CURRICULUM EVALUATION OF BACHELOR'S DEGREE PROGRAM IN COMPUTER SCIENCE AND TECHNOLOGY AT SICHUAN UNIVERSITY OF SCIENCE AND ENGINEERING USING CIPPIEST MODEL

QIAN ZHANG

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
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PROGRAM IN CURRICULUM DEVELOPMENT
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Name – Surname	Ms. Qian Zhang
Program	Curriculum Development and Instructional Innovation
Thesis Advisor	Assistant Professor Pranom Punsawai, Ph.D.
Academic Year	2022

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ABSTRACT

The research aimed to evaluate the curriculum of Bachelor's Degree program in Computer Science and Technology at Sichuan University of Science and Engineering using the CIPPiest model, which consisted of context, input, process, product, impact, effectiveness, sustainability, and transportability.

The research samples consisted of 375 people from Computer Science and Technology program at Sichuan University of Science and Engineering, selected by stratified random sampling from the population of 1,500. The samples were divided into 5 groups, namely 10 course instructors, 20 instructors, 225 students, 90 graduates, and 30 employers. Data were collected using questionnaires with a 5-point Likert scale and 5 groups of questions, which had a validity ranging from .66 to 1.00 and a reliability of .891. Percentages, means, and standard deviations were used for data analysis.

The results have shown that the overall curriculum evaluation toward the Computer Science and Technology program at Sichuan University of Science and Engineering was at a high level. When considering the aspects, it was found that context in curriculum objectives and curriculum construction, input from instructors and contributing factors, process of curriculum administration and learning management, and product of knowledge, skills, ethics were at the highest level. Additionally, impact, effectiveness, sustainability, and knowledge transfer were also at a high level.

Keywords: curriculum evaluation, CIPPiest model, computer science and technology

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Qian Zhang

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CHAPTER 1

INTRODUCTION

1.1 Background and Statement of the Problems

In the era of the knowledge economy, talent training and competition played a vital role in the country's economic and social development. Undergraduate education shouldered the mission of improving the comprehensive quality of the people and cultivating high-end talents for social development (Tan Yan, 2022, p.2). Although the scale of higher education development in our country expanded significantly and the number of graduates continued to grow, the expansion of college enrollment that began at the end of the 20th century also became an inducement for a significant decline in the quality of university education, as well as the degree of fit between the trained talents and the needs of social development. To improve the quality of undergraduate education, it was necessary to make a breakthrough in improving the quality of education in colleges and universities.

Colleges and universities, as the main front of undergraduate education, needed to shoulder the historical mission of cultivating high-level talents. To accomplish this mission, it was crucial to strengthen the management of the curriculum system. The setting of the curriculum system was a key part of the teaching work, and the system was the most basic and far-reaching factor among the many elements that affected the quality of education (Gao Juxiu, 2020, pp.66-67). The "Undergraduate Teaching Quality and Teaching Reform Project" (referred to as the "Quality Project") implemented by the Ministry of Education in 2007 listed curriculum construction as one of the very important contents. In the "National Medium- and Long-Term Education Reform and Development Plan (2010-2020)" promulgated by the Ministry of Education in 2010, curriculum construction also became a key factor in improving the quality of higher education personnel training (CPC, 2010, p.3). Experts had pointed out that running a university is

running a discipline, and the curriculum, which consists of the most valuable knowledge extracted from the discipline, was presented by professionals as a carrier. Therefore, in order to carry out "double first-class construction," it was necessary to focus on majors and build a curriculum system around them. Furthermore, evaluating the quality of the curriculum system was important for improving personnel training and strengthening teaching quality management.

The major of Computer Science and Technology at Sichuan University of Science and Engineering, as a first-class discipline, belonged to the School of Computer and Engineering. The major was listed as a school-level specialty in 2009, passed the university's professional evaluation in 2014, and passed the professional evaluation of Sichuan Province in 2016. It was a "first-class undergraduate construction in Sichuan Province" specialty. The Computer Science and Technology major aimed to train students to master the basic knowledge of natural science, systematically acquire the basic theory of computer science, computer software and hardware systems, and application knowledge. Students were expected to understand the basic process of software and hardware development, be proficient in at least one programming language, and possess the ability to analyze and design complex software and hardware systems, as well as manage software and hardware teams. They were also expected to be able to engage in the management, maintenance, and development of related application software and hardware in various industries (Zhao Liangjun, 2018, p.1).

Reviewing the development of the Computer Science and Technology field, it had gone through the following three main periods: the start-up period (1956-1960), the development period (1978-1986), and the period of rapid development (1994 to the present).

From the above development of Computer Science and Technology majors, it could be seen that the course objective had changed from "instruction of knowledge" to "cultivation of ability." In this regard, the course evaluation system could play an

important guiding role. Constructing a capability-oriented course evaluation system was currently a subject of widespread concern and research in college teaching.

In China, the evaluation of students in the teaching evaluation system had mostly been based on the final learning results to judge whether students had achieved the learning goals or requirements. This evaluation method was simple, intuitive, and easy to operate but had problems such as over-focusing on the results and ignoring the students' learning process. Educators were increasingly aware of these drawbacks and were placing more attention on assessing the learning process. For example, they attached importance to daily work, including attendance, homework, unit tests, and midterm exams, which were weighted into the total grade (Zhen Huiming, 2017, pp.84-85).

Daniel Stufflebeam developed the CIPPiest model by improving some steps and evaluation methods based on the CIPP model. The CIPPiest model provided a more comprehensive evaluation method that had been widely used and recognized by many industries. The CIPPiest model to study the Curriculum Evaluation of the Bachelor’s degree in Computer Science and Technology at Sichuan University of Science and Engineering. The CIPPiest model consisted of Context, Input, Process, Product, Impact, Effectiveness, Sustainability, and Transportability (Stufflebeam, 2015, p.21).

In conclusion, educational evaluation should not only provide information for teaching decision-making but also encourage students to study hard. Therefore, a balanced system could offer accurate information about students' learning while stimulating exploration, promoting self-confidence and efforts, and providing meaningful learning experiences. Designing and improving teaching evaluation methods had a far-reaching impact and were worthy of study and reflection (Liu Ya, 2019, pp.70-72).

1.2 Purpose of the Study

1.2.1 To evaluate the computer science and technology program at Sichuan University of Science and Engineering using CIPPiest model consists of: Context, Input, Process, Product, Impact, Effectiveness, Sustainability, and Knowledge transfer.

1.3 Scopes of the Study

1.3.1 Population and Sample

The population for this study consisted of Bachelor degree students in Computer Science and Technology from Sichuan University of Science & Engineering. It was divided into 5 groups, which included 10 course instructors, 65 instructors, 930 students, 360 undergraduates, and 135 employers, resulting in a total population of 1,500.

The sample for this study consisted of Bachelor degree students in Computer Science and Technology from Sichuan University of Science & Engineering. It was composed of 5 groups, including 10 course instructors, 20 instructors, 225 students, 90 undergraduates, and 30 employers. The researchers selected a sample of 375 participants using purposive sampling.

1.3.2 Scope of Contents

The curriculum of the Bachelor's degree program in Computer Science and Technology at Sichuan University of Science and Engineering was evaluated using the CIPPiest Model, which comprises the following components: Context, Input, Process, Product, Impact, Effectiveness, Sustainability, and Knowledge transfer.

1.3.3 Scope of Time

The study was conducted from September 2022 to March 2023.

1.4 Definition of Terms

For the sake of clarity, the following terms are defined conceptually and operationally:

1.4.1 Curriculum evaluation was a method used to assess whether the educational goals set for students in school were achieved. It involved comparing the intended outcomes with the actual results. The purpose was to determine the effectiveness of the educational process and identify any areas that required improvement in order to enhance the overall quality of education.

1.4.2 CIPPiest Model, consisting of Context, Input, Process, Product, Impact, Effectiveness, Sustainability, and Knowledge transfer, extends the dimensions of curriculum evaluation to include traditional assessment and evaluation of outcomes.

1.4.3 Context refers to assessing the consistency of course implementation, identifying needs and unresolved problems, evaluating conformity with relevant policies, and assessing the appropriateness of curriculum objectives in relation to the context.

1.4.4 Input involves checking the readiness of quantitative and qualitative resources required for curriculum implementation, such as personnel, budget, materials, time, target groups, technology, and technical specialists. It also assesses the management system and serves the following objectives: selecting an appropriate curriculum organization scheme, creating mutual understanding about alternative approaches, and providing decision-makers with relevant alternatives for further action.

1.4.5 Process assesses the organization of various curriculum activities and verifies the implementation of the curriculum plan. Its objectives include providing feedback to managers and operators, guiding operators to improve budget utilization and curriculum execution, and ensuring adherence to the specified schedule.

1.4.6 Product evaluates the extent to which the curriculum meets objectives, goals, and quality indicators. It assesses both the quantity and quality of outputs throughout curriculum implementation, including periodic outputs and final evaluation.

The goal is to measure, interpret, and judge the achievement of curriculum, programs, or actions that meet the needs of the beneficiary group. It also assesses intentional and unintentional outcomes, both positive and negative.

1.4.7 Impact assesses any changes resulting from curriculum implementation, both positive and negative, on the target group and other groups. It includes assessing impacts on public health, community, economy, society, environment, and social conflicts. Impact evaluation can be conducted during curriculum implementation and at the end, focusing on whether the curriculum exceeds desired goals and addressing any positive or negative effects.

1.4.8 Effectiveness refers to the outcome of the curriculum after its completion, evaluating the quality and success of the curriculum. It assesses whether the curriculum comprehensively meets the needs of beneficiary groups, including the achievement of curriculum objectives, satisfaction with the curriculum, and changes in success over time.

1.4.9 Sustainability assesses whether the curriculum can continue to be implemented and achieve the specified goals even after external assistance ends. It examines community co-ownership, self-management capabilities, and systematic or formal approaches to ensure sustained implementation of the curriculum. The assessment aims to determine the persistence or continuity of successful curriculum implementation and methods for maintaining success.

1.4.10 Knowledge transfer assesses the feasibility of implementing the curriculum in other areas and different contexts. It is often used for pilot curricula and feasibility studies, as well as for case studies to learn from and adapt to other areas. This dimension focuses on applying the curriculum concept and process to expand, improve, or adapt it elsewhere.

1.4.11 Course instructors mean was composed of teaching and instructional administrators from Sichuan University of Science and Engineering. They possessed

extensive experience and in-depth knowledge of teaching computer science and technology at the university.

1.4.12 Instructors mean was comprised of university administrators and instructional managers from Sichuan University of Science and Engineering. They were responsible for university administration and instructional management, and they had vast experience in these areas.

1.4.13 Students mean was composed of individuals studying computer science and technology at Sichuan University of Science and Engineering. They were enrolled in the university and had a keen understanding of the university's teaching and campus life.

1.4.14 Undergraduates mean consisted of graduates from Sichuan University of Science and Engineering. They had diverse backgrounds, having worked in various fields and gained valuable social and professional experiences.

1.4.15 Employers mean was composed of individuals who employed the university's students. They possessed an intuitive understanding of the students' learning experiences at the university.

1.5 Conceptual Framework

As an experimental research design was utilized in this research paper, the following framework served as the researcher's guide in conducting the study:

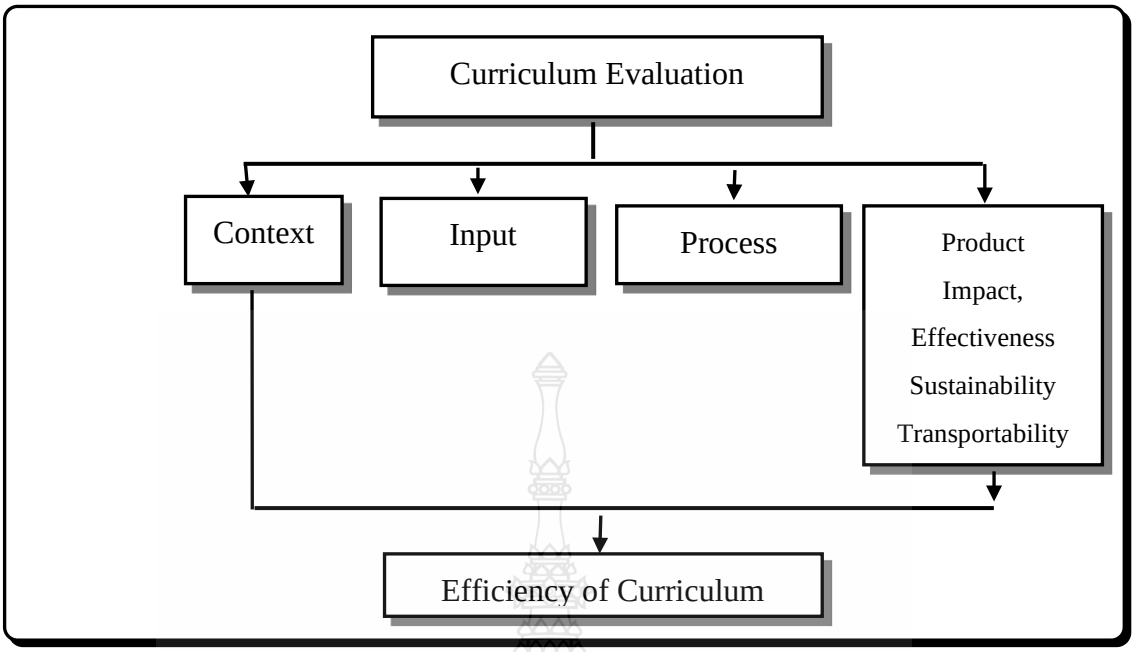

Figure 1.1 Conceptual Research Framework

1.6 Expected Benefits

1.6.1 It has been widely acknowledged that students should be included as one of the subjects in the evaluation of the curriculum. Previous studies have indicated that the construction of curricula in colleges and universities is primarily based on relevant standards established by experts and teachers, with less consideration of students' opinions and perspectives. However, by considering students as the main stakeholders in curriculum evaluation, the results can be better utilized as feedback and serve as a basis for improving the curriculum system.

1.6.2 Building upon the existing findings and relevant standards, a new evaluation system has been developed, comprising 5 primary indicators and 34 secondary indicators. These primary indicators, categorized under "function," along with their corresponding subordinate indicators, are used to assess the impact and effectiveness of the curriculum on students.

CHAPTER 2
REVIEW OF THE LITERATURE

This chapter focuses on reviewing the previous studies related to the areas relevant to this research.

2.1 Curriculum Evaluation

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2.3.2 The current situation of bachelor's degree of computer science and technology program Foreign Research

2.4 Relevant Research

2.4.1 Domestic Research

2.4.2 Foreign Research

2.1 Curriculum Evaluation

It was widely known that curriculum evaluation played a unique role. Henry pointed out that evaluation was "a series of activities used to measure the effectiveness of the entire system of teaching", and the results could be used for curriculum design. In the past, research on curriculum evaluation was relatively one-sided and not well-targeted (Ellington Henry, 1987, p.16). However, in recent years, scholars have started to focus

on the field of curriculum evaluation and have identified different types of curriculum evaluation.

2.1.1 Definition of curriculum evaluation.

The level evaluation encompassed the evaluation of curricula in primary and secondary schools, as well as kindergartens, along with the evaluation of university curricula. Category one, on the other hand, referred to the gradual division of majors and disciplines.

As a significant research outcome in the field of educational management, the theory of curriculum evaluation experienced a major breakthrough in the mid-20th century. During this time, the concept and specific operational methods of curriculum evaluation began to systematically emerge (Rangchaikul & Wiboonyasri, Y., 2013, p.1). Taylor, as a notable figure, formally introduced the theory of curriculum evaluation in the 1940s. Taylor's curriculum evaluation theory was a goal-oriented evaluation model that posited curriculum evaluation as the process of comparing predetermined goals of curriculum teaching with the effects achieved during implementation. Its aim was to assess the degree of goal attainment and improve curriculum management (Ralph Taylor, 1994, pp.85).

British education expert Kelly viewed curriculum evaluation as the process of assessing the value and effectiveness of a particular educational activity (Kelly, A. V., 1989, p.187). McDonald stated that curriculum evaluation involved receiving, obtaining, and exchanging information to directly guide curriculum decisions (Dennis Lawton, 1985, pp.154-156). All three definitions considered curriculum evaluation as a process that provided information for decision-making purposes (Phomjui, S., 2019, p.1). However, in China, curriculum evaluation was often perceived more as a value judgment activity. In contrast, Qiquan Zhong believed that curriculum evaluation was a value judgment process based on the possibility, feasibility, and usefulness of curriculum implementation. Zhong pointed out that curriculum evaluation should include two

aspects: the planning and organization of the teaching process, and the assessment performance of the teaching object (Zhong Qiquan, 1989, pp.168-169).

Bei Ding also considered curriculum evaluation as a value judgment activity, asserting that curriculum planning, implementation, and results should serve as the basis for value judgment according to certain criteria in the specific operational process (Ding Bei, 2013, pp.23-25). On the other hand, Liu Zhijun summarized a more comprehensive definition of curriculum evaluation based on domestic and international research. According to Liu, curriculum evaluation referred to the scientific evaluation process of the curriculum as a whole or in part. Its purpose was to ensure the effectiveness of curriculum updates, error correction, and improvement, making teaching managers' decisions more scientific and feasible (Liu Zhijun, 2007, pp.3-12). Furthermore, Ma Yunpeng (2005, p.20) believed that curriculum evaluation was not only a value judgment but also a practical activity.

In conclusion, by reviewing the literature, it was evident that scholars predominantly focused on the subject, content, methods, problems, and countermeasures of curriculum evaluation.

2.1.2 The meaning of curriculum evaluation

Evaluation referred to the process of assessing the value of an event, person, or process by an individual or group. In other words, evaluation involved systematically assessing the strengths and weaknesses or value of an object.

Evaluation was a complex undertaking that entailed making value judgments regarding the positive and negative aspects and identifying strengths and weaknesses to provide guidance for improvement and positive feedback. Therefore, in the field of education, evaluation served two purposes: firstly, determining whether a learning experience had achieved the intended educational goals, and secondly, identifying the strengths and weaknesses of a curriculum design. Educational evaluation went beyond measuring the extent to which educational goals had been attained; it also

involved comparing the planned educational program or educational activity with the actual results. The notion that educational evaluation could greatly contribute to enhancing education and that goal-oriented evaluation could prompt educators to reflect on their intended goals and clarify ambiguous educational outcomes formed the foundation of contemporary evaluation thinking and practice. The meaning of curriculum evaluation could be further categorized into the following five categories:

1) Viewing curriculum evaluation as the degree of alignment between performance and specific goals.

2) Considering curriculum evaluation as educational measurement and testing.

3) Regarding curriculum evaluation as the judgment of a professional who assessed the strengths, weaknesses, or value of a curriculum.

4) Seeing curriculum evaluation as the collection and provision of information to facilitate effective decision-making.

5) Perceiving curriculum evaluation as a political activity that utilized evaluation not only to assess curriculum effectiveness and manage curriculum-related issues but also to understand the ethical and aesthetic implications of evaluation and explore who benefited from it (Li Zijan and Huang Xianhua, 2022).

In conclusion, the concept of evaluation emphasizes several aspects: firstly, evaluation involved making judgments about value or strengths and weaknesses; secondly, it could encompass both qualitative and quantitative descriptions of phenomena; thirdly, evaluation was about decision-making; and fourthly, evaluation pertained not only to individual characteristics but also to the quality of education. Moreover, evaluation could be conducted not only for individual characteristics but also for curriculum programs or administrative measures. The meaning of curriculum evaluation was related to the application of evaluation in the field of curriculum.

2.2 CIPPiest Model

Curriculum evaluation played a crucial role in providing information for making decisions regarding curriculum development, improvement, and change. As a result, it was instrumental in enhancing curriculum quality. The CIPPiest model emerged as an alternative evaluation concept, with a specific focus on decision-making and offering a comprehensive and systematic evaluation of all curriculum components. Unlike singular component evaluation, the CIPPiest model ensured continuous evaluation, provided comprehensive information, and could be effectively utilized for nursing curriculum evaluation.

The CIPPiest model encompassed eight components as outlined below: Context, Input, Process, Product, Impact, Effectiveness, Sustainability, Knowledge transfer (Angwara Wongrugsa et al., 2020, pp.189-197).

2.2.1 Definition of CIPPiest Model

Daniel Stufflebeam, the developer of the CIPP evaluation model, made improvements to it in 2007 and named it the CIPPiest model (Stufflebeam, D. L., 2015, p.1). The CIPPiest model was applied to comprehensively evaluate curriculum design.

The CIPP Model was initially introduced around 1960 by Prof. Dr. Daniel L. Stufflebeam, a professor at Ohio University in the United States. The evaluation model, proposed by Stufflebeam and Shinkfield in their book "Evaluation Theory, Models, and Applications," defined assessment as the process of collecting and analyzing information to obtain useful data for decision-making. The assessor collected and analyzed information, presented the results, and analyzed the data for decision-making by executives. The main components of the CIPP model were context, input, process, and product. This model was developed based on the learning and experience gained from evaluating educational projects in the United States since the mid-1960s. The aim was to address the limitations of traditional assessment methods, such as

experimental design, objective assessment, and standardized testing, which had limitations in measuring learning achievements.

The CIPP assessment model, along with other assessment models developed at that time, was presented in the book "Educational Evaluation and Decision Making" and revised in "Evaluation Theory Models and Applications". The CIPPiest curriculum evaluation model consisted of context, input, process, product, impact, effectiveness, sustainability, and knowledge transfer. Additionally, the dimensions of course evaluation were expanded to include traditional assessment and evaluation of outcomes (Ratana Buason, 2013, p.24).

2.2.2 The measurement of CIPPiest Model

Assessment components according to the CIPP and CIPPiest assessment models: The CIPP assessment model was relevant to curriculum decisions and aligned with curriculum development. It consisted of four components, and here are the details of each component (Stufflebeam, 2007):

1) Context Evaluation assessed external factors that affected curriculum success and failure but were beyond the control of the curriculum itself. This evaluation considered societal, economic, political, and environmental conditions, as well as the policies of top-level and related agencies. It provided important information for determining curriculum objectives.

2) Input Evaluation checked the readiness of the resources needed to implement the curriculum, both quantitatively and qualitatively. It examined whether the necessary resources were available, appropriate, and sufficient, including personnel, budget, materials, time, target groups, technology, and technical specialists. Input evaluation served three objectives: (1) selecting an appropriate approach for organizing curriculum activities, (2) creating mutual understanding about alternative approaches, and (3) classifying and prioritizing relevant approaches for decision-makers.

3) Process Evaluation assessed the management of various curriculum activities and verified the implementation of the curriculum plan. It ensured that the curriculum was being implemented according to the set plan and schedule. The objectives of process evaluation were: (1) providing feedback to managers and operators regarding the curriculum's activities, schedule adherence, budget utilization, and efficiency, and (2) guiding operators to improve the use of budgets and execute the curriculum more effectively.

4) Product Evaluation evaluated the curriculum's achievement of objectives, goals, and other indicators in terms of quantity and quality. It assessed the outcomes of the curriculum during its implementation and examined the overall output. Product evaluation aimed to measure, interpret, and judge the extent to which the curriculum met the needs of the beneficiary group. It also considered both intentional and unintentional outcomes, as well as positive and negative aspects (Kanchanawasee, S. 2015, pp.3-10).

In 2007, the CIPP assessment model was expanded with the addition of four dimensions to the product evaluation component. These dimensions were Impact Evaluation, Effectiveness Evaluation, Sustainability Evaluation, and Transport Evaluation. This expanded model, known as the CIPPiest assessment model, was used to assess curricula, plans, or interventions. The evaluation questions for each dimension were as follows (Sirichai Kanchanawasi, 2015).

5) Impact Evaluation (I) assessed any changes resulting from curriculum implementation, both positive and negative, for the target group and other relevant groups. It examined the impact on public health, community, economics, social aspects, environmental factors, and social conflicts. Impact evaluation was conducted during the curriculum implementation and at its conclusion. It addressed whether the curriculum's impact exceeded the desired goals and explored the necessity of those impacts, regardless of whether they were positive or negative.

6) Effectiveness Evaluation (E) was conducted after the curriculum was completed and assessed the outcomes in terms of the curriculum's quality and level of success. It examined whether the curriculum comprehensively met the needs of the beneficiary groups and whether it had achieved its objectives. Effectiveness evaluation also considered satisfaction with the curriculum and whether its success had increased or decreased over time.

7) Sustainability Evaluation (S) assessed whether the steps of the curriculum could be sustained after its completion, even when external support from agencies ceased. It examined factors such as community ownership, the ability of communities to manage the curriculum themselves, and the systematic or formal approaches for ensuring sustainability. This evaluation aimed to assess the continuity and persistence of successful curriculum implementation, including methods to maintain such success.

8) Knowledge transfer Evaluation (T) assessed the feasibility of implementing the curriculum in other areas and different contexts. It was often used in pilot curriculums and feasibility studies, serving as a case study for learning and adaptation in other areas. Knowledge transfer evaluation explored whether the curriculum had been applied or improved elsewhere, and it focused on expanding, improving, or applying the curriculum concept and process (Theepatat Chintapanyakul et al., 2017, pp.203-212).

The dimensions of assessment were expanded in all four areas with the addition of the production evaluation's outcomes in the CIPPiest assessment model. This expansion allowed for more comprehensive and clearer assessment classification and questioning. Therefore, the CIPPiest assessment model differed from the original CIPP assessment model, as it emphasized periodic and summary assessments.

Curriculum evaluation using the CIPPiest model provided information to assist curriculum managers in making informed decisions. It involved assessing the

curriculum's context, input, process, and product aspects. The context aspect evaluated the external factors, while the input aspect assessed the readiness of resources. The process aspect evaluated the curriculum's implementation, and the product aspect evaluated the outcomes against the curriculum's objectives or benchmarks.

2.2.3 Setps of CIPPiest Model

The guidelines for applying the CIPPiest Assessment Model in curriculum evaluation are as follows:

1) Context evaluation assesses the consistency of the course implementation. It determines if there were any needs, problems, or unresolved issues, and evaluates the conformity with the policies of relevant agencies or organizations. It also assesses the appropriateness of the curriculum objectives in relation to the context.

2) Input evaluation assesses the factors or resources used in curriculum implementation, such as teacher knowledge and teaching materials. It evaluates the appropriateness of the specified teaching and learning activities.

4) Process evaluation assesses whether the course was implemented according to the defined procedures. It identifies activities that could or could not be carried out and examines any problems or obstacles. Additionally, it identifies weaknesses or strengths in the course administration process.

5) Product evaluation assesses the learning outcomes and achievements of the learners, including their competences and skills. It focuses on the aims of the course, which include:

6) Impact evaluation assesses what learners have learned and how it could be further utilized.

7) Evaluation of effectiveness (Effectiveness Evaluation) addresses three sub-issues: the achievement of learning objectives, satisfaction in teaching, and the success of students in their work.

8) Sustainability assessment (Sustainability Evaluation) evaluates the sustainability of the course, specifically by a group of course users and learners who could effectively and continuously apply the knowledge gained.

9) Assessment of knowledge transfer (Knowledge transfer Evaluation) evaluates the dissemination of course knowledge to different groups and the learners' ability to apply that knowledge to develop their own work.

In conclusion, the CIPPiest Assessment Model, also known as the CIPP Model, consists of four main dimensions: context assessment, assessment of inputs, process evaluation, and product evaluation. The addition of productivity assessment introduces four sub-dimensions: impact assessment, effectiveness assessment, persistence assessment, and assessment of knowledge transfer. By applying the CIPPiest assessment model to evaluate the curriculum, comprehensive, accurate, and practical assessment results can be obtained to meet the needs of the stakeholders.

2.3 Bachelor's degree of computer science and technology program

It was evident from the review that the development of the computer science and technology program had been ongoing for approximately 30 years, to be precise, less than 20 years. The official release and implementation of the computer science and technology program curriculum standards occurred over a decade ago. In today's rapidly evolving society, technology is updated and iterated every three years. The purpose of education is to cultivate talents that are needed by society, and course learning serves as a means to achieve this educational purpose. Hence, the evaluation of course learning is of utmost importance, as evaluation standards directly impact course implementation and societal development.

Taking "computer science and technology program curriculum evaluation" as the theme, a search was conducted on the CNKI database without any time restrictions. The results revealed 43 records, including 39 journal papers, 3 master's theses, and

1 doctoral dissertation. The research on curriculum evaluation is relatively recent, and the number of publications is limited.

2.3.1 History of the Bachelor's Degree in the Computer Science and Technology Program.

Computer Science and Technology is a four-year undergraduate major in general higher education that falls under the umbrella of computer science. It awards a bachelor's degree in engineering or science. Cai Quejin conducted research on the principles and evaluation methods for implementing the new curriculum standards in "Discussion on Teaching Evaluation Methods of Computer Science and Technology Program in Senior High Schools" (Cai Quejin, 2008, pp.77-79). Zhang Xiong studied the methods and principles used in learning evaluation of the computer science and technology program in general high schools in "Discussion on Learning Evaluation of Computer Science and Technology Program in General High Schools." The research identified the main problems in the current evaluation of the computer science and technology program curriculum (Zhang Xiong, 2005, pp.66-69). Li Yi, in "Grasping Summative Evaluation, the Bull's Nose of Computer Science and Technology Program Curriculum Development," highlighted the guiding ideology of using summative evaluation, including proletarianization, humanization, and orientation (Li Yi, 2006, p.7).

Conclusion: Computer Science and Technology is a comprehensive major in computer science that encompasses computer systems and networks. Its aim is to cultivate high-level engineering talents with strong scientific literacy, a sense of independent learning and innovation, and a combination of scientific and engineering skills.

2.3.2 Current State of Research on the Bachelor's Degree in the Computer Science and Technology Program in Foreign Studies.

The most representative and influential work in the field of computing discipline education was the research effort on curricula conducted by the IEE CS/ACM

organization. Over the past decade, the concept of computing has undergone significant changes, leading to profound implications for designing teaching programs and educational approaches.

