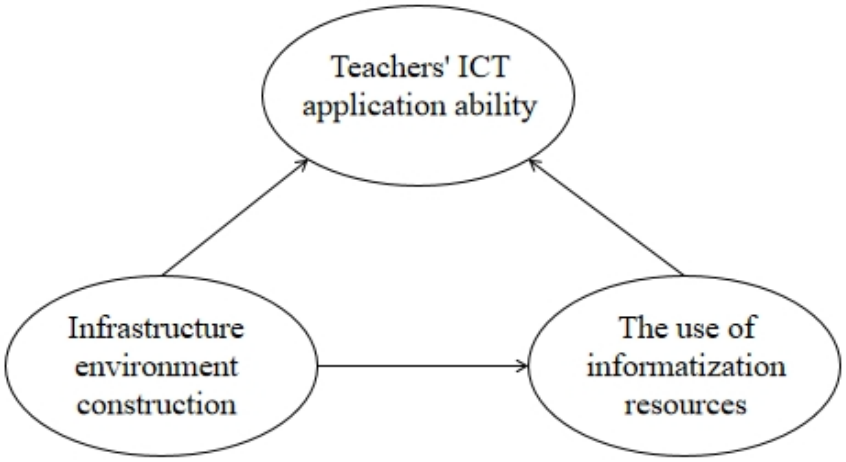

Figure 2 Factor Relationship Diagram

For data analysis, we set the ICT application ability of teachers as factor 1 (F1), infrastructure satisfaction as factor 2 (F2), and information resource utilization satisfaction as factor 3 (F3). And select 4 questions from the questionnaire test questions of three factors as observation variables, and the selected questions are shown in the table below:

Table 10 Variables included in the structural equation modeling

Latent Variable	Observed variable	Tag
ICT application capability	I am proficient in operating office software and related teaching software to complete daily teaching tasks.	Q1.1.1
	I am able to reasonably select information technology tools for teaching design and solve related teaching problems based on course objectives	Q1.2.3
	I will arouse students' interest by using information technology to design different forms of teaching activities (such as games, competitions, etc.)	Q1.3.1
	I understand multiple evaluation methods and am able to design evaluation plans based on learning objectives.	Q1.4.3

Table 10 (Cotinue)

Latent Variable	Observed variable	Tag
Infrastructure environment	Stability of campus network	Q2.1.1
	Teaching resource management platform	Q2.1.8
	Research project collaboration and exchange platform	Q2.1.11
	Campus One Card	Q2.1.20
Information resource usage	Provided teaching resource library	Q2.2.2
	Virtual simulation training resources	Q2.2.5
	Tools and software provided to support scientific research projects	Q2.2.6
	Information on the provision of electronic resources in libraries	Q2.2.11

Model Identification

The standardized analysis model path map obtained through data analysis using SPSSAU software is shown in the follow:

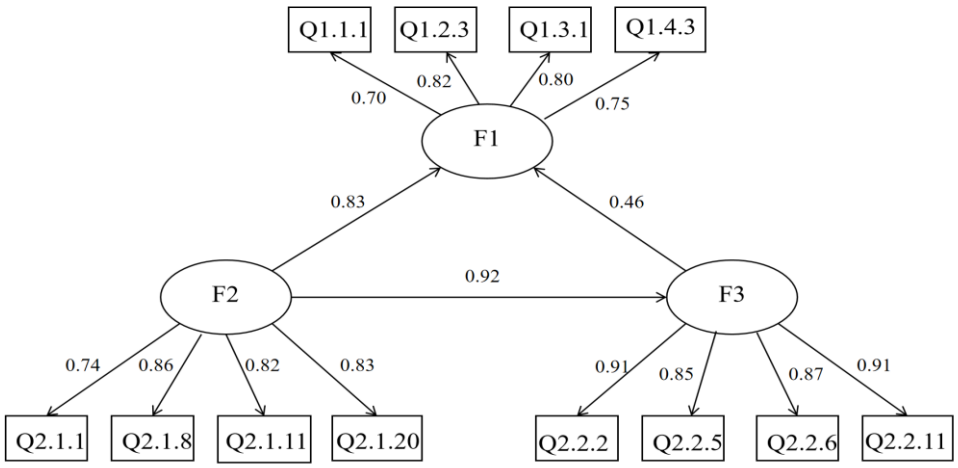

Figure 3 Standardized Analysis Model Path Map

There is no standardized regression coefficient greater than 1 in this figure, and the coefficient values are between 0.5 and 0.9, indicating that the adaptability of the path model is good, so there is no unreasonable explanation.

