

Construction and Realization of a Case Library System for Cultivating Teacher Students' Informatized Instructional Design Capabilities

Jingyi Liu^a, Ying Yang^b

School of Information Technology, Yunnan Normal University, Kunming, 650500, China

^a1144041886@qq.com, ^b79261313@qq.com

Abstract

In the process of practicing informationized education, teacher trainees are facing brand new challenges and opportunities as future educators. Among them, the ability of informatized instructional design is the key to improve teacher trainees' information literacy and informatized teaching ability. Based on this, this study focuses on improving teacher trainees' ability of informationized instructional design, and aims to promote teacher trainees' ability of instructional design and the application level of informationized means by constructing an instructional case base with informationized instructional cases as the core, and with the practical application of the case teaching method.

Keywords

Normal Students; Informatized Instructional Design; Case Library Building.

1. Introduction

With the rapid development of education informatization, information technology has become a key driving force in education reform. China has carried out a series of actions in response to the trend of education informatization. The Notice on Further Improving the Cultivation of Teacher Candidates under the Excellent Teacher Program (hereinafter referred to as the Excellent Teacher Program), issued by the Ministry of Education in 2022, mentions that it is necessary to "focus on improving the informatization education and teaching abilities of teacher candidates under the Excellent Teacher Program, and deepen the integration and application of artificial intelligence and education and teaching ". The Digital Literacy Framework for Teachers in the Education Industry Standard of Digital Quality for Teachers released by the Ministry of Education in 2022 includes digital instructional design as a component of teacher literacy. Case-based pedagogy as an organic combination of teaching and practice has been widely used in classroom teaching. Excellent cases are able to stimulate students' learning by incorporating puzzles and challenges from real-life environments, allowing them to think about and deal with real problems, and building bridges between theory and practice. In order to study the enhancement of teacher trainees' skills, this study chooses to start with the instructional design ability first, taking the course of Informative Instructional Design and Application as an example, and builds an instructional case base to support the enhancement of teacher trainees' informative instructional design ability.

2. Research Status

2.1. Informatized Instructional Design Capability

Informatized instructional design competence is a key part of informatized instructional competence. The Department of Teacher Education of the Ministry of Education has defined

instructional design competence as “instructional design competence is the competence based on professional knowledge and skills, including the ability to interpret the syllabus, analyze the teaching materials, formulate the teaching plan and write the lesson plan” [1]. The research of domestic scholars mainly focuses on the status quo of competence, enhancement strategy and cultivation mode. In the survey of the current status of competence, Tu Zhengzheng [2] and Qu Zhijun, Zhang Yazhen, etc. [3] conducted surveys and researches based on different dimensional frameworks to analyze the current status of informatization teaching competence of teachers and teacher trainees, respectively. In terms of competence enhancement strategies, Li Zhihe et al. took the new requirements of instructional design competence in the era of education informatization 2.0 as the starting point to carry out a survey, analyzed the problems of instructional design at the current stage, and further explored the enhancement of the informatization instructional design competence of the teacher trainees on the basis of the survey [4]. Wang Liang takes our teacher training students as the research object, summarizes and generalizes the status quo of teacher training students' informatization teaching ability, and puts forward the strategy of improving teacher training students' informatization teaching ability [5]. In terms of competence training mode, Lu Xia, guided by the ARCS motivation model, innovated the training of teacher trainees' informatization teaching competence by analyzing the learning motivation, designing motivation strategies, implementing motivation strategies, and evaluating the learning effect through the “Educational Technology” course as a carrier [6]. Minamata Hong Liu designed and practiced project-based learning activities based on the construction of a project-based learning framework to improve teacher trainees' informatization teaching design ability [7].

2.2. Teaching Case Library

The research on teaching case base is mainly on the construction and application of case base. For the construction of the case base, Zhang Xinping and Feng Xiaomin conducted an in-depth discussion on the connotation and value of the teaching case base construction and its construction path, which provided a direction for improving the cultivation mechanism of professional degree graduate students in China [8]. Luo Xi and Zheng Bohong constructed a teaching case base of land space master planning for professional master's degree students, which played a greater role in promoting the strengthening of practical teaching links and improving the training quality of master's degree students in urban planning [9]. Based on virtual simulation technology, Wang Lianhong and Xue Caixiu constructed a case base of teaching politics of midwifery and obstetrics with virtual simulation technology, which provides a reference for the construction of “course politics” in this discipline [10].