1) Research on Evaluation Methods

Research in this area primarily focused on the application of process evaluation, summative evaluation, and developmental evaluation in the learning of the computer science and technology program. Zhang Yun conducted practical research on process evaluation in junior high school computer science and technology program classrooms in "Practical Research on the Process Evaluation of the Computer Science and Technology Program Classroom in Junior High Schools" (Zhang Yun, 2005, p.1). Cunjing Zhang explored the content and form of summative evaluation in junior high school computer science and technology programs in "Research on the Content and Form of Summative Evaluation of the Computer Science and Technology Program in Junior High Schools" and developed evaluation papers for junior high school computer science and technology programs (Zhang Cunjing, 2008, pp.2-3).

2) Research on the Application of Modern Technologies in Computer Science and Technology Program Evaluation:

Based on educational goals, Wang Xuan conducted research on the evaluation of electronic portfolios in junior high school computer science and technology program disciplines. He developed measurement standards for learning evaluation, determined the weight distribution of the index system, and implemented classroom electronic portfolios in the actual teaching environment ("Research on the Evaluation of the Creation of Electronic Portfolios in Junior High School Computer Science and Technology Program Disciplines", (Wang Xuan, 2005, pp.3-4). Li Tian (2008, pp.3-4) designed standards for the application of electronic portfolios in the evaluation of senior high school computer science and technology programs and explored computer science and technology program classroom practices using electronic portfolio tools.

3) Research on the Problems in Learning Evaluation of Computer Science and Technology Program:

This research primarily addresses theoretical and practical aspects. Luo Xiaodan, in "Practical Research on Classroom Evaluation of Computer Science and Technology Program in Junior High Schools", developed a classroom evaluation scale by studying the existing problems in evaluation objectives, contents, methods, and tools of the computer science and technology program (Luo Xiaodan, 2010, pp.11-13). Xiao Biantian (2010, pp.23-25) analyzed the problems in the evaluation of the computer science and technology program in "Research on the Academic Evaluation of High School Computer Science and Technology Program Guided by Multiple Intelligence Theory" and explored the feasibility of using Multiple Intelligence Theory for academic evaluation of the computer science and technology program.

Conclusion: The scope and depth of computer technology are rapidly expanding, and each branch has developed a rich and comprehensive knowledge system. Therefore, a more scientific curriculum evaluation system must be established to keep up with these developments.

2.4 Relevant Research

2.4.1 Foreign Research

Regarding curriculum system evaluation abroad, one of the most significant research achievements is the development of relevant evaluation models. Among these models, the following three types stand out:

In "An Evaluation of the Quality Development of Expansion and Secondary Schools under the Jurisdiction of Nontaburi Provincial Administration Organization During the Academic Year of 2014-2016", the authors Chaemchoy, S., and Siribanpitak, P. (2020) utilized the CIPPiest model to establish quality development indicators. They conducted a comprehensive assessment to evaluate the quality development

of expanding schools and secondary schools. The study also provided policy recommendations to enhance the quality development policies for such educational institutions under the administrative organizations' jurisdiction.

In "The Evaluation of The Development Project of The Caddie's Operation Skills and Communication Skills for Support 'Phang-nga Sports Tourism', the authors Jitwarin, T., et al. (2021) employed the CIPPiest evaluation model. Through this model, they analyzed the existing curriculum issues and proposed suggestions for curriculum improvement. Their findings contributed to the theoretical basis for curriculum innovation in the field.

These research works demonstrate the importance of using effective evaluation models to assess and improve educational systems in various contexts. The CIPPiest model has proven to be a valuable tool in conducting comprehensive evaluations and offering valuable insights for policy development and curriculum enhancement.

In "The Evaluation of Life and Career Skills Development Project According to the Royal Charter Educational of Ban Pongpuey School, Bueng Kan Primary Education Area Office", the researchers conducted an assessment of the project aimed at developing life and occupational skills. The context of Ban Pongpuey School, as an educational opportunity expansion school, necessitates the creation of opportunities for all learners to acquire knowledge and skills in various life subjects, enabling them to navigate society through practical experiences and make informed career choices. The study aimed to utilize the research results as a guideline for the development of education management.

The evaluation of the project according to the Royal Charter of Education of Ban Pongpuey School focused on several aspects:

1) Assessing the appropriateness of context for life and occupation skills development project.

2) Evaluating the readiness of inputs for the project aimed at developing life skills and occupations according to the Royal Charter of Education of Ban Pongpuey School.

3) Analyzing the suitability of the process involved in the project for developing life skills and careers in alignment with the educational path of Ban Pongpuey School.

4) Examining the productivity and expansion of the project for developping life skills and occupations according to the Royal Charter of Education of Ban Pongpuey School.

All aspects of this evaluation were conducted using the CIPPiest Model, as proposed by Setthabodee, T. (2022).

In another project titled "Assessment for Moral Development of Students by Buddhist Oriented School of Ban Nongnahai Nonsa-ard School under the Office of Udon Thani Primary Education Service Area 1", Sukjai, P., (2022) employed the CIPPiest model. The study demonstrated that the CIPPiest model has a positive impact on teaching and curriculum. It is effective in improving teaching methods and results and serves as a valuable theoretical foundation for curriculum reform and innovation.

In Achwarin's N. (2017), thesis titled "Students, Faculty Members, Experts' Reflections towards Program: a CIPPiest Evaluation Model of Doctor of Philosophy in Teaching and Technology Program", the evaluation of the Doctor of Philosophy program in Teaching and Technology was discussed using the CIPPiest model. The research instruments, including questionnaires with a five-point Likert scale and structured interview forms, were carefully constructed. The findings revealed that participants' reflections towards the program were at the most appropriate level, with a mean score of 4.27 and a standard deviation of 0.40. The similarities and differences in reflections towards the program were noted and considered for further improvement and development.

In conclusion, foreign universities have greater autonomy in organizing their teaching activities, leading to extensive research outcomes in teaching quality evaluation. Examining advanced research findings and practical experiences from abroad can serve as a source of inspiration and provide theoretical support for domestic research efforts.

To summarize, both foreign and domestic research on curriculum evaluation highlight the significance of diversity. This entails considering various aspects of student development, employing stratified and differential assessment methods, and utilizing diverse means, methods, and evaluation forms to ensure comprehensive student development.

CHAPTER 3
RESEARCH METHODOLOGY

The research on curriculum evaluation of the Bachelor's degree program in Computer Science and Technology at Sichuan University of Science and Engineering utilized the CIPPiest Model. The research methodology employed a combination of quantitative and qualitative approaches. The details of the research methodology are as follows:

3.1 Population and Sample

3.2 Research Instrument

3.3 Instrument Development

3.4 Data Collection

3.5 Data analysis

3.6 Statistics research

3.1 Population and sample

3.1.1 Population

The population in this study consisted of Bachelor's degree students in Computer Science and Technology from Sichuan University of Science and Engineering. It comprised 5 groups, including 10 course instructors, 65 instructors, 930 students, 360 undergraduates, and 135 employers, with a total population of 1,500.

3.1.2 Sample

The sample for this study comprised Bachelor's degree students in Computer Science and Technology from Sichuan University of Science and Engineering. It consisted of 5 groups, including 10 course instructors, 20 instructors, 225 students, 90 undergraduates, and 30 employers. The sample of 375 participants was selected using purposive sampling.

Table 3.1 Number of population and sample research.

Groups	Population	Sample
1. Course instructors	10	10
2. Instructor	65	20
3. Students	930	225
4. Undergraduates	360	90
5. Employer	135	30
Total	1500	375

3.2 Research Instrument

3.2.1 Questionnaire

Two questionnaires were used as instruments for curriculum evaluation, collecting quantitative data as follows:

The first questionnaire was designed for course instructors, instructors, students, and undergraduates, focusing on the Computer Science and Technology curriculum. It was divided into four sections:

1) Basic information

2) Comments on the curriculum structure

3) Comments on curriculum management

4) Comments about teaching.

The second questionnaire targeted employers and focused on the Computer Science and Technology curriculum as well. It was also divided into three sections:

1) Basic information

2) Comments on the curriculum structure

3) Comments on curriculum management.

Additionally, qualitative data were collected through focus group discussions and interviews with individuals involved in relevant courses, including teachers, students, and curriculum management personnel.

3.3 Instrument development

Through the Computer Science and Technology Sichuan University of Science and Engineering curriculum evaluation questionnaire, the researcher followed the steps below:

3.3.1 Studied the evaluation course to establish the course evaluation framework according to the CIPPiest model.

3.3.2 Identified the questions for each questionnaire (draft).

3.3.3 Submitted the questionnaire (draft) evaluating computer science and technology at Sichuan University of Science and Engineering to the advisor for review and suggestions.

3.3.4 Revised the questionnaire evaluating computer science and technology at Sichuan University of Science and Engineering according to the suggestions.

3.3.5 Ensured the validity (IOC) of the questionnaires to evaluate computer science and technology at Sichuan University of Science and Engineering was between .66 to 1.00. Considered the appropriateness of the questionnaire through curriculum experts in curriculum and computer science and engineering.

3.3.6 Improved the questionnaire evaluating computer science and technology at Sichuan University of Science and Engineering based on the suggestions provided by experts.

3.3.7 Conducted a trial of the questionnaire with 30 people in the non-sample

3.3.8 Completed the evaluation of the Computer Science and Technology questionnaire of Sichuan University of Science and Engineering for the sample group.

3.3.9 After reviewing the literature and conducting expert interviews, the author chose the components of curriculum evaluation and developed the corresponding "curriculum evaluation element questionnaire" based on these elements. The research purpose, research object, research questions, and research hypotheses of this study were analyzed to determine the survey content and survey participants. The questionnaire items and options were designed accordingly.

3.3.10 Through an extensive literature review and expert consultation, a pretest questionnaire was ultimately created, named the "Computer Science and Technology Course Evaluation Questionnaire". It assessed various aspects of curriculum evaluation,

primarily focusing on recognition surveys. The survey covered teachers' skills and teaching methods, course content, course design, learning behaviors, and learning outcomes. The aim of this questionnaire was to comprehend the significance of practical teaching quality elements in the course.

3.3.11 Using computer science and technology majors at Sichuan University as an example, the questionnaire was designed to gauge students' perceptions of the importance of course evaluation from the perspective of the student body and identify the key factors influencing course evaluation.

3.4 Data Collection

The researchers collected data to evaluate the curriculum of computer science and technology at Sichuan University of Science and Engineering. The details are as follows:

3.4.1 A request was made and submitted to obtain permission from the curriculum department of computer science and technology at Sichuan University of Science and Engineering to collect data with the sample group.

3.4.2 The researchers collected data online from 1st to 31st March 2023.

3.4.3 The integrity of the returned questionnaires was checked.

3.5 Data Analysis

3.5.1 Descriptive statistics were used for quantitative data analysis from the questionnaire, which had 5 levels. The percentage, mean, and standard deviation were calculated to obtain the average values of the 5 levels, explained as follows:

Highest level: 4.50 – 5.00
High level: 3.50 – 4.49
Moderate level: 2.50 – 3.49
Low level: 1.50 – 2.49
Lowest level: 1.00 – 1.49

3.5.2 Qualitative data analysis was performed on the data collected through the questionnaire using content analysis.

3.6 Statistics used in Research

3.6.1 The formulas used to calculate the percentage (%), mean, and standard deviation (SD) in this study are as follows:

1) The formula used for calculating the percentage was:

$$P = \frac{\int}{N} \times 100$$

P represents the percentage

$\int$ Frequency the overall score

N The total number of sample

2) The formula used to calculate the arithmetic mean was:

$$\overline{X} = \frac{\sum \chi}{N}$$

$\overline{X}$ represents arithmetic mean.

$\sum \chi$ represents the sum of the data of the study

N represents total number of people

3) The formula to calculate the standard deviation was:

$$S.D. = \sqrt{\frac{\sum (x - \overline{X})^2}{N}}$$

S.D. represents standard deviation

x represents the number of student ratings

$\overline{X}$ represents mean score

N represents total number of students

3.6.2 The validity and reliability of the calculations were assessed in this study.

1) The formula to calculate validity:

$$\mathrm{IOC} = \frac{\sum \mathrm{R}}{\mathrm{N}}$$

IOC represents index of effectiveness

$\sum \mathrm{R}$ represents the total number of experts

N represents the total number of experts

2) Equation to calculate reliability.

$$\alpha = \frac{\mathrm{k}}{\mathrm{k}-1}\left\{1 - \frac{\sum \mathrm{S}_\mathrm{i}^2}{\mathrm{S}_\mathrm{i}^2}\right\}$$

α represents the value of reliability

k represents the number of tests taken

i^2 represents the score of each test

S_i^2 represents the mean variance of the total number

CHAPTER 4

RESEARCH RESULT

This research Curriculum Evaluation of Bachelor Degree of Computer Science and Engineering Using CIPPiest Model. research result follow:

4.1 Analysis of Personal Information

4.2 Analysis of Context

4.3 Analysis of Input

4.4 Analysis of Process

4.5 Analysis of Product

4.6 Analysis of Impact

4.7 Analysis of Effectiveness

4.8 Analysis of Sustainability

4.9 Analysis of Knowledge Transfer

4.10 Total of Curriculum Evaluation Using CIPPiest Mode

4.1 Analysis of Personal Information

Table 4.1 Number and percentage of personal information for course instructors.

Question	Number	Percentage (%)
1. Gender		
1.1 Male	6	60
1.2 Female	4	40
Total	10	100

Table 4.1 Number and percentage of personal information for course instructors. (Cont.)

Question	Number	Percentage (%)
2. Position held		
2.1 Dean	1	10
2.2 Vice President	3	30
2.3 Department staff	4	40
2.4 Professor	1	10
2.5 Researcher	1	10
Total:	10	100
3. Title held		
3.1 Teaching Assistant	1	10
3.2 Lecturer	4	40
3.3 Associate Professor	4	40
3.4 Professor	1	10
Total:	10	100

From the table 4.1, a total of 10 course instructors participated in the survey, and a sample of 4 questionnaires was collected. Among the respondents, 60% were male, 40% held positions as lecturers and associate professors, and 30% fell within the age stage of 41 - 45 years old.

Table 4.2 Number and percentage of personal information for instructors.

Question	Number	Percentage (%)
1. Gender		
1.1 Male	12	60
1.2 Female	8	40
Total:	20	100
2. Position held		
2.1 Dean	4	20
2.2 Vice President	6	30
2.3 Department staff	2	10
2.4 Professor	6	30
2.5 Researcher	2	10
Total:	20	100
3. Title held		
3.1 Teaching Assistant	8	40
3.2 Lecturer	2	10
3.3 Associate Professor	6	30
3.4 Professor	4	20
Total:	20	100
4. Age		
4.1 31-35	6	30
4.2 36-40	6	30
4.3 41-45	2	10
4.4 46-50	2	10
4.5 51-55	2	10
4.6 56-60	2	10
4.7 61-65	0	00
Total:	20	100

From the table 4.2, a total of 20 instructors participated in the survey, and a sample of 4 questionnaires was collected. Among the respondents, 60% were male, 30% held positions as vice president, and 30% were professors. Additionally, 30% of the respondents were in the age stage of 31-35 years old, and another 30% were in the age stage of 36-40 years old.

Table 4.3 Number and percentage of personal information for students.

Question	Number	Percentage (%)
1. Gender		
1.1 Male	108	48.15
1.2 Female	117	51.85
Total:	225	100
2. Studied in		
2.1 liberal arts	54	24.07
2.2 Science and Engineering	111	49.07
2.3 Art and Sports	60	26.85
Total:	225	100
3. Grade		
3.1 freshman	33	14.81
3.2 Sophomore year	73	32.41
3.3 Junior	73	32.41
3.4 Senior	25	11.11
3.5 Graduate student	21	9.26
Total:	225	100

From the table 4.3, a total of 225 students participated in the survey, and a sample of 4 questionnaires was collected. Among the respondents, 51.85% were female,

and 49.07% were enrolled in science and engineering programs. Additionally, 32.41% of the students were in their sophomore year, and another 32.41% were in their junior year.

Table 4.4 Number and percentage of personal information for undergraduates.

Question	Number	Percentage (%)
1. Gender		
1.1 Male	48	52.63
1.2 Female	42	47.37
Total:	90	100
2. The nature of your current job		
2.1 Work related to your major	9	10.53
2.2 Work related to similar professions	28	31.58
2.3 Not related to your major	28	31.58
2.4 Teaching	5	5.26
2.5 Administrative work	9	10.53
2.6 Enterprise management	5	5.26
2.7 Other	6	6.67
Total:	90	100
3. Title held		
3.1 Teaching Assistant	9	10.53
3.2 Lecturer	43	47.37
3.3 Associate Professor	24	26.32
3.4 Professor	14	15.79
Total:	90	100

Table 4.4 Number and percentage of personal information for undergraduates. (Cont.)

Question	Number	Percentage (%)
4. Age		
4.1 21-25	9	10.53
4.2 25-30	14	15.79
4.3 31-35	19	21.05
4.4 36-40	28	31.58
4.5 41-45	5	5.26
4.6 46-50	5	5.26
4.7 51-55	5	5.26
4.8 55-60	5	5.26
4.9 61-65	0	0
Total:	90	100

From the table 4.4, a total of 90 undergraduates participated in the survey, and a sample of 4 questionnaires was collected. Among the respondents, 52.63% were male. In terms of their work, 31.58% indicated that it was related to similar professions, while another 31.58% stated that it was not related to their major. Among the undergraduates, 47.37% identified as lecturers. Furthermore, 31.58% of the respondents were in the age stage of 36-40 years old.

Table 4.5 Number and percentage of personal information for employees.

Question	Number	Percentage (%)
1. Gender		
1.1 Male	13	43.33
1.2 Female	17	56.66
Total:	30	100
2. The nature of your unit is		
2.1 Institution	5	15.79
2.2 Government agency	8	26.32
2.3 State-owned enterprise	16	52.63
2.4 Foreign enterprise or joint venture	1	5.26
2.5 Private or private	0	0
Total:	30	100
3. Number of employees in your organization		
3.1 Below 100 employees	1	5.26
3.2 101- -200 employees	14	47.37
3.3 201- -500 people	8	26.32
3.4 501- -1000 people	3	10.53
3.5 1001- 5000 people	2	6.67
3.6 5000 or more	2	6.67
Total:	30	100

From the table 4.5, a total of 30 employees participated in the survey, and a sample of 4 questionnaires was collected. Among the respondents, 56.66% were female. In terms of their employment, 52.63% worked in state-owned enterprises. Additionally, 47.37% of the employees worked in organizations with 101 to 200 employees.

4.2 Analysis of Context

Table 4.6 Mean and standard deviation of context for course instructors.

Question	Mean	S.D.	Level
1.Goals are valuable	3.50	0.85	high
2.Course objectives lead to learning management efficiently	3.30	0.66	moderate
3.The objectives of the curriculum are in line with social needs.	3.80	.63	high
4.Clearly defined objectives	2.90	1.10	moderate
5.Achieve goals at the end of the course	3.10	.88	moderate
6.The stated objectives are up to date	3.70	.95	high
7.The stated goals meet the students' expectations	3.00	.67	moderate
8.Goals are relevant to students' needs	3.40	.97	moderate
9.The goal is to take into account the national vale	3 .60	.70	high
10.Description of course teaching activities	3.00	1.16	moderate
11.Accuracy of employment opportunities in the job market	3.40	1.17	moderate
12.Description of knowledge and skills acquired through the course	3.30	.95	moderate
13.Organize professional training courses for teachers	3.30	.82	moderate
14.Organize teaching discussion sessions for teachers	3.20	.92	moderate
15.Organize teaching and lecture competitions for teachers	2.60	.97	moderate

Table 4.6 Mean and standard deviation of context for course instructors. (Cont.)

Question	Mean	S.D.	Level
Teachers use the following different approaches to group students in the classroom:			
16.Two student working together	3.30	.95	moderate
17.Teamwork	3.50	.97	high
18.Personal Learning	3.00	.94	moderate
19.Whole class group study	3.40	.97	moderate
20.The rules and practices established by the faculty are clear	2.70	1.16	moderate
21.Teachers check students' learning to ensure all students are participating	2.90	.74	moderate
22.The teacher has the same attitude towards the students in the class	3.50	.85	high
23.Teaching methods help improve students' computer skills	3.10	.99	moderate
24.The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	3.10	1.10	moderate
25.Students are fairly evaluated during the course	3.30	.95	moderate
26.Students can get guidance and advice from teachers when they need it	3.40	1.08	moderate
27.Encourage students to do learning activities	3.60	.84	high
28.Students' computer skills are well strengthened during the course	3.20	1.03	moderate
29.Moral Cultivation and Legal Foundations	3.60	.84	high
30.Outline of Modern Chinese History	3.30	.95	moderate
31.Situation Policy	3.20	1.14	moderate

Table 4.6 Mean and standard deviation of context for course instructors. (Cont.)

Question	Mean	S.D.	Level
32.Introduction to Traditional Chinese Culture	3.50	1.18	high
33.Mental Health Education for College Students	3.30	.95	moderate
34.Career Planning and Life Development for College Students	3.50	1.43	high
35.Enrollment and Safety Education	2.90	.57	moderate
36.Military training	4.00	1.05	high
37.Military Doctrine	2.90	.88	moderate
38.Sports	3.90	.88	high
39.Advanced Mathematics A	3.20	1.14	moderate
40.Linear Algebra	3.50	1.18	high
41.University Physics B	3.30	.95	moderate
42.English	4.10	.57	high
43.English listening and speaking	3.60	.70	high
44.Introduction to Computers	3.70	.95	high
45.High-level language programs	3.30	1.06	moderate
46.High-level language program on the machine	3.10	1.45	moderate
47.Outline of Modern Chinese History	3.70	.82	high
48.Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	3.60	1.17	high
49.Sports	2.70	1.25	moderate
50.English	3.10	1.29	moderate
51.English listening and speaking	3.40	1.08	moderate
52.Probability Theory and Mathematical Statistics	3.20	1.03	moderate
53 Statistics	2.90	1.08	moderate

Table 4.6 Mean and standard deviation of context for course instructors. (Cont.)

Question	Mean	S.D.	Level
54.Discrete Mathematics	2.80	.79	moderate
55.Digital Electronics Technology C	3.30	1.06	moderate
56.Python Programming	3.20	1.03	moderate
57.Compilation Principle	3.20	1.14	moderate
58.Data Structures and Algorithms	3.30	.95	moderate
59.Database system principle	3.10	1.20	moderate
60.Operating System	3.80	.92	high
61.Object Oriented Programming	3.30	1.16	moderate
62.Principles of Computer Composition	2.90	.88	moderate
63.Java object-oriented programming	3.70	1.06	high
64.IT Awareness Internship	2.50	1.18	moderate
65.Situation Policy	3.70	1.06	high
66.Modern information search and utilization	3.40	.70	moderate
67.Practical courses in ideological and political theory	3.20	1.23	moderate
68.Career Guidance	3.00	.82	moderate
69.Professional English	3.20	.92	moderate
70.Software Engineering	3.00	1.05	moderate
71.UML Modeling Analysis and Design	3.10	1.37	moderate
72.Artificial Intelligence	3.20	1.14	moderate
73.Compilation Principle	3.20	1.32	moderate
74.Computer Networks	3.20	.63	uncertain
75.Microelectronics principle and interface technology	3.80	.92	high
76.Mobile Application Development	3.70	1.06	moderate

Table 4.6 Mean and standard deviation of context for course instructors. (Cont.)

Question	Mean	S.D.	Level
77.Big Data and Cloud Computing	3.40	1.08	moderate
78.Algorithm analysis and design	3.20	.63	moderate
79.IT Project Internship	3.60	1.27	high
80.Data Analysis and Visualization	3.10	.74	moderate
81.Web Application Development	3.50	1.18	high
82.Software Quality Assurance	2.90	1.29	moderate
83.Integrated Software Course Design	3.40	1.35	moderate
84.ARM architecture and interface technology	3.10	.74	moderate
85.Embedded Operating Systems and Applications	3.30	.82	moderate
86.Embedded Systems and Design	3.30	.95	moderate
87.Embedded Integrated Course Design	3.50	1.18	high
88.Machine Learning	3.10	.74	moderate
89.Pattern Recognition	3.10	.99	moderate
90.Deep learning techniques	3.20	1.03	moderate
91.Artificial Intelligence Integrated Course Design	3.40	1.08	moderate
92.English Vocabulary and Completion	2.90	1.10	moderate
93.English Reading	2.90	.74	moderate
94.Calculus of functions of one element and differential equations	3.10	1.20	moderate
95.Probability statistics	3.30	1.25	moderate
96.Graduation Internship	3.60	.84	high
97.Graduation design (thesis)	3.00	1.16	moderate
98.English to Chinese	2.80	1.03	moderate
99.English Writing	3.60	.84	high

Table 4.6 Mean and standard deviation of context for course instructors. (Cont.)

Question	Mean	S.D.	Level
100.Differentiation of malfunction and double integration	3.30	1.25	moderate
101.Analytic geometry and multivariate integration of functions	3.10	.74	moderate
Total	3.27	.51	moderate

From the table 4.6, the summary level of course instructors total scores（$\overline{X}$=3.27, S.D.=0.51), is moderate level. The overall score was not as good as it could have been and there is a lot of room for improvement. Among them, “English”, have high scores ($\overline{X}$=4.10, S.D.=0.57).

Table 4.7 Mean and standard deviation of context for instructors.

Question of context	Mean	S.D.	Level
1.Goals are valuable	4.20	.79	high
2.Course objectives lead to learning management efficiently	4.30	.68	high
3. The objectives of the curriculum are in line with social needs.	4.00	1.16	high
4.Clearly defined objectives	3.80	1.14	high
5.Achieve goals at the end of the course	3.50	1.43	high
6.The stated objectives are up to date	3.90	1.20	high
7.The stated goals meet the students' expectations	4.20	.63	high
8.Goals are relevant to students' needs	4.00	1.16	high
9.The goal is to take into account the national values	3.90	.88	high

Table 4.7 Mean and standard deviation of context for instructors. (Cont.)

Question of context	Mean	S.D.	Level
10.Description of course teaching activities	3.60	1.51	high
11.Accuracy of employment opportunities in the job market	4.10	.88	high
12.Description of knowledge and skills acquired through the course	4.50	.97	highest
13.Organize professional training courses for teachers	4.00	1.05	high
14.Organize teaching discussion sessions for teachers	3.90	1.29	high
15.Organize teaching and lecture competitions for teachers	4.00	1.33	high
16.Two student working together	4.00	.94	high
17.Teamwork	3.50	1.18	high
18.Personal Learning	4.20	.79	high
19.Whole class group study	3.60	1.27	high
20.The rules and practices established by the faculty are clear	3.50	1.27	high
21.Teachers check students' learning to ensure all students are participating	4.50	.53	high
22.The teacher has the same attitude towards the students in the class	3.80	.92	high
23.Teaching methods help improve students' computer skills	4.00	.94	high

Table 4.7 Mean and standard deviation of context for instructors. (Cont.)

Question of context	Mean	S.D.	Level
24.The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	3.90	1.10	high
25.Students are fairly evaluated during the course	3.80	1.40	high
26.Students can get guidance and advice from teachers when they need it	4.00	1.05	high
27.Encourage students to do learning activities	4.00	.67	high
28.Students' computer skills are well strengthened during the course	4.10	.74	high
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:			
29.Moral Cultivation and Legal Foundations	3.90	1.10	high
30.Outline of Modern Chinese History	3.30	1.42	moderate
31.Situation Policy	4.00	1.16	high
32.Introduction to Traditional Chinese Culture	4.20	.79	high
33.Mental Health Education for College Students	3.90	1.29	high
34.Career Planning and Life Development for College Students	4.30	1.16	high
35.Enrollment and Safety Education	3.60	1.27	high
36.Military training	4.40	.84	high
37.Military Doctrine	4.20	.79	high
38.Sports	4.00	.94	high
39.Advanced Mathematics A	3.90	1.20	high
40.Linear Algebra	3.30	1.06	moderate
41.University Physics B	3.60	.97	high

Table 4.7 Mean and standard deviation of context for instructors. (Cont.)

Question of context	Mean	S.D.	Level
42.English	4.20	1.03	high
43.English listening and speaking	3.90	.88	high
44.Introduction to Computers	3.90	1.60	high
45.High-level language programs	3.80	1.55	high
46.High-level language program on the machine	3.80	1.23	high
47.Outline of Modern Chinese History	4.10	.88	high
48.Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	3.90	1.37	high
49.Sports	3.40	1.51	high
50.English	4.10	1.10	high
51.English listening and speaking	3.90	.99	high
52.Probability Theory and Mathematical Statistics	3.90	1.29	high
53 Statistics	3.80	.91	high
54.Discrete Mathematics	3.40	1.17	moderate
55.Digital Electronics Technology C	3.60	1.43	high
56.Python Programming	3.90	1.29	high
57.Compilation Principle	3.80	.912	high
58.Data Structures and Algorithms	3.70	.95	high
59.Database system principle	3.90	1.10	high
60.Operating System	3.70	1.42	high
61.Object Oriented Programming	4.00	.94	high
62.Principles of Computer Composition	3.60	.97	high
63.Java object-oriented programming	3.80	1.23	high
64.IT Awareness Internship	4.10	.88	high

Table 4.7 Mean and standard deviation of context for instructors. (Cont.)

Question of context	Mean	S.D.	Level
65.Situation Policy	3.40	1.17	moderate
66.Modern information search and utilization	3.60	1.65	high
67.Practical courses in ideological and political theory	3.50	1.18	high
68.Career Guidance	3.60	1.27	high
69.Professional English	4.10	.99	high
70.Software Engineering	3.90	1.45	high
71.UML Modeling Analysis and Design	3.70	1.34	high
72.Artificial Intelligence	4.20	1.32	high
73.Compilation Principle	3.90	1.10	high
74.Computer Networks	4.00	.94	high
75.Microelectronics principle and interface technology	3.70	.95	high
76.Mobile Application Development	3.20	1.48	moderate
77.Big Data and Cloud Computing	3.50	1.27	high
78.Algorithm analysis and design	4.10	.734	high
79.IT Project Internship	3.90	1.20	high
80.Data Analysis and Visualization	4.20	1.03	high
81.Web Application Development	3.50	1.27	high
82.Software Quality Assurance	3.70	1.34	high
83.Integrated Software Course Design	4.20	.92	high
84.ARM architecture and interface technology	3.90	1.10	high
85.Embedded Operating Systems and Applications	3.80	1.14	high
86.Embedded Systems and Design	3.80	1.40	high
87.Embedded Integrated Course Design	3.80	1.14	high

Table 4.7 Mean and standard deviation of context for instructors. (Cont.)