Model Assessment

Based on the output results of "Model fit", the selected indicators RMSEA, NFI, TLI, CFI, GFI, and AGFI are used to evaluate the degree of fitting of the established model. The data results and critical values of indicators are shown in the table below:

Table 11 Data results of model fitting indicators

Fit indices	Standards for fitting indicators	Data Result
χ^2/df	<3	1.37
RMSEA	<0.1	0.04
NFI	>0.90	0.95
CFI	>0.90	0.98
GFI	>0.90	0.95
AGFI	>0.90	0.91

As shown in the table, it can be seen that the various indicators of the model's fitness are within the standardized range, indicating that the model has a good fit index with the collected data, confirming the rationality of the model setting.

Analysis of model results

Through the setting and evaluation analysis of the model, the establishment of the model meets the standards. The following is an analysis of the regression coefficients between various factors to determine the impact relationship between them. The results are shown in the table below:

Table 12 Analysis of the Path Effect of the Model

The relationship between factors	Standardized Regression Coefficient	P
F2 → F1	0.83	0.00
F2 → F3	0.92	0.00
F3 → F1	0.46	0.14

From the table, it can be seen that the path coefficient of infrastructure environment for information resource utilization is 0.92 ($P<0.01$); The path coefficient of infrastructure environment on ICT application capability is 0.83 ($P<0.01$); The path coefficient of information resource utilization is 0.46 ($p>0.05$), indicating that the infrastructure environment has a significant positive impact on teachers' ICT application ability, while the use of information resources has no significant impact on teachers' ICT application ability. At the same time, the infrastructure environment has a significant positive impact on the use of information resources.

CHAPTER 5
CONCLUSION AND DISCUSSION

The purpose of this chapter is to answer research questions, aiming to analyze the level of information and communication skills application of teachers at Nan Yang Technician College and their satisfaction with ICT environmental factors, explore the factors that affect teachers' information and communication technology application ability, explore the factors that promote teachers' information and communication technology application ability, and then propose suggestions and measures to develop teachers' information and communication technology application ability. This chapter is divided into four parts: research conclusion. Based on the discussion of the research question, the main research findings, limitations of the research, and insights and suggestions for further research.

Conclusions

To answer the three questions raised in the study, a questionnaire survey was conducted among teachers at Nan Yang Technician College and relevant information was collected.

1.Regarding the basic situation of the information and communication technology application ability of teachers in Nan Yang Technician College, descriptive statistics were used to analyze and explore the five dimensions that constitute the information and communication technology application ability of vocational school's teachers. The results showed that the level of information and communication technology application ability of teachers in Nan Yang Technician College is at a moderate level (M=3.56) and urgently needs improvement, especially in the evaluation and diagnosis dimensions (M=2.68), At a poor level.

The satisfaction level of teachers with the construction of ICT infrastructure in schools (M=3.13, SD=0.83) and the utilization of information resources (M=2.89, SD=0.77) both at the Neither level. The satisfaction of teachers with the

construction of school infrastructure and the utilization of information resources is not high, and further improvement and enhancement are needed.

2. Analyze the influencing factors of the information and communication technology application ability of teachers at Nan Yang Technician College. This article concludes that there is no significant difference in the comprehensive application ability of information and communication technology between male and female teachers in schools; There are significant differences in the application ability of information and communication technology among vocational school's teachers of different age groups. The overall level of young vocational school's teachers is higher than that of older teachers, especially in terms of planning and preparation, as well as organization and management; There is no significant difference in the application ability of information and communication technology among vocational school's teachers with different levels of education; There is no significant difference in the application ability of information and communication technology between technical teachers and cultural teachers.

3. In promoting the development of ICT skills among school's teachers, research has found that infrastructure environment has a significant positive impact on their information and communication technology application ability among environmental factors, while the use of information resources has no significant impact on their information and communication technology application ability. Furthermore, relevant suggestions and measures were proposed to enhance the application ability of information and communication technology among teachers. Research suggests that infrastructure should be improved to promote the development of teachers' information and communication technology application capabilities. At the same time, learning activities should be carried out based on the personal factors of teachers to improve their ability to apply information and communication technology. The details of the investigation results are discussed as follows:

Discussion of statistical results

Research question 1: What is the level of ICT ability and satisfaction with ICT infrastructure construction and use among teachers at Nan Yang Technician College in China?

