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Improving New Teacher's Teaching Competency through Organization Development Intervention (ODI): A Case Study of School of Telecommunication Engineering in Beijing Polytechnic

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Abstract

The purpose of the Organizational Development Action Research is to evaluate the impact of ODI on the teaching competence of new teachers in school of telecommunication engineering in Beijing Polytechnic. This study utilized a mixed research methodology which included 19 new teachers hired by the School of Telecommunications in BP since 2019 for 6 month's interventions. The objectives of this study are to assess the current situation of the teaching competence of new teachers in School of Telecommunications Engineering in BP; to design and implement appropriate Organizational Development Intervention (ODI) to improve the new teachers' teaching competence in classroom teaching; to determine the significant difference between the pre-ODI and post-ODI in the teaching competence of new teachers; and to design recommendations for new teacher development strategies based on the findings. The hypothesis test results found there were significant differences between Pre-ODI and Post-ODI in three independent variables: teaching design ability, teaching implementation ability, informatization teaching ability as well as the dependent variable: teaching competence. Using the juxtaposition of qualitative and quantitative research findings, recommendations for the development of new teachers in BP were proposed.

Keywords: OD Intervention, Teaching Competence, Teaching Design Ability, Teaching Implementation Ability, Informatization Teaching Ability.

Introduction

As China enters a new stage of development, industrial upgrading and economic restructuring are accelerating, and the demand for skilled technical talents in various industries is becoming increasingly urgent. The important status and role of vocational education are becoming increasingly prominent. In 2019, The State Council officially issued the "Implementation Plan for the Reform of National Vocational Education". To ensure the protection of technical skills, the proposed multi-school pattern also takes multiple measures to create a "Double-Professionally-Titled" teacher team and build a diversified pattern of running schools. Significant policy changes were observed in the recruitment process.

According to the policy requirements, since 2019, teachers of relevant majors in vocational colleges will, in principle, be recruited from those with more than three years of working experience in enterprises and higher vocational education. Vocational college teachers will no longer be average university graduates but enterprise engineers. Although these new teachers have technical skills and expertise, they might need to be equipped with the fundamentals of teaching, learning, and classroom conduct. To cope with such changes, China's vocational colleges and universities need to improve new teachers' teaching competence to adapt to the career change and be competent in teaching (Lyu, 2020). With the deepening of vocational education reform, teachers need to have higher teaching competencies to adapt to new educational concepts, teaching methods, and teaching models. Their teaching competence directly affects the quality of education. Only teachers with high teaching competence can better adapt to educational reforms and promote the development of vocational education.

Organization Background

Beijing Polytechnic (B.P.) is an independent public vocational college established by Beijing Municipal People's it was selected as one of the top 10 universities in grade A of the national “Double High-level Plan” for high-level school construction. Since 2019, the School of Telecommunications Engineering has recruited 19 new teachers, 7 in 2019, 9 in 2020, and 3 in 2021, through open recruitment by the policy of the national implementation program of vocational education reform. They all held master’s degrees in IT and had at least three years of experience as corporate engineers. After the new teachers started teaching, the school found that despite their extensive engineering work experience, new teachers scored poorly in the school’s teaching quality evaluation each semester.

Research Objectives

1. To assess the current teaching competence of new teachers in the School of Telecommunications Engineering in B.P.

2. To design and implement appropriate Organizational Development Intervention (ODI) to improve the new teachers’ teaching competence in classroom teaching.

3. To determine the significant difference between the pre-ODI and post-ODI in the teaching competence of new teachers.

4. To provide recommendations for new teacher development strategies to improve teacher competency based on the findings.

Literature Review

Most scholars believe teaching competency is closely related to accomplishing teaching goals and tasks (Huang, 2020). Teaching competency refers to the comprehensive performance of teachers’ knowledge, teaching ability, professional character, and personal traits in achieving teaching objectives and completing teaching tasks in the teaching process, and its content including knowledge, ability, motivation, attitude, values, and personal traits. (He & Xiong, 2015). Ruan (2020) defined the teachers' teaching competency as the characteristics of teachers required to achieve high-quality teaching objectives, which mainly cover knowledge, ability, attitude, personal traits, and values. Higher vocational colleges are to cultivate high-quality technical and skilled talents to serve regional development, so the teaching competency

structure and quality structure of teachers in higher vocational colleges have more particular requirements, and teachers need to have both theoretical teaching and practical teaching ability that is, the "dual-teacher" quality (Li & Jiang, 2018). Molenaar et al. (2009) pointed out that teaching competence is composed of three dimensions: “competence component dimension," "organization level dimension," and "teaching domain dimension." In the dimension of competence composition, teaching ability includes knowledge, skills, and attitudes.

The ability of the teacher and its development are seen as factors and requirements for the ability-based curriculum design in vocational education. Besides, they are the object of competency-based reform in vocational education (Billet, 2016; Edwards et al. 2009). Dineke et al. (2004) consider teaching ability as an integrated personal characteristic that supports effective teaching performance in various teaching environments to meet the needs of knowledge, skills, and attitudes. The Dictionary of Education, compiled by Gu Mingyuan (1998), defines teaching ability as a psychological characteristic of teachers to achieve teaching goals and successfully engage in teaching activities. It is composed of general ability and unique ability. An (2007) claimed that teaching ability included teaching design, teaching implementation and teaching evaluation ability. Lu and Hong (2009) considered teaching ability included teaching design, teaching implementation and teaching reflection ability. At the beginning of 2020, schools nationwide carried out various types of blended teaching through live streaming and other online teaching modes. Some scholars have pointed out that blended teaching is becoming the "new normal" of future education (Norberg et al., 2011). The composition of teaching ability in this study was similar to the teaching ability model in the literature. However, there were also some differences. This study emphasized the importance of informatization teaching ability and regarded it as an independent dimension, reflecting the new requirements of the current education field for teachers' teaching ability.

In this research, the teaching competency model is derived from the research theory of He and Xiong (2015) and includes four dimensions – knowledge literacy, professional character and skill, teaching ability, and personal traits.at the dimension of teaching ability, it includes teaching design ability, teaching implementation ability, and informatization teaching ability.

1. Teaching design ability (TDA), which is mainly the ability to design the teaching of a unit or a lesson according to the objectives of each unit or knowledge point in the curriculum program, mainly including:

The formulation of teaching objectives, the analysis, and organization of teaching contents, the design of resources required for teaching, the formulation of teaching activities, and the design of evaluation and assessment methods. (Dong & Hong, 2012).

2. Teaching implementation ability (TIA). It mainly refers to the implementation process of the teaching program and the implementation process of the evaluation of the teaching program according to the teaching design (Wang, 2021).

