

# Research on the Structured System of C Language Teaching

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**Abstract:** Based on the actual situation of the "C Language Programming" course in IT majors, the characteristics of this course are analyzed, and a research and practice on C language teaching reform based on PI ability cultivation is proposed. Adopting a theme project oriented theoretical teaching method, constructing a "three-level" and "three combination" practical teaching system, implementing diversified evaluation and assessment methods, and improving students' practical and innovative abilities. The experimental teaching of C language is an important part of the C language curriculum. Based on the characteristics of cultivating applied talents in independent colleges, and in response to the problems encountered in experimental teaching, a plan is proposed to optimize the overall content and system of C language experimental teaching, further improving the teaching effectiveness of C language experiments.

**Keywords:** Structured System, C Language Teaching

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## 1. INTRODUCTION

In the process of popularization of higher education, higher education is facing severe challenges, mainly due to the differences in abilities between the talents needed by the market and the talents cultivated by schools. Therefore, based on the characteristics of current popular education, how to take effective measures to promote education and teaching work, cultivate applied talents with practical and innovative abilities, and meet the needs of industries and enterprises is the primary problem faced by schools.

The comprehensive requirements for C language experimental courses are relatively high for students. They must not only master certain theoretical knowledge of C language, but also have a certain level of logical thinking ability and strong programming ability. The admission scores of independent college students are lower than those of ordinary undergraduate students, and their foundation is relatively weak, and their self-learning ability is poor. During the C language experiment class, students encountered problems such as not being able to write programs and making numerous grammar errors, which resulted in low initiative during class, poor quality of classroom teaching, poor self-learning ability, lack of good review habits, and inability to fully understand and consolidate the knowledge they had not learned in class.

Through a series of reforms such as teaching methods, experimental teaching, and evaluation methods, students' interest in learning is enhanced, basic skills are strengthened, comprehensive applications are oriented, and engineering abilities and qualities are cultivated. The purpose is to cultivate applied talents with strong practical and innovative abilities that can serve regional economic and social development. Graduates should have a solid knowledge foundation and a wide range of knowledge. Having good basic qualities, including scientific literacy and humanistic qualities. Having a rigorous scientific attitude, strong sense of innovation, independent thinking ability, and strong practical ability; Having a sound personality, such as a sense of responsibility, teamwork, and teamwork spirit.

The purpose of C language experimental teaching is to write programs, emphasizing results over processes, neglecting the training of students' thinking styles, and lacking the cultivation of students' innovative abilities. Students cannot draw inferences from each other and cannot flexibly apply the knowledge they have learned. Independent colleges aim to cultivate applied talents, with the core of cultivating students' practical abilities, social adaptability, and employment and entrepreneurship abilities. Different majors have different requirements for the purpose of C language experimental teaching. C language experimental teaching is not closely integrated with the talent cultivation mode of independent colleges, resulting in a separation of teaching positioning and training objectives. Teachers carefully design interconnected projects around teaching tasks or unit themes, with projects as the core, and construct teaching content logically according to the work process, guiding students to actively participate, inspiring students to integrate and master course knowledge points.

## 2. THE PROPOSED METHODOLOGY

### 2.1 Developing a thematic project-based theoretical teaching approach

In teaching, around the student performance management system, decompose comprehensive application examples and run through the knowledge points before and after. Firstly, by inputting and outputting student information, introduce C data types, arithmetic operations, and expressions, as well as keyboard input and screen output. Next, by adding further content to task learning, for example, the selection structure is introduced based on the judgment of whether male and female students' physical fitness test scores are qualified, and the circular structure is introduced based on whether multiple students' scores are qualified. In the assessment of language experiment courses, traditional assessment methods are changed, focusing on students' analytical, problem-solving, hands-on, and innovative abilities demonstrated during the experiment process, and standardizing the exam content, establish a comprehensive evaluation system for students' academic performance, comprehensively evaluate their

academic performance, establish a question bank for each major, provide test questions for students' self-test, stage testing, and final testing, and improve the proportion of process assessment in the total score.