To investigate the ICT application level and ability of teachers at Nan Yang Technician College, the author conducted a questionnaire survey on all 185 teachers in the school. As of the submission date, a total of 172 valid questionnaires were collected, with a recovery rate of 92.97% and a recovery rate of over 90%. Therefore, these data can represent the overall level of teachers at Nan Yang Technician College and serve as the basis for research conclusions.

According to data analysis, the ICT application ability of teachers in Nan Yang Vocational and Technician College is generally at a moderate level (M=3.56), slightly higher than the average score of 3. However, through comparison, under the use of similar survey evaluation methods, the ICT application ability scores of vocational school's teachers in other developed cities in China are as follows: Wuhan (M=4.3) (Wang Yujie, 2018) Shanghai (M=4.1) (Cao Jinxuan, 2019). The ability level of vocational school's teachers in Nan Yang Technician College is relatively low and needs further improvement. From the specific perspective of the five dimensions of ICT ability, the evaluation and diagnosis dimensions of teachers have poor scores (M=2.68), indicating that the level of teachers in this dimension is relatively low. This may be related to the current evaluation system of Nan Yang Technician College. In addition to Technician practical courses, most of the daily homework content in the college is still mainly based on paper exercises and exercise books, and stage evaluation tests are also conducted in the form of paper papers. Due to restrictions on the use of personal mobile phones by students, and the inability of schools to provide electronic devices for daily learning to each student, it is difficult to achieve information-based evaluation and assessment of students. Therefore, most teachers have little exposure to the evaluation and diagnosis system of Information and have not formed a sense of Information evaluation.

The scores of the planning and preparation dimensions (M=3.19) and the organization and management dimensions (M=3.35) of teachers' ICT application ability are also relatively low, indicating that teachers' practical abilities in applying ICT to daily lesson preparation and teaching are not strong, which may be related to the existing lesson preparation system of the college. The college still requires teachers to prepare lesson plans mainly in paper form, and some departments still require lesson plans to be handwritten. Although the classrooms are equipped with multimedia systems, it can still be seen that some teachers use blackboard writing as the teaching mode and do not use information technology equipment during the teaching process. It can be seen that some teachers use ICT less in their daily teaching.

By analyzing the Technician literacy dimension (M=3.86) and the learning and development dimension (M=3.87) of teachers' ICT application ability, the scores are relatively high. Teachers have a good awareness of ICT application and teaching, as well as a willingness to learn related knowledge. However, the overall level of ICT application is relatively low, indicating that teachers have not taken effective measures to improve their individual ICT application abilities, thereby achieving improvement. This may be related to the busy work and life of teachers and not having too many individuals improve their learning time.

According to the satisfaction analysis of teachers towards the ICT environmental factors in schools, it can be concluded that the satisfaction levels of infrastructure construction (M=3.13, SD=0.83) and information resource utilization (M=2.89, SD=0.77) are both at the Neither level. The satisfaction level of teachers with the school's ICT environmental factors is not high, indicating that their daily work and learning needs regarding ICT have not been fully met. The supporting situation of the school in infrastructure construction and information resource utilization is not perfect, and further improvement is needed. The specific improvement methods are discussed in research question three.

Research question 2: What factors affect teachers' ability to apply information and communication technology?

The author analyzes the differences in ICT application abilities of teachers based on different personal factors (gender, age, education, and courses taught) to determine whether teachers with different personal factors have an impact on ICT application abilities.

According to the results of data analysis, there is no significant difference in the ICT application ability of teachers from Nan Yang Technician College between different genders, indicating that male and female teachers have similar levels of overall ICT application ability. The results are consistent with (Wang Yujie, 2018) (Cao Jinxuan, 2019).