In the application of teaching case library, Zong Hui, Xin Hui to the student-centered, problem-oriented preparation of cases and the establishment of Chinese medicine and gynecology teaching case library, through the practice of teaching case discussions and other forms of teaching and learning to help cultivate students' clinical thinking and skills, is worth exploring the teaching practice [11]. Huang Guoqing and Guo Liping constructed a case library from three perspectives of case material source, construction content and implementation method, and found through practice that case teaching can greatly improve students' ability to analyze and solve problems, and lay a solid foundation for improving students' innovative ability and practical application ability [12].

3. Teaching Case Library Construction

3.1. Case Collection and Screening

Collecting and screening teaching cases on the Internet is one of the common methods used in building teaching case libraries. A rich variety of case resources are collected through online

platforms and teaching resource websites built by the state. In the process of collection, it is also necessary to screen the cases and use the Criteria for Teaching Cases of Education Degree as a reference to make sure that they meet the construction principles and teaching needs, so as to carry out the subsequent organizing and writing work.

3.2. Case Preparation and Organization

Cases collected on the Internet need to be further processed, which includes processing and adjusting the content of the cases to make them more in line with teaching needs and students' comprehension abilities. In addition, another source of teaching cases is to collect relevant case materials through actual investigation of teachers, and then write the cases subsequently. In the process of writing, it is necessary to ensure that the description of the case is clear, logical and rigorous, and can effectively guide students to think and discuss. At the same time, it is also necessary to organize and classify the collected cases for subsequent management and use.

3.3. Case Categorization and Labeling

In order to facilitate teachers and students to find and use the cases, teaching cases need to be categorized and labeled. Teaching cases can be categorized according to their subject area, content, stage of teaching, grade level of instruction, teaching methods/strategies, means of using information technology, etc., and corresponding labels can be added to each teaching case. This will enable the case library to have better organization and retrieval functions, and improve the efficiency of case utilization.