Question of context	Mean	S.D.	Level
88.Machine Learning	3.70	1.06	high
89.Pattern Recognition	4.00	.943	high
90.Deep learning techniques	3.80	1.23	high
91.Artificial Intelligence Integrated Course Design	3.70	1.42	high
92.English Vocabulary and Completion	3.80	1.03	high
93.English Reading	4.10	.74	high
94.Calculus of functions of one element and differential equations	3.90	1.10	high
95.Probability statistics	4.10	1.29	high
96.Graduation Internship	3.70	1.57	high
97.Graduation design (thesis)	4.00	.94	high
98.English to Chinese	3.70	1.06	high
99.English Writing	4.00	.94	high
100.Differentiation of malfunction and double integration	4.00	1.25	high
101.Analytic geometry and multivariate integration of functions	4.10	1.10	high
Total	3.87	.72	high

From the table 4.7, the summary level of instructor's total ($\overline{X}$=3.87, S.D.=0.72) is high level. The overall score is satisfactory and demonstrates the instructor's commitment to teaching and the teaching environment. Among them, "Description of knowledge and skills acquired through the course" have highest scores ($\overline{X}$=4.50, S.D.=0.97).

Table 4.8 Mean and standard deviation of context for students.

Question of context	Mean	S.D.	Level
1.Goals are valuable	4.49	1.03	high
2.Course objectives lead to learning management efficiently	3.81	.54	high
3.The objectives of the curriculum are in line with social needs.	3.80	.58	high
4.Clearly defined objectives	3.78	.62	high
5.Achieve goals at the end of the course	3.76	.67	high
6.The stated objectives are up to date	3.79	.60	high
7.The stated goals meet the students' expectations	3.79	.57	high
8.Goals are relevant to students' needs	3.80	.56	high
9.The goal is to take into account the national values	3.76	.67	high
10.Description of course teaching activities	3.78	.63	high
11.Accuracy of employment opportunities in the job market	3.79	.61	high
12.Description of knowledge and skills acquired through the course	3.79	.62	high
13.Organize professional training courses for teachers	3.76	.68	high
14.Organize teaching discussion sessions for teachers	3.77	.64	high
15.Organize teaching and lecture competitions for teachers	3.80	.58	high
16.Two student working together	3.79	.61	high
17.Teamwork	3.79	.61	high
18.Personal Learning	3.79	.60	high

Table 4.8 Mean and standard deviation of context for students. (Cont.)

Question of context	Mean	S.D.	Level
19.Whole class group study	3.81	.54	high
20.The rules and practices established by the faculty are clear	3.80	.58	high
21.Teachers check students' learning to ensure all students are participating	3.80	.58	high
22.The teacher has the same attitude towards the students in the class	3.79	.58	high
23.Teaching methods help improve students' computer skills	3.79	.61	high
24.The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	4.76	.68	highest
25.Students are fairly evaluated during the course	3.79	.58	high
26.Students can get guidance and advice from teachers when they need it	3.81	.54	high
27.Encourage students to do learning activities	3.80	.58	high
28.Students' computer skills are well strengthened during the course	3.79	.61	high
29.Moral Cultivation and Legal Foundations	3.79	.58	high
30.Outline of Modern Chinese History	3.76	.67	high
31.Situation Policy	3.79	.61	high
32.Introduction to Traditional Chinese Culture	3.76	.67	high
33.Mental Health Education for College Students	3.77	.65	high
34.Career Planning and Life Development for College Students	3.78	.60	high

Table 4.8 Mean and standard deviation of context for students. (Cont.)

Question of context	Mean	S.D.	Level
35.Enrollment and Safety Education	3.77	.64	high
36.Military training	3.80	.58	high
37.Military Doctrine	3.80	.54	high
38.Sports	3.79	.61	high
39.Advanced Mathematics A	3.77	.66	high
40.Linear Algebra	3.78	.63	high
41.University Physics B	3.77	.66	high
42.English	3.79	.58	high
43.English listening and speaking	3.80	.58	high
44.Introduction to Computers	3.77	.65	high
45.High-level language programs	3.78	.63	high
46.High-level language program on the machine	3.78	.62	high
47.Outline of Modern Chinese History	3.78	.60	high
48.Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics	4.77	.68	highest
49.Sports	3.80	.54	high
50.English	3.80	.56	high
51.English listening and speaking	3.80	.56	high
52.Probability Theory and Mathematical Statistics	3.80	.56	high
53.Statistics	3.60	.55	high
54.Discrete Mathematics	3.77	.65	high
55.Digital Electronics Technology C	3.77	.62	high

Table 4.8 Mean and standard deviation of context for students. (Cont.)

Question of context	Mean	S.D.	Level
56.Python Programming	3.76	.70	high
57.Compilation Principle	3.77	.64	high
58.Data Structures and Algorithms	3.78	.63	high
59.Database system principle	3.77	.62	high
60.Operating System	3.77	.65	high
61.Object Oriented Programming	3.79	.58	high
62.Principles of Computer Composition	3.78	.65	high
63Java object-oriented programming	3.80	.58	high
64 IT Awareness Internship	3.79	.61	high
65.Situation Policy	3.79	.61	high
66.Modern information search and utilization	3.76	.67	high
67.Practical courses in ideological and political theory	3.79	.61	high
68.Career Guidance	3.77	.64	high
69.Professional English	3.78	.62	high
70.Software Engineering	3.78	.62	high
71.UML Modeling Analysis and Design	3.80	.58	high
72.Artificial Intelligence	3.78	.65	high
73.Compilation Principle	3.79	.58	high
74.Computer Networks	3.76	.68	high
75.Microelectronics principle and interface technology	3.79	.61	high
76.Mobile Application Development	3.77	.62	high
77.Big Data and Cloud Computing	3.79	.61	high

Table 4.8 Mean and standard deviation of context for students. (Cont.)

Question of context	Mean	S.D.	Level
77.Big Data and Cloud Computing	3.79	.61	high
78.Algorithm analysis and design	3.75	.67	high
79.IT Project Internship	3.77	.66	high
80.Data Analysis and Visualization	3.77	.64	high
81.Web Application Development	3.79	.61	high
82.Software Quality Assurance	3.79	.58	high
83.Integrated Software Course Design	3.79	.61	high
84.ARM architecture and interface technology	3.78	.63	high
85.Embedded Operating Systems and Applications	3.76	.67	high
86.Embedded Systems and Design	3.77	.66	high
87.Embedded Integrated Course Design	3.80	.54	high
88.Machine Learning	3.77	.65	high
89.Pattern Recognition	3.77	.64	high
90.Deep learning techniques	3.76	.70	high
91.Artificial Intelligence Integrated Course Design	3.80	.54	high
92.English Vocabulary and Completion	3.80	.58	high
93.English Reading	3.79	.61	high
94.Calculus of functions of one element and differential equations	3.77	.65	high
95.Probability statistics	3.79	.58	high
96.Graduation Internship	3.75	.71	high
97.Graduation design (thesis)	3.77	.64	high
98.English to Chinese	3.80	.56	high
99.English Writing	3.79	.61	high

Table 4.8 Mean and standard deviation of context for students. (Cont.)

Question of context	Mean	S.D.	Level
100.Differentiation of malfunction and double integration	3.80	.58	high
101.Analytic geometry and multivariate integration of functions	4.78	.62	highest
Total	4.52	.90	highest

From the table 4.8, the summary level of student's total ($\overline{X}$=4.52, S.D.=0.90) is highest level. As the table shows, the students were satisfied with the teaching and the teaching environment, very much. Among them, "Analytic geometry and multivariate integration of function" have highest scores ($\overline{X}$=4.78, S.D.=0.62).

Table 4.9 Mean and standard deviation of context for graduate students.

Question of context	Mean	S.D.	Level
1.Goals are valuable	4.16	.77	high
2.Course objectives lead to learning management efficiently	3.84	1.02	high
3.The objectives of the curriculum are in line with social needs.	3.58	1.02	high
4.Clearly defined objectives	3.37	1.12	moderate
5.Achieve goals at the end of the course	3.53	1.21	high
6.The stated objectives are up to date	3.53	.84	high
7.The stated goals meet the students' expectations	3.84	.83	high
8.Goals are relevant to students' needs	3.68	.75	high
9.The goal is to take into account the national values	3.58	.90	high
10.Description of course teaching activities	3.21	1.18	moderate

Table 4.9 Mean and standard deviation of context for graduate students. (Cont.)

Question of context	Mean	S.D.	Level
11.Accuracy of employment opportunities in the job market	3.53	1.02	high
12.Description of knowledge and skills acquired through the course	3.53	.91	high
13.Organize professional training courses for teachers	3.63	1.01	high
14.Organize teaching discussion sessions for teachers	3.42	1.07	moderate
15.Organize teaching and lecture competitions for teachers	3.47	1.02	moderate
16.Two student working together	3.53	1.12	high
17.Teamwork	3.42	1.17	moderate
18.Personal Learning	3.42	.96	moderate
19.Whole class group study	3.79	1.03	high
20.The rules and practices established by the faculty are clear	3.63	.96	high
21.Teachers check students' learning to ensure all students are participating	3.37	.83	moderate
22.The teacher has the same attitude towards the students in the class	3.37	1.30	moderate
23.Teaching methods help improve students' computer skills	3.63	1.17	high
24.The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	3.37	1.26	moderate

Table 4.9 Mean and standard deviation of context for graduate students. (Cont.)

Question of context	Mean	S.D.	Level
25.Students are fairly evaluated during the course	3.47	1.02	moderate
26.Students can get guidance and advice from teachers when they need it	3.42	1.26	moderate
27.Encourage students to do learning activities	3.16	1.21	moderate
28.Students' computer skills are well strengthened during the course	3.58	1.07	high
29.Moral Cultivation and Legal Foundations	3.53	1.17	high
30.Outline of Modern Chinese History	3.47	1.17	moderate
31.Situation Policy	3.68	.82	high
32.Introduction to Traditional Chinese Culture	3.37	1.12	moderate
33.Mental Health Education for College Students	3.32	1.06	moderate
34.Career Planning and Life Development for College Students	3.58	1.07	high
35.Enrollment and Safety Education	3.11	.99	moderate
36.Military training	3.42	.84	moderate
37.Military Doctrine	3.47	1.12	moderate
38.Sports	3.42	1.22	moderate
39.Advanced Mathematics A	3.11	1.10	moderate
40.Linear Algebra	3.63	1.07	high
41.University Physics B	3.53	1.12	high
42.English	3.74	.93	high
43.English listening and speaking	3.58	1.02	high
44.Introduction to Computers	3.79	.79	high
45.High-level language programs	3.37	.90	high
46.High-level language program on the machine	3.63	1.21	high

Table 4.9 Mean and standard deviation of context for graduate students. (Cont.)

Question of context	Mean	S.D.	Level
47.Outline of Modern Chinese History	3.58	.90	high
48.Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	4.90	.99	highest
49.Sports	3.32	1.00	moderate
50.English	3.47	1.07	moderate
51.English listening and speaking	3.58	1.12	high
52.Probability Theory and Mathematical Statistics	3.79	.92	high
53. Statistics	3.80	.56	high
54.Discrete Mathematics	3.47	1.07	moderate
55.Digital Electronics Technology C	3.53	1.07	high
56.Python Programming	3.37	1.17	moderate
57.Compilation Principle	3.47	1.12	moderate
58.Data Structures and Algorithms	3.37	1.26	moderate
59.Database system principle	3.58	1.07	high
60.Operating System	3.53	1.02	high
61.Object Oriented Programming	3.21	1.18	moderate
62.Principles of Computer Composition	3.21	.98	moderate
63.Java object-oriented programming	3.42	1.22	moderate
64.IT Awareness Internship	3.26	1.24	moderate
65.Situation Policy	3.63	.83	high
66.Modern information search and utilization	3.32	1.16	moderate
67.Practical courses in ideological and political theory	3.68	.89	high
68.Career Guidance	3.53	1.22	high

Table 4.9 Mean and standard deviation of context for graduate students. (Cont.)

Question of context	Mean	S.D.	Level
69.Professional English	3.05	1.13	moderate
70.Software Engineering	3.63	.90	high
71.UML Modeling Analysis and Design	3.21	1.13	moderate
72.Artificial Intelligence	3.42	1.07	moderate
73.Compilation Principle	3.37	.96	moderate
74.Computer Networks	3.63	1.01	high
75.Microelectronics principle and interface technology	3.53	1.22	high
76.Mobile Application Development	3.26	1.20	high
77.Big Data and Cloud Computing	3.47	1.07	moderate
78.Algorithm analysis and design	3.42	1.17	moderate
79.IT Project Internship	3.63	1.07	high
80.Data Analysis and Visualization	3.58	.96	high
81.Web Application Development	3.63	1.01	high
82.Software Quality Assurance	3.37	.96	moderate
83.Integrated Software Course Design	3.47	1.07	moderate
84.ARM architecture and interface technology	3.47	.97	moderate
85.Embedded Operating Systems and Applications	3.58	1.35	high
86.Embedded Systems and Design	3.37	1.21	moderate
87.Embedded Integrated Course Design	3.68	1.11	high
88.Machine Learning	3.68	.95	high
89.Pattern Recognition	3.47	.91	moderate
90.Deep learning techniques	3.37	1.01	moderate
91.Artificial Intelligence Integrated Course Design	3.58	1.02	high
92.English Vocabulary and Completion	3.32	1.20	moderate

Table 4.9 Mean and standard deviation of context for graduate students. (Cont.)

Question of context	Mean	S.D.	Level
93.English Reading	3.53	1.22	high
94.Calculus of functions of one element and differential equations	3.68	1.00	high
95.Probability statistics	3.63	.96	high
96.Graduation Internship	3.42	1.12	moderate
97.Graduation design (thesis)	3.63	1.07	high
98.English to Chinese	3.42	1.17	moderate
99.English Writing	3.63	1.01	high
100.Differentiation of malfunction and double integration	3.42	1.12	moderate
101.Analytic geometry and multivariate integration of functions	3.53	1.17	high
Total	3.50	.72	high

From the table 4.9, the summary level of graduate student's total ($\overline{X}$=3.50, S.D.=0.72) is high level. As the table shows, the undergraduates are satisfied with the teaching and learning environment and are very satisfied. Among them, "Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics" have highest scores ($\overline{X}$=4.90，S.D.=0.99).

Table 4.10 Mean and standard deviation of context for employers.

Question of context	Mean	S.D.	Level
1.Goals are valuable	3.47	.84	moderate
2.Course objectives lead to learning management efficiently	3.26	.81	moderate
3.The objectives of the curriculum are in line with social needs.	3.32	1.06	moderate
4.Clearly defined objectives	3.26	1.06	moderate
5.Achieve goals at the end of the course	3.16	.90	moderate
6.The stated objectives are up to date	3.11	.81	moderate
7.The stated goals meet the students' expectations	3.32	.82	moderate
8.Goals are relevant to students' needs	3.16	.90	moderate
9.The goal is to take into account the national values	3.63	1.17	high
10.Description of course teaching activities	3.37	1.01	moderate
11.Accuracy of employment opportunities in the job market	3.79	.92	high
12.Description of knowledge and skills acquired through the course	3.21	.79	moderate
13.Organize professional training courses for teachers	3.84	.69	high
14.Organize teaching discussion sessions for teachers	3.00	1.05	moderate
15.Organize teaching and lecture competitions for teachers	3.16	.90	moderate
16.Two student working together	3.42	1.02	moderate
17.Teamwork	3.05	.97	moderate
18.Personal Learning	3.37	.96	moderate
19.Whole class group study	3.11	1.20	moderate

Table 4.10 Mean and standard deviation of context for employers. (Cont.)

Question of context	Mean	S.D.	Level
20.The rules and practices established by the faculty are clear	3.42	.69	moderate
21.Teachers check students' learning to ensure all students are participating	3.16	1.12	moderate
22.The teacher has the same attitude towards the students in the class	2.95	1.03	moderate
23.Teaching methods help improve students' computer skills	3.16	.96	moderate
24.The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	4.16	.90	highest
25.Students are fairly evaluated during the course	3.37	1.12	moderate
26.Students can get guidance and advice from teachers when they need it	3.53	1.02	high
27.Encourage students to do learning activities	3.32	1.11	moderate
28.Students' computer skills are well strengthened during the course	3.05	.911	moderate
29.Moral Cultivation and Legal Foundations	3.21	1.18	moderate
30.Outline of Modern Chinese History	2.95	1.08	moderate
31.Situation Policy	3.16	.83	moderate
32.Introduction to Traditional Chinese Culture	3.00	.94	moderate
33.Mental Health Education for College Students	3.16	1.12	moderate
34.Career Planning and Life Development for College Students	3.42	.90	moderate

Table 4.10 Mean and standard deviation of context for employers. (Cont.)

Question of context	Mean	S.D.	Level
35.Enrollment and Safety Education	3.00	1.11	moderate
36.Military training	3.05	1.03	moderate
37.Military Doctrine	3.42	.84	moderate
38.Sports	2.90	1.10	moderate
39.Advanced Mathematics A	3.11	1.15	moderate
40.Linear Algebra	3.00	1.05	moderate
41.University Physics B	3.05	.91	moderate
42.English	3.32	1.16	moderate
43.English listening and speaking	3.16	.90	moderate
44.Introduction to Computers	3.00	1.11	moderate
45.High-level language programs	3.11	1.10	moderate
46.High-level language program on the machine	2.74	1.10	moderate
47.Outline of Modern Chinese History	3.63	.83	high
48.Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	4.00	1.156	highest
49.Sports	3.05	.97	moderate
50.English	3.05	.97	moderate
51.English listening and speaking	3.26	.93	moderate
52.Probability Theory and Mathematical Statistics	3.37	1.12	moderate
53.Discrete Mathematics	2.84	1.12	moderate
54.Digital Electronics Technology C	3.26	1.05	moderate
55.Python Programming	2.63	1.21	moderate
56.Compilation Principle	3.11	.81	moderate
57.Data Structures and Algorithms	3.26	.99	moderate

Table 4.10 Mean and standard deviation of context for employers. (Cont.)

Question of context	Mean	S.D.	Level
58.Database system principle	3.00	.94	moderate
59.Operating System	3.37	.90	moderate
60.Object Oriented Programming	3.32	1.06	moderate
61.Principles of Computer Composition	3.21	.92	moderate
62.Java object-oriented programming	3.05	1.08	moderate
63.IT Awareness Internship	3.00	1.20	moderate
64.Situation Policy	3.63	1.07	high
65.Modern information search and utilization	3.42	.96	moderate
66.Practical courses in ideological and political theory	3.05	1.35	moderate
67.Career Guidance	2.90	1.15	moderate
68.Professional English	3.32	1.00	moderate
69.Software Engineering	2.84	.90	moderate
70.UML Modeling Analysis and Design	2.95	1.08	moderate
71.Artificial Intelligence	3.16	.96	moderate
72.Compilation Principle	3.37	.50	moderate
73.Computer Networks	3.11	.66	moderate
74.Microelectronics principle and interface technology	3.11	1.10	moderate
75.Mobile Application Development	3.32	.89	moderate
76.Big Data and Cloud Computing	3.16	1.12	moderate
77.Algorithm analysis and design	3.00	.82	moderate
78.IT Project Internship	3.11	.88	moderate
79.Data Analysis and Visualization	3.21	1.03	moderate
80.English	3.05	.97	moderate

Table 4.10 Mean and standard deviation of context for employers. (Cont.)

Question of context	Mean	S.D.	Level
81.Web Application Development	3.16	.96	moderate
82.Software Quality Assurance	3.16	.96	moderate
83.Integrated Software Course Design	3.47	1.02	moderate
84.ARM architecture and interface technology	3.32	1.00	moderate
85.Embedded Operating Systems and Applications	3.21	.54	moderate
86.Embedded Systems and Design	3.47	.77	moderate
87.Embedded Integrated Course Design	3.05	.97	moderate
88.Machine Learning	3.21	.98	moderate
89.Pattern Recognition	2.95	1.13	moderate
90.Deep learning techniques	2.95	.91	moderate
91.Artificial Intelligence Integrated Course Design	3.58	.77	high
92.English Vocabulary and Completion	3.11	.94	moderate
93.English Reading	3.37	.96	moderate
94.Calculus of functions of one element and differential equations	3.16	.96	moderate
95.Probability statistics	2.95	1.27	moderate
96.Graduation Internship	3.53	1.02	high
97.Graduation design (thesis)	2.79	1.08	moderate
98.English to Chinese	3.26	.56	moderate
99.English Writing	3.05	1.03	moderate
100.Differentiation of malfunction and double integration	3.68	.82	high
101.Analytic geometry and multivariate integration of functions	3.26	.87	moderate
Total	3.20	.47	moderate

From the table 4.10, the summary level of employer total ($\overline{X}$=3.20, S.D.=0.47) is moderate level. We have also conducted a questionnaire survey among employers, and the results show that they are not satisfied with what students have learned at university. Among them, “The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students” have high scores ($\overline{X}$=4.16, S.D.=0.90).

4.3 Analysis of Input

Table 4.11 Mean and standard deviation of input for course instructors.

Question of input	Mean	S.D.	Level
1.Instructors are knowledgeable and experienced in the subjects taught in theory and practice	3.70	.95	high
2.Instructors are knowledgeable and capable of giving students academic counseling and other areas	2.50	.97	moderate
3.Students are responsible for work as assigned	3.40	.84	moderate
4.The student’s knowledge is at a good level	4.00	.67	high
5.Teaching media and equipment are sufficient for teachers and students	3.60	1.17	high
6.Practical classroom	3.50	.71	high
7.Course meets objectives	3.40	1.27	moderate
8.Effective information system presence	2.80	.92	moderate
9.Effective guidance system exists	3.10	1.20	moderate
10.Adequate teaching and research staff	3.30	.68	moderate
11.Teaching content meets the needs	3.00	1.33	moderate
12.Teaching content meets expectations	3.100	.88	moderate
13.The content provided is up-to-date	3.200	1.03	moderate
14.The content of the course material is coherent	3.30	1.34	moderate

Table 4.11 Mean and standard deviation of input for course instructors. (Cont.)

Question of input	Mean	S.D.	Level
15.Reasonable allocation of class time	3.30	1.06	moderate
16.Multimedia classrooms are well-equipped	3.30	.82	moderate
17.The existence of teaching manuals	3.20	1.14	moderate
18.Utilization of library resources	3.20	.92	moderate
19.Well-prepared learning resources	3.30	1.06	moderate
20.Such materials meet the course objectives	3.40	1.17	moderate
21.The tasks and exercises in the course materials effectively improve learning computer skills	3.10	1.20	moderate
Total	3.27	.51	moderate

From the table 4.11, the summary level of course instructors total ($\overline{X}$=3.27, S.D.=0.51) is moderate level. As shown in the table, the results are not satisfactory in terms of total scores. There is much room for improvement. Among them, “The student’s knowledge is at a good level” have highest scores ($\overline{X}$=4.00, S.D.=0.67).

Table 4.12 Mean and standard deviation of input for instructors

Question of input	Mean	S.D.	Level
1.Instructors are knowledgeable and experienced in the subjects taught in theory and practice	4.20	.79	high
2.Instructors are knowledgeable and capable of giving students’ academic counseling and other areas	3.90	1.37	high
3.Students are responsible for work as assigned	3.50	1.08	high
4.The student’s knowledge is at a good level	4.00	1.33	high

Table 4.12 Mean and standard deviation of input for instructors. (Cont.)

Question of input	Mean	S.D.	Level
5.Teaching media and equipment are sufficient for teachers and students	4.30	.82	high
6.Practical classroom	3.60	1.08	high
7.Course meets objectives	4.00	1.49	high
8.Effective information system presence	3.70	1.57	high
9.Effective guidance system exists	3.50	1.27	high
10.Adequate teaching and research staff	3.60	1.58	high
11.Teaching content meets the needs	4.00	1.25	high
12.Teaching content meets expectations	3.90	1.20	high
13.The content provided is up-to-date	3.50	1.58	high
14.The content of the course material is coherent	4.00	1.49	high
15.Reasonable allocation of class time	4.00	1.49	high
16.Multimedia classrooms are well-equipped	4.00	.94	high
17.The existence of teaching manuals	4.00	.94	high
18.Utilization of library resources	4.00	.82	high
19.Well-prepared learning resources	3.50	1.18	high
20.Such materials meet the course objectives	3.20	1.48	moderate
21.The tasks and exercises in the course materials effectively improve learning computer skills	4.10	1.20	high
Total	3.84	.87	high

From the table 4.12, the summary level of instructor's total ($\bar{X}$=3.84, S.D.=0.87) is high level. As shown in the table, the results are satisfactory in terms of overall scores. There is much room for improvement. Among them, "Teaching media and equipment are sufficient for teachers" have high scores ($\bar{X}$=4.30, S.D.=0.82).

Table 4.13 Mean and standard deviation of input for students.

Question of input	Mean	S.D.	Level
1.Instructors are knowledgeable and experienced in the subjects taught in theory and practice	4.82	.65	highest
2.Instructors are knowledgeable and capable of giving students' academic counseling and other areas	3.83	.57	high
3.Students are responsible for work as assigned	3.86	.52	high
4.The student's knowledge is at a good level	3.85	.58	high
5.Teaching media and equipment are sufficient for teachers and students	3.83	.60	high
6.Practical classroom	3.86	.56	high
7.Course meets objectives	3.82	.63	high
8.Effective information system presence	3.86	.50	high
9.Effective guidance system exists	3.85	.51	high
10.Adequate teaching and research staff	3.84	.52	high
11.Teaching content meets the needs	3.84	.53	high
12.Teaching content meets expectations	3.87	.53	high
13.The content provided is up-to-date	3.84	.58	high
14.The content of the course material is coherent	3.84	.55	high
15.Reasonable allocation of class time	3.87	.50	high
16.Multimedia classrooms are well-equipped	3.85	.51	high
17.The existence of teaching manuals	3.85	.61	high
18.Utilization of library resources	3.86	.54	high
19.Well-prepared learning resources	3.87	.48	high
20.Such materials meet the course objectives	3.85	.56	high

Table 4.13 Mean and standard deviation of input for students. (Cont.)

Question of input	Mean	S.D.	Level
21.The tasks and exercises in the course materials effectively improve learning computer skills	3.82	.60	high
Total	3.68	.80	high

From the table 4.13, the summary level of student's total ($\bar{X}$=3.68, S.D.=0.80) is high level. In terms of overall scores, the results were satisfactory. Students are satisfied with what they have learned at the university. Among them, "Instructors are knowledgeable and experienced in the subjects taught in theory and practice" have highest scores ($\bar{X}$=4.82, S.D.=0.57).

Table 4.14 Mean and standard deviation of input for undergraduates.

Question of input	Mean	S.D.	Level
1.Instructors are knowledgeable and experienced in the subjects taught in theory and practice	3.26	1.33	moderate
2.Instructors are knowledgeable and capable of giving students academic counseling and other areas	3.47	1.07	moderate
3.Students are responsible for work as assigned.	3.53	1.26	high
4.The student's knowledge is at a good level	3.53	1.26	moderate
5.Teaching media and equipment are sufficient for teachers and students	3.32	1.20	moderate
6.Practical classroom	3.32	1.16	moderate
7.Course meets objectives	3.32	1.06	moderate
8.Effective information system presence	3.32	1.16	moderate
9.Effective guidance system exists	3.42	.96	moderate

Table 4.14 Mean and standard deviation of input for undergraduates. (Cont.)

Question of input	Mean	S.D.	Level
10.Adequate teaching and research staff	3.42	1.12	moderate
11.Teaching content meets the needs	3.21	1.13	moderate
12.Teaching content meets expectations	3.32	.82	moderate
13.The content provided is up-to-date	3.32	.75	moderate
14.The content of the course material is coherent	3.37	1.12	moderate
15.Reasonable allocation of class time	3.26	.99	moderate
16.Multimedia classrooms are well-equipped	3.32	1.20	moderate
17.The existence of teaching manuals	3.26	.81	moderate
18.Utilization of library resources	3.53	1.07	high
19.Well-prepared learning resources	3.37	.90	moderate
20.Such materials meet the course objectives	3.47	1.22	moderate
21.The tasks and exercises in the course materials effectively improve learning computer skills	3.79	.71	high
Total	3.39	.73	moderate

From the table 4.14, the summary level of graduate student's total ($\overline{X}$=3.39, S.D.=0.73) is moderate level. In terms of overall scores, the results were unsatisfactory. What students learn at university does not fully meet the needs of society. Among them, "The tasks and exercises in the course materials effectively improve learning computer skills", have high scores ($\overline{X}$=3.79, S.D.=0.71).

4.4 Analysis of Process

Table 4.15 Mean and standard deviation of process for course instructors.

Question of process	Mean	S.D.	Level
1.Encourage the development of appropriate academic knowledge and necessary skills	3.60	.84	high
2.Regularly supervise and follow up on teaching and learning outcomes	3.00	1.33	moderate
3.You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation	3.70	.68	high
4.Be able to link theory into practice consistently and appropriately	3.10	.97	moderate
5.Students are allowed to ask appropriate questions and problems about their knowledge	3.40	.70	moderate
Total	3.37	.56	moderate

From the table 4.15, the summary level of course instructors total ($\overline{X}$=3.37, S.D.=0.56) is moderate level. As the chart shows, the results are unsatisfactory. Students need to be empowered more to meet the needs of the society. Among them, “You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation” have high scores ($\overline{X}$=3.70, S.D.=0.68).

Table 4.16 Mean and standard deviation of process for instructors.

Question of process	Mean	S.D.	Level
1.Encourage the development of appropriate academic knowledge and necessary skills	4.00	.82	high
2.Regularly supervise and follow up on teaching and learning outcomes	3.70	1.25	high
3You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation	4.30	1.06	high
4.Be able to link theory into practice consistently and appropriately	4.10	.99	high
5.Students are allowed to ask appropriate questions and problems about their knowledge	4.00	.82	high
Total	4.02	.86	high

From the table 4.16, the summary level of instructor's total ($\bar{X}$=4.02, S.D.=0.86) is high level. Among them, "You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation", have high scores ($\bar{X}$=4.30, S.D.=1.06).

Table 4.17 Mean and standard deviation of process for students.