Diversify the forms of process assessment, closely focusing on the cultivation goals of problem-solving and practical abilities, including classroom assignments, quizzes, after-school thinking questions, and small-scale software development. Incorporate students' entire learning process into the assessment scope and strive to comprehensively and objectively reflect their academic performance. Teachers design teaching links to engage in interactive, inspiring, and discussion-based learning, stimulate students' interest in learning, and guide them to actively learn. Utilize multimedia teaching environment to achieve human-machine interaction, teacher-student interaction, on-site programming, and combine theory with practice; Flexible use of heuristic teaching, setting problems, creating situations, and cultivating students' ability to raise, analyze, and solve problems in simple and profound terms.

In the teaching process, students are divided into small groups and organized to engage in collaborative learning. Through collaborative discussions within the group, information is exchanged, inspired, and promoted to stimulate their interest in learning. Through various forms of interaction, inspire classroom teaching and group collaborative learning, integrate project practice and training throughout the entire learning process, and cultivate students' innovative thinking, practical ability, and cooperative awareness from multiple perspectives. Teachers design teaching links to engage in interactive, inspiring, and discussion-based learning, stimulate students' interest in learning, and guide them to actively learn. Utilize multimedia teaching environment to achieve human-machine interaction, teacher-student interaction, on-site programming, and combine theory with practice; Flexible use of heuristic teaching, setting problems, creating situations, and cultivating students' ability to raise, analyze, and solve problems in simple and profound terms.

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## 2.2 Constructing a step-by-step practical teaching system

To assess students' abilities, establish diversified evaluation methods, reduce the assessment of memory content, increase the assessment of application ability, and combine grades with students' practical and innovative abilities, a new evaluation method for this course is developed, specifically including daily grades, computer exams, theoretical exams, etc. scientifically and reasonably. The usual grades include quantitative statistics of homework and engineering practice achievements, written summary materials and quality

evaluation, defense, ability, and quality evaluation, etc. Teachers use the provincial high-quality course management website to accurately assign and manage homework, program homework online and automatically score, and grades are automatically ranked. Students "feel like practicing in online games", turning passive learning into active learning, and top students stand out.

Integrate existing language video resources related to C language experimental teaching, teaching material information resources held by teachers themselves, and student learning feedback information resources, establish a teaching resource information sharing platform using the network, and place multimedia teaching courseware, videos, C language programs, and exercises on the information platform to achieve optimal resource allocation, facilitate communication and sharing between teachers and students, and solve the problem of less teacher-student meetings. When students encounter problems that cannot be solved during their learning, they should fully utilize their autonomy in learning and improve their ability to analyze and solve problems through self-study, practice, discussion, and other means. The "three levels" refer to the basic level, improvement level, and comprehensive innovation level.

The basic layer focuses on cultivating students' basic experimental abilities, enabling them to receive basic experimental training. The experimental teaching content mainly includes operational, confirmatory, and other types. Operational experiments are experiments that cultivate students' operational skills according to certain procedures and technical requirements for each knowledge unit. A confirmatory experiment is an experiment in which students complete the entire experimental process according to the requirements of the experimental purpose, to verify the theory of classroom teaching and deepen theoretical teaching.

The improvement layer focuses on cultivating students' problem-solving abilities through comprehensive programming training. The experimental teaching content mainly includes comprehensive, design oriented, and other types. Comprehensive experiments integrate various knowledge units into a systematic project, with system settings and calculations, system measurements and analysis comparisons, and plan improvements or suggestions. When establishing a teaching resource platform, it is necessary to establish a platform for teacher-student communication, teacher-student communication, and student-student communication.

The main content among teachers is to share teaching videos, courseware, and teaching experience, with the aim of improving teaching effectiveness. The main content of teacher-student communication is to answer questions, online teaching, and collect feedback from students. Teachers can promptly answer students' questions, and students can exchange learning experience with each other as the main content. Through teaching resource platforms, students can learn independently according to their actual situation, at each learning stage, students can timely understand their mastery of the knowledge they have learned through self-test questions on the platform.