3.4. Design of the Framework For the Case Library System

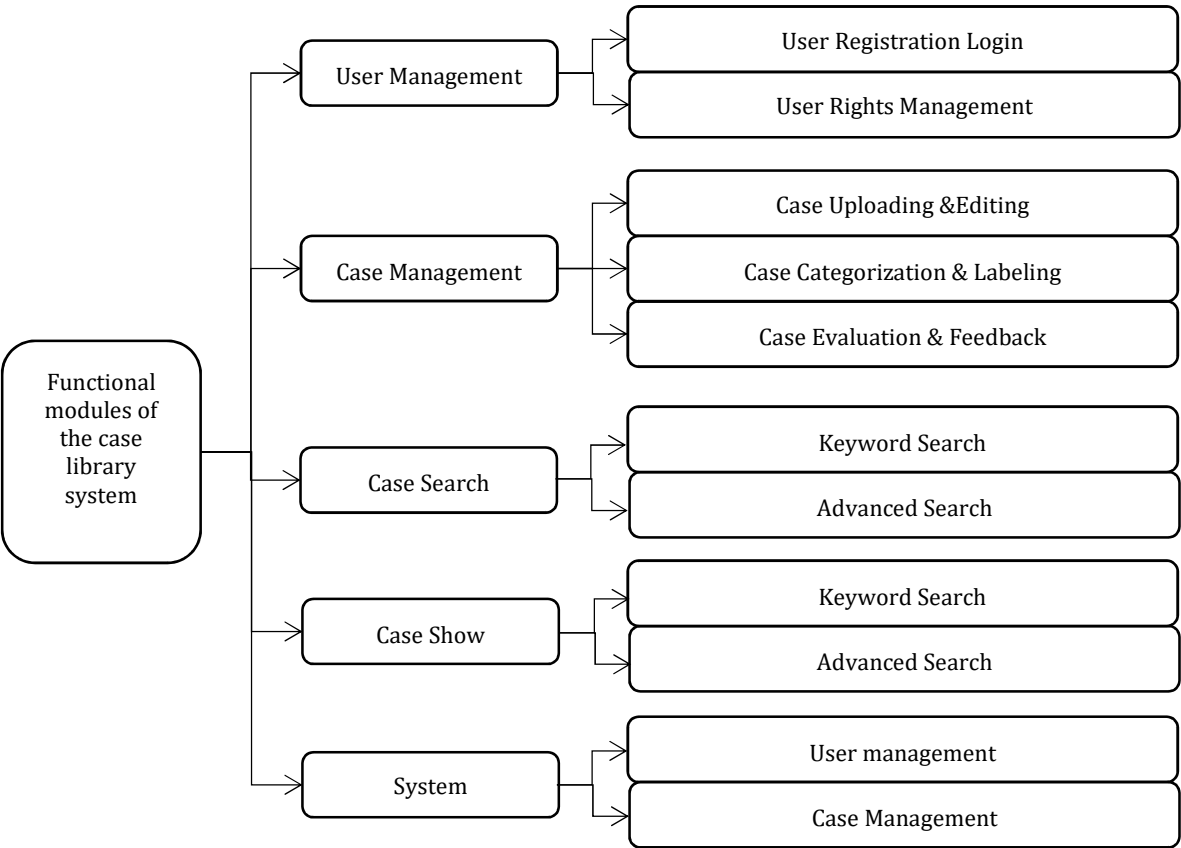


Fig. 1 Functional Module Diagram of the Case Base System

The purpose of the development of the case library system for information technology instructional design capacity development is to master the methods and strategies of

information technology instructional design through the study of information technology instructional design cases by teacher trainees, and to enhance their instructional design capacity and the application of information technology to teaching. The framework design of the case library system needs to take into account the overall structure and functional modules of the system in order to realize the effective management, retrieval and utilization of cases. The functional modules of the case library system are shown in Fig. 1.

3.4.1. Design of the Framework for the Case Library System

User Registration and Login: Allow users to register for an account and provide login functionality to ensure that only authorized users can access the case library system.

User Rights Management: Setting up different user roles (e.g. Administrator, Teacher, Student) and managing their rights in order to manage and utilize different features of the case library.

3.4.2. Case Management Module

Case Upload and Editing: Allows administrators or teachers to upload new cases and provides editing functions to ensure that case information is complete and accurate.

Case Categorization and Labeling: Provides case categorization and labeling functions to facilitate users to search and filter according to their needs.

Case Evaluation and Feedback: Allows users to evaluate and provide feedback on cases to provide reference for improving cases.

3.4.3. Search & Retrieval Module

Keyword Search: Provides a keyword search function that allows users to quickly retrieve relevant cases by entering keywords.

Advanced Search: Supports advanced search based on a variety of conditions (e.g., subject area, teaching content, teaching stage, teaching grade, teaching methods/strategies, etc.) to meet the specific needs of different users.

3.4.4. Case Presentation & Viewing Module

Case list display: display cases in the form of list or grid, including the title, summary and categorized information of the cases.

Case Detailed View: Users can click on the case title or icon to jump to view the detailed information of the case, including the case description, teaching objectives, teaching methods and so on.

3.4.5. System Management Module

User Management: Manage user information and permission settings.

Case Management: Manage uploading, editing and deleting of cases.

3.5. Overall Design of the Case Library

The cases in this paper mainly contain cases of deep integration of information technology with subject curriculum, which will help students to improve their information technology instructional design ability. The cases will be divided into two main parts, namely, subject and instructional design. In the subject part, there are text cases and video cases according to each subject, and the instructional design part is divided into five parts according to the teaching stage, namely, teaching introduction module, teaching strategy module, classroom teaching module, classroom activity module and teaching evaluation module.

4. Case Base Implementation Methodology

The specific implementation methodology of the case base will follow four phases: case preparation and introduction, case analysis and discussion, case reflection and summarization, and self-directed instructional design tasks, as shown in Fig. 2.



Fig. 2 Flowchart of Case Library Implementation

4.1. Case Preparation and Introduction

Cases related to the content of the class “Informationized Instructional Design and Application” and appropriate to the level of students are selected from the teaching case library and posted to the online teaching platform for students' self-study 1-2 weeks in advance. In the offline classroom teaching, the selected cases are introduced into the teaching process by introducing the background of the cases, posing questions or situations to arouse students' interest and thinking. The introduction should ensure that the case introduction is connected with the course content so that students can understand the importance of the case and the application scenarios.