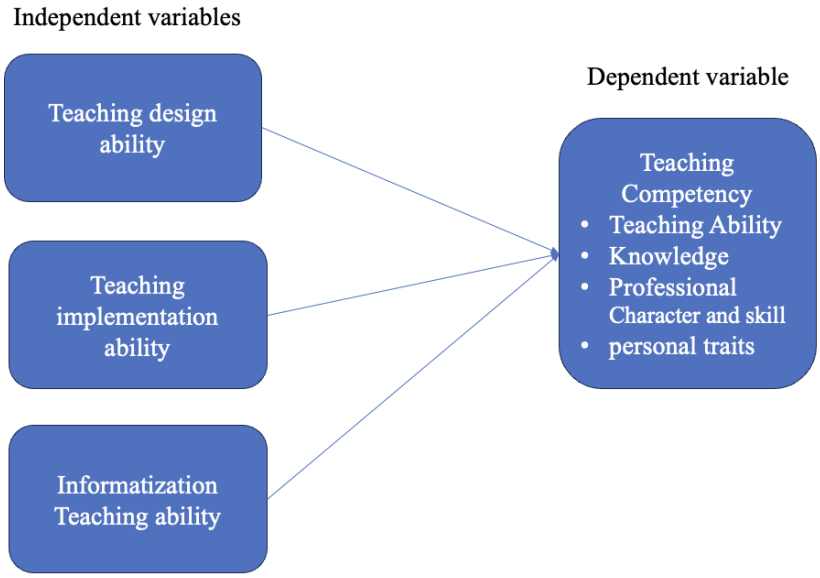
3. Informatization teaching ability (ITA). It refers to the new teaching ability that integrates information technology into subject teaching knowledge for teaching design, implementation, management, and evaluation and is the core ability of teachers engaged in education and teaching activities in the information environment (Du, 2017). Liu and Yin (2014) believes that informatization teaching ability is a kind of knowledge and ability structure in which teachers use information communication technology to transform subject knowledge

into effective student learning. TPACK is a framework that integrates technology, content, Pedagogy, and context, which provides a perspective for teaching and learning in the context of informatization. The level of teachers' informatization teaching ability will directly affect the application of TPACK in classroom teaching. On the one hand, the improvement of teachers' informatization teaching ability can help teachers better apply technology into classroom teaching, improve the quality and efficiency of classroom teaching, and enhance students' learning experience and effect (Wu, 2019). On the other hand, TPACK also promotes the improvement of teachers' informatization teaching ability.

The study was designed first to understand the current situation of new teachers' teaching design ability, teaching implementation ability, and informatization teaching ability, then design and implement interventions to improve the new teachers teaching ability. The ODI strategies were coaching, peer mentoring and training. Then the teaching competence of the new teachers was tested in post-ODI to understand the improvement. The Conceptual Framework of the study is shown in Figure 1.

Figure 1

Conceptual Framework



Research Methodology

Hypotheses of the Study

H1o: There is no significant difference between Pre-ODI and Post-ODI on Teaching Design Ability.

H1a: There is a significant difference between Pre-ODI and Post-ODI on Teaching Design Ability.

H2o: There is no significant difference between Pre-ODI and Post-ODI on Teaching Implementation ability.

H2a: There is a significant difference between Pre-ODI and Post-ODI on Teaching Implementation ability.

H3o: There is no significant difference between Pre-ODI and Post-ODI on Informatization Teaching ability.

H3a: There is a significant difference between Pre-ODI and Post-ODI on Informatization Teaching ability.

H4o: There is no significant difference between Pre-ODI and Post-ODI on Teaching Competence.

H4a: There is a significant difference between Pre-ODI and Post-ODI on Teaching Competence.

Research Design

The purpose of this study is to improve the teaching design ability, teaching implementation ability, and informatization teaching ability of new teachers through ODI, so as to improve the teaching competence of new teachers. A mixed method of quantitative and qualitative research was utilized in this study.

- Pre-ODI: Survey (quantitative data).
  Interview (qualitative data)
- ODI: Intervention logs
- Post-ODI: Survey (quantitative data).
  Interview (qualitative data)
  Recommendation. (Juxtaposition of qualitative and quantitative data)

Research Instrument

The quantitative research instrument is the survey carried out in pre- and post-ODI stages. The researcher designed a survey questionnaire based on an existing questionnaire (He & Xiong, 2015). Part I of the questionnaire included the basic information. Part II included a 5-point Likert Scale with 40 items on each variable, which include 8 items of teaching design ability, 9 items of teaching implementation ability, 6 items of Informatization teaching ability and 17 items of teaching competence.

The Qualitative instrument was the interview used at the pre- and post-ODI Stages. The interview was a semi-structured survey with four questions. When informants' answers deviated too far from the topic, the interviewer used some simple tips to guide them back to the topic. The interview question outline is shown in Table 1.

Table 1

The Interview Question Outline

Variable	Interview questions & guide tips
teaching design ability	How do you evaluate your teaching design in your classroom teaching?
teaching implementation ability	What teaching methods and strategies have you used in the teaching implementation, and what problems have you encountered ?
informatization teaching ability	What information technologies do you use in your teaching?
teaching competence	How do you view your teaching competence?

Reliability Test of the Quantitative Survey Questionnaire

To test the reliability of the research instrument, the survey questionnaire was subjected to Pilot testing with 58 respondents from a random sample of the faculty (not including the 19 participants), of which 51 were valid, with an effective rate of 87.9%. Cronbach's alpha was used to test the reliability of the questionnaire. The Cronbach's alpha values for teaching design ability, informatization teaching ability, and teaching competence are all above 0.8, indicating reliability is “very good”. The Cronbach's alpha value for teaching implementation ability is 0.762, classified as "good" reliability.

Validity Test of the Quantitative Survey Questionnaire

Item Objective Congruence (IOC) was used to test the validity of the questionnaire by five experts. The results showed that items 5, 20, and 25 were deleted due to IOC scores below 0.6. Some of the remaining items were modified based on the experts' recommendations to improve the clarity of the question descriptions. Finally, the questionnaire consists of 40 items.

Research Population

In this Action Research, the research population includes all teachers (N= 58) who worked in BP, School of Telecommunication Engineering. The research used purposive sampling using 19 new teachers who joined as new teachers since 2019 after the new policy was implemented. The School of Telecommunications Engineering has hired 19 new teachers, 9 in 2019, 8 in 2020, and 2 in 2021. Those new teachers all have at least a master's degree and more than three years of working experience as an engineer in an enterprise.

All 19 teachers were participants of this study as respondents of the survey questionnaire in both pre- and post-ODI, as informants in the pre- and post-ODI interview, and as ODI participants.

