



## DEVELOPING THE ACADEMIC ADMINISTRATION GUIDELINES ON COMPUTER SCIENCE AND TECHNOLOGY PRACTICAL TEACHING OF JIANGXI VOCATIONAL COLLEGE OF ENVIRONMENTAL ENGINEERING, CHINA\*

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### Abstract

The objectives of this research were: 1) to investigate the problems and needs of academic administration practical teaching of computer science and technology; 2) to construct academic administration guidelines for practical teaching of computer science and technology. For the investigation of problems and needs, the population were divided into 2 groups, namely: 1) 3,000 students, 2) 40 teachers. The sample groups for the investigation of problems and needs were divided into 2 groups, namely: 1) 353 students, 2) 36 teachers. Moreover, the 3 specialists were used for the focus group discussion meeting. The research instruments employed in this study were questionnaires and a set of questions for the focus group discussion meetings. The information and data collected were analyzed through the content analysis method and presented in terms of frequency count, mean value, standard deviation. The Likert's rating scales were used to rate the degree or level of problems and needs. All the set of questionnaires were evaluated by the 3 specialists and possessed the IOC values from 0.67 to 1.00. The finding indicates that: the most students' evaluation of the problems in the practical teaching of computer science and technology were at a "high" level. Similarly, most teachers' evaluation of the problems in the practical teaching of computer science and technology were at a "high" level. According to the research results, the guidelines of practical teaching of computer science and technology are formulated, which mainly includes five parts; namely: 1) the guidelines to teach students according to improve student's

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attitude; 2) the guidelines for practical learning management; 3) the guidelines for designing a curriculum suitable for practical teaching of computer science; 4) the guidelines for learning environment management to reduce the student's pressured in practical teaching; 5) the guidelines for effective ways to give feedback to students.

**Keywords:** Academic Administration, Computer Science, Technology Practice

## Introduction

With the rapid development of the field of computer science and technology, educational administration practice teaching is facing a series of challenges and demands. Firstly, traditional teaching methods may not be able to fully meet the learning needs of students, especially in the training of practical skills. Secondly, teachers may face problems such as insufficient teaching resources and single teaching methods in practice teaching. Therefore, it is great significance to discuss the existing problems and demands of teaching practice teaching of computer science and technology major and construct corresponding teaching administration management criteria for improving teaching quality, satisfying students' needs and promoting teachers' professional development.

Formulate educational administration guidelines: According to the research results, formulate targeted educational administration guidelines to provide guidance for schools to formulate reasonable teaching plans, improve teaching methods, and enhance teaching quality, to improve teaching effects (Ma, D, 2020).

Promote teaching reform and improvement: Through the development of educational administration guidelines, promote teaching reform, explore new models and methods suitable for practical teaching of computer science and technology majors, improve teaching quality, and cultivate more excellent talents.

The need for guidelines on computer science and technology practice is articulated in a range of studies. With the rise of socio-scientific issues, educators are required to select relevant topics for teaching (Villa-Komaroff, 2019) In recent times, there has been a move towards the construction of STEAM (Science, Technology, Engineering, Arts, Mathematics)



curriculum models even in pre-school settings (Mengmeng, Xiantong& Xinghua, 2019). Thus, However, curriculum reforms can be complex and challenging. Comparative studies on curriculum changes, such as provide insights into the dynamics of implementing reforms. (Gleeson, J.2020), Moreover, successful curriculum changes depend on international contexts and lessons learned from different nations (Sinnema, C. 2020). The integration of computer science and technology into education requires adequate digital infrastructure. Challenges such as those faced in Africa (Joseph, M. 2019).

The importance of this study is reflected in the following aspects: Exploring problems and needs: By investigating the opinions and suggestions of students and teachers, we can deeply understand the problems and needs in the practical teaching of computer science and technology, which is helpful to comprehensively grasp the teaching status and provide scientific basis for educational administration.

Therefore, this study is of great significance for optimizing educational administration, improving teaching quality, promoting teaching reform and cultivating high-quality talents.

### **Objectives of this Research**

1. To investigate the problems and needs of academic administration practical teaching of computer science and technology.
2. To construct Academic Administration Guidelines for practical teaching of computer science and technology.