In terms of ICT application abilities of teachers at Nan Yang Technician College of different age groups, there are significant differences between their groups. According to data analysis, as the age stage increases, the overall level shows a downward trend. Specifically, the overall level of the 20-30 year old group is significantly higher than that of the 41-50 year old group and the 51 year old and above group, and there is a significant difference; The overall level of the 31-40 year old group is significantly higher than that of the 41-50 year old group and the 51 year old and above group, with significant differences; However, there was no significant difference in overall levels between the 41-50 year old group and the 51 year old and above group. This may be related to the fact that the development of information technology in China started in the 1990s, which resulted in significant differences in the ICT knowledge and equipment that teachers of different age groups were exposed to during their school studies. Younger teachers have been exposed to more new ICT knowledge and equipment in school and daily life since elementary school. The younger they are, the shorter their graduation time. During their school years, they have ample time to learn and be exposed to new ICT knowledge and equipment. However, older age group teachers had fewer opportunities to access ICT knowledge and equipment during their school years, and the overall level of ICT development in China was not high at that

time. This results in older teachers only being able to improve their ICT application level through self-study or school provided training, without urgent awareness raising and busy work. The training effect is not ideal, resulting in lower ICT application ability of older teachers.

According to the analysis of differences in ICT application abilities among teachers with different educational level, there is no significant difference in ICT application abilities among teachers with different educational backgrounds. According to the comparative average, it can be seen that the average level of teachers with a college degree is higher than that of teachers with a bachelor's or master's degree or above. Teachers with a bachelor's degree and those with a master's degree or above have similar levels of ability. This may be related to the content learned by teachers with a college degree during their school years. College courses mainly focus on vocational applications and technology, with fewer cultural courses and more opportunities for exposure to ICT knowledge and equipment. At the same time, the recruitment of teachers at Nan Yang Institute of Technology generally requires a bachelor's degree or above. The in-service college degree teachers are those who have won awards in national Technician competitions or have other special skill certificates. Their overall personal ability level is relatively high, so their ICT application ability is higher than other teachers.

Through data analysis, there are significant differences in the application ability of information and communication technology among teachers in different teaching subjects in the dimensions of learning and development. The performance of teachers in Technician subjects is significantly higher than that of teachers in cultural subjects. There is no significant difference in other dimensions. According to the comparison of average values, the average level of teachers teaching Technician subjects is slightly higher than that of teachers teaching cultural subjects. This may be related to the development of new technologies faced by Technician teachers, which forces Technician course teachers to continuously learn new knowledge and technologies, making technician course teachers have better learning and development

awareness and behavior than cultural course teachers. Relatively speaking, cultural curriculum teachers teach language, mathematics, physical education, etc., with relatively fixed knowledge content and low update frequency, which makes cultural curriculum teachers lack urgent learning and development awareness and behavior.

Research question 3: What factors contribute to the development of teachers' ICT abilities?

Through the analysis of data on the satisfaction level of teachers with infrastructure environment and information resources, as well as their ICT proficiency level, it can be concluded that infrastructure environment has a positive and significant impact on teachers' ICT application ability, while the use of information resources has no significant impact on teachers' ICT application ability. Meanwhile, the infrastructure environment has a significant positive impact on the use of information resources. There is an ancient Chinese saying that goes, "To first improve one's body, one must first sharpen one's tools.". A complete set of supporting facilities is the foundation for teachers to implement information-based teaching and plays a crucial role in improving and developing their ability to apply information technology. Therefore, in order to develop the ICT abilities of teachers, a comprehensive analysis is combined with domestic and foreign research discussions. The study proposes the following suggestions and measures for the development of ICT abilities among teachers at Nan Yang Technician College.

Suggestions for improvement in environmental factors

Through the analysis of research results, among environmental factors, infrastructure construction has a positive impact on teachers' ability to apply information and communication technology. Therefore, strengthening infrastructure construction is a way to improve teachers' ability to apply information and communication technology. This is consistent with Akbaba Altun's (2006) view that increasing investment to improve the software and hardware environment is the first step in improving teachers' information-based teaching ability. The specific data analysis of basic environmental facilities in this study mainly includes four aspects: the stability of the campus network;

Teaching resource management platform; Research project cooperation and exchange platform; Campus One Card. Below are suggestions for improvement and enhancement in these four areas.