Data Analysis

Quantitative Data Analysis

Descriptive analysis was used for the demographic data. Frequency and percentage were used to show the distribution of gender, age, educational background, teaching years, and professional title of the participants. Description analysis was used to determine the Mean and std. Deviation of the scale items per variable in both pre- and post- ODI. Before the descriptive analysis, all negative questions have been re-coded, with 5 points replacing 1 point, 4 points replacing 2 points, and so on. After re-coding, the distribution in the data can be observed and analyzed more intuitively. At the same time, this can also ensure that the data analysis results are more in line with people's real intentions and actual needs. The highest Mean indicates that most of the respondents agreed on that variable. The lowest Standard deviation indicates the stability of ideas on the specific variable (Sediqi, 2022). Paired sample t-test was used to verify differences between pre- and post-ODI in paired data.

Qualitative Data Analysis

The qualitative data were analyzed by content analysis, a method for identifying, analyzing, and reporting data themes. It minimally organizes and describes the data in rich detail, and it can explain aspects of the research topic (Braun & Clarke, 2006). The interview data were analyzed using content analysis, which generated codes and then extracted categories

and themes. Code is a data segment descriptor that assigns meaning, which is a description of the data. Themes are more conceptual because they are different sub-themes/categories grouped to form a "more abstract" central concept. Two more experts in pedagogy and the researcher conducted the content analysis as coders.

Mixed Method Data Analysis

The mixed method data analysis was used to design new teacher development strategy recommendations for the organization. The findings of the qualitative analysis were from the insights from the Themes generated from the interviews between pre and post-ODI. The findings of the quantitative analysis were from the paired sample t-test of the pre and post-survey data. Through juxtaposing the findings of qualitative and quantitative analysis, recommendations for the organization to improve the teaching competency of new teachers were designed.

ODI Process of the Study

Pre-ODI Stage.

In the pre-ODI stage, the researcher assessed the current situation of the 19 participants in terms of all the variables through a quantitative survey questionnaire and qualitative interview. The pre-ODI survey was conducted in May 2022. The pre-ODI interviews spanned from May to June 2022. The objective of the pre-ODI stage was to understand the current situation of the teaching abilities as well as the teaching competence of the participants in pre-ODI, which would be used to design OD interventions.

ODI Stage.

1. Coaching. Small-scale programs were conducted to coach new teachers. The coaching activities were held once a month; five activities were conducted during the ODI stage in weeks 1, 4, 8, 12, and 17 of semester 22-23-1. Each activity took about 45-60 minutes. During the coach- me- the researcher sets a goal in each monthly coaching session and discusses the achievement and next steps in the next coaching session. Coaching objectives were formulated for each activity, to improve teaching design ability, teaching implement ability and informatization teaching ability.

2. Training/workshops. There were two training activities in the ODI stage; the first was an online training course held from October to December 2022. All the new teachers joined the online training. The training was carried out in the form of lectures on teaching ability improvement. The objective of the training was to improve teaching ability. The second one was carried out at the end of December 2022, and the content was the informatization teaching ability improvement training based on TPACK theory, The training activity aimed to help teachers effectively integrate technology, subject content, and teaching methods to improve informatization teaching.

3. Peer mentoring. At the beginning of the ODI, the School of Telecommunication Engineering arranged one-to-one mentoring peers for new teachers. Peer mentors are veteran teachers in the same major who answer questions and help new teacher’s one-to-one. Each group of peers set the peer mentoring plan; the peer discussed the plan together. The researcher held two seminars at the mid-term, and the end of the term to discuss the progress and effect of peer guidance, and the peer mentors reported the progress of the new teachers. The objective was to help new teachers to improve teaching abilities at any time.

Table 2

Research Process Table of ODI Stage

Activities	**Participants**	**Time lines**	**Peer**	**Variable intended to change**	**Objective**	**Output**
Coaching activity 1	All the 19 new teachers	Week 1, term 22-23-1	The coach (The researcher)	teaching design ability	To improve the teaching design ability by setting appropriate teaching objectives and analyzing the learning situation accurately	Coaching log
Coaching activity 2		Week 4, term 22-23-1		teaching implementation ability	To improve teaching implementation ability by organizing appropriate activities	Coaching log
Coaching activity 3		Week 8, term 22-23-1		informatization teaching ability	To improve informatization teaching ability by the construction of information technology resources	Coaching log
Coaching activity 4		Week 12, term 22-23-1		informatization teaching ability teaching implementation ability	To improve informatization teaching ability and teaching implementation ability by using information technology in teaching implementation appropriately.	Coaching log
Coaching activity 5		Week 17, term 22-23-1		teaching implementation ability teaching design ability	To improve teaching implementation ability and teaching design ability by reporting the teaching design and implementing the plan	Coaching log
Training activity 1		Week 7-week 15	The department management	teaching design ability teaching implementation ability informatization teaching ability	Improving Teaching Ability	Summary of Training
Training activity 2		Week 17-18		teaching implementation ability	Improving teaching implementation ability	Teaching implementation report
Peer mentoring		Week 1-16	Each peer	teaching design ability teaching implementation ability informatization teaching ability	Improving Teaching Ability	Summary of peer mentoring

Post-ODI Stage.

In the post-ODI stage, the researcher used the same questionnaire and interview questions for all the participants to analyze the effect of ODI on variables. The survey questionnaire was distributed in March 2023, the results were used for hypothesis testing. The interviews were conducted spanning from March to April. Interview results were compared with the pre-ODI interview to understand the changes, and then through juxtaposition of qualitative and quantitative data recommendations were generated for the organization.

Results and Discussion

Demographic Data Analysis

The participants are 19 new teachers teaching in the Telecommunication Engineering School in BP in the past five years. They all had more than three years of enterprise work experience. According to results of demographic data analysis, 31.58% are 30-35 years old, and 47.37% are 36-40 years old. Those under 30 and over 41 accounted for a minority. More than a half (57.89%) of participants are male, and 42.11% are female. Three participants have a doctoral degree, and the other 16 have a master's degree. More than sixty precents (63%) of the participants have the title of lecturer, and 37% have the title of assistant teacher. Two teachers had been working as college teachers for less than one year, accounting for 10.53%, 8 with 1-2 years accounting for 42.11%. The remaining 9 teachers with 2-3 years of teaching years accounted for 47.37%.

Pre-ODI Quantitative Descriptive Analysis of the Variables

1. Independent Variable: Teaching Design Ability

The descriptive analysis of teaching design ability is shown in Table 3. As can be seen, the overall mean score was 4.26 (Strongly confirmed) on a 5-point Likert scale. Question item 7- “I continue to improve my instructional design until I achieve satisfactory results.” had the lowest score of 3.47(conform). Question 1- “I often collect and process relevant materials to enrich the teaching content.” had the highest mean score of 4.74(strongly conform).