Question of process	Mean	S.D.	Level
Course Administration			
1.Encourage the development of appropriate academic knowledge and necessary skills	3.86	.54	high
2.Regularly supervise and follow up on teaching and learning outcomes	4.85	.54	high

Table 4.17 Mean and standard deviation of process for students. (Cont.)

Question of process	Mean	S.D.	Level
3.You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation	3.83	.62	high
4.Be able to link theory into practice consistently and appropriately	3.88	.45	high
5.Students are allowed to ask appropriate questions and problems about their knowledge	3.86	.48	high
Total	4.06	.79	high

From the table 4.17, the summary level of students ($\overline{X}$=4.06, S.D.=0.79) is high level. The scores are high as shown in the chart. Students are in university with improved skills and a greater love of life. Among them, “Regularly supervise and follow up on teaching and learning outcomes”, have highest scores ($\overline{X}$=4.85, S.D.=0.54).

Table 4.18 Mean and standard deviation of process for undergraduates.

Question of process	Mean	S.D.	Level
1.Encourage the development of appropriate academic knowledge and necessary skills.	3.37	1.26	moderate
2.Regularly supervise and follow up on teaching and learning outcomes.	3.11	1.10	moderate
3.You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.	3.42	1.17	moderate
4.Be able to link theory into practice consistently and appropriately.	3.68	.95	high

Table 4.18 Mean and standard deviation of process for undergraduates. (Cont.)

Question of process	Mean	S.D.	Level
5.Students are allowed to ask appropriate questions and problems about their knowledge.	3.63	1.07	high
Total	3.44	.87	moderate

From the table 4.18, antecedents for undergraduates of total ($\bar{X}$=3.44, S.D.=0.89) is moderate level. Score-wise, the scores are not high. There is a lack of knowledge on the part of the students. The specific "Be able to link theory into practice consistently and appropriately", have high mean ($\bar{X}$=3.68, S.D.=0.95).

4.5 Analysis of Product

Table 4.19 Mean and standard deviation of product for course instructors.

Question of product	Mean	S.D.	Level
1.Well-versed in theory and practice in the field of study	2.70	.95	moderate
2.Be able to implement the knowledge into practice	3.10	.88	moderate
3.Be able to use information technology	3.30	.68	moderate
4.Ability to use computer proficiently	2.70	1.25	moderate
5.Be enthusiastic to work	3.10	.88	moderate
6.Good behavior, behave according to the good social culture and norms	3.90	.88	high
7.Teachers have sufficient professional knowledge in teaching	3.00	1.05	moderate
8.Teachers assign learning tasks to students	3.20	1.03	moderate
9.The teacher corrects the homework	3.30	.95	moderate

Table 4.19 Mean and standard deviation of product for course instructors. (Cont.)

Question of product	Mean	S.D.	Level
10.The teacher commented on the exam results	2.60	1.17	moderate
11.Student's performance is fair	2.80	1.32	moderate
12.The teacher always lists the evaluation criteria before the examination	3.10	.99	moderate
13.Assignments related to course objectives	3.30	1.34	moderate
14.Student satisfaction with the course	3.10	.74	moderate
15.Curriculum activities meet the professional needs of students	3.40	1.17	moderate
16.Curriculum activities increase students' knowledge	3.20	.92	moderate
17.The course improved students' attitudes	3.60	.70	high
18.Textbooks in line with the course	3.10	.99	moderate
19.Normal promotion rate	2.80	1.23	moderate
20.Low dropout rate	3.40	1.08	moderate
21.Student's annual internship plan	3.60	.70	high
22.Peacetime performance	3.30	1.25	moderate
23.Midterm examination	3.40	1.08	moderate
24.Final examination	3.40	1.17	moderate
25.At the end of the course, students have obtained the basic abilities required by the course	3.20	1.03	moderate
26.Skills acquired are related to students' career development	3.40	.97	moderate
27.The acquired skills are related to the needs of domestic computer majors	2.70	1.16	moderate
28.I think this course is very useful	3.30	1.06	moderate

Table 4.19 Mean and standard deviation of product for course instructors. (Cont.)

Question of product	Mean	S.D.	Level
29.Normal employment rate of graduates	3.00	1.25	moderate
Total	3.16	.58	moderate

From the table 4.19, the summary level of course instructors of total ($\overline{X}$=3.16, S.D.=0.58) is moderate level. Score-wise, the score is not high. The results were unsatisfactory. The competence of instructors and administrators needs to be improved. Among them, “The course improved students' attitudes” have high scores ($\overline{X}$=3.60, S.D.=0.70).

Table 4.20 Mean and standard deviation of product for instructors.

Question of product	Mean	S.D.	Level
1.Well-versed in theory and practice in the field of study.	4.20	1.03	high
2.Be able to implement the knowledge into practice	4.10	1.37	high
3.Be able to use information technology	4.10	.99	high
4.Ability to use computer proficiently	4.00	.82	high
5.Be enthusiastic to work.	4.00	.82	high
6.Good behavior, behave according to the good social culture and norms	3.90	1.10	high
7.Teachers have sufficient professional knowledge in teaching	3.80	1.23	high
8.Teachers assign learning tasks to students	4.10	.99	high
9.The teacher corrects the homework	4.00	1.05	high
10.The teacher commented on the exam results	3.90	.74	high
11.Student's performance is fair	3.30	1.34	moderate

Table 4.20 Mean and standard deviation of product for instructors. (Cont.)

Question of product	Mean	S.D.	Level
12.The teacher always lists the evaluation criteria before the examination	4.00	1.33	high
13.Assignments related to course objectives	4.00	1.33	high
14.Student satisfaction with the course	4.00	1.05	high
15.Curriculum activities meet the professional needs of students	3.70	1.42	high
16.Curriculum activities increase students' knowledge	3.90	1.29	high
17.The course improved students' attitudes	3.80	1.40	high
18.Textbooks in line with the course	3.90	1.45	high
19.Normal promotion rate	4.00	1.41	high
20.Low dropout rate	4.30	.82	high
21.Student's annual internship plan	3.60	1.17	high
22.Peacetime performance	3.70	1.57	high
23.Midterm examination	4.20	1.03	high
24.Final examination	4.200	1.03	high
25.At the end of the course, students have obtained the basic abilities required by the course	4.10	.88	high
26.Skills acquired are related to students' career development	3.90	1.10	high
27.The acquired skills are related to the needs of domestic computer majors	3.30	1.25	moderate
28.I think this course is very useful	4.30	.82	high
29.Normal employment rate of graduates	3.90	1.20	high
Total	3.93	.77	moderate

From the table 4.20, the summary level of instructor's total ($\overline{X}$=3.93, S.D.=0.77). is moderate level. In terms of scores, the scores are not high, and there is a lot of room for improvement in the instructors' teaching methods, and teaching abilities. Among them, "Low dropout rate", and I think this course is very useful" have high scores ($\overline{X}$=4.30, S.D.=0.82).

Table 4.21 Mean and standard deviation of product for students.

Question of product	Mean	S.D.	Level
1.Well-versed in theory and practice in the field of study.	3.85	.53	high
2.Be able to implement the knowledge into practice	3.83	.62	high
3.Be able to use information technology	3.84	.58	high
4.Ability to use computer proficiently	3.86	.50	high
5.Be enthusiastic to work.	3.84	.58	high
6.Good behavior, behave according to the good social culture and norms	3.82	.65	high
7.Teachers have sufficient professional knowledge in teaching	3.83	.59	high
8.Teachers assign learning tasks to students	3.81	.66	high
9.The teacher corrects the homework	3.82	.60	high
10.The teacher commented on the exam results	3.85	.51	high
11.Student's performance is fair	3.83	.62	high
12.The teacher always lists the evaluation criteria before the examination	3.82	.62	high
13.Assignments related to course objectives	3.83	.60	high
14.Student satisfaction with the course	3.87	.50	high

Table 4.21 Mean and standard deviation of product for students. (Cont.)

Question of product	Mean	S.D.	Level
15.Curriculum activities meet the professional needs of students	3.86	.54	high
16.Curriculum activities increase students' knowledge	3.82	.59	high
17.The course improved students' attitudes	3.86	.56	high
18.Textbooks in line with the course	3.79	.71	high
19.Normal promotion rate	3.87	.50	high
20.Low dropout rate	3.82	.65	high
21.Student's annual internship plan	3.82	.61	high
22.Peacetime performance	3.84	.58	high
23.Midterm examination	3.84	.60	high
24.Final examination	3.83	.56	high
25.At the end of the course, students have obtained the basic abilities required by the course	3.85	.51	high
26.Skills acquired are related to students' career development	3.83	.54	high
27.The acquired skills are related to the needs of domestic computer majors	3.85	.54	high
28.I think this course is very useful	3.86	.54	high
29.Normal employment rate of graduates	3.85	.56	high
Total	3.86	.82	high

From the table 4.21, the summary level of students of total ($\bar{X}$=3.86, S.D.=0.82) is high level. It is evident from the results that the students are highly satisfied with the knowledge they have acquired and the skills they have learned. Among them, “Normal promotion rate”, have high scores ($\bar{X}$=3.87, S.D.=0.50).

Table 4.22 Mean and standard deviation of product for undergraduates.

Question of product	Mean	S.D.	Level
1.Well-versed in theory and practice in the field of study	3.58	.96	high
2.Be able to implement the knowledge into practice	3.42	.96	moderate
3.Be able to use information technology	3.47	1.12	moderate
4.Ability to use computer proficiently	3.26	1.10	moderate
5.Be enthusiastic to work	3.53	1.17	high
6.Good behavior, behave according to the good social culture and norms	3.47	.91	moderate
7.Teachers have sufficient professional knowledge in teaching	3.47	1.07	moderate
8.Teachers assign learning tasks to students	3.42	.84	moderate
9.The teacher corrects the homework	3.53	1.22	high
10.The teacher commented on the exam results	3.32	1.20	moderate
11.Student's performance is fair	3.16	1.12	moderate
12.The teacher always lists the evaluation criteria before the examination	3.21	1.03	moderate
13.Assignments related to course objectives	3.21	1.03	moderate
14.Student satisfaction with the course	3.53	1.12	high
15.Curriculum activities meet the professional needs of students	3.63	1.17	high
16.Curriculum activities increase students' knowledge	3.21	1.18	moderate
17.The course improved students' attitudes	3.37	.956	moderate
18.Textbooks in line with the course	3.21	.98	moderate
19.Normal promotion rate	3.90	.94	high

Table 4.22 Mean and standard deviation of product for undergraduates. (Cont.)

Question of product	Mean	S.D.	Level
20.Low dropout rate	3.58	1.26	high
21.Student's annual internship plan	3.21	1.23	moderate
22.Peacetime performance	3.47	.96	moderate
23.Midterm examination	3.42	1.02	moderate
24.Final examination	3.53	.96	high
25.At the end of the course, students have obtained the basic abilities required by the course	3.90	.88	high
26.Skills acquired are related to students' career development	3.37	1.12	moderate
27.The acquired skills are related to the needs of domestic computer majors	3.11	1.15	moderate
4.7 Overall impression of the course			
28.I think this course is very useful	3.42	1.02	moderate
29.Normal employment rate of graduates	3.32	1.06	moderate
Total	3.43	.79	moderate

From the table 4.22, the summary level of undergraduates of total ($\overline{X}$=3.43, S.D.=0.79) is moderate level. As can be seen from the results, overall satisfaction is low, as are the individual scores. Among them, “Normal promotion rate” ($\overline{X}$=3.90, S.D.=0.94) and “At the end of the course, students have obtained the basic abilities required by the course”, have high scores ($\overline{X}$=3.90, S.D.=0.88).

Table 4.23 Mean and standard deviation of product for employers.

Question of product	Mean	S.D.	Level
1.Well-versed in theory and practice in the field of study	3.58	.96	high
2.Be able to implement the knowledge into practice	2.95	.97	moderate
3.Be able to use information technology	3.11	1.05	moderate
4.Ability to use computer proficiently	3.26	.87	moderate
5.Be enthusiastic to work	3.21	1.03	moderate
6.Good behavior, behave according to the good social culture and norms	3.47	.84	moderate
7.Teachers have sufficient professional knowledge in teaching	3.58	.84	high
8.Teachers assign learning tasks to students	3.16	.96	moderate
9.The teacher corrects the homework	2.90	1.10	moderate
10.The teacher commented on the exam results	3.42	1.02	moderate
11.Student's performance is fair	3.21	.98	moderate
12.The teacher always lists the evaluation criteria before the examination	3.00	1.00	moderate
13.Assignments related to course objectives	3.26	.93	moderate
14.Student satisfaction with the course	3.16	1.20	moderate
15.Curriculum activities meet the professional needs of students	3.42	.96	moderate
16.Curriculum activities increase students' knowledge	3.21	.98	moderate
17.The course improved students' attitudes	3.11	.94	moderate
18.Textbooks in line with the course	3.00	1.05	moderate
19.Normal promotion rate	2.90	1.20	moderate
20.Low dropout rate	3.05	.97	moderate

Table 4.23 Mean and standard deviation of product for employers. (Cont.)

Question of product	Mean	S.D.	Level
21.Student's annual internship plan	2.74	.93	moderate
22.Peacetime performance	3.68	1.11	high
23.Midterm examination	2.79	1.44	moderate
24.Final examination	3.00	1.05	moderate
25.At the end of the course, students have obtained the basic abilities required by the course	3.37	1.01	moderate
26.Skills acquired are related to students' career development	2.90	.94	moderate
27.The acquired skills are related to the needs of domestic computer majors	3.16	1.02	moderate
28.I think this course is very useful	3.32	.82	moderate
29.Normal employment rate of graduates	3.32	1.00	moderate
Total	3.18	.51	moderate

From the table 4.23, the summary level of employers of total ($\overline{X}$=3.18, S.D.=0.51) is moderate level. From the questionnaires, it was clear that the results are unsatisfactory and that the students' skills need to be upgraded in all areas. Among them, “Peacetime performance”, have high scores ($\overline{X}$=3.68, S.D.=1.11).

4.6 Analysis of Impact

Table 4.24 Mean and standard deviation of impact for course instructors.

Question of impact	Mean	S.D.	Level
1.Achieved learning objectives	3.40	.97	moderate
2.Increased interest in learning	2.80	1.32	moderate
3.Can use the learned knowledge to serve the society	3.20	1.69	moderate
4.Achieved the teaching objectives	3.10	.74	moderate
5.Have a deeper understanding of the course	3.20	1.14	moderate
6.More perfect teaching methods	2.90	1.10	moderate
7.Improved teaching ability	2.90	1.37	moderate
Total	3.07	.69	moderate

From the table 4.24, the summary level of course instructors of total ($\overline{X}$=3.07, S.D.=0.69) is moderate level. As can be seen from the questionnaire, the results are unsatisfactory, with low overall scores and low individual scores, which are issues that are thought-provoking. Among them, “Achieved learning objectives”, have moderate scores ($\overline{X}$=3.40, S.D.=0.74).

Table 4.25 Mean and standard deviation of impact for instructors.

Question of impact	Mean	S.D.	Level
1.Achieved learning objectives	3.90	1.45	high
2.Increased interest in learning	3.60	1.51	high
3.Can use the learned knowledge to serve the society	4.10	1.20	high
4.Achieved the teaching objectives	4.20	.92	high
5.Have a deeper understanding of the course	4.30	1.06	high
6.More perfect teaching methods	4.00	1.16	high
7.Improved teaching ability	3.70	1.57	high
Total	3.97	1.02	high

From the table 4.25, the summary level of instructors of total ($\overline{X}$=3.97, S.D.=1.02) is high level. As can be seen from the data in the table, the results of the survey are satisfactory. It has contributed to the development of teaching and learning. Among them, “Have a deeper understanding of the course”, have high scores ($\overline{X}$=4.30, S.D.=1.06)

Table 4.26 Mean and standard deviation of impact for undergraduates.

Question of impact	Mean	S.D.	Level
1.Achieved learning objectives	3.58	.96	high
2.Increased interest in learning	3.26	1.24	moderate
3.Can use the learned knowledge to serve the society	3.37	1.30	uncertain
4.Achieved the teaching objectives	3.26	1.33	moderate
5.Have a deeper understanding of the course	3.16	1.12	moderate
6.More perfect teaching methods	3.32	1.06	moderate
7.Improved teaching ability	3.68	.89	high
Total	3.38	.92	moderate

From the table 4.26, the summary level of graduate student's total ($\overline{X}$=3.38, S.D.=0.92) is moderate level. As can be seen from the data in the table, the results of the survey are unsatisfactory. Students need to learn more after graduation and entering the society. Among them, "Improved teaching ability", have high scores ($\overline{X}$=3.68, S.D.=0.89).

Table 4.27 Mean and standard deviation of impact for employers.

Question of impact	Mean	S.D.	Level
1.Achieved learning objectives	3.42	.77	moderate
2.Increased interest in learning	2.90	1.29	moderate
3.Can use the learned knowledge to serve the society	3.47	1.02	moderate
4.Achieved the teaching objectives	3.00	1.05	moderate
5.Have a deeper understanding of the course	3.00	1.11	moderate
6.More perfect teaching methods	3.11	1.05	moderate
7.Improved teaching ability	3.053	1.08	moderate
Total	3.13	.60	moderate

From the table 4.27, the summary level of employers of total ($\overline{X}$=3.13, S.D.=0.60) is moderate level. As can be seen from the data in the table, the results of the survey are unsatisfactory. After graduating and entering the society, students need to learn more knowledge and constantly improve themselves to adapt to the development of the society. Among them, "Achieved learning objectives", have moderate scores ($\overline{X}$=3.42, S.D.=0.77).

4.7 Analysis of Effectiveness

Table 4.28 Mean and standard deviation of effectiveness for course instructors.

Question of effectiveness	Mean	S.D.	Level
1.Achieve the scheduled course objectives	3.80	.79	high
2.Students' academic performance and skills have improved	3.40	1.35	moderate
3.Success rate of the curriculum	2.70	.95	moderate
4.The course is helpful for students' employment	3.30	1.42	moderate
5.The curriculum is helpful for students' growth	2.80	1.23	moderate
6.The curriculum has attracted social attention	3.20	1.23	moderate
7.Curriculum adapts to the development of social productive forces	3.10	.88	moderate
Total	3.20	.76	moderate

From the table 4.28, the summary level of course instructors of total ($\overline{X}$=3.20, S.D.=0.76) is moderate level. As you can see from the data in the table, the total score is not high. Upgrading management styles and developing all-round management personnel play an important role in the development of society. Among them, “Achieve the scheduled course objective” ,have high level scores ($\overline{X}$=3.80,S.D.=0.79).

Table 4.29 Mean and standard deviation of effectiveness for instructors.

Question of effectiveness	Mean	S.D.	Level
1.Achieve the scheduled course objectives	4.50	.85	high
2.Students' academic performance and skills have improved	4.10	.99	high
3.Success rate of the curriculum	4.10	1.10	high
4.The course is helpful for students' employment	4.00	1.25	high
5.The curriculum is helpful for students' growth	4.20	1.32	high
6.The curriculum has attracted social attention	4.40	1.08	high
7.Curriculum adapts to the development of social productive forces	4.00	.94	high
Total	4.23	.89	high

From the table 4.29, the summary level of instructors of total ($\overline{X}$=4.23, S.D.=0.89) is high level. As can be seen from the data, the total score is not high and teachers are recognized for their students' learning and all-round development. Among them, “Achieve the scheduled course objectives”, have highest scores ($\overline{X}$=4.50, S.D.= 0.85).

Table 4.30 Mean and standard deviation of effectiveness for undergraduates.

Question of effectiveness	Mean	S.D.	Level
1.Achieve the scheduled course objectives	3.53	1.12	high
2.Students' academic performance and skills have improved	3.32	1.16	moderate
3.Success rate of the curriculum	3.32	1.46	moderate
4.The course is helpful for students' employment	3.58	.90	high
5.The curriculum is helpful for students' growth	3.84	1.12	high
6.The curriculum has attracted social attention	3.63	1.17	high

Table 4.30 Mean and standard deviation of effectiveness for undergraduates. (Cont.)

Question of effectiveness	Mean	S.D.	Level
7.Curriculum adapts to the development of social productive forces	3.63	.83	high
Total	3.55	.81	high

From the table 4.30, the summary level of undergraduates of total ($\overline{X}$=3.55, S.D.=0.81) is high level. As can be seen from the data, the results were satisfactory, and the students recognized the instructors' commitment. Among them, “The curriculum is helpful for students' growth”, have high scores ($\overline{X}$=3.84, S.D.=1.12).

Table 4.31 Mean and standard deviation of effectiveness for employers.

Question of effectiveness	Mean	S.D.	Level
1.Achieve the scheduled course objectives	3.58	.96	high
2.Students' academic performance and skills have improved	2.95	1.31	moderate
3.Success rate of the curriculum	3.32	1.20	moderate
4.The course is helpful for students' employment	3.21	.92	moderate
5.The curriculum is helpful for students' growth	2.84	1.21	moderate
6.The curriculum has attracted social attention	3.37	1.01	moderate
7.Curriculum adapts to the development of social productive forces	2.84	1.17	moderate
Total	3.16	.75	moderate

From the table 4.31, the summary level of employers of total ($\overline{X}$=3.16, S.D.=0.75) is moderate level. On the whole, the results have been unsatisfactory, and society's demands on graduates have increased, with students having to adapt to society as quickly

as possible after graduation. Among them, “Achieve the scheduled course objectives”, have high scores ($\overline{X}$=3.58, S.D.=0.96).

4.8 Analysis of Sustainability

Table 4.32 Mean and standard deviation of sustainability for course instructors.

Question of sustainability	Mean	S.D.	Level
1.Social demand for such talents	3.50	.85	high
2.Student's contribution to society	3.40	1.27	moderate
3.Curriculum adapts to social development	3.40	1.35	moderate
4.Courses help students grow	3.10	.99	moderate
5.The curriculum can attract more students for the school	3.40	1.17	moderate
6.Cultivate more high-quality college talents	3.30	1.42	moderate
7.The contribution of curriculum to social productivity	3.40	.84	moderate
Total	3.36	.79	moderate

From the table 4.32, the summary level of course instructors of total ($\overline{X}$=3.36, S.D.=0.79) is moderate level. On the whole, the results have been unsatisfactory, and society has increased its demands on students to adapt to society as quickly as possible after graduation. Among them, “Social demand for such talents”, have high scores ($\overline{X}$=3.50, S.D.=0.85).

Table 4.33 Mean and standard deviation of sustainability for instructors.

Question of sustainability	Mean	S.D.	Level
1.Social demand for such talents	4.10	.99	high
2.Student's contribution to society	3.80	1.23	high
3.Curriculum adapts to social development	3.90	1.20	high
4.Courses help students grow	3.50	1.35	high
5.The curriculum can attract more students for the school	3.70	.82	high
6.Cultivate more high-quality college talents	3.90	.88	high
7.The contribution of curriculum to social productivity	3.60	1.51	high
Total	3.79	.76	high

From the table 4.33, the summary level of instructors of total ($\overline{X}$=3.79, S.D.=0.76) is high level. From the findings, it can be seen that the scores are high and the ability of students to learn knowledge and skills has increased and they learn the skills in the shortest possible time. Among them, “Social demand for such talents”, have high scores ($\overline{X}$=4.10, S.D.=0.99).

Table 4.34 Mean and standard deviation of sustainability for undergraduates.

Question of sustainability	Mean	S.D.	Level
1.Social demand for such talents	3.47	1.12	moderate
2.Student's contribution to society	3.58	.96	high
3.Curriculum adapts to social development	3.32	.89	moderate
4.Courses help students grow	3.42	1.07	moderate
5.The curriculum can attract more students for the school	3.37	1.17	moderate

Table 4.34 Mean and standard deviation of sustainability for undergraduates. (Cont.)

Question of sustainability	Mean	S.D.	Level
6.Cultivate more high-quality college talents	3.47	1.26	moderate
7.The contribution of curriculum to social productivity	3.37	1.17	moderate
Total	3.43	.83	moderate

From the table 4.34, the summary level of undergraduates total scores ($\overline{X}$=3.43, S.D.=0.83), is moderate level. Among them, From the survey results, it is clear that the scores are not high and that what students learn in school does not fully meet the needs of society. “Student's contribution to society”, have high scores ($\overline{X}$=3.58, S.D.=0.96) And other all moderate level.

4.9 Analysis of Knowledge Transfer

Table 4.35 Mean and standard deviation of knowledge transfer for course instructors.

Question of knowledge transfer	Mean	S.D.	Level
1.Would you like to recommend this course to your classmates or friends?	3.30	1.34	moderate
2.If you were a teacher, would you like to take this course?	3.30	1.06	moderate
3.You are an administrator of a school. Are you willing to add this course to the school?	2.80	1.32	moderate
Total	3.13	1.00	moderate

From the table 4.35, the summary level of course instructors of total ($\overline{X}$=3.13, S.D.=1.00) is moderate level. As can be seen from the results of the survey, the scores are

not high, and due to two decades of development, society is close to saturation in terms of demand for this type of talent. Curriculum innovation, learning more advanced, comprehensive knowledge, adapt to social development. Among them, “Would you like to recommend this course to your classmates or friends” and “If you were a teacher, would you like to take this course”, have moderate scores ($\overline{X}$=3.30, S.D.=1.06).

Table 4.36 Mean and standard deviation of knowledge transfer for instructors.

Question of knowledge transfer	Mean	S.D.	Level
1.Would you like to recommend this course to your classmates or friends?	3.20	1.48	moderate
2.If you were a teacher, would you like to take this course?	3.50	.97	high
3.You are an administrator of a school. Are you willing to add this course to the school?	4.00	.67	high
Total	3.57	.70	high

From the table 4.36, the summary level of instructors of total ($\overline{X}$=3.57, S.D.=0.70) is high level. As can be seen from the results of the survey, the results are satisfactory, and the students, after graduation, are good at finding jobs, earn a moderate income, and adapt quickly to society. Among them, “You are an administrator of a school. Are you willing to add this course to the school”, have high scores ($\overline{X}$=4.00, S.D.=0.67).

Table 4.37 Mean and standard deviation of knowledge transfer for undergraduates.

Question of knowledge transfer	Mean	S.D.	Level
1.Would you like to recommend this course to your classmates or friends?	3.21	1.48	moderate
2.If you were a teacher, would you like to take this course?	3.37	1.21	moderate
3.You are an administrator of a school. Are you willing to add this course to the school?	3.58	1.07	high
Total	3.39	1.05	moderate

Based on the table 4.37, the summary level of undergraduates' responses was at a moderate level ($\overline{X}$ =3.39, S.D.=1.05). Training more comprehensive professionals is essential to adapt to the needs of social development. Universities play a crucial role in cultivating scientific research talents. Notably, the item "You are an administrator of a school. Are you willing to add this course to the school?" received high scores ($\overline{X}$=3.58, S.D.=1.07) among the responses from undergraduates.

4.10 Total of Curriculum Evaluation Using CIPPiest Mode

Table 4.38 Mean and level of total curriculum evaluation using CIPPiest model.

	CIPPiest model	Mean	S.D.	Level
Context	1. Curriculum Objectives	4.52	.34	highest
	2. Curriculum Construction	4.61	.30	highest
	3. Subject Content	4.45	.38	high
	Total Context	4.52	.39	highest

Table 4.38 Mean and level of total curriculum evaluation using CIPPiest model. (Cont.)

	CIPPiest model	Mean	S.D.	Level
Input	1. Instructor	4.73	.29	highest
	2. Student	4.25	.43	high
	3. Factors Contributing	4.55	.37	highest
	Total Input	4.51	.40	highest
Process	1. Curriculum Administration	4.21	.51	high
	2. Learning Management	3.89	.60	high
	Total Process	4.05	.54	high
Product	1.Knowledge	3.96	.55	high
	2. Skill	4.03	.36	high
	3. Ethics	3.88	.44	High
	Total Product	3.96	.45	high
	Impact	3.97	.46	high
	Effectiveness	4.19	.45	high
	Sustainability	3.79	.50	high
	Knowledge Transfer	3.57	.64	high
	Total	4.09	.52	high

Based on the table 4.38, the summary level of the questionnaire for Course instructors indicates an uncertain level. Among them, “Process” received the highest score ($\overline{X}$=3.37). The summary level of the questionnaire for Instructors is a high level. Among them, “Effectiveness” received the highest score ($\overline{X}$=4.19). The summary level of the questionnaire for Students is at an agree level. Among them, “Input” received the highest score ($\overline{X}$ =4.68). The summary level of the questionnaire for Graduates is uncertain. Among them, “Effectiveness” received the highest score ($\overline{X}$=3.55). The

summary level of the questionnaire for Graduates' users is uncertain, with “Context” receiving the highest score ($\overline{X}$=3.20).

Results: The analysis evaluated the bachelor’s degree curriculum in the Computer Science and Technology program at Sichuan University of Science and Engineering using the CIPPiest model in terms of context, input, process, product, impact, effectiveness, sustainability, and knowledge transfer, all of which received a high level of evaluation.

CHAPTER 5

CONCLUSION DISCUSSION AND RECOMMENDATION

This research follows the Curriculum Evaluation of Bachelor Degree of Computer Science and Engineering Using the CIPPiest Model.

5.1 Research conclusion

5.2 Discussion

5.3 Research recommendations

The CIPPiest model was utilized for the curriculum evaluation of the bachelor's degree program in Computer Science and Technology at Sichuan University of Science and Engineering. This model expanded the evaluation dimensions across all four areas and introduced outcomes assessment as a separate category, thereby enhancing the clarity of the assessment process. It differed from the previous CIPP assessment model by incorporating periodic and summary assessments, including outcomes assessment, along with other enhancements. The CIPPiest Model comprised several components, including Context, Input, Process, Product, Impact, Effectiveness, Sustainability, and Transportability. The research methodology employed in this study involved the use of curriculum instruments to gather quantitative data through questionnaires, utilizing a 5-point Likert scale. The sample for the study included 10 course instructors, 20 instructors, 225 students, 90 undergraduates, and 30 employers.

5.1 Research Conclusion

The study assessed the curriculum management project of the computer science and technology program at Sichuan University of Science and Engineering using the CIPPiest model assessment model in eight aspects: context, input, process, product, impact, effectiveness, sustainability, and knowledge transfer. The research results are summarized as follows:

5.1.1 Overall, the computer science and technology program at Sichuan University of Science and Engineering received a high level of evaluation ($\overline{X}$=4.09) using the CIPPiest model.