### **Research Methodology**

This study takes Jiangxi Vocational College of Environmental Engineering, China as an example to investigate problems and needs of academic administration practical teaching of computer science and technology.

1. Research design



Mixed Methods Research (Quantitative research and Qualitative research) was used to analyze the data because it uses both quantitative and qualitative approaches in the research process

## 2. Population and Sample

### 2.1 Population

For the investigation of problems and needs, the populations were divided into 2 groups, namely, 1) 3000 students; and 2) 40 teachers.

### 2.2 Sample

2.3 In this research project, the sample groups were divided into 2 groups: namely, 1) 353 students and 2) 36 teachers. (Yamane, 1967) The respondents were obtained through the stratified random sampling technique.

## 3. Research Instrument

By summarizing the existing paper database, core journals, literature and related literature, this paper studies and analyzes the learning characteristics and daily behaviors of computer major students, so as to understand and master the current research status and achievements. After drawing up the questionnaire outline, the content of the questionnaire was analyzed and adjusted, and finally the two groups of research objects were investigated.

For the investigation of problems and needs, questionnaire was employed for the data collection. The questionnaire was divided 2 sets for different sample groups; Namely : 1) students; 2) teachers. The questionnaire was evaluated of its validity with the index of congruence (IOC). Each question in the questionnaire had an IOC ranging from 0.67 to 1.00. In addition, the reliability of the questionnaire was evaluated through alpha Cronbach coefficient of 0.904. (Tavakol & Dennick, 2011)

The questionnaire was divided into 4 parts: namely, 1) General information 2) Problems in Practical Teaching of Computer Science and Technology 3) Needs and vision of students in practical teaching of computer science and technology. 4) Teachers ' problems in practical teaching of computer science and technology.



#### 4. Data Collection

For the investigation of problems and needs, the researcher himself collected the data and information from the sample groups online via emailing. Moreover, the three focus group discussion meetings were conducted to recruit the comments, ideas and suggestions for the correctness and improvement of the academic administration guidelines.

#### 5. Data Analysis

5.1 For the investigation of problems and needs, the data and information collected were analyzed, interpreted, and then presented in terms of frequency count, percentage, mean, standard deviation. The Five Point Likert's Rating Scale were used to evaluate the level or degree of the respondents' needs and problems.

5.2 For the correctness and improvement of the academic administration guidelines, the ideas, suggestions, and comments of the 3 specialists obtained from the focus group discussion meetings, were analyzed and then used to correct and improve the contents of the guidelines.

### Research Result

#### 1. Problems and needs in practical teaching of computer science and technology.

**Table 1** Teachers ' Problems in Practical Teaching of Computer Science and Technology

Questions	n=36		Level of needs
	$\bar{x}$	S.D.	
1. PLCs may require resources to organize events, purchase teaching materials, or invite experts, which may cause difficulties within or outside the educational institution.	4.57	0.60	Highest
2. I need to make sure that service learning doesn't take up so much class time that it interferes with the normal course progress.	4.57	0.60	Highest
3. I need to create a personalized lesson plan, which will require more time and resources.	4.49	0.56	High



4. Failure and maintenance of technical equipment can cause disruption and inconvenience to instruction, requiring additional time and resources to fix the problem.	4.41	0.60	High
5. I face students from different backgrounds, academic levels and learning styles, and need to have an inclusive and positive attitude to meet the needs of each student.	4.51	0.69	Highest
6. Technical equipment and tools can break down or have problems, which can cause disruptions to the plan and require me to adapt and solve problems quickly.	4.49	0.69	High
7. Students in computer science and technology fields come from different cultures and backgrounds, and I need to ensure that the teaching environment is diverse and inclusive.	4.49	0.56	High
8. Analyzing and interpreting assessment data from different students requires additional skills and time to understand their needs and progress.	4.49	0.65	High
9. I lacked the training and experience in mindfulness practice to know how to effectively introduce mindfulness into my teaching.	4.46	0.60	High
10 I do not know how to conduct effective self-reflection and self-assessment and lack proper structures and methods.	4.43	0.65	High

According to table 1, it is indicated problems in practical teaching of computer science and technology in the opinions of teachers are at the high level ( $\bar{x}$ =4.49, S.D. =0.62) Firstly, most students indicate I need to make sure that service learning doesn't take up so



much class time that it interferes with the normal course progress with ( $\bar{x}$ =4.57. S.D.=0.60). Secondly, most of students indicate PLCs may require resources to organize events, purchase teaching materials, or invite experts, which may cause difficulties within or outside the educational institution with ( $\bar{x}$ =4.57. S.D.=0.60.) Finally, I do not know how to conduct effective self-reflection and self-assessment and lack proper structures and methods with ( $\bar{x}$ =4.43. S.D.=0.65).