Firstly, the stability of campus networks is reflected in aspects such as broadband network speed, wireless network coverage, and network security. The campus of Nan Yang Technician College has achieved WIFI coverage of teaching buildings, but the signal in public areas is weak. The broadband single port access speed is only around 10M/s, and there may be lag when playing online videos during teaching. So, with sufficient funds, increasing the access speed of school broadband to 100M/s of high-speed broadband will ensure the smooth use of the network by teachers and students. Alternatively, one can refer to the method of Heze City in Shandong Province to establish an education urban area network, classify switch packets based on their characteristics, and adopt different transmission strategies according to different traffic categories to meet the network application needs of various schools (Miao Fengchun, 2015).In terms of network security, it can be planned for the construction of the campus network security of Sun Yat-Sen University. Firstly, the security performance of various network hardware devices themselves, especially the routing switches on the core layer, need to have good anti attack and other functions; The second is the distributed security protection of the entire campus network. By dividing different security domains and developing corresponding security strategies, one-on-one identity authentication for internet users is achieved through various hardware and software parameters, to prevent illegal use of network resources and prevent the occurrence of internal security risks; The third is the security protection of the external network. By setting up a firewall, intrusion detection is achieved, effectively preventing external attacks (Wang Gongliang, 2015).

Secondly, on the teaching resource management platform, Nan Yang Technician College has established its own Mood server and created a digital teaching resource management system. But this platform only provides a digital resource management structure and framework and does not provide any educational and

teaching resources. All resources need to be created by teachers themselves or collected online, and then uploaded to the platform for use. There are not many digital resources and the quality is not high. Therefore, there is a problem of low usage. Therefore, it is possible to learn from the practices of Qujing Normal University and access rich digital education and teaching resources, including the China MOOC platform, video public courses of various internet companies, and national public education resources. The acquisition of these resources will better promote the enrichment of platform resources.

Thirdly, a platform for scientific research project cooperation and exchange. At present, Nan Yang Technician College has not established a specialized research project cooperation and exchange platform, which requires the school to vigorously promote and build a technology project and achievement docking system, create a supply and demand platform, and achieve technology project and achievement docking. We can learn from the approach of Nanjing University of Technology to jointly build a research platform between schools and enterprises. Alternatively, Xuzhou University can collaborate with the provincial Smart Data International Joint Research Center to build an international joint research platform. It has played a strong supporting role in talent cultivation, project application, research and development of new technologies, processes, and products, and transformation of scientific and technological achievements for the development of both parties (Hu Shuigen, 2021).

Fourthly, campus one card. The existing campus card of Nan Yang Technician College includes comprehensive consumption functions such as cafeteria, supermarket, water and electricity payment. The "Campus Card" is an important component of the "Digital Campus", which should mainly have functions such as comprehensive consumption, identity recognition, financial services, and public information services (Zhang, Y., Li, X., & Lei, N.,2021). Become a student and teacher's ID card, library card, medical record card, entry and exit chest card, dining consumption card, computer card, etc. (He Qi, 2017). The next step for schools is to gradually improve the identity recognition function and public information service

function of campus all-in-one cards, to help teachers and students more conveniently use the college's library, computer rooms, and other infrastructure.

Suggestions for improving personal factors.

From the research on strategies for improving teachers' ICT application ability, organizing learning activities for teachers is the main improvement strategy (Liu Qingqing&Cai Jianzhong, 2017) (Akbaba Altun, 2006) (Wachira, P., &Keengwe, J.2011). However, the improvement effect of training on teachers' ICT application ability is not the same. In terms of the situation in China, there is relatively little training specifically for teachers' ICT application abilities, and apart from short-term training, it is difficult for teachers to spare enough time from heavy work tasks to learn and improve themselves. Therefore, organizing efficient learning activities and improving relevant support policies are important factors in promoting the improvement of teachers' ICT application abilities. That is consistent with the opinion of (Quan Xiaoxiao, 2018) and (Wang Chunlei, 2007).

So how to form efficient learning activities? Developing training policies tailored to the specific situation of teachers is the suggestion of the majority. For example, Akbaba Altun (2006) proposed providing different subject software and resources for teachers of different ages. Through the analysis of this study, it can be concluded that there are significant differences in ICT application abilities among teachers of different age groups, and most teachers have lower evaluation and diagnostic abilities. Therefore, training should focus on evaluation and diagnosis, and more attention should be paid to the training of elderly teachers. And this requires a people-oriented approach, teaching students according to their aptitude, drawing on the ICT training policies of the UK, clarifying the Technician shortcomings and training needs of teachers, and inviting training companies to develop targeted training plans. In terms of learning methods, exploratory learning and task driven approach are adopted. Set task goals for teachers, allowing them to actively explore while completing tasks. To improve teachers' practical operation ability and information acquisition ability (Wei Yan ,2010).