5.1.2 The context received the highest level of evaluation ($\overline{X}$=4.52) with Curriculum Construction and Curriculum Objectives having the highest levels ($\overline{X}$=4.61, 4.52), and Subject Content also receiving a high level of evaluation ($\overline{X}$=4.45).

5.1.3 The input received an overall highest level of evaluation ($\overline{X}$ = 4.51) with Instructors and Factors Contributing having the highest levels ($\overline{X}$=4.73, 4.55), and Students also receiving a high level of evaluation ($\overline{X}$=4.25).

5.1.4 The process received an overall high level of evaluation ($\overline{X}$=4.05) with Curriculum Administration and Learning Management receiving high levels ($\overline{X}$=4.21, 3.89).

5.1.5 The product received an overall high level of evaluation ($\overline{X}$=3.96) with Skills, Knowledge, and Ethics receiving high levels ($\overline{X}$=4.03, 3.96, 3.88). Additionally, Impact, Effectiveness, Sustainability, and Knowledge Transfer received high levels of evaluation ($\overline{X}$=3.97, 4.19, 3.79, 3.59) as well.

5.2 Discussion

The author utilized the CIPPiest model to develop quality development indicators, evaluate the quality development for comprehensive assessment, and make policy recommendations on quality development policies for expanding schools and secondary schools (Chaemchoy, S., & Siribanpitak, P., 2020, pp.273-286).

5.2.1 Context: The undergraduate course in computer science and technology at Sichuan University of Science and Engineering faced various challenges, including financial difficulties, inadequate policy support, and outdated teaching equipment. The university had invested heavily in infrastructure and equipment to meet the demands of

talent training. However, the original equipment had become outdated with the growth of student numbers, making it challenging to meet short-term teaching requirements.

Course instructors, teachers, and students had identified factors hindering the achievement of the curriculum goals, including society, knowledge, and students. The curriculum reflected the political and economic requirements of society and was influenced by the level of productivity, scientific and cultural development, and laws of physical and mental student development. Therefore, society, knowledge, and students were the three major factors governing the school curriculum.

5.2.2 Input: The curriculum structure of the undergraduate program in computer science and technology, the infrastructure of Sichuan University of Science and Engineering, financial support, and highly qualified faculty members were essential inputs to the course. According to Sukjai, the CIPPiest model had a positive effect on teaching and the curriculum. It could improve teaching methods, enhance teaching results, and provide a theoretical basis for curriculum reform and innovation (Sukjai, P., 2022, pp.81-94).

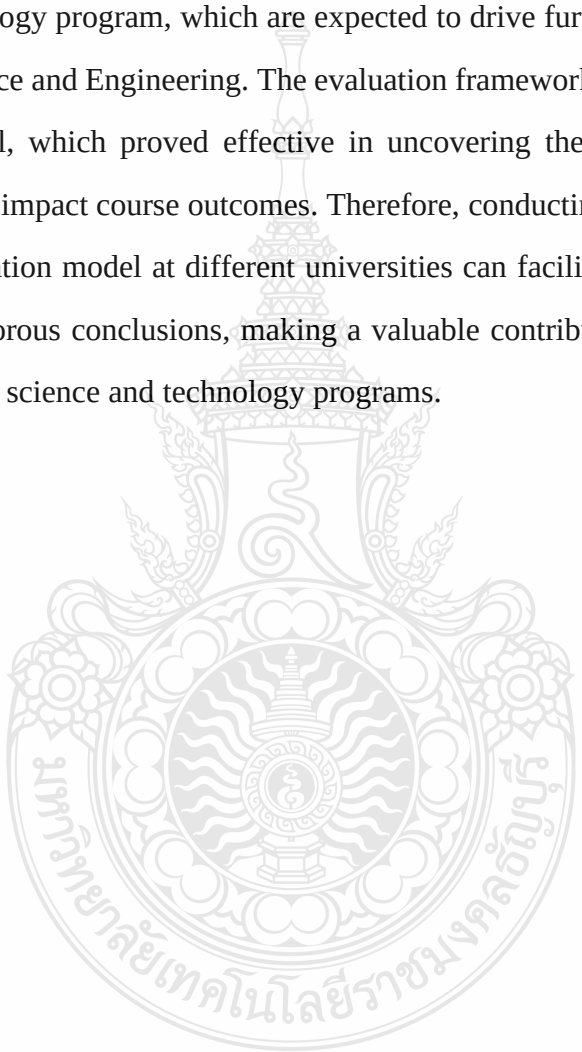
5.2.3 Process: The difficulties in the curriculum process of the undergraduate course in computer science and technology included building a qualified teaching team, increasing the enthusiasm of teachers and students, and introducing highly educated professional teachers. Regular or irregular training for teachers, internal college lecture competitions, and diversified teaching methods such as "group cooperation" and "reverse classroom" could improve teaching skills.

5.2.4 Product: The effectiveness of the undergraduate course in computer science and technology depended on knowledge, skills, and student behavior. The quality of the course's teaching activities remained high over the years, but there were some issues with knowledge transfer and skills development. The impact of the curriculum was mainly positive, with beneficial effects on society, the school, and students. The effectiveness and sustainability of the curriculum were assessed through surveys and

interviews. Knowledge transfer was crucial for achieving intra-organizational knowledge sharing, organizational learning, and innovation.

5.3 Research recommendations

In this study, we identified the influences on future research in the computer science and technology program, which are expected to drive further reforms at Sichuan University of Science and Engineering. The evaluation framework used in this study was the CIPPiest model, which proved effective in uncovering the relationships between various factors that impact course outcomes. Therefore, conducting similar studies using the CIPPiest evaluation model at different universities can facilitate result comparisons and draw more rigorous conclusions, making a valuable contribution to the curriculum reform of computer science and technology programs.



List of Bibliography

Buason, R. (2013). CIPP and CIPPIEST concepts that move and correct their use**.** **Silpakorn Journal Education and Research, 5**(2): 7-24.

Cai, Q. (2008). Discussion on the evaluation method of high school information technology course teaching. **Journal of Ningde Teacher College (Natural Science Edition), 08**(01): 77-79.

CPC. (2010). **Outline of the National Medium and Long-term Education Reform and Development Plan Beijing.** BeiJing, China: Beijing Education Bureau.

Ding, B. (2013). Toward student participatory course evaluation. **Modern Elementary and Secondary Education, Beijing**. (pp.23-25)

Ellington, H. (1987). The Role of Evaluation in Course and Curriculum Design. **Teaching and Learning in Higher Education, 24**(1), 16.

Gao, X. (2020). Design of undergraduate course evaluation system in the context of hybrid teaching. **China New Communication, 22**(24), 66-67.

Kanchanawasee, S. (2015). “Changed CIPP Model: Meaning, Importance and Development Association message”. **Social Science Research of Thailand, 2**(1): 3-10. (in Thai)

Kelly, A. V. (1989). **The Curriculum Theory and Practice.** London, UK: [n.p.]. (p.87).

Lawton, D. (1985). **Theory and practice of curriculum research.** Beijing, China: People's Education Publishing House. (pp.154-156).

Li, T. (2008). A study on the application of e-portfolio evaluation in high school information technology courses (Unpublished doctoral dissertation). **Capital Normal University, 6**(2): 3-4.

Li, Y. (2006). Seizing summative assessment as an oxymoron for IT curriculum development. **Information Technology Education, 5**(3): 1-7.

Li, Z., & Hunag, X. (2022). **The meaning of course evaluation**. Screech. Retrieved September 12, 2022, from : https://baijiahao.baidu.com/s?id=1724582893103912354&wfr=spider&for=pc

List of Bibliography (Continued)

Liu, Y. (2019). Practice and reflection on the joint application of formative and summative assessment: the example of "Computer Fundamentals" course. **Journal of Higher Education, 19**(23): 70-72.

Liu, Z. (2007). Current status, problems and prospects of curriculum evaluation. Curriculum. Teaching Materials. **Teaching Methodology, 10**(1): 3-12.

Luo, X. (2010). **A practical study on the evaluation of information technology classroom in junior high school.** (Doctoral dissertation, Guangxi Normal University: pp.11-13).

Ma, Y. (2005). **Curriculum and Pedagogy** (2nd ed.). Beijing, China: Central Radio and Television University Press. (p.20).

Phithiyanuwat, S. (2016). **Assessment Methodology: The Science of Value** (6th ed.). Bangkok, Thailand: Chulalongkorn University Pres. (in Thai)

Phomjui, S. (2019). **Curriculum Assessment Techniques** (7th ed.). Bangkok, Thailand: Jatuporn Design. (in Thai)

Rangchaikul Wiboonyasri, Y. (2013). **Curriculum Evaluation concept and practice** (8th ed.). Bangkok, Thailand: Chulalongkorn University. Retrieved from : http://rszarf.ips.uw.edu.pl/ewalps/dzienne/cipp-model-stufflebeam2015.pdf

Stufflebeam, D. L. (2015). **For applying CIPP evaluation model checklist: A tool the CIPP model to assess curriculums and programs** (Doctoral dissertation, Western Michigan University).

Stufflebeam, D. L., & Shinkfield, A. J. (2007). **Evaluation theory, models & applications.** San Francisco: Jossey-Bass.

Tan, Yan. (2022). **Research on the Construction of First-class Undergraduate Curriculum in China's Universities.** (Doctoral dissertation, Shanghai Normal University, p.2)

Taylor, R. (1994). **Fundamentals of Curriculum and Instruction.** People's Education Publishing House. (pp.187).

List of Bibliography (Continued)

Theepatat Chintapanyakul, Somchit Ruangsri, Kittisak Lakkana, & Pornpirom Longsap. (2017). Evaluation. New Course: CIPPiest THE NEW CURRICULUM EVALUATION: CIPPiest MODEL. **Police Nurse Journal, 9**(2): 203-212.

Wang, X. (2005). **A study on the evaluation of creating electronic portfolios in junior high school information technology subjects** (doctoral dissertation, Nanjing Normal University: pp.3-4).

Xiao, B. (2010). A Study on High School Information Technology (Compulsory) Students' Academic Evaluation Guided by Multiple Intelligences Theory (Doctoral dissertation, Shaanxi Normal University: pp.23-25).

Zhang, C. (2008). Research on the content and form of summative evaluation in junior high school information technology class. (Doctoral dissertation, Shandong Normal University.8(1): 2-3).

Zhang, X. (2005). A discussion on the evaluation of information technology course learning in general high school. **China Electrochemical Education, 12:** 66-69.

Zhang, Y. (2005). **A practical study of process evaluation in junior high school information technology classroom.** (Master's thesis, Nanjing Normal University: p.1).

Zhao, L. (2018). **Computer Science and Technology Professional Training Program.** Retrieved August 1, 2022, from : https://jsj.suse.edu.cn/p/0/?StId=st_app_news_i_x636964030563928277

Zhen, H. (2017). The dilemma and way out of formative assessment in teaching in the context of deepening curriculum reform. **Journal of Jiangsu Second Normal College, 33**(02): 84-85.

Zhong, Q. (1989). **Modern Curriculum Theory.** Shanghai, China: Shanghai Education Press. (pp.168-169.)

APPENDIXS

APPENDIX A

- List of Experts Reviewing Research Instruments

- Letter to Experts and Specialists for Research Tools Validation

List of Experts reviewing Research Instruments

1. Assoc. Prof. Dr Tiwat Maneechote

   Faculty of School of Creative Educational Management Panyapiwat Institute of Management ,Thailand.

2. Assoc. Prof. Dr. Rewadi krahomvong

   Faculty of Education, Thaksin University, Thailand.

3. Dr. Sujin Nukaew

   Faculty of Education Nakhon Si Thammarat Rajabhat University, Thailand.

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Postal Code 12110, Thailand

23 February 2023

Subject Invitation letter inviting experts to validate research instruments

Dear Asso. Prof. Dr Tiwat Maneechote

Due to Ms.Qian Zhang , a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "Curriculum evaluation of Bachelor degree of Computer Science and Technology at Sichuan University of Science and Engineering using CIPPIEST model" with Asst. Prof. Dr. Pranom Punsawai, a research advisor.

In relation to this, the researcher has a strong desire to be assisted with regard to the validation of the instruments required studies. The curriculum administration committee consider that you are the most qualified professional with knowledge and capabilities to provide such, the researcher has chosen and would like to ask approval from your good office to be the evaluator. I would like to invite you to be an expert to the validation research instruments for Ms.Qian Zhang for the benefit of further education. I am highly anticipating your kind approval regarding this matter.

Thank you for your kind consideration.

Sincerely Yours,

(Asst. Prof. Arnon Niyomphol)
Dean, Faculty of Technical Education

Department of Education
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Postal Code 12110, Thailand

23 February 2023

Subject Invitation letter inviting experts to validate research instruments

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Due to Ms.Qian Zhang , a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "Curriculum evaluation of Bachelor degree of Computer Science and Technology at Sichuan University of Science and Engineering using CIPPIEST model" with Asst. Prof. Dr. Pranom Punsawai, a research advisor.

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Dear Dr. Sujin Nukaew

Due to Ms.Qian Zhang , a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "Curriculum evaluation of Bachelor degree of Computer Science and Technology at Sichuan University of Science and Engineering using CIPPIEST model" with Asst. Prof. Dr. Pranom Punsawai, a research advisor.

In relation to this, the researcher has a strong desire to be assisted with regard to the validation of the instruments required studies. The curriculum administration committee consider that you are the most qualified professional with knowledge and capabilities to provide such, the researcher has chosen and would like to ask approval from your good office to be the evaluator. I would like to invite you to be an expert to the validation research instruments for Ms.Qian Zhang for the benefit of further education. I am highly anticipating your kind approval regarding this matter.

Thank you for your kind consideration.

Sincerely Yours,

(Asst. Prof. Arnon Niyomphol)
Dean, Faculty of Technical Education

Department of Education
Tel: +66-2549-3207
Fax: +66-2577-3207

APPENDIX B

Questionnaire survey of course instructors majoring of computer science and technology curriculum in Sichuan University of Science and Engineering

This Curriculum Evaluation is divided into 9 parts as follows: Part 1 Personal Information Part 2 Context, Part 3 Input, Part 4 Process, Part 5 Product, Part 6 Impact, Part 7 Effectiveness, Part 8 Sustainability and Part 9 Knowledge Transfer Assessment.

Insert a mark (✓) into your comment box and write useful suggestions for further improvement. The criteria for considering conformity are as follows:

Part 1 Personal Information

1. Gender:
   - ( ) Male
   - ( ) Female
2. Position held:
   - ( ) Dean
   - ( ) Vice President
   - ( ) Epartment
   - ( ) Staff Professor
   - ( ) Researcher
3. Title held:
   - ( ) Teaching Assistant
   - ( ) Lecturer
   - ( ) Associate Professor
   - ( ) Professor
4. Age:
   - ( ) 31-35
   - ( ) 36-40
   - ( ) 41-45
   - ( ) 46-50
   - ( )51-55
   - ( ) 56-60
   - ( ) 61-65

Evaluation of the effectiveness of the Computer Science and Technology curriculum. Please refer to each of the following statements about the course goals and objectives and use the provided grid to describe your view of each statement. Kindly tick the appropriate box (✓).

Part 2 Context

Research background, learning activities and learning content.

Question	Highest	High	Moderate	Low	Lowest
1 Background effectiveness evaluation					
1.1 Curriculum Objectives					
1 Goals are valuable					
2 Course objectives lead to learning management efficiently					
3 The objectives of the curriculum are in line with social needs.					
4 Clearly defined objectives					
5 Achieve goals at the end of the course					
6 The stated objectives are up to date					
7 The stated goals meet the students' expectations					
8 Goals are relevant to students' needs					
9 The goal is to take into account the national values					
10 Description of course teaching activities					
11 Accuracy of employment opportunities in the job market					

Question	Highest	High	Moderate	Low	Lowest
12 Description of knowledge and skills acquired through the course					
1.2 Curriculum Construction					
Process evaluation					
1.2.1 What is the level of faculty involvement.					
13 Organize professional training courses for teachers					
14 Organize teaching discussion sessions for teachers					
15 Organize teaching and lecture competitions for teachers					
1.2.2 How to use teaching strategies?					
Teachers use the following different approaches to group students in the classroom:					
16 Two student working together					
17 Teamwork					
18 Personal Learning					
19 Whole class group study					
20 The rules and practices established by the faculty are clear					
21 Teachers check students' learning to ensure all students are participating					
22 The teacher has the same attitude towards the students in the class					
23 Teaching methods help improve students' computer skills					

Question	Highest	High	Moderate	Low	Lowest
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students					
25 Students are fairly evaluated during the course					
26 Students can get guidance and advice from teachers when they need it					
1.2.3 What is the level of student involvement in learning activities?					
27 Encourage students to do learning activities					
28 Students' computer skills are well strengthened during the course					
Total evaluation:					
1.3 Subject Contributing					
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:					
First-year class schedule subjects.					
29 Moral Cultivation and Legal Foundations					
30 Outline of Modern Chinese History					
31 Situation Policy					
32 Introduction to Traditional Chinese Culture					
33 Mental Health Education for College Students					

Question	Highest	High	Moderate	Low	Lowest
34 Career Planning and Life Development for College Students					
35 Enrollment and Safety Education					
36 Military training					
37 Military Doctrine					
38 Sports					
39 Advanced Mathematics A					
40 Linear Algebra					
41 University Physics B					
42 English					
43 English listening and speaking					
44 Introduction to Computers					
45 High-level language programs					
46 High-level language program on the machine					
Class Schedule Subjects for Sophomore Year:					
47 Outline of Modern Chinese History					
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics					
49 Sports					
50 English					
51 English listening and speaking					
52 Probability Theory and Mathematical Statistics					
53 Statistics					

Question	Highest	High	Moderate	Low	Lowest
54 Discrete Mathematics					
55 Digital Electronics Technology C					
56 Python Programming					
57 Compilation Principle					
58 Data Structures and Algorithms					
59 Database system principle					
60 Operating System					
61 Object Oriented Programming					
62 Principles of Computer Composition					
63 Java object-oriented programming					
64 IT Awareness Internship					
Class Schedule Subjects for Senior Year:					
65 Situation Policy					
66 Modern information search and utilization					
67 Practical courses in ideological and political theory					
68 Career Guidance					
69 Professional English					
70 Software Engineering					
71 UML Modeling Analysis and Design					
72 Artificial Intelligence					
73 Compilation Principle					
74 Computer Networks					

Question	Highest	High	Moderate	Low	Lowest
75 Microelectronics principle and interface technology					
76 Mobile Application Development					
77 Big Data and Cloud Computing					
78 Algorithm analysis and design					
79 IT Project Internship					
80 Data Analysis and Visualization					
81 Web Application Development					
82 Software Quality Assurance					
83 Integrated Software Course Design					
84 ARM architecture and interface technology					
85 Embedded Operating Systems and Applications					
86 Embedded Systems and Design					
87 Embedded Integrated Course Design					
88 Machine Learning					
89 Pattern Recognition					
90 Deep learning techniques					
91 Artificial Intelligence Integrated Course Design					
92 English Vocabulary and Completion					
93 English Reading					
94 Calculus of functions of one element and differential equations					
95 Probability statistics					

Question	Highest	High	Moderate	Low	Lowest
Senior Year Class Schedule Subjects:					
96 Graduation Internship					
97 Graduation design (thesis)					
98 English to Chinese					
99 English Writing					
100 Differentiation of malfunction and double integration					
101 Analytic geometry and multivariate integration of functions					

Suggestion：

Part 3 Input

Table 2 Input Effectiveness Evaluation of Computer Science and Technology Course

Question	Highest	High	Moderate	Low	Lowest
2 Input effectiveness evaluation					
2.1 Instructor					
1 Instructors are knowledgeable and experienced in the subjects taught in theory and practice.					
2 Instructors are knowledgeable and capable of giving students academic counseling and other areas.					
2.2 Students					
3 Students are responsible for work as assigned.					

Question	Highest	High	Moderate	Low	Lowest
4 The student's knowledge is at a good level.					
2.3 Factors contributing to the curriculum					
5 Teaching media and equipment are sufficient for teachers and students.					
6 Practical classroom					
7 Course meets objectives					
8 Effective information system presence					
9 Effective guidance system exists					
10 Adequate teaching and research staff					
11 Teaching content meets the needs					
12 Teaching content meets expectations					
13 The content provided is up-to-date					
14 The content of the course material is coherent					
15 Reasonable allocation of class time					
16 Multimedia classrooms are well-equipped					
17 The existence of teaching manuals					
18 Utilization of library resources					
19 Well-prepared learning resources					
20 Such materials meet the course objectives					
21 The tasks and exercises in the course materials effectively improve learning computer skills					

Suggestion :

……

……..

Part 4 Process

Course Implementation and Instructional Processes (P)

Please respond to each of the following statements based on the frequency of occurrence in the teaching and learning process.

Question	Highest	High	Moderate	Low	Lowest
Curriculum Administration					
1 Encourage the development of appropriate academic knowledge and necessary skills.					
2 Regularly supervise and follow up on teaching and learning outcomes.					
Learning Management					
3 You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.					
4 Be able to link theory into practice consistently and appropriately.					
5 Students are allowed to ask appropriate questions and problems about their knowledge.					

Suggestion :

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Part 5 Product, Course Outcome Evaluation (P)

Referring to each of the following statements about evaluation and student performance, how would you rate the computer science and technology course?

Question	Highest	High	Moderate	Low	Lowest
4. Result evaluation					
4.1 Knowledge					
1 Well-versed in theory and practice in the field of study.					
2 Be able to implement the knowledge into practice					
4.2 Skills					
3 Be able to use information technology					
4 Ability to use computer proficiently					
4.3 Ethics					
5 Be enthusiastic to work.					
6 Good behavior, behave according to the good social culture and norms					
4.4 Is the course carried out normally?					
7 Teachers have sufficient professional knowledge in teaching					
8 Teachers assign learning tasks to students					
9 The teacher corrects the homework					
10 The teacher commented on the exam results					
11 Student's performance is fair					

Question	Highest	High	Moderate	Low	Lowest
12 The teacher always lists the evaluation criteria before the examination					
13 Assignments related to course objectives					
14 Student satisfaction with the course					
15 Curriculum activities meet the professional needs of students					
16 Curriculum activities increase students' knowledge					
17 The course improved students' attitudes					
18 Textbooks in line with the course					
19 Normal promotion rate					
20 Low dropout rate					
21 Student's annual internship plan					
4.5 Does the tool evaluated effectively evaluate students' performance?					
22 Peacetime performance					
23 Midterm examination					
24 Final examination					
4.6 Are the required skills met?					
25 At the end of the course, students have obtained the basic abilities required by the course					
26 Skills acquired are related to students' career development					

Question	Highest	High	Moderate	Low	Lowest
27 The acquired skills are related to the needs of domestic computer majors					
4.7 Overall impression of the course					
28 I think this course is very useful					
29 Normal employment rate of graduates					
Total evaluation:					

Suggestion :

……..

……..

Part 6 Impact Assessment (I)

Please respond to each of the following statements according to the expected goal.

Question	Highest	High	Moderate	Low	Lowest
Student performance:					
1 Achieved learning objectives					
2 Increased interest in learning					
3 Can use the learned knowledge to serve the society					
4 Teachers' performance:					
5 Achieved the teaching objectives					
6 Have a deeper understanding of the course					
7 More perfect teaching methods					
8 Improved teaching ability					
Total evaluation:					

Suggestion :

……..

……..

Part 7 Effectiveness evaluation (E)

Please respond to each of the following statements based on the quality of the course.

Question	Highest	High	Moderate	Low	Lowest
Students demonstrate the quality of the curriculum:					
1 Achieve the scheduled course objectives					
2 Students' academic performance and skills have improved					
3 Success rate of the curriculum					
4 The course is helpful for students' employment					
5 The curriculum is helpful for students' growth					
6 The curriculum has attracted social attention					
7 Curriculum adapts to the development of social productive forces					
Total evaluation:					

Suggestion :

Part 8 Sustainability assessment (S)

Please evaluate each of the following statements after the course.

Question	Highest	High	Moderate	Low	Lowest
The influence of curriculum on social life:					
1 Social demand for such talents					
2 Student's contribution to society					
3 Curriculum adapts to social development					
4 Courses help students grow					
5 The curriculum can attract more students for the school					
6 Cultivate more high-quality college talents					
7 The contribution of curriculum to social productivity					
Total evaluation:					

Suggestion :

……..

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Part 9 Knowledge Transfer Assessment (T)

Please respond to each of the following statements based on your knowledge evaluation.

Question	Highest	High	Moderate	Low	Lowest
The knowledge taught in the curriculum has been expanded:					
1 Would you like to recommend this course to your classmates or friends?					
2 If you were a teacher, would you like to take this course?					
3 You are an administrator of a school. Are you willing to add this course to the school?					
Total evaluation:					

Suggestion:

……..

……..

Thank you very much for your cooperation!

Questionnaire survey of instructors majoring of computer science and technology curriculum in Sichuan University of Science and Engineering

Dear instructors:

This Curriculum Evaluation is divided into 9 parts as follows: Part I Personal Information Part 2 Context , Part 3 Input , Part 4 Process, Part 5 Product, Part 6 Impact , Part 7 Effectiveness ,Part 8 Sustainability and Part 9 Knowledge Transfer Assessment.

Insert a mark (□) into your comment box and write useful suggestions for further improvement. The criteria for considering conformity are as follows:

+1 means conform or agree

0 means unsure or doubtful

-1 means inconsistent or disagree

Part 1 Personal Information

Question：

1. Gender:
   ( ) Male
   ( ) Female
2. Position held:
   ( ) Dean
   ( ) Vice President
   ( ) Department staff
   ( ) Professor
   ( ) Researcher
3. Title held:
   ( ) Teaching Assistant
   ( ) Lecturer
   ( ) Associate Professor
   ( ) Professor

4. Age:

( ) 31-35

( ) 36-40

( ) 41-45

( ) 46-50

( ) 51-55

( ) 56-60

( ) 61-65

Evaluation of the effectiveness of computer science and technology curriculum. Refer to each of the following statements about the course goals and objectives, and use the grid provided, please describe you。

The view of each statement. Please tick as appropriate（ ✓)。

Part 2 Context

Research background, learning activities and learning content. （C）

Table 1 Course content and materials

Question	**Highest**	**High**	**Moderate**	**Low**	**Lowest**
1 Background effectiveness evaluation					
1.1 Curriculum Objectives					
1 Goals are valuable					
2 Course objectives lead to learning management efficiently					
3 The objectives of the curriculum are in line with social needs.					
4 Clearly defined objectives					
5 Achieve goals at the end of the course					
6 The stated objectives are up to date					

Question	Highest	High	Moderate	Low	Lowest
7 The stated goals meet the students' expectations					
8 Goals are relevant to students' needs					
9 The goal is to take into account the national values					
10 Description of course teaching activities					
11 Accuracy of employment opportunities in the job market					
12 Description of knowledge and skills acquired through the course					
1.2 Curriculum Construction					
Process evaluation					
1.2.1 What is the level of faculty involvement.					
13 Organize professional training courses for teachers					
14 Organize teaching discussion sessions for teachers					
15 Organize teaching and lecture competitions for teachers					
1.2.2 How to use teaching strategies?					
Teachers use the following different approaches to group students in the classroom:					
16 Two student working together					
17 Teamwork					
18 Personal Learning					
19 Whole class group study					

Question	Highest	High	Moderate	Low	Lowest
20 The rules and practices established by the faculty are clear					
21 Teachers check students' learning to ensure all students are participating					
22 The teacher has the same attitude towards the students in the class					
23 Teaching methods help improve students' computer skills					
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students					
25 Students are fairly evaluated during the course					
26 Students can get guidance and advice from teachers when they need it					
1.2.3 What is the level of student involvement in learning activities?					
27 Encourage students to do learning activities					
28 Students' computer skills are well strengthened during the course					
Total evaluation:					
1.3 Subject content					
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:					
First-year class schedule subjects.					
29 Moral Cultivation and Legal Foundations					

Question	Highest	High	Moderate	Low	Lowest
30 Outline of Modern Chinese History					
31 Situation Policy					
32 Introduction to Traditional Chinese Culture					
33 Mental Health Education for College Students					
34 Career Planning and Life Development for College Students					
35 Enrollment and Safety Education					
36 Military training					
37 Military Doctrine					
38 Sports					
39 Advanced Mathematics A					
40 Linear Algebra					
41 University Physics B					
42 English					
43 English listening and speaking					
44 Introduction to Computers					
45 High-level language programs					
46 High-level language program on the machine					
Class Schedule Subjects for Sophomore Year:					
47 Outline of Modern Chinese History					
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics					

Question	Highest	High	Moderate	Low	Lowest
49 Sports					
50 English					
51 English listening and speaking					
52 Probability Theory and Mathematical 53 53 Statistics					
54 Discrete Mathematics					
55 Digital Electronics Technology C					
56 Python Programming					
57 Compilation Principle					
58 Data Structures and Algorithms					
59 Database system principle					
60 Operating System					
61 Object Oriented Programming					
62 Principles of Computer Composition					
63 Java object-oriented programming					
64 IT Awareness Internship					
Class Schedule Subjects for Senior Year:					
65 Situation Policy					
66 Modern information search and utilization					
67 Practical courses in ideological and political theory					
68 Career Guidance					
69 Professional English					
70 Software Engineering					
71 UML Modeling Analysis and Design					

Question	Highest	High	Moderate	Low	Lowest
72 Artificial Intelligence					
73 Compilation Principle					
74 Computer Networks					
75 Microelectronics principle and interface technology					
76 Mobile Application Development					
77 Big Data and Cloud Computing					
78 Algorithm analysis and design					
79 IT Project Internship					
80 Data Analysis and Visualization					
81 Web Application Development					
82 Software Quality Assurance					
83 Integrated Software Course Design					
84 ARM architecture and interface technology					
85 Embedded Operating Systems and Applications					
86 Embedded Systems and Design					
87 Embedded Integrated Course Design					
88 Machine Learning					
89 Pattern Recognition					
90 Deep learning techniques					
91 Artificial Intelligence Integrated Course Design					
92 English Vocabulary and Completion					

Question	Highest	High	Moderate	Low	Lowest
93 English Reading					
94 Calculus of functions of one element and differential equations					
95 Probability statistics					
Senior Year Class Schedule Subjects:					
96 Graduation Internship					
97 Graduation design (thesis)					
98 English to Chinese					
99 English Writing					
100 Differentiation of malfunction and double integration					
101 Analytic geometry and multivariate integration of functions					

Suggestion :

……..

