

# Teaching Innovation and Practice of Basic Computer Courses in Local Colleges and Universities

Yan Dong Yu\*, Yu Ge Yao

Ulanqab Key Laboratory of Intelligent Information Processing and Security, Jining Normal University, Ulanqab 012000, Inner Mongolia Autonomous Region, China

\*Corresponding author: Yan Dong Yu, yuyandong88@gmail.com

**Copyright:** © 2023 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

**Abstract:** The rapid advancement of information technology poses significant pedagogical challenges for basic computer courses in local colleges and universities. This study proposes a comprehensive framework for instructional innovation, encompassing the restructuring of course content, enrichment of teaching resources, reformulation of instructional methods, and the establishment of feedback channels, as well as a comprehensive framework for optimizing assessment mechanisms. The implementation of this framework has yielded remarkable outcomes, including heightened classroom engagement and academic rigor as well as an overall enhancement in students' critical thinking and practical skills. These transformative changes have propelled basic computer courses in local higher education institutions to a new stage while offering valuable insights for future pedagogical reforms.

**Keywords:** Teaching innovation; Practice orientation; Evaluation mechanism; Feedback channel; Students' independent thinking

**Online publication:** December 25, 2023

## 1. Introduction

With the rapid advancement of information technology, basic computer courses are assuming an increasingly pivotal role in higher education<sup>[1]</sup>. However, local universities face a multitude of teaching challenges in these basic computer courses due to the diverse student body and limited teaching resources<sup>[2]</sup>. To better adapt to this context, we conducted research on innovative pedagogical practices for basic computer courses in local universities. The objective of this paper is to thoroughly examine the teaching issues and propose a practical research framework that can enhance the quality of basic computer courses in local colleges and universities while fostering comprehensive student development through innovative pedagogy<sup>[3]</sup>. In this era of information, it holds profound significance to identify and address the existing problems in basic computer courses at local institutions, thereby providing valuable insights for future educational research and practice.

## **2. Problem analysis**

### **2.1. Discrepancy between the design of teaching content and the objective of professional training**

The basic computer course covers a vast range of topics with widely distributed knowledge points, demonstrating strong practicality<sup>[4]</sup>. However, it lacks close integration with the objectives of professional training. The ideological and political aspects of the course are not adequately explored, and the teaching method is monotonous, resulting in passive student engagement during lectures. To stimulate students' interest in learning, it is necessary to reconstruct the teaching content, enrich available resources, and enhance students' independent learning abilities.

### **2.2. Diversity in students' computer foundation**

The student population in local colleges and universities is vast, resulting in varying levels of computer proficiency among students<sup>[5]</sup>. This discrepancy is particularly evident in border ethnic areas where students generally lack a solid computer foundation. Consequently, the basic computer course poses relatively higher challenges for them to get started. The significant differences in students' prior exposure to computers make it difficult for teachers to cater to their individual needs, thereby impacting their learning outcomes. To address this issue and enhance teaching effectiveness during student orientation, relevant improvements are necessary.

### **2.3. Outcome-oriented course evaluation**

Current course evaluations primarily emphasize student outcomes while neglecting the assessment of the learning process itself<sup>[6]</sup>. Overemphasis on results-based evaluation may obscure potential issues encountered during the study of basic computer course. Traditional evaluation methods fail to comprehensively capture students' actual learning processes and skills, limiting understanding and satisfaction regarding individual learning needs. Therefore, incorporating smart teaching tools becomes essential for shifting the evaluation perspectives from outcomes toward processes, enabling real-time feedback on students' learning behaviors for effective assessment.

## **3. Literature review**

Before delving into the pedagogical innovation and practice of basic computer courses in local colleges and universities, it is imperative to review pertinent literature findings in related fields to grasp previous research trends and existing teaching methodologies<sup>[1-3,7]</sup>. The educational literature indicates a gradual departure from the conventional lecture-based approach, with scholars placing greater emphasis on students' subjectivity and practicality.