**Table 2** Needs of strategic guidelines for Developing the Academic Administration Guidelines on Computer Science and Technology Practical Teaching in teachers' opinions.

Questions	n=36		Level of needs
	$\bar{x}$	S.D.	
1. I need to effectively manage the use of computer LABS or other technical equipment to ensure that each student has access to the necessary resources.	4.47	0.56	High
2. I hope to coordinate the time between service learning and classroom learning.	4.36	0.72	High
3. I need to make a personalized learning plan according to the characteristics of different students.	4.25	0.69	High
4. Strengthen maintenance of technical equipment failures.	4.36	0.64	High
5. I think academic management should provide more support.	4.33	0.63	High
6. Strengthen mindfulness training for teachers.	4.50	0.61	High
7. Strengthen teachers' research and training in the latest fields of computer science.	4.31	0.67	High
8. Facing students from different backgrounds, teachers should enhance their cultural knowledge.	4.36	0.59	High
9. Establish a classroom management system suitable for different students.	4.44	0.61	High



10. I think more training and resources should be provided to help teachers better master and apply diverse teaching methods.	4.17	0.66	High
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According to the table, it is indicated that needs of strategic guidelines for developing the academic administration guidelines on computer science and technology practical teaching in teachers' opinions are at the high level ( $\bar{x}$ =4.36, S.D. =0.64). Firstly, most students indicate strengthen mindfulness training for teachers. with ( $\bar{x}$ =4.50. S.D.=0.61). Secondly, most of students indicate I need to effectively manage the use of computer LABS or other technical equipment to ensure that each student has access to the necessary resources with ( $\bar{x}$ =4.47. S.D.=0.56). Finally, just a few of students i think more training and resources should be provided to help teachers better master and apply diverse teaching methods with ( $\bar{x}$ =4.17. S.D.=0.66).

**Table 3** Students' Problems in Practical Teaching of Computer Science and Technology

Questions	n=353		Level of needs
	$\bar{x}$	S.D.	
1. Lack of adequate support and guidance from teachers to help you solve problems encountered in your computer science practice.	4.41	0.65	High
2. Community service projects are less associated with computer science and technology.	4.44	0.65	High
3. You rarely could choose your own learning activities or projects.	4.46	0.60	High
4. There is a lack of adequate training and support to help students make the most of the technical tools in computer science and technology practice.	4.42	0.60	High
5. Lack of mindfulness skills leads to anxiety, depression, and physical health problems	4.36	0.69	High





6. I lack a clear learning goal, which leads to a lack of direction in the learning process.	4.40	0.61	High
7. Some courses were designed to be too rigid to accommodate my personal interests and academic goals.	4.48	0.63	High
8. Adopting different assessment methods to suit different students raises the issue of complexity and fairness of assessment.	4.43	0.63	High
9. The feedback I received was not constructive and did not encourage me to improve.	4.46	0.62	High
10. I lack practical work experience because some courses focus on theoretical knowledge rather than practical practice.	4.39	0.63	High

According to table 3, it is indicated problems in practical teaching of computer science and technology in the opinions of students are at the high level ( $\bar{x}$ =4.42, S.D. =0.63). Firstly, most students indicate Some courses were designed to be too rigid to accommodate my personal interests and academic goals with ( $\bar{x}$ =4.48. S.D.=0.63). Secondly, most of students indicate the feedback I received was not constructive and did not encourage me to improve with ( $\bar{x}$ =4.46. S.D.=0.63. Finally, Lack of mindfulness skills leads to anxiety, depression, and physical health problems with ( $\bar{x}$ =4.36. S.D.=0.69).