……..

Part 3 Input

Table 2 Input Effectiveness Evaluation of Computer Science and Technology Course

Question	Highest	High	Moderate	Low	Lowest
2 Input effectiveness evaluation					
2.1 Instructor					
1 Instructors are knowledgeable and experienced in the subjects taught in theory and practice.					

Question	Highest	High	Moderate	Low	Lowest
2 Instructors are knowledgeable and capable of giving students academic counseling and other areas.					
2.2 Students					
3 Students are responsible for work as assigned.					
4 The student's knowledge is at a good level.					
2.3 Factors contributing to the curriculum					
5 Teaching media and equipment are sufficient for teachers and students.					
6 Practical classroom					
2.4 Course Enrichment					
7 Course meets objectives					
8 Effective information system presence					
9 Effective guidance system exists					
10 Adequate teaching and research staff					
11 Teaching content meets the needs					
12 Teaching content meets expectations					
13 The content provided is up-to-date					
14 The content of the course material is coherent					
15 Reasonable allocation of class time					
2.5 Is the educational equipment provided in good condition?					
16 Multimedia classrooms are well-equipped					

Question	Highest	High	Moderate	Low	Lowest
17 The existence of teaching manuals					
18 Utilization of library resources					
19 Well-prepared learning resources					
20 Such materials meet the course objectives					
21 The tasks and exercises in the course materials effectively improve learning computer skills					

Suggestion :

……..

……..

Part 4 Process

Course Implementation and Instructional Processes (P)

Please respond to each of the following statements based on the frequency of occurrence in the teaching and learning process.

Table 3 Process effectiveness evaluation

Question	Highest	High	Moderate	Low	Lowest
Course Administration					
1 Encourage the development of appropriate academic knowledge and necessary skills.					
2 Regularly supervise and follow up on teaching and learning outcomes.					
Learning Management					

Question	Highest	High	Moderate	Low	Lowest
3 You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.					
4 Be able to link theory into practice consistently and appropriately.					
5 Students are allowed to ask appropriate questions and problems about their knowledge.					

Suggestion :

……..

……..

Part 5 Product

Course Outcome Evaluation (P)

Referring to each of the following statements about evaluation and student performance, how would you rate the computer science and technology course?

Table 4 Evaluation of the effectiveness of the results

Question	Highest	High	Moderate	Low	Lowest
4. Result evaluation					
4.1 Knowledge					
1 Well-versed in theory and practice in the field of study.					
2 Be able to implement the knowledge into practice					
4.2 Skills					
3 Be able to use information technology					

Question	Highest	High	Moderate	Low	Lowest
4 Ability to use computer proficiently					
4.3 Ethics					
5 Be enthusiastic to work.					
6 Good behavior, behave according to the good social culture and norms					
4.4 Is the course carried out normally?					
7 Teachers have sufficient professional knowledge in teaching					
8 Teachers assign learning tasks to students					
9 The teacher corrects the homework					
10 The teacher commented on the exam results					
11 Student's performance is fair					
12 The teacher always lists the evaluation criteria before the examination					
13 Assignments related to course objectives					
14 Student satisfaction with the course					
15 Curriculum activities meet the professional needs of students					
16 Curriculum activities increase students' knowledge					
17 The course improved students' attitudes					

Question	Highest	High	Moderate	Low	Lowest
18 Textbooks in line with the course					
19 Normal promotion rate					
20 Low dropout rate					
21 Student's annual internship plan					
4.5 Does the tool evaluated effectively evaluate students' performance?					
22 Peacetime performance					
23 Midterm examination					
24 Final examination					
4.6 Are the required skills met?					
25 At the end of the course, students have obtained the basic abilities required by the course					
26 Skills acquired are related to students' career development					
27 The acquired skills are related to the needs of domestic computer majors					
4.7 Overall impression of the course					
28 I think this course is very useful					
29 Normal employment rate of graduates					
Total evaluation:					

Suggestion :

……

……

Part 6 Impact Assessment (I)

Please respond to each of the following statements according to the expected goal.

Table 5 Expected Objectives

Question	Highest	High	Moderate	Low	Lowest
Student performance:					
1 Achieved learning objectives					
2 Increased interest in learning					
3 Can use the learned knowledge to serve the society					
4 Teachers' performance:					
5 Achieved the teaching objectives					
6 Have a deeper understanding of the course					
7 More perfect teaching methods					
8 Improved teaching ability					
Total evaluation:					

Suggestion :

…….

……

Part 7 Effectiveness evaluation (E)

Please respond to each of the following statements based on the quality of the course.

Table 6 Curriculum Quality

Question	Highest	High	Moderate	Low	Lowest
Students demonstrate the quality of the curriculum:					
1 Achieve the scheduled course objectives					
2 Students' academic performance and skills have improved					
3 Success rate of the curriculum					
4 The course is helpful for students' employment					
5 The curriculum is helpful for students' growth					
6 The curriculum has attracted social attention					
7 Curriculum adapts to the development of social productive forces					
Total evaluation:					

Suggestion :

…….

……

Part 8 Sustainability assessment (S)

Please evaluate each of the following statements after the course.

Table 7 Sustainability

Question	Highest	High	Moderate	Low	Lowest
The influence of curriculum on social life:					
1 Social demand for such talents					
2 Student's contribution to society					
3 Curriculum adapts to social development					
4 Courses help students grow					
5 The curriculum can attract more students for the school					
6 Cultivate more high-quality college talents					
7 The contribution of curriculum to social productivity					
Total evaluation:					

Suggestion :

…….

……

Part 9 Knowledge Transfer Assessment (T)

Please respond to each of the following statements based on your knowledge evaluation.

Table 8 Knowledge Transfer

Question	Highest	High	Moderate	Low	Lowest
The knowledge taught in the curriculum has been expanded:					
1Would you like to recommend this course to your classmates or friends?					
2 If you were a teacher, would you like to take this course?					
3 You are an administrator of a school. Are you willing to add this course to the school?					
Total evaluation:					

Suggestion :

…….

……

Thank you very much for your cooperation!

Questionnaire survey of students majoring of computer science and technology curriculum in Sichuan University of Science and Engineering

Dear students:

I am contacting you to ask you to collaborate with me on a study for my Master of Education degree at RMUTT. I would be grateful if you could help me by filling out the questionnaire. The questionnaire is part of a case study that focuses on the Computer Science and Technology program at Sichuan University of Science & Engineering. It is specifically designed to collect data to assist in the evaluation of the effectiveness of the program using the CIPPiest model. It is critical that the data collected for this study be as accurate and reliable as possible, so all questions should be answered as honestly and sincerely as possible. All answers and information you provide will be kept confidential and will be anonymous and non-attributable. The results will be used primarily for academic purposes, but will also contribute to the development of the Computer Science and Technology program at Sichuan University of Science and Engineering.

Your participation is entirely voluntary. If you agree to participate, please ensure that all questions are completed and do not hesitate to comment if you have any. Your assistance and cooperation is greatly appreciated.

This Curriculum Evaluation is divided into 9 parts as follows: Part I Personal Information Part 2 Context , Part 3 Input , Part 4 Process, Part 5 Product, Part 6 Impact , Part 7 Effectiveness ,Part 8 Sustainability and Part 9 Knowledge Transfer Assessment.

Insert a mark (□) into your comment box and write useful suggestions for further improvement. The criteria for considering conformity are as follows:

Part 1 Personal Information

Question:

1. Gender:

( ) Male

( ) Female

2. Position held:

( ) Dean

( ) Vice President

( ) Department staff

( ) Professor

( )E earcher

3. Title held:

( ) Teaching Assistant

( ) Lecturer

( ) Associate Professor

( ) Professor

4.Age:

( ) 31-35

( ) 36-40

( ) 41-45

( ) 46-50

( ) 51-55

( ) 56-60

( ) 61-65

Evaluation of the effectiveness of computer science and technology curriculum. Refer to each of the following statements about the course goals and objectives, and use the grid provided, please describe you

The view of each statement. Please tick as appropriate（ ✓)。

Part 2 Context

Research background, learning activities and learning content. （C）

Table 1 Course content and materials

Question	Highest	High	Moderate	Low	Lowest
1 Background effectiveness evaluation					
1.1 Curriculum Objectives					
1 Goals are valuable					
2 Course objectives lead to learning management efficiently					
3 The objectives of the curriculum are in line with social needs.					
4 Clearly defined objectives					
5 Achieve goals at the end of the course					
6 The stated objectives are up to date					
7 The stated goals meet the students' expectations					
8 Goals are relevant to students' needs					
9 The goal is to take into account the national values					
10 Description of course teaching activities					

Question	Highest	High	Moderate	Low	Lowest
11 Accuracy of employment opportunities in the job market					
12 Description of knowledge and skills acquired through the course					
1.2 Curriculum Construction					
Process evaluation					
1.2.1 What is the level of faculty involvement.					
13 Organize professional training courses for teachers					
14 Organize teaching discussion sessions for teachers					
15 Organize teaching and lecture competitions for teachers					
1.2.2 How to use teaching strategies?					
Teachers use the following different approaches to group students in the classroom:					
16 Two student working together					
17 Teamwork					
18 Personal Learning					
19 Whole class group study					
20 The rules and practices established by the faculty are clear					
21 Teachers check students' learning to ensure all students are participating					
22 The teacher has the same attitude towards the students in the class					

Question	Highest	High	Moderate	Low	Lowest
23 Teaching methods help improve students' computer skills					
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students					
25 Students are fairly evaluated during the course					
26 Students can get guidance and advice from teachers when they need it					
1.2.3 What is the level of student involvement in learning activities?					
27 Encourage students to do learning activities					
28 Students' computer skills are well strengthened during the course					
Total evaluation:					
1.3 Subject content					
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:					
First-year class schedule subjects.					
29 Moral Cultivation and Legal Foundations					
30 Outline of Modern Chinese History					
31 Situation Policy					
32 Introduction to Traditional Chinese Culture					

Question	Highest	High	Moderate	Low	Lowest
33 Mental Health Education for College Students					
34 Career Planning and Life Development for College Students					
35 Enrollment and Safety Education					
36 Military training					
37 Military Doctrine					
38 Sports					
39 Advanced Mathematics A					
40 Linear Algebra					
41 University Physics B					
42 English					
43 English listening and speaking					
44 Introduction to Computers					
45 High-level language programs					
46 High-level language program on the machine					
Class Schedule Subjects for Sophomore Year:					
47 Outline of Modern Chinese History					
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics					
49 Sports					
50 English					
51 English listening and speaking					

Question	Highest	High	Moderate	Low	Lowest
52 Probability Theory and Mathematical Statistics					
53 Statistics					
54 Discrete Mathematics					
55 Digital Electronics Technology C					
56 Python Programming					
57 Compilation Principle					
58 Data Structures and Algorithms					
59 Database system principle					
60 Operating System					
61 Object Oriented Programming					
62 Principles of Computer Composition					
63 Java object-oriented programming					
64 IT Awareness Internship					
Class Schedule Subjects for Senior Year:					
65 Situation Policy					
66 Modern information search and utilization					
67 Practical courses in ideological and political theory					
68 Career Guidance					
69 Professional English					
70 Software Engineering					
71 UML Modeling Analysis and Design					
72 Artificial Intelligence					

Question	Highest	High	Moderate	Low	Lowest
73 Compilation Principle					
74 Computer Networks					
75 Microelectronics principle and interface technology					
76 Mobile Application Development					
77 Big Data and Cloud Computing					
78 Algorithm analysis and design					
79 IT Project Internship					
80 Data Analysis and Visualization					
81 Web Application Development					
82 Software Quality Assurance					
83 Integrated Software Course Design					
84 ARM architecture and interface technology					
85 Embedded Operating Systems and Applications					
86 Embedded Systems and Design					
87 Embedded Integrated Course Design					
88 Machine Learning					
89 Pattern Recognition					
90 Deep learning techniques					
91 Artificial Intelligence Integrated Course Design					
92 English Vocabulary and Completion					
93 English Reading					

Question	Highest	High	Moderate	Low	Lowest
94 Calculus of functions of one element and differential equations					
95 Probability statistics					
Senior Year Class Schedule Subjects:					
96 Graduation Internship					
97 Graduation design (thesis)					
98 English to Chinese					
99 English Writing					
100 Differentiation of malfunction and double integration					
101 Analytic geometry and multivariate integration of functions					

Suggestion：

…….

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Part 3 Input

Table 2 Input Effectiveness Evaluation of Computer Science and Technology Course

Question	Highest	High	Moderate	Low	Lowest
2 Input effectiveness evaluation					
2.1 Instructor					
1 Instructors are knowledgeable and experienced in the subjects taught in theory and practice.					

Question	Highest	High	Moderate	Low	Lowest
2 Instructors are knowledgeable and capable of giving students academic counseling and other areas.					
2.2 Students					
3 Students are responsible for work as assigned.					
4 The student's knowledge is at a good level.					
2.3 Factors contributing to the curriculum					
5 Teaching media and equipment are sufficient for teachers and students.					
6 Practical classroom					
2.4 Course Enrichment					
7 Course meets objectives					
8 Effective information system presence					
9 Effective guidance system exists					
10 Adequate teaching and research staff					
11 Teaching content meets the needs					
12 Teaching content meets expectations					
13 The content provided is up-to-date					
14 The content of the course material is coherent					
15 Reasonable allocation of class time					
2.5 Is the educational equipment provided in good condition?					
16 Multimedia classrooms are well-equipped					

Question	Highest	High	Moderate	Low	Lowest
17 The existence of teaching manuals					
18 Utilization of library resources					
19 Well-prepared learning resources					
20 Such materials meet the course objectives					
21 The tasks and exercises in the course materials effectively improve learning computer skills					

Suggestion :

…….

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Part 4 Process

Course Implementation and Instructional Processes (P)

Please respond to each of the following statements based on the frequency of occurrence in the teaching and learning process.

Table 3 Process effectiveness evaluation

Question	Highest	High	Moderate	Low	Lowest
Course Administration					
1 Encourage the development of appropriate academic knowledge and necessary skills.					
2 Regularly supervise and follow up on teaching and learning outcomes.					

Question	Highest	High	Moderate	Low	Lowest
Learning Management					
3 You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.					
4 Be able to link theory into practice consistently and appropriately.					
5 Students are allowed to ask appropriate questions and problems about their knowledge.					

Suggestion :

…….

…….

Part 5 Product

Course Outcome Evaluation (P)

Referring to each of the following statements about evaluation and student performance, how would you rate the computer science and technology course?

Table 4 Evaluation of the effectiveness of the results

Question	Highest	High	Moderate	Low	Lowest
4. Result evaluation					
4.1 Knowledge					
1 Well-versed in theory and practice in the field of study.					
2 Be able to implement the knowledge into practice					

Question	Highest	High	Moderate	Low	Lowest
4.2 Skills					
3 Be able to use information technology					
4 Ability to use computer proficiently					
4.3 Ethics					
5 Be enthusiastic to work.					
6 Good behavior, behave according to the good social culture and norms					
4.4 Is the course carried out normally?					
7 Teachers have sufficient professional knowledge in teaching					
8 Teachers assign learning tasks to students					
9 The teacher corrects the homework					
10 The teacher commented on the exam results					
11 Student's performance is fair					
12 The teacher always lists the evaluation criteria before the examination					
13 Assignments related to course objectives					
14 Student satisfaction with the course					
15 Curriculum activities meet the professional needs of students					
16 Curriculum activities increase students' knowledge					

Question	Highest	High	Moderate	Low	Lowest
17 The course improved students' attitudes					
18 Textbooks in line with the course					
19 Normal promotion rate					
20 Low dropout rate					
21 Student's annual internship plan					
4.5 Does the tool evaluated effectively evaluate students' performance?					
22 Peacetime performance					
23 Midterm examination					
24 Final examination					
4.6 Are the required skills met?					
25 At the end of the course, students have obtained the basic abilities required by the course					
26 Skills acquired are related to students' career development					
27 The acquired skills are related to the needs of domestic computer majors					
4.7 Overall impression of the course					
28 I think this course is very useful					
29 Normal employment rate of graduates					
Total evaluation:					

Suggestion :

……

……

Thank you very much for your cooperation!

Questionnaire survey of graduate students majoring of computer science and technology curriculum in Sichuan University of Science and Engineering

Dear graduate students:

I am contacting you to ask you to collaborate with me on a study for my Master of Education degree at RMUTT. I would be grateful if you could help me by filling out the questionnaire. The questionnaire is part of a case study that focuses on the Computer Science and Technology program at Sichuan University of Science & Engineering. It is specifically designed to collect data to assist in the evaluation of the effectiveness of the program using the CIPPiest model. It is critical that the data collected for this study be as accurate and reliable as possible, so all questions should be answered as honestly and sincerely as possible. All answers and information you provide will be kept confidential and will be anonymous and non-attributable. The results will be used primarily for academic purposes, but will also contribute to the development of the Computer Science and Technology program at Sichuan University of Science and Engineering.

Your participation is entirely voluntary. If you agree to participate, please ensure that all questions are completed and do not hesitate to comment if you have any. Your assistance and cooperation is greatly appreciated.

This Curriculum Evaluation is divided into 9 parts as follows: Part I Personal Information Part 2 Context , Part 3 Input , Part 4 Process, Part 5 Product, Part 6 Impact , Part 7 Effectiveness , Part 8 Sustainability and Part 9 Knowledge Transfer Assessment.

Insert a mark (□) into your comment box and write useful suggestions for further improvement. The criteria for considering conformity are as follows:

Part 1 Personal Information

Question

1. Gender:

( ) Male

( ) Female

2. Position held:

( ) Dean

( ) Vice President

( ) Department staff

( ) Professor

( ) Researcher

3. Title held:

( ) Teaching Assistant

( ) Lecturer

( ) Associate Professor

( ) Professor

4.Age:

( ) 31-35

( ) 36-40

( ) 41-45

( ) 46-50

( ) 51-55

( ) 56-60

( ) 61-65

Evaluation of the effectiveness of computer science and technology curriculum.

Refer to each of the following statements about the course goals and objectives, and use the grid provided, please describe you

The view of each statement. Please tick as appropriate（ ✓)。

Part 2 Context

Research background, learning activities and learning content. （C）

Table 1 Course content and materials

Question	Highest	High	Moderate	Low	Lowest
1 Background effectiveness evaluation					
1.1 Curriculum Objectives					
1 Goals are valuable					
2 Course objectives lead to learning management efficiently					
3 The objectives of the curriculum are in line with social needs.					
4 Clearly defined objectives					
5 Achieve goals at the end of the course					
6 The stated objectives are up to date					
7 The stated goals meet the students' expectations					
8 Goals are relevant to students' needs					
9 The goal is to take into account the national values					
10 Description of course teaching activities					

Question	Highest	High	Moderate	Low	Lowest
11 Accuracy of employment opportunities in the job market					
12 Description of knowledge and skills acquired through the course					
1.2 Curriculum Construction					
Process evaluation					
1.2.1 What is the level of faculty involvement.					
13 Organize professional training courses for teachers					
14 Organize teaching discussion sessions for teachers					
15 Organize teaching and lecture competitions for teachers					
1.2.2 How to use teaching strategies?					
Teachers use the following different approaches to group students in the classroom:					
16 Two student working together					
17 Teamwork					
18 Personal Learning					
19 Whole class group study					
20 The rules and practices established by the faculty are clear					
21 Teachers check students' learning to ensure all students are participating					
22 The teacher has the same attitude towards the students in the class					

Question	Highest	High	Moderate	Low	Lowest
23 Teaching methods help improve students' computer skills					
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students					
25 Students are fairly evaluated during the course					
26 Students can get guidance and advice from teachers when they need it					
1.2.3 What is the level of student involvement in learning activities?					
27 Encourage students to do learning activities					
28 Students' computer skills are well strengthened during the course					
Total evaluation:					
1.3 Subject content					
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:					
First-year class schedule subjects.					
29 Moral Cultivation and Legal Foundations					
30 Outline of Modern Chinese History					
31 Situation Policy					
32 Introduction to Traditional Chinese Culture					

Question	Highest	High	Moderate	Low	Lowest
33 Mental Health Education for College Students					
34 Career Planning and Life Development for College Students					
35 Enrollment and Safety Education					
36 Military training					
37 Military Doctrine					
38 Sports					
39 Advanced Mathematics A					
40 Linear Algebra					
41 University Physics B					
42 English					
43 English listening and speaking					
44 Introduction to Computers					
45 High-level language programs					
46 High-level language program on the machine					
Class Schedule Subjects for Sophomore Year:					
47 Outline of Modern Chinese History					
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics					
49 Sports					
50 English					
51 English listening and speaking					

Question	Highest	High	Moderate	Low	Lowest
52 Probability Theory and Mathematical Statistics					
53 Statistics					
54 Discrete Mathematics					
55 Digital Electronics Technology C					
56 Python Programming					
57 Compilation Principle					
58 Data Structures and Algorithms					
59 Database system principle					
60 Operating System					
61 Object Oriented Programming					
62 Principles of Computer Composition					
63 Java object-oriented programming					
64 IT Awareness Internship					
Class Schedule Subjects for Senior Year:					
65 Situation Policy					
66 Modern information search and utilization					
67 Practical courses in ideological and political theory					
68 Career Guidance					
69 Professional English					
70 Software Engineering					
71 UML Modeling Analysis and Design					
72 Artificial Intelligence					

Question	Highest	High	Moderate	Low	Lowest
73 Compilation Principle					
74 Computer Networks					
75 Microelectronics principle and interface technology					
76 Mobile Application Development					
77 Big Data and Cloud Computing					
78 Algorithm analysis and design					
79 IT Project Internship					
80 Data Analysis and Visualization					
81 Web Application Development					
82 Software Quality Assurance					
83 Integrated Software Course Design					
84 ARM architecture and interface technology					
85 Embedded Operating Systems and Applications					
86 Embedded Systems and Design					
87 Embedded Integrated Course Design					
88 Machine Learning					
89 Pattern Recognition					
90 Deep learning techniques					
91 Artificial Intelligence Integrated Course Design					
92 English Vocabulary and Completion					
93 English Reading					

Question	Highest	High	Moderate	Low	Lowest
94 Calculus of functions of one element and differential equations					
95 Probability statistics					
Senior Year Class Schedule Subjects:					
96 Graduation Internship					
97 Graduation design (thesis)					
98 English to Chinese					
99 English Writing					
100 Differentiation of malfunction and double integration					
101 Analytic geometry and multivariate integration of functions					

Suggestion :

……

……

Part 3 Input

Table 2 Input Effectiveness Evaluation of Computer Science and Technology Course

Question	Highest	High	Moderate	Low	Lowest
2 Input effectiveness evaluation					
2.1 Instructor					
1 Instructors are knowledgeable and experienced in the subjects taught in theory and practice.					
2 Instructors are knowledgeable and capable of giving students academic counseling and other areas.					
2.2 Students					
3 Students are responsible for work as assigned.					
4 The student's knowledge is at a good level.					
2.3 Factors contributing to the curriculum					
5 Teaching media and equipment are sufficient for teachers and students.					
6 Practical classroom					
2.4 Course Enrichment					
7 Course meets objectives					
8 Effective information system presence					
9 Effective guidance system exists					
10 Adequate teaching and research staff					
11 Teaching content meets the needs					

Question	Highest	High	Moderate	Low	Lowest
12 Teaching content meets expectations					
13 The content provided is up-to-date					
14 The content of the course material is coherent					
15 Reasonable allocation of class time					
2.5 Is the educational equipment provided in good condition?					
16 Multimedia classrooms are well-equipped					
17 The existence of teaching manuals					
18 Utilization of library resources					
19 Well-prepared learning resources					
20 Such materials meet the course objectives					
21 The tasks and exercises in the course materials effectively improve learning computer skills					

Suggestion :

……

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Part 4 Process

Course Implementation and Instructional Processes (P)

Please respond to each of the following statements based on the frequency of occurrence in the teaching and learning process.

Table 3 Process effectiveness evaluation

Question	Highest	High	Moderate	Low	Lowest
Course Administration					
1 Encourage the development of appropriate academic knowledge and necessary skills.					
2 Regularly supervise and follow up on teaching and learning outcomes.					
Learning Management					
3 You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.					
4 Be able to link theory into practice consistently and appropriately.					
5 Students are allowed to ask appropriate questions and problems about their knowledge.					

Suggestion :

……

……

Part 5 Product

Course Outcome Evaluation (P)

Referring to each of the following statements about evaluation and student performance, how would you rate the computer science and technology course?

Table 4 Evaluation of the effectiveness of the results

Question	Highest	High	Moderate	Low	Lowest
4. Result evaluation					
4.1 Knowledge					
1 Well-versed in theory and practice in the field of study.					
2 Be able to implement the knowledge into practice					
4.2 Skills					
3 Be able to use information technology					
4Ability to use computer proficiently					
4.3 Ethics					
5 Be enthusiastic to work.					
6 Good behavior, behave according to the good social culture and norms					
4.4 Is the course carried out normally?					
7 Teachers have sufficient professional knowledge in teaching					
8 Teachers assign learning tasks to students					
9 The teacher corrects the homework					

Question	Highest	High	Moderate	Low	Lowest
10 The teacher commented on the exam results					
11 Student's performance is fair					
12 The teacher always lists the evaluation criteria before the examination					
13 Assignments related to course objectives					
14 Student satisfaction with the course					
15 Curriculum activities meet the professional needs of students					
16 Curriculum activities increase students' knowledge					
17 The course improved students' attitudes					
18 Textbooks in line with the course					
19 Normal promotion rate					
20 Low dropout rate					
21 Student's annual internship plan					
4.5 Does the tool evaluated effectively evaluate students' performance?					
22 Peacetime performance					
23 Midterm examination					
24 Final examination					
4.6 Are the required skills met?					

Question	Highest	High	Moderate	Low	Lowest
25 At the end of the course, students have obtained the basic abilities required by the course					
26 Skills acquired are related to students' career development					
27 The acquired skills are related to the needs of domestic computer majors					
4.7 Overall impression of the course					
28 I think this course is very useful					
29 Normal employment rate of graduates					
Total evaluation:					

Suggestion :

……

……

Part 6 Impact Assessment (I)

Please respond to each of the following statements according to the expected goal.

Table 5 Expected Objectives

Question	Highest	High	Moderate	Low	Lowest
Student performance:					
1 Achieved learning objectives					
2 Increased interest in learning					
3 Can use the learned knowledge to serve the society					

Question	Highest	High	Moderate	Low	Lowest
Teachers' performance:					
4 Achieved the teaching objectives					
5 Have a deeper understanding of the course					
6 More perfect teaching methods					
7 Improved teaching ability					
Total evaluation:					

Suggestion :

……

……

Part 7 Effectiveness evaluation (E)

Please respond to each of the following statements based on the quality of the course.

Table 6 Curriculum Quality

Question	Highest	High	Moderate	Low	Lowest
Students demonstrate the quality of the curriculum:					
1 Achieve the scheduled course objectives					
2 Students' academic performance and skills have improved					
3 Success rate of the curriculum					
4 The course is helpful for students' employment					
5 The curriculum is helpful for students' growth					

Question	Highest	High	Moderate	Low	Lowest
6 The curriculum has attracted social attention					
7 Curriculum adapts to the development of social productive forces					
Total evaluation:					

Suggestion：

……

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Part 8 Sustainability assessment (S)

Please evaluate each of the following statements after the course.

Table 7 Sustainability

Question	**Highest**	**High**	**Moderate**	**Low**	**Lowest**
The influence of curriculum on social life:					
1 Social demand for such talents					
2 Student's contribution to society					
3 Curriculum adapts to social development					
4 Courses help students grow					
5 The curriculum can attract more students for the school					
6 Cultivate more high-quality college talents					
7 The contribution of curriculum to social productivity					
Total evaluation:					

Suggestion :

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Part 9 Knowledge Transfer Assessment (T)

Please respond to each of the following statements based on your knowledge evaluation.

Table 8 Knowledge Transfer

Question	Highest	High	Moderate	Low	Lowest
The knowledge taught in the curriculum has been expanded:					
1 Would you like to recommend this course to your classmates or friends?					
2 If you were a teacher, would you like to take this course?					
3 You are an administrator of a school. Are you willing to add this course to the school?					
Total evaluation:					

Suggestion :

……

……

Thank you very much for your cooperation!

Questionnaire survey of employers majoring of computer science and technology curriculum in Sichuan University of Science and Engineering

Dear employer:

I am contacting you to ask you to collaborate with me on a study for my Master of Education degree at RMUTT. I would be grateful if you could help me by filling out the questionnaire. The questionnaire is part of a case study that focuses on the Computer Science and Technology program at Sichuan University of Science & Engineering. It is specifically designed to collect data to assist in the evaluation of the effectiveness of the program using the CIPPiest model. It is critical that the data collected for this study be as accurate and reliable as possible, so all questions should be answered as honestly and sincerely as possible. All answers and information you provide will be kept confidential and will be anonymous and non-attributable. The results will be used primarily for academic purposes, but will also contribute to the development of the Computer Science and Technology program at Sichuan University of Science and Engineering.

Your participation is entirely voluntary. If you agree to participate, please ensure that all questions are completed and do not hesitate to comment if you have any. Your assistance and cooperation is greatly appreciated.

This Curriculum Evaluation is divided into 9 parts as follows: Part I Personal Information Part 2 Context , Part 3 Input , Part 4 Process, Part 5 Product, Part 6 Impact , Part 7 Effectiveness ,Part 8 Sustainability and Part 9 Knowledge Transfer Assessment. Insert a mark (□) into your comment box and write useful suggestions for further improvement. The criteria for considering conformity are as follows:

Question

1. Gender:

( ) Male

( ) Female

2. Position held:

( ) Dean

( ) Vice President

( ) Department staff

( ) Professor

( ) Researcher

3. Title held:

( ) Teaching Assistant

( ) Lecturer

( ) Associate Professor

( ) Professor

4.Age:

( ) 31-35

( ) 36-40

( ) 41-45

( ) 46-50

( ) 51-55

( ) 56-60

( ) 61-65

Evaluation of the effectiveness of computer science and technology curriculum. Refer to each of the following statements about the course goals and objectives, and use the grid provided, please describe you.