## 3. CONCLUSION

In the teaching of C language programming, conducting research and practice on teaching reform based on PI ability cultivation, adopting a theme project-oriented theoretical teaching method, constructing a "three level" and "three combination" practical teaching system, and implementing

diversified evaluation methods can help expand students' thinking, stimulate their enthusiasm and initiative, and gradually improve their comprehensive application and innovation abilities, Solve the problem of disconnection between course theory teaching and engineering practice. Propose to optimize the content and system of C language experimental teaching. Focusing on the talent cultivation mode of independent colleges, with the principles of emphasizing basic knowledge, practical application, and ability cultivation, optimize the design of teaching content, methods, assessment mode, teaching plan, and integration of teaching resources. Detailed exploration was conducted on how C language experimental teaching can adapt to the talent cultivation mode of independent colleges.

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#### 4. REFERENCES

- [1] Yi Deqin, Xu Jun, Yin Xiaoshui. Research on the Development Characteristics and Main Issues of Small Towns in Chongqing under the Background of New Urbanization [J]. Chongqing Mountain Urban and Rural Planning, 2014 (2): 5
- [2] He Xue. Research on the Supply of Socialized Elderly Care Services in Small Towns under the Background of New Urbanization [D]. China University of Mining and Technology, 2022
- [3] Han Zhiyuan. Research on the Layout of Small and Medium sized City Commerce in the New Era [D]. Taiyuan University of Technology, 2015. DOI: 10.76666/d. Y2798147
- [4] Wu Fangfang, Liang Wen, Pan Rui. Research on the Quality of E-commerce Logistics Services in Small Towns Based on LSQ and SERVQUAL Models [J]. Journal of Jining Normal University, 2018, 40 (3): 6. DOI: CNKI: SUN: JNSI. 0.2018-03-006
- [5] Zhang Song. Research on the Development Path of Small Towns in Jinan under the Background of New Urbanization [D]. Shandong Normal University, 2014. DOI: 10.76666/d. D534482
- [6] Yang Ling. Research on the Development of Rural E-commerce under the Background of New Urbanization [J]. Brand, 2014 (11): 1
- [7] Wang Yuanyuan. Research on the Evaluation of Service Capability of Small-Town E-commerce Logistics Enterprises under the Background of New Urbanization [D]. Anhui University, 2016. DOI: CNKI: CDMD: 21016.134586
- [8] Wang Minahan. Research on the Evolution of China's Agricultural Product Logistics System under the Background of New Urbanization -- From the Perspective of Superorder Parameter Exchange [D]. Beijing Jiaotong University [2023-09-22]
- [9] Zhang Wei. Research on the Relationship between Consumer Service Participation, Perceived Service Quality, and Psychological Contract: An Empirical Analysis Based on E-commerce Logistics Services in Small Towns [D]. Anhui University [2023-09-22]
- [10] Zhang Wei. Research on the Relationship between Consumer Service Participation, Perceived Service Quality, and Psychological Contract [D]. Anhui University, 2017. DOI: 10.76666/d. Y3213920
- [11] Cao Lin, Wang Lu. Research on the Spatial Development of Small-Town High-Speed Rail New City under the Background of New Urbanization - Taking Yixing High Speed Rail New City as an Example [J]. Small Town Construction, 2016 (8): 7. DOI: 10.3969/j.issn.1002-8439.2016.08.013
- [12] Zhang Song. Research on the Development Path of Small Towns in Jinan under the Background of New Urbanization [D]. Shandong Normal University, 2014
- [13] Xu Jun, Yi Deqin, Yin Xiaoshui, et al. Research on the Development Strategy of Small Towns in Chongqing under the Background of New Urbanization [C]//2013 China Urban Planning Annual Conference. [2023-09-22]
- [14] Ma Zhengyan. Research on the Development of Urban Agriculture Leading Small Towns under the Background of New Urbanization: Taking Xingdian Town, Nanjing City as an Example [D]. Suzhou University [2023-09-22]