**Table 4** Needs and vision of students in practical teaching of computer science and technology in students' opinions.

Questions	n=353		Level of needs
	$\bar{x}$	S.D.	
1. Problems encountered in computer science practice require adequate teacher support and guidance to help you solve.	4.41	0.67	High



2. Increase community services with more links to computer science and technology.	4.36	0.63	High
3. Increase your chances of choosing your own learning activity or project	4.39	0.64	High
4. I need a combination of theoretical knowledge and programming skills.	4.41	0.64	High
5. To establish a different set of assessment mechanisms for different students.	4.38	0.64	High
6. Teacher evaluation needs to be improved to constructive evaluation.	4.38	0.65	High
7. I hope to provide more practical work experience.	4.36	0.68	High
8. Add enough training and support to help students make the most of technology tools in their computer science and technology practice.	4.36	0.65	High
9. Increase your mindfulness skills to avoid anxiety, depression, and physical health problems.	4.39	0.63	High
10. I needed external guidance to help me set a clear learning goal.	4.39	0.65	High

According to the table, it is indicated that needs of developing the academic administration guidelines on computer science and technology practical teaching are at the high level ( $\bar{x}$ =4.38, S.D.=0.65). Firstly, most students indicate Problems encountered in computer science practice require adequate teacher support and guidance to help you solve with ( $\bar{x}$ =4.41. S.D.=0.67. Secondly, most of students indicate teachers need to encourage and support students to study on their own with ( $\bar{x}$ =4.41. S.D.=0.63. Finally, Increase community services with more links to computer science and technology with ( $\bar{x}$ =4.36. S.D.=0.63.)



2. Academic Administration Guidelines for practical teaching of computer science and technology.

2.1. The guidelines to teach students according to improve student's attitudes are as follows: (1) Understanding Student Attitudes (2) Creating a Positive Classroom Environment (3) Tailoring Instructional Techniques (4) Enhancing Instructional Differentiation (5) Adjusting Assessment Approaches (6) Collaboration with Parents and Guardians and (7) Continual Professional Development.

2.2. The guidelines for practical learning management are as follows: (1) Active Learning Techniques (2) Integration of Technology (3) Multisensory Learning (4) Differentiated Instruction (5) Collaborative Learning (6) Formative Assessment

2.3 The guidelines for designing a curriculum suitable for practical teaching of computer science are as follows: (1) Project-Based Learning Approach (2) Collaborative Learning. (3) Integration of Technology. (4) Thorough Curriculum Mapping. (5) Practical Applications. (6) Interactive Learning Opportunities. (7) Industry Collaborations and Internships.

2.3 The guidelines for learning environment management to reduce the student's pressured in practical teaching are as follows: (1) Foster Collaboration and Peer Learning (2) Ensure Clear Instructions and Expectations (3) Provide Individualized Support (4) Allow Adequate Time for Practice and Reflection (5) Cultivate a Growth Mindset (6) Establish a Positive Classroom Environment.

2.4 The guidelines for effective ways to give feedback to students are as follows: (1) Foster a positive and supportive ambiance. (2) Be specific and unbiased. (3) Be prompt. (4) Strike a balance between positive feedback and constructive criticism. (5) Utilize a growth mindset approach. (6) Engage students in the feedback process. (7) Offer actionable steps for improvement. (8) Follow up on feedback.