The view of each statement. Please tick as appropriate（ ✓)。

Part 2　Context

Research background, learning activities and learning content.（C）

Table 1 Course content and materials

Question	Highest	High	Moderate	Low	Lowest
1 Background effectiveness evaluation					
1.1 Curriculum Objectives					
1 Goals are valuable					
2 Course objectives lead to learning management efficiently					
3 The objectives of the curriculum are in line with social needs.					
4 Clearly defined objectives					
5 Achieve goals at the end of the course					
6 The stated objectives are up to date					
7 The stated goals meet the students' expectations					
8 Goals are relevant to students' needs					
9 The goal is to take into account the national values					
10 Description of course teaching activities					
11 Accuracy of employment opportunities in the job market					

Question	Highest	High	Moderate	Low	Lowest
12 Description of knowledge and skills acquired through the course					
1.2 Curriculum Construction					
Process evaluation					
1.2.1 What is the level of faculty involvement.					
13 Organize professional training courses for teachers					
14 Organize teaching discussion sessions for teachers					
15 Organize teaching and lecture competitions for teachers					
1.2.2 How to use teaching strategies?					
Teachers use the following different approaches to group students in the classroom:					
16 Two student working together					
17 Teamwork					
18 Personal Learning					
19 Whole class group study					
20 The rules and practices established by the faculty are clear					
21Teachers check students' learning to ensure all students are participating					
22vThe teacher has the same attitude towards the students in the class					
23 Teaching methods help improve students' computer skills					

Question	Highest	High	Moderate	Low	Lowest
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students					
25 Students are fairly evaluated during the course					
26 Students can get guidance and advice from teachers when they need it					
1.2.3 What is the level of student involvement in learning activities?					
27 Encourage students to do learning activities					
28 Students' computer skills are well strengthened during the course					
Total evaluation:					
1.3 Subject content					
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:					
First-year class schedule subjects.					
29 Moral Cultivation and Legal Foundations					
30 Outline of Modern Chinese History					
31 Situation Policy					
32 Introduction to Traditional Chinese Culture					
33 Mental Health Education for College Students					

Question	Highest	High	Moderate	Low	Lowest
34 Career Planning and Life Development for College Students					
35 Enrollment and Safety Education					
36 Military training					
37 Military Doctrine					
38 Sports					
39 Advanced Mathematics A					
40 Linear Algebra					
41 University Physics B					
42 English					
43 English listening and speaking					
44 Introduction to Computers					
45 High-level language programs					
46 High-level language program on the machine					
Class Schedule Subjects for Sophomore Year:					
47 Outline of Modern Chinese History					
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics					
49 Sports					
50 English					
51 English listening and speaking					
52 Probability Theory and Mathematical Statistics					
53 Statistics					

Question	Highest	High	Moderate	Low	Lowest
54 Discrete Mathematics					
55 Digital Electronics Technology C					
56 Python Programming					
57 Compilation Principle					
58 Data Structures and Algorithms					
59 Database system principle					
60 Operating System					
61 Object Oriented Programming					
62 Principles of Computer Composition					
63 Java object-oriented programming					
64 IT Awareness Internship					
Class Schedule Subjects for Senior Year:					
65 Situation Policy					
66 Modern information search and utilization					
67 Practical courses in ideological and political theory					
68 Career Guidance					
69 Professional English					
70 Software Engineering					
71 UML Modeling Analysis and Design					
72 Artificial Intelligence					
73 Compilation Principle					
74 Computer Networks					

Question	Highest	High	Moderate	Low	Lowest
75 Microelectronics principle and interface technology					
76 Mobile Application Development					
77 Big Data and Cloud Computing					
78 Algorithm analysis and design					
79 IT Project Internship					
80 Data Analysis and Visualization					
81 Web Application Development					
82 Software Quality Assurance					
83 Integrated Software Course Design					
84 ARM architecture and interface technology					
85 Embedded Operating Systems and Applications					
86 Embedded Systems and Design					
87 Embedded Integrated Course Design					
88 Machine Learning					
89 Pattern Recognition					
90 Deep learning techniques					
91 Artificial Intelligence Integrated Course Design					
92 English Vocabulary and Completion					
93 English Reading					
94 Calculus of functions of one element and differential equations					
95 Probability statistics					

Question	Highest	High	Moderate	Low	Lowest
Senior Year Class Schedule Subjects:					
96 Graduation Internship					
97 Graduation design (thesis)					
98 English to Chinese					
99 English Writing					
100 Differentiation of malfunction and double integration					
101 Analytic geometry and multivariate integration of functions					

Suggestion :

……

……

Part 5 Product

Course Outcome Evaluation (P)

Referring to each of the following statements about evaluation and student performance, how would you rate the computer science and technology course?

Table 4 Evaluation of the effectiveness of the results

Question	Highest	High	Moderate	Low	Lowest
4. Result evaluation					
4.1 Knowledge					
1 Well-versed in theory and practice in the field of study.					
2 Be able to implement the knowledge into practice					

Question	Highest	High	Moderate	Low	Lowest
4.2 Skills					
3 Be able to use information technology					
4 Ability to use computer proficiently					
4.3 Ethics					
5 Be enthusiastic to work.					
6 Good behavior, behave according to the good social culture and norms					
4.4 Is the course carried out normally?					
7 Teachers have sufficient professional knowledge in teaching					
8 Teachers assign learning tasks to students					
9 The teacher corrects the homework					
10 The teacher commented on the exam results					
11 Student's performance is fair					
12 The teacher always lists the evaluation criteria before the examination					
13 Assignments related to course objectives					
14 Student satisfaction with the course					
15 Curriculum activities meet the professional needs of students					
16 Curriculum activities increase students' knowledge					

Question	Highest	High	Moderate	Low	Lowest
17 The course improved students' attitudes					
18 Textbooks in line with the course					
19 Normal promotion rate					
20 Low dropout rate					
21 Student's annual internship plan					
4.5 Does the tool evaluated effectively evaluate students' performance?					
22 Peacetime performance					
23 Midterm examination					
24 Final examination					
4.6 Are the required skills met?					
25 At the end of the course, students have obtained the basic abilities required by the course					
26 Skills acquired are related to students' career development					
27 The acquired skills are related to the needs of domestic computer majors					
4.7 Overall impression of the course					
28 I think this course is very useful					
29 Normal employment rate of graduates					
Total evaluation:					

Suggestion :

……

……

Part 6 Impact Assessment (I)

Please respond to each of the following statements according to the expected goal.

Table 5 Expected Objectives

Question	Highest	High	Moderate	Low	Lowest
Student performance:					
1 Achieved learning objectives					
2 Increased interest in learning					
3 Can use the learned knowledge to serve the society					
4 Teachers' performance:					
5 Achieved the teaching objectives					
6 Have a deeper understanding of the course					
7 More perfect teaching methods					
8 Improved teaching ability					
Total evaluation:					

Suggestion：

……

……

Part 7 Effectiveness evaluation (E)

Please respond to each of the following statements based on the quality of the course.

Table 6 Curriculum Quality

Question	Highest	High	Moderate	Low	Lowest
Students demonstrate the quality of the curriculum:					
1 Achieve the scheduled course objectives					
2 Students' academic performance and skills have improved					
3 Success rate of the curriculum					
4 The course is helpful for students' employment					
5 The curriculum is helpful for students' growth					
6 The curriculum has attracted social attention					
7 Curriculum adapts to the development of social productive forces					
Total evaluation:					

Suggestion :

……

……

Thank you very much for your cooperation!

APPENDIX C

List of Validity (IOC : Item Objective Congruence)

Validity (IOC : Item Objective Congruence)

Questionnaire for course instructors

Part 1 Personal Information

Question	IOC	Result
1. Gender: ( ) Male ( ) Female	1	Yes
2. Position held: ( ) Dean ( ) Vice President ( ) Department staff ( ) Professor ( ) Researcher	1	Yes
3. Title held: ( ) Teaching Assistant ( ) Lecturer ( ) Associate Professor ( ) Professor	1	Yes
4.Age: ( ) 31-35 ( ) 36-40 ( ) 41-45 ( ) 46-50 ( ) 51-55 ( ) 56-60 ( ) 61-65	1	Yes

Part 2 Context (C) : Research background, learning activities and learning content.

Question	IOC	Result
1 Background effectiveness evaluation		
1.1 Course Objectives		
1 Goals are valuable	1	Yes
2 Course objectives lead to learning management efficiently	1	Yes
3 The objectives of the curriculum are in line with social needs.	1	Yes
4 Clearly defined objectives	1	Yes
5 Achieve goals at the end of the course	1	Yes
6 The stated objectives are up to date	0.66	Yes
7 The stated goals meet the students' expectations	1	Yes
8 Goals are relevant to students' needs	1	Yes
9 The goal is to take into account the national values	1	Yes
10 Description of course teaching activities	1	Yes
11 Accuracy of employment opportunities in the job market	1	Yes
12 Description of knowledge and skills acquired through the course	1	Yes
1.2 Curriculum Construction		
Process evaluation		
1.2.1 What is the level of faculty involvement.		
13 Organize professional training courses for teachers	0.66	Yes
14 Organize teaching discussion sessions for teachers	1	Yes
15 Organize teaching and lecture competitions for teachers	1	Yes
1.2.2 How to use teaching strategies?		
Teachers use the following different approaches to group students in the classroom:		
16 Two student working together	1	Yes

Question	IOC	Result
17 Teamwork	1	Yes
18 Personal Learning	1	Yes
19 Whole class group study	1	Yes
20 The rules and practices established by the faculty are clear	1	Yes
21 Teachers check students' learning to ensure all students are participating	1	Yes
22 The teacher has the same attitude towards the students in the class	1	Yes
23 Teaching methods help improve students' computer skills	1	Yes
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	1	Yes
25 Students are fairly evaluated during the course	1	Yes
26 Students can get guidance and advice from teachers when they need it	1	Yes
1.2.3 What is the level of student involvement in learning activities?		
27 Encourage students to do learning activities	0.66	Yes
28 Students' computer skills are well strengthened during the course	1	Yes
29 Students can get guidance and advice from		
Total evaluation:	1	Yes
1.3 Subject content		
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:		
First-year class schedule subjects.		
30 Moral Cultivation and Legal Foundations	1	Yes
31 Outline of Modern Chinese History	1	Yes
32 Situation Policy	1	Yes

Question	IOC	Result
33 Introduction to Traditional Chinese Culture	1	Yes
34 Mental Health Education for College Students	1	Yes
35 Career Planning and Life Development for College Students	1	Yes
36 Enrollment and Safety Education	1	Yes
37 Military training	1	Yes
38 Military Doctrine	1	Yes
39 Sports	1	Yes
40 Advanced Mathematics A	1	Yes
41 Linear Algebra	1	Yes
42 University Physics B	1	Yes
43 English	1	Yes
44 English listening and speaking	1	Yes
45 Introduction to Computers	1	Yes
46 High-level language programs	1	Yes
47 High-level language program on the machine	1	Yes
Class Schedule Subjects for Sophomore Year:		
48 Outline of Modern Chinese History	0.66	Yes
49 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	0.66	Yes
50 Sports	1	Yes
51 English	1	Yes
52 English listening and speaking	1	Yes
53 Probability Theory and Mathematical Statistics	1	Yes
54 Discrete Mathematics	1	Yes
55 Digital Electronics Technology C	1	Yes

Question	IOC	Result
56 Python Programming	1	Yes
57 Compilation Principle	1	Yes
58 Data Structures and Algorithms	1	Yes
59 Database system principle	1	Yes
60 Operating System	1	Yes
61 Object Oriented Programming	1	Yes
62 Principles of Computer Composition	1	Yes
63 Java object-oriented programming	1	Yes
64 IT Awareness Internship	1	Yes
Class Schedule Subjects for Senior Year:		
65 Situation Policy	1	Yes
66 Modern information search and utilization	1	Yes
67 Practical courses in ideological and political theory	1	Yes
68 Career Guidance	1	Yes
69 Professional English	1	Yes
70 Software Engineering	1	Yes
71 UML Modeling Analysis and Design	1	Yes
72 Artificial Intelligence	1	Yes
73 Compilation Principle	1	Yes
74 Computer Networks	1	Yes
75 Microelectronics principle and interface technology	1	Yes
76 Mobile Application Development	1	Yes
77 Big Data and Cloud Computing	1	Yes
78 Algorithm analysis and design	1	Yes
79 IT Project Internship	1	Yes

Question	IOC	Result
80 Data Analysis and Visualization	1	Yes
81 Web Application Development	1	Yes
82 Software Quality Assurance	1	Yes
83 Integrated Software Course Design	1	Yes
84 ARM architecture and interface technology	1	Yes
85 Embedded Operating Systems and Applications	1	Yes
86 Embedded Systems and Design	1	Yes
87 Embedded Integrated Course Design	1	Yes
88 Machine Learning	1	Yes
89 Pattern Recognition	1	Yes
90 Deep learning techniques	1	Yes
91 Artificial Intelligence Integrated Course Design	1	Yes
92 English Vocabulary and Completion	1	Yes
93 English Reading	1	Yes
94 Calculus of functions of one element and differential equations	1	Yes
95 Probability statistics	1	Yes
Senior Year Class Schedule Subjects:		
96 Graduation Internship	1	Yes
97 Graduation design (thesis)	1	Yes
98 English to Chinese	1	Yes
99 English Writing	1	Yes
100 Differentiation of malfunction and double integration	1	Yes
101 Analytic geometry and multivariate integration of functions	1	Yes

Part 3 Input (I) : Instructors /teachers students and materials

Question	IOC	Result
2 Input effectiveness evaluation		
2.1 Instructor		
1 Instructors are knowledgeable and experienced in the subjects taught in theory and practice.	1	Yes
2 Instructors are knowledgeable and capable of giving students academic counseling and other areas.	1	Yes
2.2 Students		
3 Students are responsible for work as assigned.	1	Yes
4 The student's knowledge is at a good level.	1	Yes
2.3 Factors contributing to the curriculum		
5 Teaching media and equipment are sufficient for teachers and students.	1	Yes
6 Practical classroom	1	Yes
2.4 Course Enrichment		
7 Course meets objectives	1	Yes
8 Effective information system presence	1	Yes
9 Effective guidance system exists	1	Yes
10 Adequate teaching and research staff	1	Yes
11 Teaching content meets the needs	1	Yes
12 Teaching content meets expectations	1	Yes
13 The content provided is up-to-date	1	Yes
14 The content of the course material is coherent	1	Yes
15 Reasonable allocation of class time	1	Yes
2.5 Is the educational equipment provided in good condition?		

Question	IOC	Result
16 Multimedia classrooms are well-equipped	1	Yes
17 The existence of teaching manuals	1	Yes
18 Utilization of library resources	1	Yes
19 Well-prepared learning resources	1	Yes
20 Such materials meet the course objectives	1	Yes
21 The tasks and exercises in the course materials effectively improve learning computer skills	1	Yes

Part 4 Process (P) : Course Implementation and Instructional Processes

Question	IOC	Result
Course Administration		
1 Encourage the development of appropriate academic knowledge and necessary skills.	1	Yes
2 Regularly supervise and follow up on teaching and learning outcomes.	1	Yes
Learning Management		
3 You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.	1	Yes
4 Be able to link theory into practice consistently and appropriately.	1	Yes
5 Students are allowed to ask appropriate questions and problems about their knowledge.	0.66	Yes

Part 5 Product (P) : Knowledge Performance /skill and Attribute

Question	IOC	Result
4. Result evaluation		
4.1 Knowledge		
1 Well-versed in theory and practice in the field of study.	1	Yes
2 Be able to implement the knowledge into practice	1	Yes
4.2 Skills		
3 Be able to use information technology	1	Yes
4 Ability to use computer proficiently	1	Yes
4.3 Ethics		
5 Be enthusiastic to work.	1	Yes
6 Good behavior, behave according to the good social 7 culture and norms	1	Yes
4.4 Is the course carried out normally?		
7 Teachers have sufficient professional knowledge in teaching	1	Yes
8 Teachers assign learning tasks to students	1	Yes
9 The teacher corrects the homework	1	Yes
10 The teacher commented on the exam results	1	Yes
11 Student's performance is fair	1	Yes
12 The teacher always lists the evaluation criteria before the examination	0.66	Yes
13 Assignments related to course objectives	1	Yes
14 Student satisfaction with the course	1	Yes
15 Curriculum activities meet the professional needs of students	1	Yes
16 Curriculum activities increase students' knowledge	1	Yes

Question	IOC	Result
17 The course improved students' attitudes	1	Yes
18 Textbooks in line with the course	1	Yes
19 Normal promotion rate	1	Yes
20 Low dropout rate	1	Yes
21 Student's annual internship plan	1	Yes
4.5 Does the tool evaluated effectively evaluate students' performance?		
22 Peacetime performance	1	Yes
23 Midterm examination	1	Yes
24 Final examination	1	Yes
4.6 Are the required skills met?		
25 At the end of the course, students have obtained the basic abilities required by the course	1	Yes
26 Skills acquired are related to students' career development	1	Yes
27 The acquired skills are related to the needs of domestic computer majors	1	Yes
4.7 Overall impression of the course		
28 I think this course is very useful	1	Yes
29 Normal employment rate of graduates	1	Yes
Total evaluation:	1	Yes

Part 6 Impact Assessment (I)

Question	IOC	Result
Student performance:		
1 Achieved learning objectives	1	Yes
2 Increased interest in learning	1	Yes
3 Can use the learned knowledge to serve the society	1	Yes
Teachers' performance:		
4 Achieved the teaching objectives	1	Yes
5 Have a deeper understanding of the course	1	Yes
6 More perfect teaching methods	1	Yes
7 Improved teaching ability	1	Yes
Total evaluation:	1	Yes

Part 7 Effectiveness evaluation (E)

Question	IOC	Result
Students demonstrate the quality of the curriculum:		
1 Achieve the scheduled course objectives	1	Yes
2 Students' academic performance and skills have improved	1	Yes
3 Success rate of the curriculum	1	Yes
4 The course is helpful for students' employment	1	Yes
5 The curriculum is helpful for students' growth	1	Yes
6 The curriculum has attracted social attention	1	Yes
7 Curriculum adapts to the development of social productive forces	0.66	Yes
Total evaluation:	1	Yes

Part 8 Sustainability assessment (S)

Question	IOC	Result
The influence of curriculum on social life:		
1 Social demand for such talents	1	Yes
2 Student's contribution to society	1	Yes
3 Curriculum adapts to social development	1	Yes
4 Courses help students grow	1	Yes
5 The curriculum can attract more students for the school	1	Yes
6 Cultivate more high-quality college talents	1	Yes
7 The contribution of curriculum to social productivity	1	Yes
Total evaluation:	1	Yes

Part 9 Knowledge Transfer Assessment (T)

Question	IOC	Result
The knowledge taught in the curriculum has been expanded:	1	Yes
1 Would you like to recommend this course to your classmates or friends?	1	Yes
2 If you were a teacher, would you like to take this course?	1	Yes
3 You are an administrator of a school. Are you willing to add this course to the school?	1	Yes
Total evaluation:	1	Yes

Validity (IOC : Item Objective Congruence)

Questionnaire for instructors

Part 1 Personal Information

Question	IOC	Result
1. Gender: ( ) Male ( ) Female	1	Yes
2. Position held: ( ) Dean ( ) Vice President ( ) Department staff ( ) Professor ( ) Researcher	1	Yes
3. Title held: ( ) Teaching Assistant ( ) Lecturer ( ) Associate Professor ( ) Professor	1	Yes
Age: ( ) 31-35 ( ) 36-40 ( ) 41-45 ( ) 46-50 ( ) 51-55 ( ) 56-60 ( ) 61-65	1	Yes

Part 2 Context (C) : Research background, learning activities and learning content.

Question	IOC	Result
1 Background effectiveness evaluation		
1.1 Course Objectives		
1 Goals are valuable	1	Yes
2 Course objectives lead to learning management efficiently	1	Yes
3 The objectives of the curriculum are in line with social needs.	1	Yes
4 Clearly defined objectives	1	Yes
5 Achieve goals at the end of the course	1	Yes
6 The stated objectives are up to date	1	Yes
7 The stated goals meet the students' expectations	1	Yes
8 Goals are relevant to students' needs	1	Yes
9 The goal is to take into account the national values	1	Yes
10 Description of course teaching activities	1	Yes
11 Accuracy of employment opportunities in the job market	1	Yes
12 Description of knowledge and skills acquired through the course	1	Yes
1.2 Course Construction		
Process evaluation		
1.2.1 What is the level of faculty involvement.		
13 Organize professional training courses for teachers	1	Yes
14 Organize teaching discussion sessions for teachers	1	Yes
15 Organize teaching and lecture competitions for teachers	1	Yes
1.2.2 How to use teaching strategies?		
Teachers use the following different approaches to group students in the classroom:		
16 Two student working together	0.66	Yes

Question	IOC	Result
17 Teamwork	1	Yes
18 Personal Learning	1	Yes
19 Whole class group study	1	Yes
20 The rules and practices established by the faculty are clear	1	Yes
21 Teachers check students' learning to ensure all students are participating	0.66	Yes
22 The teacher has the same attitude towards the students in the class	1	Yes
23Teaching methods help improve students' computer skills	1	Yes
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	1	Yes
25 Students are fairly evaluated during the course	1	Yes
26 Students can get guidance and advice from teachers when they need it	1	Yes
1.2.3 What is the level of student involvement in learning activities?		
27 Encourage students to do learning activities	1	Yes
28 Students' computer skills are well strengthened during the course	1	Yes
Total evaluation:	1	Yes
1.3 Subject content		
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:		
First-year class schedule subjects.		
29 Moral Cultivation and Legal Foundations	1	Yes
30 Outline of Modern Chinese History	1	Yes
31 Situation Policy	1	Yes
32 Introduction to Traditional Chinese Culture	1	Yes

Question	IOC	Result
33 Mental Health Education for College Students	1	Yes
34 Career Planning and Life Development for College Students	1	Yes
35 Enrollment and Safety Education	1	Yes
36 Military training	1	Yes
37 Military Doctrine	1	Yes
38 Sports	1	Yes
39 Advanced Mathematics A	1	Yes
40 Linear Algebra	1	Yes
41 University Physics B	1	Yes
42 English	0.66	Yes
43 English listening and speaking	1	Yes
44 conduction to Computers	1	Yes
45 High-level language programs	1	Yes
46 High-level language program on the machine	1	Yes
Class Schedule Subjects for Sophomore Year:		
47 Outline of Modern Chinese History	1	Yes
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	1	Yes
49 Sports	1	Yes
50 English	1	Yes
51 English listening and speaking	1	Yes
52 Probability Theory and Mathematical Statistics	1	Yes
53 Statistics		
54 Discrete Mathematics	1	Yes
55 Digital Electronics Technology C	1	Yes

Question	IOC	Result
56 Python Programming	1	Yes
57 Compilation Principle	1	Yes
58 Data Structures and Algorithms	1	Yes
59 Database system principle	1	Yes
60 Operating System	1	Yes
61 Object Oriented Programming	1	Yes
62 Principles of Computer Composition	1	Yes
63 Java object-oriented programming	1	Yes
644 IT Awareness Internship	1	Yes
Class Schedule Subjects for Senior Year:		
65 Situation Policy	1	Yes
66 Modern information search and utilization	1	Yes
67 Practical courses in ideological and political theory	1	Yes
68 Career Guidance	1	Yes
69 Professional English	1	Yes
70 Software Engineering	1	Yes
71 UML Modeling Analysis and Design	1	Yes
72 Artificial Intelligence	1	Yes
73 Compilation Principle	1	Yes
74 Computer Networks	1	Yes
75 Microelectronics principle and interface technology	1	Yes
76 Mobile Application Development	1	Yes
77 Big Data and Cloud Computing	1	Yes
78 Algorithm analysis and design	1	Yes
79 IT Project Internship	1	Yes

Question	IOC	Result
80 Data Analysis and Visualization	1	Yes
81 Web Application Development	1	Yes
82 Software Quality Assurance	1	Yes
83 Integrated Software Course Design	1	Yes
84 ARM architecture and interface technology	1	Yes
85 Embedded Operating Systems and Applications	1	Yes
86 Embedded Systems and Design	1	Yes
87 Embedded Integrated Course Design	1	Yes
88 Machine Learning	1	Yes
89 Pattern Recognition	1	Yes
90 Deep learning techniques	1	Yes
91 Artificial Intelligence Integrated Course Design	1	Yes
92 English Vocabulary and Completion	1	Yes
93 English Reading	1	Yes
94 Calculus of functions of one element and differential equations	1	Yes
95 Probability Statistics	1	Yes
Senior Year Class Schedule Subjects:		
96 Graduation Internship	1	Yes
97 Graduation design (thesis)	1	Yes
98 English to Chinese	1	Yes
99 English Writing	1	Yes
100 Differentiation of malfunction and double integration	1	Yes
101 Analytic geometry and multivariate integration of functions	1	Yes

Part 3 Input (I) : Instructors /teachers students and materials

Question	IOC	Result
2 Input effectiveness evaluation		
2.1 Instructor		
1 Instructors are knowledgeable and experienced in the subjects taught in theory and practice.	1	Yes
2 Instructors are knowledgeable and capable of giving students academic counseling and other areas.	1	Yes
2.2 Students		
3 Students are responsible for work as assigned.	1	Yes
4 The student's knowledge is at a good level.	1	Yes
2.3 Factors contributing to the curriculum		
5 Teaching media and equipment are sufficient for teachers and students.	1	Yes
6 Practical classroom	1	Yes
2.4 Course Enrichment		
7 Course meets objectives	1	Yes
8 Effective information system presence	1	Yes
9 Effective guidance system exists	1	Yes
10 Adequate teaching and research staff	1	Yes
11 Teaching content meets the needs	1	Yes
12 Teaching content meets expectations	1	Yes
13 The content provided is up-to-date	1	Yes
14 The content of the course material is coherent	1	Yes
15 Reasonable allocation of class time	1	Yes
2.5 Is the educational equipment provided in good condition?		

Question	IOC	Result
16 Multimedia classrooms are well-equipped	1	Yes
17 The existence of teaching manuals	1	Yes
18 Utilization of library resources	1	Yes
19 Well-prepared learning resources	1	Yes
20 Such materials meet the course objectives	1	Yes
21 The tasks and exercises in the course materials effectively improve learning computer skills	1	Yes

Part 4 Process (P) : Course Implementation and Instructional Processes

Question	IOC	Result
Course Administration		
1 Encourage the development of appropriate academic knowledge and necessary skills.	1	Yes
2 Regularly supervise and follow up on teaching and learning outcomes.	1	Yes
Learning Management		
3 You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.	1	Yes
4 Be able to link theory into practice consistently and appropriately.	1	Yes
5 Students are allowed to ask appropriate questions and problems about their knowledge.	1	Yes

Part 5 Product (P) : Knowledge Performance /skill and Attribute

Question	IOC	Result
4. Result evaluation		
4.1 Knowledge		
1 Well-versed in theory and practice in the field of study.	0.66	Yes
2 Be able to implement the knowledge into practice	0.66	Yes
4.2 Skills		
3 Be able to use information technology	1	Yes
4 Ability to use computer proficiently	1	Yes
4.3 Ethics		
5 Be enthusiastic to work.	1	Yes
6 Good behavior, behave according to the good social culture and norms	1	Yes
4.4 Is the course carried out normally?		
7 Teachers have sufficient professional knowledge in teaching	1	Yes
8 Teachers assign learning tasks to students	1	Yes
9 The teacher corrects the homework	1	Yes
10 The teacher commented on the exam results	1	Yes
11 Student's performance is fair	1	Yes
12 The teacher always lists the evaluation criteria before the examination	1	Yes
13 Assignments related to course objectives	1	Yes
14 Student satisfaction with the course	1	Yes
15 Curriculum activities meet the professional needs of students	1	Yes
16 Curriculum activities increase students' knowledge	1	Yes
17 The course improved students' attitudes	1	Yes

Question	IOC	Result
18 Textbooks in line with the course	1	Yes
19 Normal promotion rate	1	Yes
20 Low dropout rate	1	Yes
21 Student's annual internship plan	1	Yes
4.5 Does the tool evaluated effectively evaluate students' performance?		
22 Peacetime performance	1	Yes
23 Midterm examination	1	Yes
24 Final examination	1	Yes
4.6 Are the required skills met?		
25 At the end of the course, students have obtained the basic abilities required by the course	1	Yes
26 Skills acquired are related to students' career development	1	Yes
27 The acquired skills are related to the needs of domestic computer majors	1	Yes
4.7 Overall impression of the course		
28 I think this course is very useful	1	Yes
29 Normal employment rate of graduates	1	Yes
Total evaluation:	1	Yes

Part 6 Impact Assessment (I)

Question	IOC	Result
Student performance:		
1 Achieved learning objectives	1	Yes
2 Increased interest in learning	1	Yes
3 Can use the learned knowledge to serve the society	1	Yes
Teachers' performance:		
4 Achieved the teaching objectives	1	Yes
5 Have a deeper understanding of the course	1	Yes
6 More perfect teaching methods	1	Yes
7 Improved teaching ability	1	Yes
Total evaluation:	1	Yes

Part 7 Effectiveness evaluation (E)

Question	IOC	Result
Students demonstrate the quality of the curriculum:		
1 Achieve the scheduled course objectives	1	Yes
2 Students' academic performance and skills have improved	1	Yes
3 Success rate of the curriculum	1	Yes
4 The course is helpful for students' employment	1	Yes
5 The curriculum is helpful for students' growth	1	Yes
6 The curriculum has attracted social attention	1	Yes
7 Curriculum adapts to the development of social productive forces	1	Yes
Total evaluation:	1	Yes

Part 8 Sustainability assessment (S)

Question	IOC	Result
The influence of curriculum on social life:		
1 Social demand for such talents	1	Yes
2 Student's contribution to society	1	Yes
3 Curriculum adapts to social development	1	Yes
4 Courses help students grow	1	Yes
5 The curriculum can attract more students for the school	1	Yes
6 Cultivate more high-quality college talents	1	Yes
7 The contribution of curriculum to social productivity	1	Yes
Total evaluation:	1	Yes

Part 9 Knowledge Transfer Assessment (T)

Question	IOC	Result
The knowledge taught in the curriculum has been expanded:	1	Yes
1 Would you like to recommend this course to your classmates or friends?	1	Yes
2 If you were a teacher, would you like to take this course?	1	Yes
3 You are an administrator of a school. Are you willing to add this course to the school?	1	Yes
Total evaluation:	1	Yes

Validity (IOC : Item Objective Congruence)

IOC Questionnaire for students

Part 1 Personal Information

Question	IOC	Result
1. Gender: ( ) Male ( ) Female	1	Yes
2. Studied in : ( ) liberal arts ( ) Science and Engineering ( ) Art and Sports	1	Yes
3. Grade: ( ) freshman ( ) Sophomore year ( ) Junior ( ) Senior ( ) Graduate student	1	Yes

Part 2 Context (C) : Research background, learning activities and learning content.