Table 3

Descriptive Analysis of Teaching Design Ability in Pre-ODI Stage (n=19)

Items	Mean	Std. Deviation
1. I often collect and process relevant materials to enrich the teaching content.	4.74 Highest mean	0.45
2. I have a good understanding about the situation and characteristics of students in my teaching.	4.00	0.75
3. I take a variety of ways to comprehensively evaluate students' learning outcomes.	4.57	0.51
4. I often reflect on teachings and summarize my teaching experience and lessons in a timely manner.	4.63	0.50
5. When I prepare my lessons, I can design my teaching objectives in a logical manner.	4.42	0.69
6. I think comprehensively and carefully to arrange the content of my teaching.	4.32	0.58

Items	Mean	Std. Deviation
7. I continue to improve my instructional design until I achieve satisfactory results.	3.47 Lowest mean	0.84
8. The teaching theory I have acquired can be well applied to teaching practice.	4.00	0.75
Overall teaching design ability	4.26	0.40

2. Independent Variable: Teaching Implementation Ability

Table 4 shows that the mean score for the overall teaching implementation ability on a scale out of 5 was 3.95 (conform). Question item 5- "In my teaching, students are less actively engaged." obtained the lowest mean of 2.32(Not conform). Question 4: "My teaching language is fluent, clear, concise, and rigorous." Received the highest standard of 4.47(strongly conform).

Table 4

Descriptive Analysis of Teaching Implementation Ability in Pre-ODI Stage (n=19)

Items	Mean	Std. Deviation
1. I can't deal with the situations and problems that arise in my teaching.	3.79	1.03
2. I adjust my teaching in a timely manner according to the students' responses.	4.16	0.83
3. To inspire students, I often use strategies such as questioning, repetition, and emphasis.	3.95	1.03
4. My teaching language is fluent, clear, concise, and rigorous.	4.47	0.70
5. In my teaching, students are less actively engaged.	2.32	0.95
6. I interact and communicate with people very smoothly and happily.	4.26	0.56
7. I have developed my own distinct style in teaching.	4.26	0.81
8. I encourage students to express different perspectives and opinions in my teaching.	4.21	0.42
9. I will care about students in various ways to stimulate their interest in learning.	4.16	0.50
Overall teaching implementation ability	3.95	0.37

3. Independent Variable: Informatization Teaching Ability

As can be seen in Table 5, the overall informatization teaching ability got a score of 4.09(Conform). Question item 3- "I understand the novel ideas and developments in the subjects I teach," had the lowest mean score of 3.79(conform), while question item 5- “I am not familiar with information teaching technology and rarely use it in teaching.” had the highest mean score of 4.53(strongly conform).

Table 5

Descriptive Analysis of Informatization Teaching Ability in Pre-ODI Stage (n=19)

Items	Mean	Std. Deviation
1. I was able to turn the collected teaching content into an informative teaching resource	3.90	0.94
2. I can flexibly use online teaching platforms and new media to transmit teaching information.	3.84	0.83
3. I understand the novel ideas and developments in the subjects I teach.	3.79	1.08
4. I can learn new knowledge actively and master the knowledge and skills of information teaching so that I can apply them to classroom teaching.	4.21	0.86
5. I am not familiar with information teaching technology and rarely use it in teaching.	4.53	0.70
6. In my teaching, I often use more discussions, cases, multimedia and other teaching methods.	4.26	0.56
Overall informatization teaching ability	4.09	0.42

4. Dependent Variable: Teaching Competence

The teaching competency of all respondents was measured in the pre-ODI stage, and the mean score on a scale out of 5 was 4.14(conform), as tabulated below. The highest mean of all the items was “I look forward to being a teacher respected and liked by my students," with a mean score of 4.84(Strongly conform). The lowest mean item," I know little about humanities and social sciences," was 3.53(Conform).

Table 6

Descriptive Analysis of Teaching Competence in Pre-ODI Stage

Items		Mean	Std. Deviation
Knowledge	1. I have a solid academic knowledge	3.95	0.71
	6.The education and teaching theories I have mastered are sufficient for the teaching needs	4.11	0.46
	10. I know little about natural science	4.21	0.79
	12. I know little about humanities and social sciences	3.53	0.61
Personality traits	2. I will make critical analysis and never blindly believe anything	3.90	0.57
	7. I often feel out of my depth and unsure of myself at work. (Lowest mean)	3.42	0.51
	8.I manage my emotions effectively and rarely worry, complain, or get angry.	3.68	0.67
	11. I am always humorous and approachable in both work and life	3.47	0.77
	15. I can insist on treating others fairly and justly	4.11	0.81
	16. I will tolerate other people's different opinions and provocative actions	4.58	0.51
professional character and skill	3.I can quickly adapt to new environment and new tasks	3.90	0.46
	4.I like the subject I am teaching	4.79	0.42
	5. I have never thought of giving up my teaching position in the university	4.68	0.58
	9.Every time I teach, I can experience success and happiness	4.26	0.73
	13. I try to persevere when things aren't going well	4.53	0.61

Items		Mean	Std. Deviation
	14. I look forward to being a teacher respected and liked by my students (highest mean)	4.84	0.50
	17. I am passionate about teaching, and I am willing to pour my energy into it	4.37	0.50
Pre-ODI teaching competence		4.14	0.20

As part of the pre-ODI stage, the researcher assessed the current status of the teaching design ability, teaching implementation ability, and informatization teaching ability of new teachers before the ODI started.

Pre-ODI Qualitative Research Outcome

The qualitative data analysis outcome of each variable by three coders in the pre-ODI stage is shown in the following table.

Table 7

The Themes and Categories of Each Variable in the Pre-ODI Stage

Variables	Categories	Themes
Teaching Design Ability	Category1: Meet the objective of the cultivation program Category2: Understand the student's current situation Category3: Make PowerPoint slides Category4: Write lesson plans Category5: Collect and arrange teaching contents Category6: Teaching content design should be resilient	Theme1: Set Appropriate teaching objectives are designed and aligned with curriculum standards (Category:1) Theme2: Consideration of the learning situation in the learning design (Category:2) Theme3: The teaching content is not only to make PowerPoint slides and write lesson plans but also to choose and arrange the teaching content (Category:3,4,5,6)
informatization teaching ability	Category1: Motivate Students Category2: Teacher-student interaction Category3: Language Use of Instruction Category4: Flexible adjustment of teaching implementation Category5: Teaching Method and Strategy Category6: Teaching process arrangement Category7: Teaching evaluation in time Category8: The teaching process is mainly based on the introduction, explanation, and practice	Theme1: Student motivation is important for teaching implementation (Category:1,7) Theme2: Interaction between teacher and students were inactively (Category:2) Theme3: Teaching implementations include the selection of appropriate methods and strategies, the use of precise professional teaching terms, the arrangement of proper activities (Category:3,5,8) Theme4: Teaching content with reasonable arrangement and flexible adjustment. (Category:4,6)
Informatization teaching ability	Category 1: Information technology mastery Category 2: Resource Construction Category 3: Cognitive of information technology	Theme1: Be able to actively study and master the knowledge and skills of informatization teaching and apply them to classroom teaching. (Category1,2,3) Theme 2:

Variables	Categories	Themes
	Category 4: Information teaching feedback Category 5: Information teaching statistics Category 6: Information multiple media application	Being able to use the online teaching platform and new media flexibly means delivering the teaching information (Category6) Theme 3: Use the informatization teaching platform to strengthen teaching monitoring and feedback in combination with the learning situation. (Code4,5)
Teaching Competence	Category1: Excellent professional knowledge background Category2: Desire to improve teaching competence and need guidance Category3: Will to be a good teacher Category4: Related work experience is helpful Category5: Shortcomings in the teaching ability dimension of teaching competence Category6: The present situation of teaching competence is not good	Theme1: Possess a high level of knowledge dimension in teaching competency (Category1,4) Theme2: Possess a lower level of ability dimension in teaching competency (Category5,6) Theme3: The present situation of teaching competence is not good (Category6) Theme4: Have the will and attitude to improve teaching competency and need guidance (Category2,3)

The Discussion of Pre-ODI Stage

By juxtaposing the qualitative and quantitative findings, among the three IVs, teaching implementation ability got the lowest score, informatization teaching ability scored in the middle; teaching design ability scored the highest. This basically matches the situation in the qualitative analysis. The status quo seems that new teachers have more vital teaching design ability than informatization teaching ability, stronger informatization teaching ability than teaching implementation ability, and new teachers have the weakest teaching implementation ability.

However, the high score in teaching design ability may be because new teachers do not fully understand teaching design. They misunderstand teaching design as writing lesson plans and creating PowerPoint presentations. That is to say, although new teachers believe that their teaching design ability is high in quantitative questionnaires and qualitative interviews, their inadequate teaching implementation ability may also be caused by the lack of teaching design. Indeed, if new teachers do not fully understand teaching design, they may equate it with writing lesson plans and creating PowerPoint presentations, which does not mean that they have acquired effective teaching design abilities. Moreover, teaching implementation ability is closely related to teaching design ability (Wang, 2021). If new teachers lack teaching design ability, it may cause them to encounter difficulties in actual teaching. Wang (2021)'s study claimed that there was a significant positive correlation between the teaching design and the teaching implementation.

Informatization teaching ability scored second, firstly because the participants were all teachers in computer-related disciplines, and their expertise included information technology. Secondly, new teachers are more receptive to new things and are generally familiar with

information technology and the use of information technology media. In the perception of young teachers, information technology teaching is part of everyday teaching and not something new. The epidemic, in particular, has given rise to online forms of teaching. Information-based teaching technology has gradually become an ordinary means of teaching.

The lowest teaching implementation ability score was also the most challenging part. New teachers generally perceived difficulties in teaching implementation to be related to student learning, attributing them to poor student quality and inexperience. As demonstrated in the study by Yu (2011), teachers' teaching implementation is a process of curriculum implementation and optimization. It relies on teachers' ability to make choices and balance between their personal and interactive experiences, overall considerations and individual attention in their interactions with students and the environment. Teaching implementation abilities need to be improved.

The study attempted to enhance the teaching competency of new teachers at the ODI stage through the intervention strategies of coaching, peer mentoring, and training to achieve the study's objectives. According to the analysis, the corresponding intervention plan was set up and ready to be implemented in the ODI stage. Specific interventions are shown in Table 8.

Table 8

Corresponding Interventions for the Findings

Variable	Low mean Question (pre-ODI)		Mean value	Corresponding to the qualitative analysis outcomes	Intervention to deal with this problem
Teaching Design Ability	I continue to improve my instructional design until I achieve satisfactory results.		3.47 Lowest mean	Theme3: The teaching content is not only to make PowerPoint slides and write lesson plans but also to choose and arrange the teaching content Category 6:Teaching content design should be resilient	Improve teaching design ability through coaching activities
	I have a good understanding about the situation and characteristics of students in my teaching.		4.00 Second lowest mean	Theme2: Learning situation should be analyzed accurately in teaching design	Peer mentoring The peer mentor would help in the learning situation analysis
	The teaching theory I have acquired can be well applied to teaching practice.		4.00 Second lowest mean	Theme1: Set appropriate teaching objective, not just meet the curriculum standards	Training for teaching theory
informatization teaching ability	In my teaching, students are less actively engaged.		2.32 Lowest mean	Theme1: Student motivation is important for teaching implementation Theme2: Interaction between teacher and students should be more active	Improve teaching implementation ability through coaching activities
	To inspire students, I often use		3.95 Second	Theme 3: The teaching process should include	Peer mentoring The peer mentor

Variable	Low mean Question (pre-ODI)		Mean value	Corresponding to the qualitative analysis outcomes	Intervention to deal with this problem
	strategies such as questioning, repetition, and emphasis.		lowest mean	the selection of appropriate methods and strategies, the use of precise professional teaching terms, the arrangement of proper activities, and the flexible adjustment in implementation.	would answer any implementation questions at any time
Informatization teaching ability	I understand the novel ideas and developments in the subjects I teach.		3.79 Lowest mean	Theme1: Be able to actively study and master the knowledge and skills of informatization teaching and apply them to the classroom teaching.	Improve informatization teaching ability through coaching activities.
	I can flexibly use online teaching platforms and new media to transmit teaching information.		3.84 Second lowest mean	Theme 2: Being able to use the online teaching platform and new media flexibly means to deliver the teaching information.	Informatization teaching training

Based on the results of the analysis of pre-ODI, the following interventions are proposed:

1. Improve teaching design ability through coaching activities.
2. Improve teaching implementation ability through coaching activities.
3. Improve informatization teaching ability through coaching activities.
4. Training for teaching theory to improving teaching ability.
5. Training for Informatization teaching technology based on TPACK theory.
6. Peer mentoring. The peer mentor would help with the learning situation analysis and answer any implementation questions at any time.

ODI Stage

Based on the findings in pre-ODI stage, the ODI process was designed. Instructional coaching can be used as a school-based improvement strategy. Because it focuses on the core teaching work, it supports a culture of collaboration. (Kowal & Steiner, 2007). Coaching was used to improve teaching design ability, teaching implementation ability and informatization teaching ability. Peer mentoring, which focuses on mentoring new teachers by veteran teachers, has been an effective strategy. Training, including lecture and workshops, is also a key ODI strategy for improving teaching competence. The coaching was a combination of group counseling and individual counseling. The peer mentoring was conducted on a one-to-one basis by groups. The training was conducted collectively by all new teachers. The intervention logs consisted of six broad sections:

- Basic information: describing the time and place of the intervention activity and other essential information.
- Variable intended to change describes what variable changed for this intervention

• Objectives: Description of the goals set for the activity
• Content: Describes the main activities of the intervention
• Detail of activity: Describes the details of activities of the intervention.
• Output: describes the response to the activity

Post-ODI Quantitative Descriptive Analysis of the Variables

The specifics of the three IVs were analyzed similarly as in the pre-ODI stage.