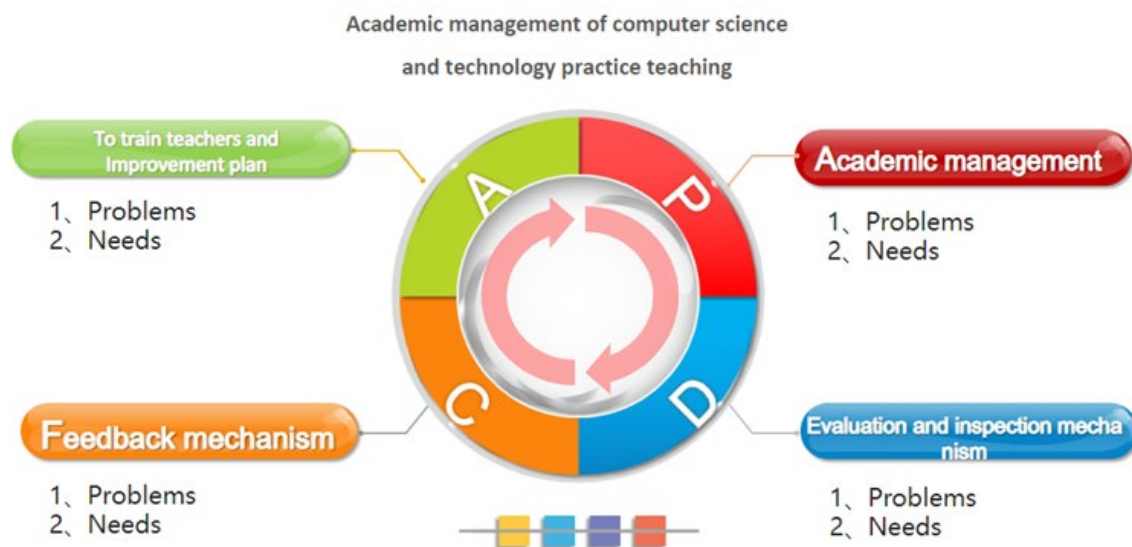
## Research Discussion

From the survey results of this study, the survey of students and teachers shows that the problems existing in the practical teaching of computer science and technology are at a "high" level. The problems in Practical Teaching of Computer Science and Technology in the opinions of students are at the high level. ( $\bar{x}$ =4.28, S.D. =0.63), and the problems in Practical Teaching of Computer Science and Technology in the opinions of teachers are at the high level. ( $\bar{x}$ =4.30, S.D. =0.60) This indicates that there is some room for improvement in practice teaching, and it is necessary to carry out in-depth research and improvement measures for these problems.

The research shows that the practical teaching of computer science and technology major needs to be strengthened in terms of education and training to meet the market demand and the overall characteristics of computer talent training. The effective combination of theoretical knowledge and practical courses is very important to enhance students' comprehensive learning ability. However, the lack of coordination in current practical courses leads to a disconnect between students' theoretical knowledge and practical ability, which in turn affects their employment development. Therefore, it is suggested to pay attention to the coordination of curriculum in practice teaching to enhance students' comprehensive ability and employment competitiveness (Cen, L. 2021).

## Research Body of Knowledge

The main content of the research is to find the problems existing in the academic management of computer science and technology practice teaching. Manage the four stages of the PDCA cycle and improve defects in the process. The content of this paper mainly involves several aspects of the quality management of computer science and technology practice teaching in colleges and universities, to improve the academic management system. Improve evaluation and inspection mechanisms, establish and improve feedback mechanisms, train teachers and improve plans. As shown in the picture:



**Figure 1.** Research Body of Knowledge

## Research Suggestion

### 1. Suggestions in practice

1.1 Teaching Management Guideline: To ensure effective implementation of practical teaching, universities offering computer science and technology courses should establish a well-defined teaching management framework. This framework should encompass distinct objectives, realistic timetables, and proper allocation of resources for practical sessions. Additionally, a supervision and evaluation mechanism should be established to uphold the effectiveness of practical teaching.

1.2 Guideline for Learner Management: Jiangxi Environmental Engineering Vocational College should provide students with efficient learner management strategies and resources during practical courses. These strategies should aim to engage and support learners in their practical work, while also monitoring and utilizing the progress and outcomes of their learning for continuous improvement.

1.3 Guidelines on Course Designed: The curriculum design for practical teaching at the college should align with industry standards and evolving technological trends. It should be structured in a manner that equips students with practical experience and problem-solving



skills. Regular updates to the curriculum should reflect the dynamic changes in the field of computer science and technology.

## 2. Suggestions for research

2.1 Development of a cohesive pedagogical framework: Subsequent research endeavors could concentrate on formulating a cohesive framework. These frameworks will equip educators with a comprehensive approach towards implementing practical computer science teaching. By amalgamating recommendations for enhancing student attitudes, guidelines for managing practical learning, principles for curriculum design, strategies for managing learning environments, and methodological instructions for delivering effective feedback, teachers will have a structured roadmap to enhance the overall learning experience.

2.2 Longitudinal studies examining student achievement: Conducting longitudinal studies to assess the prolonged impact of implementing these guidelines would be highly valuable. Researchers can track students who have been directly taught by these guidelines and observe their academic performance, career choices, and overall satisfaction over an extended period. This approach will yield concrete evidence showcasing the effectiveness of these guidelines in shaping students' attitudes, skills, and success within the realm of computer science education.



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