4.2. Case Studies and Discussion

Lead students to analyze and discuss the case, organize group discussions or online discussions, etc., so that students can explore the problems, challenges and solutions in the case. Through the analysis and discussion of the cases, students are stimulated to think and explore, and develop their problem-solving skills and innovative thinking.

4.3. Case Reflections and Summaries

The class concludes with a reflection and summary of the case, allowing students to share their learning experiences and insights, and to summarize the experiences and lessons learned from the case study. Teachers provide feedback and guidance based on questions raised by students to help them further understand the case content and apply it to their daily learning and practice.

4.4. Autonomous Instructional Design Tasks

At the end of the class, assign the task of letting them design an informatization teaching design scheme independently or in groups to test the learning outcomes. At the same time to complete the design task process to encourage students to play a creative thinking, in order to develop their independent problem-solving ability and the ability to use information technology means of teaching.

5. Conclusion

Through the construction and practice of the case library system, teacher trainees are able to make full use of the case resources for in-depth learning and understanding of real situations and challenges in teaching practice. And after analyzing and discussing the cases, they not only deepen their understanding of teaching theories, but also develop problem-solving skills and innovative thinking. Especially, the task of independently and autonomously completing the informationalized instructional design allowed the teacher trainees to further enhance their instructional design ability and their ability to use informationalized tools in teaching. Overall, the construction and realization of this case library system provides an important support and practice platform for the cultivation of teacher trainees' informatization instructional design ability, which not only helps teacher trainees better adapt to the development trend of informatization education, but also can cultivate more educational talents with the ability of applying informatization means in the field of education in the future.

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References

- [1] Department of Teacher Education, Ministry of Education. Theory and Practice of Teacher Professionalization [M]. Beijing: People's Education Publishing House, 2003. 2-8.
- [2] Tu Z. Survey research on the status quo of rural primary and secondary school teachers' informatization instructional design ability [D]. Jiangxi Normal University, 2019.
- [3] Qu Zhijun, Zhang Yazhen, Yin Huanhuan. Survey research on the status quo of teacher trainees' informatization teaching ability--taking education interns of Jiujiang College as an example[J]. Science and education literature, 2023(17):126-129.
- [4] LI Zhihe, LIU Min. The current situation and improvement measures of the cultivation of teacher students' informatization teaching design ability[J]. Life Education, 2020(04):33-37+69.
- [5] Wang Liang. Research on Strategies for Improving Teaching Ability of Teacher Trainees with Informationization[J]. Computer Knowledge and Technology, 2020, 16(20):152-153.
- [6] Lu Xia. Design and implementation of informationized teaching ability training for teacher trainees under the perspective of ARCS model[J]. Journal of Taiyuan City Vocational and Technical College, 2021(07):92-95.
- [7] Liu Minamata Hong. Research on the Design and Practice of Project-based Learning Framework for Cultivating Teacher Training Students' Informatization Instructional Design Ability [D]. Northeast Normal University, 2023.
- [8] Zhang XP, Feng XM. Construction of Professional Degree Teaching Case Library: Connotation, Value and Key Points[J]. Modern University Education, 2020, 36(04):100-104+112.
- [9] LUO Xi, ZHENG Bo Hong. Discussion on the Construction of Teaching Case Base for Master's Degree Students of Urban Planning in Master's Degree of Territorial Spatial Master Planning--Taking Central South University as an Example[J]. Western Journal, 2022(15):137-141.
- [10] WANG Lianhong, XUE Caixiu, YANG Ke, et al. Construction of a case base for teaching midwifery's "course politics" with virtual simulation technology[J]. Journal of Nursing, 2023, 30(12):36-39.
- [11] Zong Hui, Xin Hui. Establishment and practice of teaching case base for master's degree students of Chinese medicine and gynecology under the background of "two-track unity"[J]. Chinese Medicine Education, 2023, 42(02):84-87.
- [12] HUANG Guoqing, GUO Liping, LI Xiaodan et al. Construction and Practice of Teaching Case Library of "Food Resource Utilization and Development"[J]. Food Industry, 2023, 44(10):212-214.