Table 9

Descriptive Analysis of Teaching Design Ability in Post-ODI Stage (n=19)

Items	Mean	Std. Deviation
1. I often collect and process relevant materials to enrich the teaching content.	4.74	0.45
2. I relatively have a good understanding about the situation and characteristics of students in my teaching.	4.00	0.75
3. The teaching theory I have acquired can be well applied to teaching practice.	4.53	0.51
4. I often reflect on teachings and summarize my teaching experience and lessons in a timely manner.	4.63	0.50
5. When I prepare my lessons, I can design my teaching objectives in a logical manner.	4.42	0.69
6. I think comprehensively and carefully to arrange the content of my teaching.	4.37	0.60
7. I continue to improve my instructional design until I achieve satisfactory results.	3.90	0.99
8. I take a variety of ways to comprehensively evaluate students' learning outcomes.	4.53	0.61
Overall Post-teaching design ability	4.39	0.46

Table 9 shows that the mean of the post-ODI scores is higher than that of the pre-ODI scores. The mean score for respondents was 4.39(strongly conform) out of 5. Question 1- "I often collect and process relevant materials to enrich the teaching content." received the highest mean score of 4.74(strongly conform), the same as the Pre-test score. In contrast, question 7- "I continue to improve my instructional design until I achieve satisfactory results." had the lowest mean score of 3.90(conform). It could be seen that the post-ODI was higher than the Pre-ODI at 3.48.

Table 10

Descriptive Analysis of Teaching Implementation Ability in Post-ODI Stage (n=19)

Items	Mean	Std. Deviation
1. I can't deal with the situations and problems in my teaching.	4.05	1.22
2. I adjust my teaching in a timely manner according to the students' responses.	4.53	0.61
3. To inspire students, I often use strategies such as questioning, repetition, and emphasis.	4.63	0.60
4. My teaching language is fluent, clear, concise, and rigorous.	4.63	0.50
5. In my teaching, students are less actively engaged.	2.63	1.34
6. I interact and communicate with people very smoothly and happily.	4.63	0.50
7. I have developed my own distinct style in teaching.	4.26	0.81

Items	Mean	Std. Deviation
8. I encourage students to express different perspectives and opinions in my teaching.	4.63	0.50
9. I will care about students in various ways to stimulate their interest in learning.	4.42	0.61
Overall Post-teaching implementation ability	4.27	0.44

The mean of the post -test scores is higher than that of the pre-test, as shown in Table 10. The mean overall teaching implementation ability score of 4.27(strongly conform) out of 5 is higher than the pre-ODI score of 3.96. Question 5- "In my teaching, students are less actively engaged," scored the lowest mean of 2.63(slightly conform). However, the post-ODI was still higher than the pre-ODI of 2.32. Meanwhile, questions 3, 4, 7, and 8 all received the same highest mean score of 4.63(strongly conform).

Table 11

Descriptive Analysis of Informatization Teaching Ability in Post-ODI Stage (n=19)

Items	Mean	Std. Deviation
1. I was able to turn the collected teaching content into an informative teaching resource	4.63	0.60
2. I can flexibly use online teaching platforms and new media to transmit teaching information.	4.63	0.60
3. I understand the novel ideas and developments in the subjects I teach.	4.42	0.90
4. I can learn new knowledge actively and master the knowledge and skills of information teaching so that I can apply them to classroom teaching.	4.68	0.48
5. I am not familiar with information teaching technology and rarely use it in teaching.	4.68	0.48
6. In my teaching, I often use more discussions, cases, multimedia and other teaching methods in my teaching.	4.32	0.75
Overall Post-informatization teaching ability	4.56	0.47

As can be seen from Table 11, the overall informatization teaching ability scored a mean of 4.56 (strongly conform) in the post-ODI stage, which is higher than the pre-ODI. Questions 4- “I can learn new knowledge actively and master the knowledge and skills of information teaching so that I can apply them to classroom teaching “and question 5- “I understand the novel ideas and developments in the subjects I teach.” had the highest mean of 4.68(strongly conform). The lowest mean for question 6- “In my teaching, I often use more discussions, cases, multimedia, and other teaching methods. ” had the lowest mean of 4.32(strongly conform), but it was still higher than the pre-ODI stage at 4.26.

The teaching competency of all respondents was measured in the post-ODI stage, and the mean score on a scale out of 5 was 4.28(strongly conform), which was better than 4.14 in Pre-ODI Stage, as tabulated below：

Table 12

Descriptive Analysis of Teaching Competence in Post-ODI Stage

Items		Mean	Std. Deviation
Knowledge	1. I have a solid academic knowledge	4.11	0.57
	6. The education and teaching theories I have mastered are sufficient for the teaching needs	4.16	0.50
	10. I know little about natural science	4.42	0.51
	12. I know little about humanities and social sciences	3.63	0.60
Personality traits	2. I will make critical analysis and never blindly believe anything	4.21	0.71
	7. I often feel out of my depth and unsure of myself at work.	4.16	0.90
	8. I manage my emotions effectively and rarely worry, complain, or get angry.	4.32	0.89
	11. I am always humorous and approachable in both work and life	3.47	0.77
	15. I can insist on treating others fairly and justly	4.21	0.71
	16. I will tolerate other people's different opinions and provocative actions	4.58	0.51
professional character and skill	3.I can quickly adapt to new environment and new tasks	3.90	0.46
	4.I like the subject I am teaching	4.79	0.54
	5.I have never thought of giving up my teaching position in the university	4.68	0.58
	9. Every time I teach, I can experience success and happiness	4.26	0.73
	13. I try to persevere when things aren't going well	4.53	0.61
	14. I look forward to being a teacher respected and liked by my students	4.90	0.32
	17. I am passionate about teaching, and I am willing to pour my energy into it	4.37	0.50
Post-ODI teaching competence		4.28	0.19

Post-ODI Qualitative Research Outcome

The qualitative data analysis outcome of each variable is shown in the following table.