The formulation of relevant support policies is an important factor in ensuring teachers' learning motivation, learning time, and learning effectiveness (Li Yumei, 2020). From the previous analysis and discussion, it can be seen that Nan Yang Technician College does not have clear regulations on the application of teacher Information in teachers' lesson preparation methods, teaching methods, student evaluation, and daily evaluation systems. Therefore, schools should first establish relevant institutional systems. Firstly, with the principal as the team leader, an information technology leadership group is established, specifically responsible for formulating information technology related policies, performance rewards, event organization, and other work to ensure the effective implementation of relevant policies (Gu Yifeng, 2018). From teacher classroom preparation to teaching implementation, from evaluating students' daily homework due, comprehensively establish an information assessment form. Through long-term accumulation, teachers can gradually adapt to information technology in their daily work and improve their ability to apply information and communication technology. Once again, for the evaluation of teachers' information and communication technology capabilities, it is necessary to adopt a multi-dimensional process evaluation based on the different abilities of teachers, combined with teacher mutual evaluation, student evaluation, etc. Incorporate the evaluation results into the performance evaluation standards of schools and teachers (Xu Huifu, 2011).

Limitations of the study

In terms of influencing factor analysis, due to the numerous factors that affect teachers' ICT application ability, and the limitations of research conditions, the study cannot comprehensively analyze other factors.

At the same time, the study focused on Nan Yang Technician College and analyzed the individual case of the school. The analysis of the impact of individual cases on teachers' ICT application ability has certain limitations and cannot represent the overall situation of vocational school’s teachers.

The paper uses a questionnaire survey to evaluate the ICT application ability of teachers, and the evaluation dimension is relatively single. The measurement of teachers' ICT application ability may not be comprehensive and accurate enough.

Recommendations for future research

This study evaluates the ICT application ability of teachers at Nan Yang Technician College, explores the influencing factors of vocational school's teachers' abilities, and provides development suggestions. The object of this study is only aimed at vocational school's teachers in the Nan Yang area. Subsequent research can continue the method used in this article in various urban areas of Henan Province, evaluate the ICT application ability of vocational school's teachers, and then analyze and compare the differences and characteristics between regions.

Secondly, it is necessary to constantly track and pay attention to the dynamic changes in the ICT application capabilities of vocational school's teachers in Nan Yang Technician College, as well as the implementation of recommendations, in order to provide reasonable data support for the evaluation of the information development of the entire region.

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APPENDICES

QUESTIONNAIRE

A survey on the ICT proficiency level of vocational school's teachers and satisfaction with school ICT related environmental factors.

Dear teacher:

Hello! First, thank you very much for taking the valuable time to participate in this survey! We want to truly understand the current situation of information technology teaching, research, and application satisfaction of vocational school's teachers through this survey. In order to provide better information infrastructure, information teaching, teaching and research resources, and platform systems for school's teachers in a targeted manner.

This survey is conducted anonymously, and the results are for scientific research purposes only. It will not have any negative impact on you or the school, and we will keep all your information confidential. Please provide an objective answer based on your actual situation and thank you again for your support and participation!

Part Ⅰ: Basic information

Directions: Please mark ✓ in the ☐ or fill the answer that is most applicable to you.

Gender:

☐ Male ☐ Female

Age:

☐ 20-30 years old ☐ 31-40 years old

☐ 41-50 years old ☐ upper51years old

Educational Level:

☐ Associate Degree

☐ Bachelor's Degree

☐ Master's Degree and above

Teaching major:

☐ Technical majors ☐ Cultural majors

Part Ⅱ: Questionnaire

Questionnaire 1: Teacher's information technology application ability

Directions: Please mark ✓ in the column that is most applicable to you.

What is your level of application ability in ICT in daily teaching and work?

(The level of ability ranged from 5 = highest score to 1 = lowest score)

1.ICT application ability	Level of ability				
	5	4	3	2	1
1.1 Technology Literacy					
1.1.1 I am proficient in using office software and related teaching software to meet the needs of daily teaching tasks.					
1.1.2 I believe that applying ICT skills is a necessary skill for me, otherwise it will affect the development of students.					
1.1.3 I have found that using information technology is beneficial for supporting student-centered learning.					
1.1.4 I always think about how to better apply information technology to teaching.					
1.1.5 I am very willing to try new teaching models in the information environment.					
1.2 Planning and Preparation					
1.2.1 I am able to handle digital educational resources that effectively support classroom teaching.					
1.2.2 Before class, I habitually check the teaching equipment and resources that will be used and prepare solutions for any problems that may arise during the teaching process.					
1.2.3 I am able to reasonably select information technology tools for teaching design and solve related teaching problems based on course objectives.					