Various theories have been posited by researchers regarding the establishment of knowledge communities, promotion of critical thinking skills, and cultivation of practical problem-solving skills, thereby providing theoretical underpinnings for instructional innovation. However, current literature on basic computer courses highlights issues such as an extensive content scope and reliance on a singular teaching method that hinder active learning engagement among students while also limiting their capacity to apply acquired knowledge in real-world contexts. By scrutinizing previous literature findings, we can gain deeper insights into the nature of these challenges and establish a theoretical foundation for developing innovative pedagogical frameworks.

## 4. Research framework

To address the aforementioned concerns, this study proposes a research framework encompassing the following pivotal components (Figure 1).

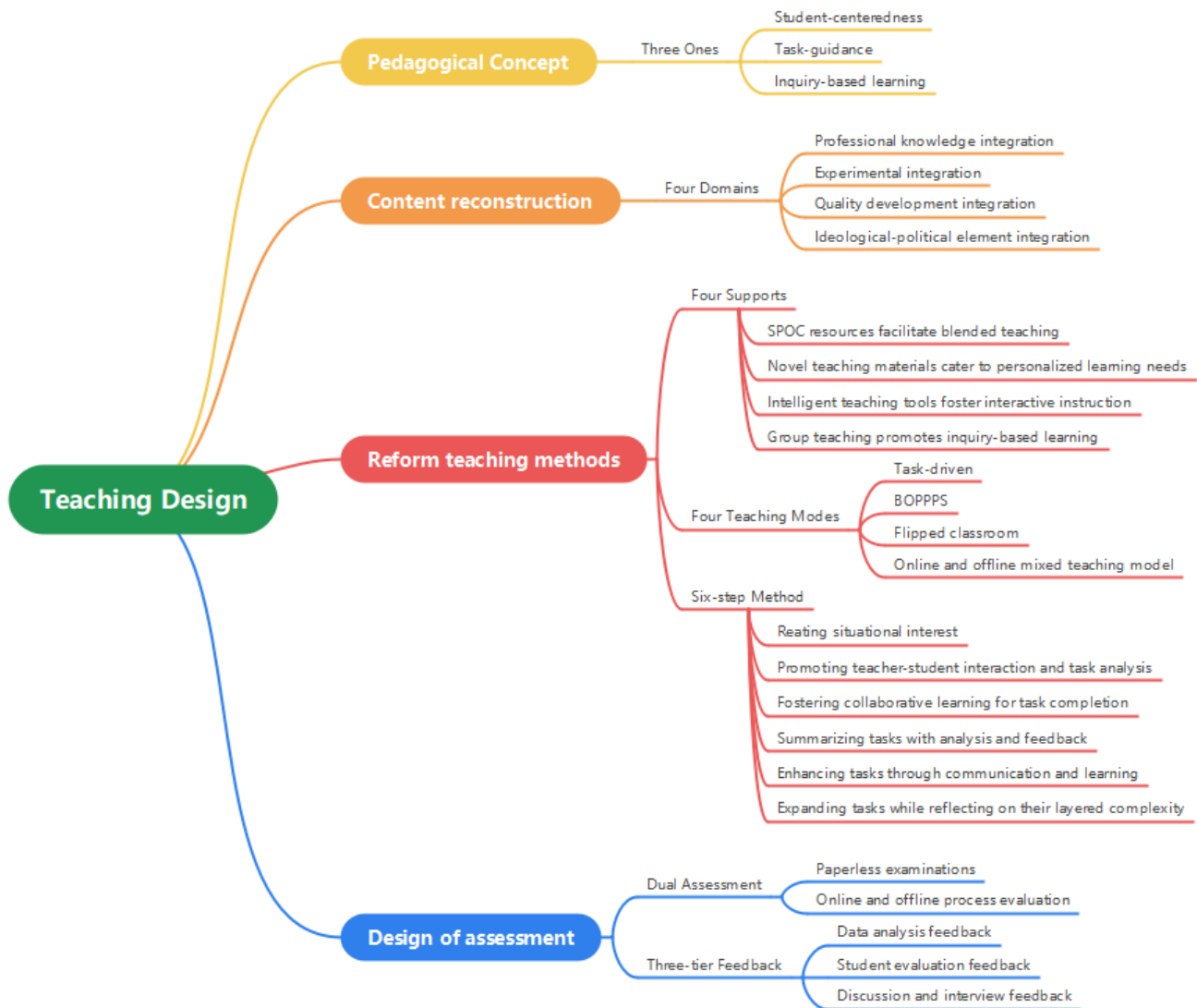


Figure 1. Research framework

### 4.1. Content reconstruction

The present paper adheres to the pedagogical principle of “Three Ones,” which encompasses a singular subject, a coherent main line, and a central focus, thereby emphasizing student-centeredness, task-guidance, and inquiry-based learning. By integrating and expanding upon existing knowledge content while transcending conventional chapter divisions, this approach adopts tasks as interconnected links skillfully interwoven with multiple teaching activities. Such design facilitates the comprehensive acquisition of knowledge and skills through task completion while fostering integration across four domains: professional knowledge integration, experimental integration, quality development integration, and ideological-political element integration.

### 4.2. Enhancing the quality of educational materials

The “Four Supports” strategy effectively enhances the teaching resources in this paper. SPOC (Small Private

Online Course) resources facilitate blended teaching, novel teaching materials cater to personalized learning needs, intelligent teaching tools foster interactive instruction, and group teaching promotes inquiry-based learning. The utilization of this integrated approach comprehensively supports both teaching and learning processes, enabling students to acquire knowledge more effectively within a diverse learning environment.

### **4.3. Teaching methods reform**

Located in the border ethnic area, this course adopts a task-based approach and integrates new technologies and methods such as SPOC + flipped classroom to enhance teaching effectiveness. It flexibly combines four teaching modes: “task-driven + BOPPPS (Bridge-in, Outcomes, Pre-assessment, Participatory Learning, Post-assessment, and Summary) + flipped classroom + online and offline mixed teaching model” to achieve seamless integration between in-class and extracurricular activities. The instructional process follows a six-step method:

- (1) Creating situational interest
- (2) Promoting teacher-student interaction and task analysis
- (3) Fostering collaborative learning for task completion
- (4) Summarizing tasks with analysis and feedback
- (5) Enhancing tasks through communication and learning
- (6) Expanding tasks while reflecting on their layered complexity

### **4.4. Improving the evaluation mechanism**

By adopting a student-centered approach in line with the Outcome-Based Education (OBE) concept, this study employs paperless examinations to enhance the dual assessment of online and offline process evaluation. Additionally, it integrates flexible and diverse assessments throughout each teaching task completion process, including classroom performance, student self-evaluation, intra-group evaluation, inter-group evaluation, and teacher evaluation.

### **4.5. Establishing feedback channels**

Establishing a comprehensive “three-tier feedback” system, encompassing data analysis feedback, student evaluation feedback, and discussion and interview feedback, facilitates the creation of a closed-loop teaching approach that enables teachers to promptly identify and address issues while continuously enhancing their instructional practices.

## **5. Anticipated outcomes of the application of the research framework**

Through the implementation of the aforementioned research framework, we have achieved remarkable outcomes that have infused fresh vitality into the pedagogical construction and reform of basic computer courses in local universities<sup>[2]</sup>. Classes are no longer characterized by passivity but rather exhibit enhanced levels of interactivity, leading to a significant increase in student engagement. The level of academic rigor has been effectively elevated, resulting in heightened academic enthusiasm and self-challenge spirit among students when confronted with more comprehensive and intricate tasks.

It is particularly noteworthy that our adoption of the “Three Ones” teaching philosophy encourages students to prioritize independent thinking throughout their learning journey. By integrating and expanding course content through task-based instruction, students not only acquire knowledge in a receptive manner but also develop their ability for autonomous reasoning while completing assignments. As students progressively tackle practical problems, they gradually develop a profound comprehension of basic computer principles,

thereby establishing a robust foundation for future professional advancement.