Table 13

The Themes and Categories of Each Variable in the Post-ODI Stage

Variables	Categories	Themes
Teaching Design Ability	Category1: According to the ability objective to set teaching objective Category2: Design teaching content from teaching methods, teaching activities, and other aspects Category3: Set teaching objectives and contents according to the analysis of the learning situation Category4: Consider the interests of students in carrying out teaching design Category5: Teaching evaluation design Category6: The concept of teaching design changed	Theme1: Teaching design is regarded as a complete process, including goal design, learning situation analysis, content design, evaluation design, and so on Theme2: The teaching design considers the learning situation, the starting point of teaching, and the interest of students Theme3: The concept of teaching design changed Theme4:

Variables	Categories	Themes
	Category7: Consider the baseline of students to carry out teaching design Category8: flexible adjustment of teaching programs	Design teaching methods and strategies, flexible adjustment of teaching programs
Teaching implementation ability	Category1: Use a variety of motivational strategies and teacher-student interaction to increase student engagement Category2: The teaching implementation process and strategies are flexibly adjusted Category3: Use appropriate teaching methods and strategies Category4: Consider the students as the teaching subject Category5: Teaching evaluation implementation Category6: Form one's teaching style Category7: Class teaching organization and management Category8: Get help and coaching in the implementation process	Theme1: Teaching implementation takes students as the main body and pays attention to students' learning state (Category:1,4,10) Theme2: Optimize the teaching implementation process, including implementation methods, strategies, evaluation, etc. (Category:2,3,5) Theme3: Personal growth of teachers in the implementation of teaching (Category:6,7,8)
Informatization teaching ability	Category1: Diversity of information technology mastery Category2: Master cutting-edge information technology Category3: Use appropriate informatization teaching technology to assistant teaching Category4: Information media application for different types of teaching Category5: Information teaching monitoring and feedback Category6: Information-based teaching resources production Category7: Class teaching organization and management	Theme1: Master various types of information technology and apply it to teaching (Category:1,2,3) Theme2: Through information technology to broaden the teaching methods and forms (Category:3,4) Theme3: Various forms of teaching assistance and management are realized through information technology (Category:5,6,7) Theme4: Able to produce information resources for teaching (Category:6)
Teaching Competence	Category1: teaching competence is better than before Category2: My professional skills are better than before Category3: The professional knowledge and pedagogy knowledge are better than before Category4: The improvement of teaching ability promotes the advancement of competence Category5: A better understanding of the teaching competence Category6: Gain personal growth and satisfaction Category7: Appeal to improve the organizational management of teacher competency	Theme1: Improve all aspects of teaching competence (Category:1,2,3，4,) Theme2: Have a more comprehensive understanding of competency and strive to improve (Category:1,5) Theme3: Improve teaching competence to bring a sense of achievement (Category:1,6) Theme4: Appeal to the organization management to pay attention to teaching competency (Category:7)

Qualitative data analysis confirmed that at the post-ODI, participants' understanding of teaching competencies changed, and they became more explicit about how teaching design ability, teaching implementation ability, and informatization teaching ability manifested themselves in their teaching. After the intervention, they had a more accurate and comprehensive understanding of teaching competencies and could better apply the increased competencies to their classroom teaching.

The Comparison between Pre-ODI and Post-ODI

Paired t-test

The results were analyzed using the paired samples t-test as a parametric test. The paired t-test examines the relationship between differences in paired data; analyses whether each group of paired items shows a significant difference (p-value less than 0.05 or 0.01) from each other. If the results show significance, then a specific comparison of the magnitude of the mean (or difference) describes precisely where the differences lie, and finally, the analysis is summarized.

Table 14

Paired t-test of IVs

Items	Paired (M±SD)		Mean difference(Paired1-Paired2)	t	p
	Paired1	Paired2			
Pre-informatization teaching ability Paired Post-informatization teaching ability	4.09±0.42	4.56±0.47	-0.47	-6.088	0.000**
Pre-teaching implementation ability Paired Post-teaching implementation ability	3.95±0.42	4.27±0.44	-0.32	-7.118	0.000**
Pre-teaching design ability Paired Post-teaching design ability	4.26±0.40	4.39±0.46	-0.13	-3.269	0.004**
Pre-teaching competence Paired Post-teaching competence	4.14±0.20	4.28±0.19	-0.14	4.246	0.000**
* p<0.05 ** p<0.01					

The differences between pre-ODI and post-ODI were tested by paired sample t-test. As can be seen in Table 14, the four paired data showed significant differences ($p < 0.01$). There were significant differences between pre-ODI and post-ODI on teaching design ability, teaching implementation ability informatization teaching ability as well as teaching competence.

Hypothesis Testing

Table 15 shows the hypotheses testing results on each variable. A significant difference between pre-ODI and post-ODI because the obtained p-value < 0.01 confirmed that each group of paired items shows a significant difference. Therefore, all the null hypotheses are rejected.

Table 15

Hypotheses Testing Results

	Hypothesis	The corresponding variable	p-value	Results
H1	H1o: There is no significant difference between Pre-ODI and Post-ODI on Teaching Design Ability. H1a: There is a significant difference between Pre-ODI and Post-ODI on Teaching Design Ability.	teaching design ability	0.004	H1a is supported
H2	H2o: There is no significant difference between Pre-ODI and Post-ODI on Teaching Implementation ability. H2a: There is a significant difference between Pre-ODI and Post-ODI on Teaching Implementation ability.	teaching implementation ability	0.000	H2a is supported
H3	H3o: There is no significant difference between Pre-ODI and Post-ODI on Informatization Teaching ability. H3a: There is a significant difference between Pre-ODI and Post-ODI on Informatization Teaching ability.	informatization teaching ability	0.000	H3a is supported
H4	H4o: There is no significant difference between Pre-ODI and Post-ODI on Teaching Competence. H4a: There is a significant difference between Pre-ODI and Post-ODI on Teaching Competence.	teaching competence	0.000	H4a is supported

After completion of the intervention, the quantitative analysis data of each participant was evaluated and examined by the researcher. Paired sample t-test analysis was used to determine the significant difference between pre- and post-ODI to prove the hypotheses. Results for hypotheses show that all the null hypotheses are rejected.

Conclusion and Recommendations

Conclusion

This action research aimed to explore the impact of ODI on the improvement of teaching competency of new teachers in in the School of Telecommunication Engineering in BP. The study found that ODI had a positive impact on the teaching design ability, implementation ability, and information technology teaching ability of new teachers, and proposed recommendations for the development and improvement of teaching competency of new teachers for the organization. Research findings showed that the improvement of new teachers' teaching competency was closely related to the improvement of their teaching design ability, implementation ability, and information technology teaching ability. Therefore, full utilization of the ODI strategy helped enhance the level of teaching competency of new teachers in school organizations and achieved the school construction goals faster and better.

Recommendations

Finally, the research results obtained by juxtaposing quantitative and qualitative data were used to propose recommendations for university organizations to improve the teaching competence of new teachers. The researcher provided recommendations on new teacher development strategies for BP. The summary of the recommendations after the juxtaposition of qualitative and quantitative data analysis results is shown in Table 16.