1.2.4 I am trying to utilize information technology (such as animation, audio and video, etc.)Make teaching difficult and important points simple and easy to understand.					
1.2.5 I help students broaden their thinking by providing them with information based learning materials.					
1.3 Organization and Management					
1.3.1 I will arouse students' interest by using information technology to design different forms of teaching activities (such as games, competitions, etc.)					
1.3.2 When individual students perform technical operations in the classroom, I will arrange other students' activities reasonably.					
1.3.3 I can guide students to continuously focus on digital resource content by designing questions, prompts, assigning tasks, and other means.					
1.3.4 In the information technology classroom, I will adjust the equipment or the relative position of teachers and students to ensure that each student obtains good audio-visual effects.					
1.3.5 I listen to students' suggestions when using devices or software in an information technology environment.					
1.4 Assessment and Diagnosis					
1.4.1 I am able to establish electronic student learning records to provide support for the evaluation of students' comprehensive qualities.					
1.4.2 I am able to learn and master the operation of the new evaluation system.					
1.4.3 I understand multiple evaluation methods and am able to design evaluation plans based on learning objectives.					

1.4.4 I will use different evaluation tools (such as electronic portfolios) to evaluate students' learning process.					
1.4.5 I am able to apply information technology to organize and analyze students' learning process information, identify teaching problems, and propose targeted improvement measures.					
1.5 Learning and Development					
1.5.1 I believe that information technology can promote one's professional development.					
1.5.2 I actively participate in special forums, online community activities, and often pay attention to the application trends of new media in education and teaching.					
1.5.3 I often use information technology tools to exchange experiences with experts and peers, obtain guidance and assistance.					
1.5.4 I can actively participate in school-based training activities supported by information technology.					
1.5.5 I can learn related to the subjects I teach in an information-based environment.					

Questionnaire 2: Satisfaction with environmental factors

Directions: Please mark ✓ in the column that is most applicable to you.

How satisfied are you with the school's ICT related environment?

(The level of ability ranged from 5 = Very satisfied to 1 = Very dissatisfied)

2.1 Satisfaction with infrastructure construction	Level of Satisfaction				
	5	4	3	2	1
2.1.1. Stability of campus network					
2.1.2 Security of Campus Network					
2.1.3 Access speed of campus network					
2.1.4 Informatized office environment					
2.1.5 Information based teaching environment					
2.1.6 Multimedia teaching equipment					
2.1.7 Online teaching platform					
2.1.8 Teaching resource management platform					
2.1.9 Online examination platform/system					
2.1.10 Virtual simulation training platform					
2.1.11 Research project collaboration and exchange platform					
2.1.12 Research project knowledge sharing platform					
2.1.13 Information tools to support scientific research projects					
2.1.14 Timeliness of information provided by the system					
2.1.15 Response time of the system					

2.1.16 Video conferencing equipment					
2.1.17 Campus Announcement System (BBS)					
2.1.18 Email system					
2.1.19 Network storage space					
2.1.20 Campus One Card					
2.2 Satisfaction with the use of information resources	**Level of Satisfaction**				
	5	4	3	2	1
2.2.1 Provided teaching resource editing software					
2.2.2 Provided teaching resource library					
2.2.3 Online test question bank provided					
2.2.4 Online teaching resources					
2.2.5 Virtual simulation training resources					
2.2.6 Tools and software provided to support scientific research projects					
2.2.7 Provided scientific research resource library					
2.2.8 Scientific research information provided					
2.2.9 Research collaboration opportunities provided					
2.2.10 Opportunities for applying for scientific research projects provided					
2.2.11 Information on the provision of electronic resources in libraries					
2.2.12 On campus information resource search tool					