Emphasizing practice is a pivotal strategy for enhancing the quality of our pedagogy. The integration of teaching, experimentation, and theory within the computer room facilitates students' engagement in hands-on operations during classroom sessions, thereby comprehensively augmenting their practical skills. This practice-oriented instructional approach also significantly fosters students' innovative thinking and application abilities.

By tackling real-life problems, students not only acquire fundamental computer knowledge but also cultivate problem-solving capabilities that provide them with invaluable experiential insights for future careers in related industries. These transformative changes not only infuse dynamism into the classroom environment but also enhance students' autonomy in critical thinking and motivation to learn independently. We firmly believe that through such pedagogical innovation and implementation, the educational quality of basic computer courses at local colleges and universities will experience substantial improvement.

## **6. Conclusions and prospects**

Summarizing the innovation and practice of basic computer course teaching in local universities, this paper reveals that by implementing the “Three Ones” teaching concept, the integration and expansion of teaching content have been achieved organically, thereby stimulating students' interest in learning and fostering their independent thinking ability. Simultaneously, through the application of the “Four Supports” strategy, teaching resources have become more abundant and diverse, effectively addressing variations in students' foundational knowledge while enhancing individualization and flexibility in instruction. The reform of teaching methods, particularly the utilization of the six-step teaching approach, has rendered curricula more suited to student needs and improved instructional effectiveness. Furthermore, optimization of evaluation mechanisms including the establishment of a “dual assessments” method and a “three-tier feedback” system comprehensively reflects students' learning process while providing robust support for pedagogical enhancement.

Looking ahead to future research directions, this paper proposes investigating the long-term effects of teaching innovation, emphasizing the impact of technological advancements on pedagogy, and promoting interdisciplinary integration research to foster a more comprehensive computer literacy among professionals. Simultaneously, it will strengthen international collaboration by sharing resources and experiences with global universities, thereby enhancing the international competitiveness of basic computer courses in local institutions. In the future, this paper suggests maintaining an innovative mindset while prioritizing student needs, closely aligning with technological developments, and continuously optimizing teaching strategies to contribute significantly towards cultivating exceptional computer talents.

## **Acknowledgments**

The authors express their heartfelt thanks to all the members of the project team.

## **Funding**

2022 Inner Mongolia Higher Education Association - Higher Education Research Key Topic “Innovation and Practice of Teaching Basic Computer Courses in Local Universities” (Project number: NMGJXH-2022XB026)

## Disclosure statement

The authors declare no conflict of interest.

## Author contributions

Y.Y.D. and Y.Y.G. conceived of the idea, developed the proforma, and drafted the manuscript. All authors read and approved the final manuscript.

## References

- [1] Chen J, Wang Y, Yang Y, 2020, Online Teaching Design of University Computer Course Based on BOPPPS Mode. 2020 IEEE 2nd International Conference on Computer Science and Educational Informatization (CSEI), IEEE, 322–325.
- [2] Guo F, Yu JB, Liu XX, et al., 2021, The Construction and Practice of the Blended Teaching Mode on College Computer-Common Courses. Proceedings of the 6th International Conference on Information and Education Innovations, 6–11.
- [3] Xia F, 2019, Construction of Basic Computer Practice Teaching Platform Based on Innovation Ability Cultivation, Proceedings of the 2019 International Conference on Advanced Education and Social Science Research (ICAESSR 2019). Atlantis Press, 182–184.
- [4] Wang F, 2021, On the Teaching Reform of Computer Basic Course in Colleges and Universities for Innovation and Entrepreneurship. *Frontiers in Science and Engineering*, 1(2): 12–15.
- [5] Li H, He Z, Li S, 2015, Teaching Innovation and Practice of the Basic Computer Course Based on the Principle of Individualized Teaching and Classified Cultivation. 2015 10th International Conference on Computer Science & Education (ICCSE), IEEE, 867–869.
- [6] Castro R, 2019, Blended Learning in Higher Education: Trends and Capabilities. *Education and Information Technologies*, 24(4): 2523–2546.
- [7] Dakhi O, Jama J, Irfan D, 2020, Blended Learning: A 21st Century Learning Model at College. *International Journal of Multi Science*, 1(08): 50–65.

### Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.