Table 16

Summary of data analysis to generate the recommendations

Variables	Quantitative findings (Lowest mean or Highest mean)	Influence effect Mean of Post-ODI	Conclusion (Hypotheses testing)	Summary of themes from qualitative analysis	Juxtaposed the findings of quantitative and qualitative results to generate recommendations
Teaching design ability	I continue to improve my instructional design until I achieve satisfactory results (3.90)	3.90-3.47=0.43	H1a: "There is a significant difference between Pre-ODI and Post-ODI on Teaching Design Ability. " is supported	Theme4: Design teaching methods and strategies, flexible adjustment of teaching programs Category8: flexible adjustment of teaching programs	The recommendation to enhance the teaching design ability should include the following points: 1. Teaching design should have flexibility. Teaching is not scripted; it needs to be adjusted and the preparation of teaching plans and syllabus should be flexible. 2. The content of teaching design needs to be accumulated over time, constantly improved and updated. Teaching design should include the preparation of teaching activities, teaching methods, and related materials
	I often collect and process relevant materials to enrich the teaching content. (4.74)	4.74-4.74=0.00		Theme1: Teaching design is regarded as a complete process, including goal design, learning situation analysis, content design, evaluation design, and so on Category2: Design teaching content from teaching methods, teaching activities, and other aspects	
Teaching implementation ability	In my teaching, students are less actively engaged. (2.63)	2.63-2.32=0.31	H2a:" There is a significant difference between Pre-ODI and Post-ODI on Teaching Implementation ability. "is supported	Theme1: Teaching implementation takes students as the main body and pays attention to students' learning state Category1: Use a variety of motivational strategies and teacher-student interaction to increase student engagement	The recommendation to enhance the teaching implementation ability should include the following points: 1. Use various motivational strategies and teacher-student interaction to increase student engagement. 2. Strengthen the construction of a student learning atmosphere to improve students' classroom learning engagement
	To inspire	4.63-		Theme1: Teaching	

Variables	Quantitative findings (Lowest mean or Highest mean)	Influence effect Mean of Post-ODI	Conclusion (Hypotheses testing)	Summary of themes from qualitative analysis	Juxtaposed the findings of quantitative and qualitative results to generate recommendations
	students, I often use strategies such as questioning, repetition, and emphasis. (4.63)	3.95=0.68		implementation takes students as the main body and pays attention to students' learning state Theme2: Optimize the teaching implementation process, including implementation methods, strategies, evaluation, etc.	3. Encourage teachers to grow and to develop their teaching style and characteristics. 4. Encourage teachers to guide students to innovate.
	My teaching language is fluent, clear, concise, and rigorous. (4.63)	4.63-4.47=0.16		Theme3: Personal growth of teachers in the implementation of teaching Category6: Develop one's teaching style()	
	I have developed my own distinct style in teaching. (4.63)	4.63-4.26=0.37		Theme3: Personal growth of teachers in the implementation of teaching Category6: Develop one's own teaching style	
	I encourage students to express different perspectives and opinions in my teaching(4.63)	4.63-4.21=0.42		Theme1: Teaching implementation takes students as the main body and pays attention to students' learning state Category4: Consider the students as the teaching subject Code7: Encourage creative thinking	
	I understand the novel ideas and developments in the subjects I teach. (4.68)	4.68-3.79=0.89	H3a:" There is a significant difference between Pre-ODI and Post-ODI on Informatization Teaching ability." is supported	Theme1: Master various types of information technology and apply it to teaching Category2: Master cutting-edge information technology	The recommendation to enhance the informatization teaching ability should include the following points: 1. Enhance teachers' information-based teaching ability through information technology teaching training and coaching. 2. Support teachers to
	I can learn new	4.68-4.21=0.47		Theme1: Master various	

Variables	Quantitative findings (Lowest mean or Highest mean)	Influence effect Mean of Post-ODI	Conclusion (Hypotheses testing)	Summary of themes from qualitative analysis	Juxtaposed the findings of quantitative and qualitative results to generate recommendations
	knowledge actively and master the knowledge and skills of information teaching to apply them to classroom teaching. (4.68)			types of information technology and apply it to teaching Category3: Use appropriate informatization teaching technology to assist teaching Theme2: Through information technology to broaden the teaching methods and strategy (Category:3,4)	develop and use information technology
Teaching Compen tence	I look forward to being a teacher respected and liked by my students (4.90)	4.90-4.84=0.06	H4a:" There is a significant difference between Pre-ODI and Post-ODI on Teaching Competence." is supported	Theme3: Improve teaching competence to bring a sense of achievement Theme4: Appeal the organization management to pay attention to teaching competency	The recommendation to enhance teaching competence should include the following points: 1. Increase the teacher development promotion mechanism to help new teachers develop teaching competence. 2. To increase the incentive system of teachers to promote the improvement of teachers' teaching competency

To sum up, the following recommendations can be proposed to BP.

1. Teaching design should pay more attention to the specific content design and the flexibility of design and reduce the excessive and cumbersome requirements of teaching design documents

As discussed earlier, teaching design should be flexible and adjustable. The preparation of teaching plans and syllabuses should be relaxed. If teachers want to improve the practical implementation of instructional design, they should design instruction flexibly rather than follow the teaching documents, which are only auxiliary materials for education, rather than reflecting teaching quality, let alone teaching competence.

2. The School should research on students' engagement, strengthen the construction of the learning atmosphere, and strive to improve student's learning engagement.

The analysis suggests that the school should use a variety of incentive strategies and teacher-student interactions to increase student motivation for learning. BP can use the National Survey of Student Engagement (NSSE)(NSSE, 2021) to conduct student engagement research and study the influence of various incentive strategies on student engagement.

3. The School should encourage the personal growth of new teachers, encourage

teachers to form their teaching styles and characteristics, and encourage teachers to guide students to innovate.

When building relevant mechanisms, schools need to contribute to an environment for personal growth and imperceptibly achieve the goal of encouraging new teachers to grow independently (He & Xiong, 2015). Multifaceted efforts are needed for Teachers' independent growth.

4. The School should regularly organize coaching and training projects to help teachers improve their teaching design, implementation, and information teaching ability.

Analysis and findings indicate that ODIs have a significant improvement effect on teaching competence. Therefore, schools should regularly hold relevant activities to help new teachers improve

5. The School should strengthen the promotion and incentive mechanism of teacher development and effectively encourage the improvement of teachers' teaching competence. Specifically, BP needs to develop a teaching assessment and reward system equivalent to scientific research work, forming a policy orientation of giving equal importance to teaching and scientific research. Additionally, in the process of evaluating awards and selecting excellent teachers, consideration should be given to teachers differentiating groups by teaching experience, allowing new teachers to have more opportunities to receive awards.

Suggestions for Further Research

This study used action research to explore the intervention of OD on teaching design ability, teaching implementation ability, and information teaching ability to improve the teaching ability of new teachers. A comprehensive study of models and promotion strategies for teaching competency can be conducted in future research. Such comprehensive research will focus on more than instructional design, implementation, and informatization teaching ability that affects teaching competency. The scope of the study can be extended from new teachers to all university teachers. The research on teachers' competency has practical solid applications in the field of education. To a large extent, the competence of higher education teachers affects the direction of teacher education and teacher professional development in higher education. The current teaching management of university and college teachers requires a standardized and quantifiable assessment system for teachers' teaching evaluation.

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