The Standard of Teacher's Ability of Applying Information Technology in Primary and Secondary Schools (Trial)		
The Dimension	I. Use information technology to optimize classroom teaching	II. Use information technology to transform learning style
Technical literacy	1. Understand the role of information technology in improving classroom teaching. Arouse the consciousness of using information technology to optimize classroom teaching actively.	1. Understand the information age to the new requirements of student training. Have the consciousness of actively exploring and using information technology to change students' learning styles.
	2. Understand the types and functions of multimedia teaching environments. Proficient in operating common multimedia teaching equipment.	2. Familiar with the Internet, mobile devices, and other new technologies, and understand its supporting role in education and teaching.
	3. Understand the functions and characteristics of general software and subject software related to teaching, and be proficient in application.	3. Explore the use of online teaching platforms to support students' autonomous, cooperative, inquiry learning and other technical resources.
	4. Acquire digital education resources through various ways, and master the tools and methods of processing, making, and managing digital education resources.	4. Use technology to integrate multiple resources, connect school, family, and society, and expand students' learning space.
	5. Have information ethics and information security awareness, and can set an example.	5. Help students to establish information ethics and information security awareness, and cultivate students' good behavior habits.

Planning and Preparation	6. Based on curriculum standards, learning objectives, student characteristics, and technological environment, select appropriate teaching methods. Identify the convergence point of information technology and teaching.	6. Based on curriculum standards, learning objectives, student characteristics, and technological environment, select appropriate teaching methods. Determine the convergence point of using information technology to cultivate students' comprehensive ability.
	7. Use information technology to design effective teaching processes to achieve learning objectives.	7. Using information technology, design the teaching process and learning activities that help students to learn independently, cooperatively, and inquisitively.
	8. According to teaching needs, choose and use technical resources reasonably.	8. Choose and use technical resources reasonably, and provide students with rich learning opportunities and personalized learning experiences.
	9. Develop digital educational resources that effectively support classroom instruction.	9. Design learning guidance strategies and methods to promote students' cooperation, communication, exploration, reflection, and creation.
	10. Ensure technical equipment and resources are properly used in the classroom environment.	10. Ensure that students have convenient and secure access to the Internet and resources.
	11. Anticipate possible problems in the application of information technology and formulate solutions.	11. Foresee the problems that students may encounter in learning independently and cooperatively in the information environment, and formulate countermeasures.

Organization and Management	12. Use technical support to improve teaching methods and effectively implement classroom teaching.	12. Use technology to support, change learning mode, and effectively carry out students' independent, cooperative, inquiry learning.
	13. Let each student have equal access to technical resources, stimulate students' interest, and keep students' attention on learning.	13. Give students equal access to technical resources and participation in learning activities in groups and individual learning.
	14. In the process of tech-mediated teaching, students' classroom feedback should be observed and collected to effectively adjust the teaching behavior.	14. Use technology tools to collect students' learning feedback effectively, and provide timely guidance and appropriate intervention to learning activities.
	15. Flexibly deal with the unexpected situation caused by technical failure in classroom teaching.	15. Flexibly deal with other unexpected situations that occur when students are engaged in learning activities in an information environment.
	16. Encourage students to participate in the teaching process guide students to improve their technical literacy and give play to their technical advantages.	16. Support students to actively explore the use of new technology resources, and creative participation in learning activities.

Assessment and Diagnosis	17. According to the learning objectives, scientifically design and implement the information teaching evaluation scheme.	17. According to the learning objectives, we should scientifically design and implement the information-based teaching evaluation scheme, and rationally select or process the evaluation tools.
	18. Try to use technology tools to collect students' learning process information, sort out and analyze them, find teaching problems, and put forward targeted improvement measures.	18. Make comprehensive use of technical means to analyze the learning situation and provide the basis for promoting students' personalized learning.
	19. Try to use technical tools to carry out tests, exercises, and other work to improve the efficiency of evaluation.	19. Guide students to use evaluation tools to carry out self-evaluation and mutual evaluation, and do a good job in the process and final evaluation.
	20. Try to establish electronic archives of students' learning to provide support for students' comprehensive quality evaluation.	20. Use technology to collect key information about students' learning process and results, establish electronic files of students' learning, and provide support for students' comprehensive quality evaluation.

Learning and Development	21. Understand the role of information technology in the professional development of teachers, and have the awareness of actively using information technology to promote self-reflection and development.
	22. Take advantage of the teacher network training community, actively participate in professional development activities supported by technology, develop the habit of network learning, and constantly improve one's teaching ability.
	23. Use information technology to establish and maintain contacts with experts and peers, relying on the learning community to promote professional growth. 24. Master the technical means and methods required for professional development, and improve the ability of independent learning in the information technology environment. 25. Effectively participate in school-based research and study supported by information technology, and combine learning with application.

VITA