Question	**IOC**	**Result**
1 Background effectiveness evaluation		
1.1 Course Objectives		
1 Goals are valuable	1	Yes
2 Course objectives lead to learning management efficiently	1	Yes
3 The objectives of the curriculum are in line with social needs.	1	Yes
4 Clearly defined objectives	0.66	Yes

Question	IOC	Result
5 Achieve goals at the end of the course	1	Yes
6 The stated objectives are up to date	1	Yes
7 The stated goals meet the students' expectations	1	Yes
8 Goals are relevant to students' needs	1	Yes
9 The goal is to take into account the national values	1	Yes
10 Description of course teaching activities	1	Yes
11 Accuracy of employment opportunities in the job market	1	Yes
12 Description of knowledge and skills acquired through the course	0.66	Yes
1.2 Course Construction		
Process evaluation		
1.2.1 What is the level of faculty involvement.		
13 Organize professional training courses for teachers	1	Yes
14 Organize teaching discussion sessions for teachers	1	Yes
15 Organize teaching and lecture competitions for teachers	1	Yes
1.2.2 How to use teaching strategies?		
Teachers use the following different approaches to group students in the classroom:		
16 Two student working together	1	Yes
17 Teamwork	1	Yes
18 Personal Learning	1	Yes
19 Whole class group study	1	Yes
20 The rules and practices established by the faculty are clear	1	Yes
21 Teachers check students' learning to ensure all students are participating	1	Yes
22 The teacher has the same attitude towards the students in the class	1	Yes

Question	IOC	Result
23 Teaching methods help improve students' computer skills	1	Yes
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	1	Yes
25 Students are fairly evaluated during the course	1	Yes
26 Students can get guidance and advice from teachers when they need it	1	Yes
1.2.3 What is the level of student involvement in learning activities?		
27 Encourage students to do learning activities		
28 Students' computer skills are well strengthened during the course	0.66	Yes
Total evaluation:	1	Yes
1.3 Subject content		
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:		
First-year class schedule subjects		
29 Moral Cultivation and Legal Foundations	1	Yes
30 Outline of Modern Chinese History	1	Yes
31 Situation Policy	1	Yes
32 Introduction to Traditional Chinese Culture	1	Yes
33 Mental Health Education for College Students	1	Yes
34 Career Planning and Life Development for College Students	1	Yes
35 Enrollment and Safety Education	1	Yes
36 Military training	1	Yes
37 Military Doctrine	1	Yes
38 Sports	1	Yes
39 Advanced Mathematics A	1	Yes

Question	IOC	Result
40 Linear Algebra	1	Yes
41 University Physics B	1	Yes
42 English	1	Yes
43 English listening and speaking	1	Yes
44 Introduction to Computers	1	Yes
45 High-level language programs	1	Yes
46 High-level language program on the machine	1	Yes
Class Schedule Subjects for Sophomore Year:		
47 Outline of Modern Chinese History	1	Yes
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	1	Yes
49 Sports	1	Yes
50 English	1	Yes
51 English listening and speaking	1	Yes
52 Probability Theory and Mathematical Statistics	1	Yes
53.Statistics	1	Yes
54 Discrete Mathematics	1	Yes
55 Digital Electronics Technology C	1	Yes
56 Python Programming	1	Yes
57 Compilation Principle	1	Yes
58 Data Structures and Algorithms	1	Yes
59 Database system principle	1	Yes
60 Operating System	1	Yes
61 Object Oriented Programming	1	Yes
62 Principles of Computer Composition	1	Yes

Question	IOC	Result
63 Java object-oriented programming	1	Yes
64 IT Awareness Internship	1	Yes
Class Schedule Subjects for Senior Year:		
65 Situation Policy	1	Yes
66 Modern information search and utilization	1	Yes
67 Practical courses in ideological and political theory	1	Yes
68 Career Guidance	1	Yes
69 Professional English	1	Yes
70 Software Engineering	1	Yes
71 UML Modeling Analysis and Design	1	Yes
72 Artificial Intelligence	1	Yes
73 Compilation Principle	1	Yes
74 Computer Networks	1	Yes
75 Microelectronics principle and interface technology	1	Yes
76 Mobile Application Development	1	Yes
77 Big Data and Cloud Computing	1	Yes
78 Algorithm analysis and design	1	Yes
79 IT Project Internship	1	Yes
80 Data Analysis and Visualization	1	Yes
81 Web Application Development	1	Yes
82 Software Quality Assurance	1	Yes
83 Integrated Software Course Design	1	Yes
84 ARM architecture and interface technology	1	Yes
85 Embedded Operating Systems and Applications	1	Yes
86 Embedded Systems and Design	1	Yes

Question	IOC	Result
87 Embedded Integrated Course Design	1	Yes
88 Machine Learning	1	Yes
89 Pattern Recognition	1	Yes
90 Deep learning techniques	1	Yes
91 Artificial Intelligence Integrated Course Design	1	Yes
92 English Vocabulary and Completion	1	Yes
93 English Reading	1	Yes
94 Calculus of functions of one element and differential equations	1	Yes
95 Probability statistics	1	Yes
Senior Year Class Schedule Subjects:		
96 Graduation Internship	1	Yes
97 Graduation design (thesis)	1	Yes
98 English to Chinese	1	Yes
99 English Writing	1	Yes
100 Differentiation of malfunction and double integration	1	Yes
101 Analytic geometry and multivariate integration of functions	1	Yes

Part 3 Input (I) : Instructors /teachers students and materials

Question	IOC	Result
2 Input effectiveness evaluation		
2.1 Instructor		
1 Instructors are knowledgeable and experienced in the subjects taught in theory and practice.	1	Yes
2 Instructors are knowledgeable and capable of giving students academic counseling and other areas.	0.66	Yes

Question	IOC	Result
2.2 Students		
3 Students are responsible for work as assigned.	1	Yes
4 The student's knowledge is at a good level.	1	Yes
2.3 Factors contributing to the curriculum		
5 Teaching media and equipment are sufficient for teachers and students.	1	Yes
6 Practical classroom	1	Yes
2.4 Course Enrichment		
7 Course meets objectives	1	Yes
8 Effective information system presence	1	Yes
9 Effective guidance system exists	1	Yes
10 Adequate teaching and research staff	1	Yes
11 Teaching content meets the needs	1	Yes
12 Teaching content meets expectations	1	Yes
13 The content provided is up-to-date	1	Yes
14 The content of the course material is coherent	1	Yes
15 Reasonable allocation of class time	1	Yes
2.25 Is the educational equipment provided in good condition?		
16 Multimedia classrooms are well-equipped	1	Yes
17 The existence of teaching manuals	1	Yes
18 Utilization of library resources	1	Yes
19 Well-prepared learning resources	1	Yes
20 Such materials meet the course objectives	1	Yes
21 The tasks and exercises in the course materials effectively improve learning computer skills	1	Yes

Part 4 Process (P) : Course Implementation and Instructional Processes

Question	IOC	Result
Course Administration		
1 Encourage the development of appropriate academic knowledge and necessary skills.	1	Yes
2 Regularly supervise and follow up on teaching and learning outcomes.	1	Yes
Learning Management		
3 You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.	1	Yes
4 Be able to link theory into practice consistently and appropriately.	1	Yes
5 Students are allowed to ask appropriate questions and problems about their knowledge.	1	Yes

Part 5 Product (P) : Knowledge Performance /skill and Attribute

Question	IOC	Result
4. Result evaluation		
4.1 Knowledge		
1 Well-versed in theory and practice in the field of study.	1	Yes
2 Be able to implement the knowledge into practice	1	Yes
4.2 Skills		
3 Be able to use information technology	1	Yes
4 Ability to use computer proficiently	1	Yes
4.3 Ethics		
5 Be enthusiastic to work.	1	Yes
6 Good behavior, behave according to the good social culture and norms	1	Yes

Question	IOC	Result
4.4 Is the course carried out normally?		
7 Teachers have sufficient professional knowledge in teaching	1	Yes
8 Teachers assign learning tasks to students	1	Yes
9 The teacher corrects the homework	1	Yes
10 The teacher commented on the exam results	1	Yes
11 Student's performance is fair	1	Yes
12 The teacher always lists the evaluation criteria before the examination	1	Yes
13 Assignments related to course objectives	1	Yes
14 Student satisfaction with the course	1	Yes
15 Curriculum activities meet the professional needs of students	1	Yes
16 Curriculum activities increase students' knowledge	1	Yes
17 The course improved students' attitudes	1	Yes
18 Textbooks in line with the course	1	Yes
19 Normal promotion rate	1	Yes
20 Low dropout rate	1	Yes
21 Student's annual internship plan	1	Yes
4.5 Does the tool evaluated effectively evaluate students' performance?		
22 Peacetime performance	1	Yes
23 Midterm examination	1	Yes
24 Final examination	1	Yes
4.6 Are the required skills met?		
25 At the end of the course, students have obtained the basic abilities required by the course	1	Yes
26 Skills acquired are related to students' career development	1	Yes

Question	IOC	Result
27 The acquired skills are related to the needs of domestic computer majors	1	Yes
4.7 Overall impression of the course		
28 I think this course is very useful	1	Yes
29 Normal employment rate of graduates	1	Yes
Total evaluation:	1	Yes

Validity (IOC : Item Objective Congruence)

IOC Questionnaire for graduate students

Question	IOC	Result
1. Gender: ( ) Male ( ) Female	1	Yes
2.The nature of your current job ( ) A. Work related to your major ( ) B. Work related to similar professions ( ) C. Not related to your major ( ) D. Teaching ( ) E. Administrative work ( ) F. Enterprise management ( ) G. Other	1	Yes
3. Title held: ( ) Teaching Assistant ( ) Lecturer ( ) Associate Professor ( ) Professor	1	Yes
4. Age: ( ) 21-25 ( ) 26-30 ( ) 31-35 ( ) 36-40 ( ) 41-45 ( ) 46-50 ( ) 51-55 ( ) 56-60 ( ) 61-65	1	Yes

Part 2 Context (C) : Research background, learning activities and learning content.

Question	IOC	Result
1 Background effectiveness evaluation		
1.1 Course Objectives		
1 Goals are valuable	1	Yes
2 Course objectives lead to learning management efficiently	1	Yes
3 The objectives of the curriculum are in line with social needs.	1	Yes
4 Clearly defined objectives	0.66	Yes
5 Achieve goals at the end of the course	1	Yes
6 The stated objectives are up to date	1	Yes
7 The stated goals meet the students' expectations	1	Yes
8 Goals are relevant to students' needs	1	Yes
9 The goal is to take into account the national values	1	Yes
10 Description of course teaching activities	1	Yes
11 Accuracy of employment opportunities in the job market	1	Yes
12 Description of knowledge and skills acquired through the course	0.66	Yes
1.2 Course Construction		
Process evaluation		
1.2.1 What is the level of faculty involvement.		
13 Organize professional training courses for teachers	1	Yes
14 Organize teaching discussion sessions for teachers	1	Yes
15 Organize teaching and lecture competitions for teachers	1	Yes
1.2.2 How to use teaching strategies?		
Teachers use the following different approaches to group students in the classroom:		
16 Two student working together	1	Yes

Question	IOC	Result
17 Teamwork	1	Yes
18 Personal Learning	1	Yes
19 Whole class group study	1	Yes
20 The rules and practices established by the faculty are clear	1	Yes
21 Teachers check students' learning to ensure all students are participating	1	Yes
22 The teacher has the same attitude towards the students in the class	1	Yes
23 Teaching methods help improve students' computer skills	1	Yes
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	1	Yes
25 Students are fairly evaluated during the course	1	Yes
26 Students can get guidance and advice from teachers when they need it	1	Yes
1.2.3 What is the level of student involvement in learning activities?		
27 Encourage students to do learning activities		
28 Students' computer skills are well strengthened during the course	0.66	Yes
Total evaluation:	1	Yes
1.3 Subject content		
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:		
First-year class schedule subjects		
29 Moral Cultivation and Legal Foundations	1	Yes
30 Outline of Modern Chinese History	1	Yes
31 Situation Policy	1	Yes
32 Introduction to Traditional Chinese Culture	1	Yes

Question	IOC	Result
33 Mental Health Education for College Students	1	Yes
34 Career Planning and Life Development for College Students	1	Yes
35 Enrollment and Safety Education	1	Yes
36 Military training	1	Yes
37 Military Doctrine	1	Yes
38 Sports	1	Yes
39 Advanced Mathematics A	1	Yes
40 Linear Algebra	1	Yes
41 University Physics B	1	Yes
42 English	1	Yes
43 English listening and speaking	1	Yes
44 Introduction to Computers	1	Yes
45 High-level language programs	1	Yes
46 High-level language program on the machine	1	Yes
Class Schedule Subjects for Sophomore Year:		
47 Outline of Modern Chinese History	1	Yes
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	1	Yes
49 Sports	1	Yes
50 English	1	Yes
51 English listening and speaking	1	Yes
52 Probability Theory and Mathematical Statistics	1	Yes
53 Statistics	1	Yes
54 Discrete Mathematics	1	Yes
55 Digital Electronics Technology C	1	Yes

Question	IOC	Result
56 Python Programming	1	Yes
57 Compilation Principle	1	Yes
58 Data Structures and Algorithms	1	Yes
59 Database system principle	1	Yes
60 Operating System	1	Yes
61 Object Oriented Programming	1	Yes
62 Principles of Computer Composition	1	Yes
63 Java object-oriented programming	1	Yes
64 IT Awareness Internship	1	Yes
Class Schedule Subjects for Senior Year:		
65 Situation Policy	1	Yes
66 Modern information search and utilization	1	Yes
67 Practical courses in ideological and political theory	1	Yes
68 Career Guidance	1	Yes
69 Professional English	1	Yes
70 Software Engineering	1	Yes
71 UML Modeling Analysis and Design	1	Yes
72 Artificial Intelligence	1	Yes
73 Compilation Principle	1	Yes
74 Computer Networks	1	Yes
75 Microelectronics principle and interface technology	1	Yes
76 Mobile Application Development	1	Yes
77 Big Data and Cloud Computing	1	Yes
78 Algorithm analysis and design	1	Yes
79 IT Project Internship	1	Yes

Question	IOC	Result
80 Data Analysis and Visualization	1	Yes
81 Web Application Development	1	Yes
82 Software Quality Assurance	1	Yes
83 Integrated Software Course Design	1	Yes
84 ARM architecture and interface technology	1	Yes
85 Embedded Operating Systems and Applications	1	Yes
86 Embedded Systems and Design	1	Yes
87 Embedded Integrated Course Design	1	Yes
88 Machine Learning	1	Yes
89 Pattern Recognition	1	Yes
90 Deep learning techniques	1	Yes
91 Artificial Intelligence Integrated Course Design	1	Yes
92 English Vocabulary and Completion	1	Yes
93 English Reading	1	Yes
94 Calculus of functions of one element and differential equations	1	Yes
95 Probability statistics	1	Yes
Senior Year Class Schedule Subjects:		
96 Graduation Internship	1	Yes
97 Graduation design (thesis)	1	Yes
98 English to Chinese	1	Yes
99 English Writing	1	Yes
100 Differentiation of malfunction and double integration	1	Yes
101 Analytic geometry and multivariate integration of functions	1	Yes

Part 3 Input (I) : Instructors /teachers students and materials

Question	IOC	Result
2 Input effectiveness evaluation		
2.1 Instructor		
1 Instructors are knowledgeable and experienced in the subjects taught in theory and practice.	1	Yes
2 Instructors are knowledgeable and capable of giving students academic counseling and other areas.	1	Yes
2.2 Students		
3 Students are responsible for work as assigned.	0.66	Yes
4 The student's knowledge is at a good level.	0.66	Yes
2.3 Factors contributing to the curriculum		
5 Teaching media and equipment are sufficient for teachers and students.	1	Yes
6 Practical classroom	1	Yes
2.4 Course Enrichment		
7 Course meets objectives	1	Yes
8 Effective information system presence	1	Yes
9 Effective guidance system exists	1	Yes
10 Adequate teaching and research staff	1	Yes
11 Teaching content meets the needs	1	Yes
12 Teaching content meets expectations	1	Yes
13 The content provided is up-to-date	1	Yes
14 The content of the course material is coherent	1	Yes
15 Reasonable allocation of class time	1	Yes
2.25 Is the educational equipment provided in good condition?		

Question	IOC	Result
16 Multimedia classrooms are well-equipped	1	Yes
17 The existence of teaching manuals	1	Yes
18 Utilization of library resources	1	Yes
19 Well-prepared learning resources	1	Yes
20 Such materials meet the course objectives	1	Yes
21 The tasks and exercises in the course materials effectively improve learning computer skills	1	Yes

Part 4 Process (P) : Course Implementation and Instructional Processes

Question	IOC	Result
Course Administration		
1 Encourage the development of appropriate academic knowledge and necessary skills.	1	Yes
2 Regularly supervise and follow up on teaching and learning outcomes.	1	Yes
Learning Management		
3 You have done your teaching plans by clearly specifying objectives, learning activities, and evaluation.	1	Yes
4 Be able to link theory into practice consistently and appropriately.	1	Yes
5 Students are allowed to ask appropriate questions and problems about their knowledge.	1	Yes

Part 5 Product (P) : Knowledge Performance /skill and Attribute

Question	IOC	Result
4. Result evaluation		
4.1 Knowledge		
1 Well-versed in theory and practice in the field of study.	1	Yes
2 Be able to implement the knowledge into practice	1	Yes
4.2 Skills		
3 Be able to use information technology	1	Yes
4 Ability to use computer proficiently	1	Yes
4.3 Ethics		
5 Be enthusiastic to work.	0.66	Yes
6 Good behavior, behave according to the good social culture and norms	1	Yes
4.4 Is the course carried out normally?		
7 Teachers have sufficient professional knowledge in teaching	1	Yes
8 Teachers assign learning tasks to students	1	Yes
9 The teacher corrects the homework	1	Yes
10 The teacher commented on the exam results	1	Yes
11 Student's performance is fair	1	Yes
12 The teacher always lists the evaluation criteria before the examination	1	Yes
13 Assignments related to course objectives	1	Yes
14 Student satisfaction with the course	1	Yes
15 Curriculum activities meet the professional needs of students	1	Yes
16 Curriculum activities increase students' knowledge	1	Yes
17 The course improved students' attitudes	1	Yes

Question	IOC	Result
18 Textbooks in line with the course	1	Yes
19 Normal promotion rate	1	Yes
20 Low dropout rate	1	Yes
21 Student's annual internship plan	1	Yes
4.5 Does the tool evaluated effectively evaluate students' performance?		
22 Peacetime performance	1	Yes
23 Midterm examination	1	Yes
24 Final examination	1	Yes
4.6 Are the required skills met?		
25 At the end of the course, students have obtained the basic abilities required by the course	1	Yes
26 Skills acquired are related to students' career development	1	Yes
27 The acquired skills are related to the needs of domestic computer majors	1	Yes
4.7 Overall impression of the course		
28 I think this course is very useful	1	Yes
29 Normal employment rate of graduates	0.66	Yes
Total evaluation:	1	Yes

Part 6 Impact Assessment (I)

Question	IOC	Result
Student performance:		
1 Achieved learning objectives	1	Yes
2 Increased interest in learning	1	Yes
3 Can use the learned knowledge to serve the society	1	Yes
Teachers' performance:		
4 Achieved the teaching objectives	1	Yes
5 Have a deeper understanding of the course	1	Yes
6 More perfect teaching methods	1	Yes
1 Improved teaching ability	1	Yes
Total evaluation:	1	Yes

Part 7 Effectiveness evaluation (E)

Question	IOC	Result
Students demonstrate the quality of the curriculum:		
1 Achieve the scheduled course objectives	1	Yes
2 Students' academic performance and skills have improved	1	Yes
3 Success rate of the curriculum	1	Yes
4 The course is helpful for students' employment	1	Yes
5 The curriculum is helpful for students' growth	1	Yes
6 The curriculum has attracted social attention	1	Yes
7 Curriculum adapts to the development of social productive forces	1	Yes
Total evaluation:	1	Yes

Part 8 Sustainability assessment (S)

Question	IOC	Result
The influence of curriculum on social life:		
1 Social demand for such talents	1	Yes
2 Student's contribution to society	1	Yes
3 Curriculum adapts to social development	1	Yes
4 Courses help students grow	1	Yes
5 The curriculum can attract more students for the school	1	Yes
6 Cultivate more high-quality college talents	1	Yes
7 The contribution of curriculum to social productivity	1	Yes
Total evaluation:	1	Yes

Part 9 Knowledge Transfer Assessment (T)

Question	IOC	Result
The knowledge taught in the curriculum has been expanded:	1	Yes
1 Would you like to recommend this course to your classmates or friends?	1	Yes
2 If you were a teacher, would you like to take this course?	1	Yes
3 You are an administrator of a school. Are you willing to add this course to the school?	1	Yes
Total evaluation:	1	Yes

Validity (IOC : Item Objective Congruence)

IOC Questionnaire for employers

Part 1 Personal Information

Question	IOC	Result
1. Gender: ( )Male ( ) Female	1	Yes
2. The nature of your unit is : ( ) (1)Institution ( ) (2)Government agency ( ) (3)State-owned enterprise ( ) (4)Foreign enterprise or joint venture ( ) (5)Private or private	1	Yes
3. Number of employees in your organization : ( ) (1) Below 100 employees ( ) (2) 101-200 employees ( ) (3) 201- -500 people ( ) (4) 501- -1000 people ( ) (5) 1001- 5000 people ( ) (6) 5000 or more	1	Yes

Part 2 Context (C) : Research background, learning activities and learning content.

Question	IOC	Result
1 Background effectiveness evaluation		
1.1 Course Objectives		
1 Goals are valuable	1	Yes
2 Course objectives lead to learning management efficiently	1	Yes
3 The objectives of the curriculum are in line with social needs.	1	Yes
4 Clearly defined objectives	0.66	Yes
5 Achieve goals at the end of the course	1	Yes
6 The stated objectives are up to date	1	Yes
7 The stated goals meet the students' expectations	1	Yes
8 Goals are relevant to students' needs	1	Yes
9 The goal is to take into account the national values	1	Yes
10 Description of course teaching activities	1	Yes
11 Accuracy of employment opportunities in the job market	1	Yes
12 Description of knowledge and skills acquired through the course	0.66	Yes
1.2 Course Construction		
Process evaluation		
1.2.1 What is the level of faculty involvement.		
13 Organize professional training courses for teachers	1	Yes
14 Organize teaching discussion sessions for teachers	1	Yes
15Organize teaching and lecture competitions for teachers	1	Yes
1.2.2 How to use teaching strategies?		
Teachers use the following different approaches to group students in the classroom:		
16 Two student working together	1	Yes

Question	IOC	Result
17 Teamwork	1	Yes
18 Personal Learning	1	Yes
19 Whole class group study	1	Yes
20 The rules and practices established by the faculty are clear	1	Yes
21 Teachers check students' learning to ensure all students are participating	1	Yes
22 The teacher has the same attitude towards the students in the class	1	Yes
23 Teaching methods help improve students' computer skills	1	Yes
24 The teacher presented the learning tasks in some interesting ways that made the tasks achievable for the students	1	Yes
25 Students are fairly evaluated during the course	1	Yes
26 Students can get guidance and advice from teachers when they need it	1	Yes
1.2.3 What is the level of student involvement in learning activities?		
27 Encourage students to do learning activities		
28 Students' computer skills are well strengthened during the course	0.66	Yes
30 Total evaluation:	1	Yes
1.3 Subject content		
All instructional activities used in the classroom contribute to the development of competencies and skills in computer science and technology in the following areas:		
First-year class schedule subjects		
29 Moral Cultivation and Legal Foundations	1	Yes
30 Outline of Modern Chinese History	1	Yes
31 Situation Policy	1	Yes
32 Introduction to Traditional Chinese Culture	1	Yes

Question	IOC	Result
33 Mental Health Education for College Students	1	Yes
34 Career Planning and Life Development for College Students	1	Yes
35 Enrollment and Safety Education	1	Yes
36 Military training	1	Yes
37 Military Doctrine	1	Yes
38 Sports	1	Yes
39 Advanced Mathematics A	1	Yes
40 Linear Algebra	1	Yes
41 University Physics B	1	Yes
42 English	1	Yes
43 English listening and speaking	1	Yes
44 Introduction to Computers	1	Yes
45 High-level language programs	1	Yes
46 High-level language program on the machine	1	Yes
Class Schedule Subjects for Sophomore Year:		
47 Outline of Modern Chinese History	1	Yes
48 Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	1	Yes
49 Sports	1	Yes
50 English	1	Yes
51 English listening and speaking	1	Yes
52 Probability Theory and Mathematical Statistics	1	Yes
53 Discrete Mathematics	1	Yes
54 Digital Electronics Technology C	1	Yes
55 Python Programming	1	Yes

Question	IOC	Result
56 Compilation Principle	1	Yes
57 Data Structures and Algorithms	1	Yes
58 Database system principle	1	Yes
59 Operating System	1	Yes
60 Object Oriented Programming	1	Yes
61 Principles of Computer Composition	1	Yes
62 Java object-oriented programming	1	Yes
63 IT Awareness Internship	1	Yes
Class Schedule Subjects for Senior Year:		
64 Situation Policy	1	Yes
65 Modern information search and utilization	1	Yes
66 Practical courses in ideological and political theory	1	Yes
67 Career Guidance	1	Yes
68 Professional English	1	Yes
69 Software Engineering	1	Yes
70 UML Modeling Analysis and Design	1	Yes
71 Artificial Intelligence	1	Yes
72 Compilation Principle	1	Yes
73 Computer Networks	1	Yes
74 Microelectronics principle and interface technology	1	Yes
75 Mobile Application Development	1	Yes
76 Big Data and Cloud Computing	1	Yes
77 Algorithm analysis and design	1	Yes
78 IT Project Internship	1	Yes
79 Data Analysis and Visualization	1	Yes

Question	IOC	Result
80.English	1	Yes
81 Web Application Development	1	Yes
82 Software Quality Assurance	1	Yes
83 Integrated Software Course Design	1	Yes
84 ARM architecture and interface technology	1	Yes
85 Embedded Operating Systems and Applications	1	Yes
86 Embedded Systems and Design	1	Yes
87 Embedded Integrated Course Design	1	Yes
88 Machine Learning	1	Yes
89 Pattern Recognition	1	Yes
90 Deep learning techniques	1	Yes
91 Artificial Intelligence Integrated Course Design	1	Yes
92 English Vocabulary and Completion	1	Yes
93 English Reading	1	Yes
94 Calculus of functions of one element and differential equations	1	Yes
95 Probability statistics	1	Yes
Senior Year Class Schedule Subjects:		
96 Graduation Internship	1	Yes
97 Graduation design (thesis)	1	Yes
98 English to Chinese	1	Yes
99 English Writing	1	Yes
100 Differentiation of malfunction and double integration	1	Yes
101 Analytic geometry and multivariate integration of functions	1	Yes

Part 3 Product (P) : Knowledge Performance /skill and Attribute

Question	IOC	Result
4. Result evaluation		
4.1 Knowledge		
1 Well-versed in theory and practice in the field of study.	1	Yes
2 Be able to implement the knowledge into practice	1	Yes
4.2 Skills		
3 Be able to use information technology	0.66	Yes
4 Ability to use computer proficiently	1	Yes
4.3 Ethics		
5 Be enthusiastic to work.	1	Yes
6 Good behavior, behave according to the good social culture and norms	1	Yes
4.4 Is the course carried out normally?		
7 Teachers have sufficient professional knowledge in teaching	1	Yes
8 Teachers assign learning tasks to students	1	Yes
9 The teacher corrects the homework	1	Yes
10 The teacher commented on the exam results	1	Yes
11 Student's performance is fair	1	Yes
12 The teacher always lists the evaluation criteria before the examination	1	Yes
13 Assignments related to course objectives	1	Yes
14 Student satisfaction with the course	1	Yes
15 Curriculum activities meet the professional needs of students	1	Yes
16 Curriculum activities increase students' knowledge	1	Yes
17 The course improved students' attitudes	1	Yes

Question	IOC	Result
18 Textbooks in line with the course	1	Yes
19 Normal promotion rate	1	Yes
20 Low dropout rate	1	Yes
21 Student's annual internship plan	1	Yes
4.5 Does the tool evaluated effectively evaluate students' performance?		
22 Peacetime performance	1	Yes
23 Midterm examination	0.66	Yes
24 Final examination	1	Yes
4.6 Are the required skills met?		
25 At the end of the course, students have obtained the basic abilities required by the course	1	Yes
26 Skills acquired are related to students' career development	1	Yes
27 The acquired skills are related to the needs of domestic computer majors	1	Yes
4.7 Overall impression of the course		
28 I think this course is very useful	1	Yes
29 Normal employment rate of graduates	1	Yes
Total evaluation:	1	Yes

Part 4 Impact Assessment (I)

Question	IOC	Result
Student performance:		
1 Achieved learning objectives	1	Yes
2 Increased interest in learning	1	Yes
3 Can use the learned knowledge to serve the society	1	Yes
Teachers' performance:		
4 Achieved the teaching objectives	1	Yes
5 Have a deeper understanding of the course	1	Yes
6 More perfect teaching methods	1	Yes
7 Improved teaching ability	1	Yes
Total evaluation:	1	Yes

Part 5 Effectiveness evaluation (E)

Question	IOC	Result
Students demonstrate the quality of the curriculum:		
1 Achieve the scheduled course objectives	1	Yes
2 Students' academic performance and skills have improved	1	Yes
3 Success rate of the curriculum	1	Yes
4 The course is helpful for students' employment	1	Yes
5 The curriculum is helpful for students' growth	1	Yes
6 The curriculum has attracted social attention	1	Yes
7 Curriculum adapts to the development of social productive forces	1	Yes
Total evaluation:	1	Yes

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