ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202402_7(2).0010

Research on PBL of Vocational Education Design Course

Zhi Zhao[1], Leile Feng[2], Dan He[3]

[1]Wenzhou polytechnic, Wenzhou, 325035, China

[2]Yueqing City, Shifan no. 3 primary school, Wenzhou, 325600, China

[3]Yueqing Surveying and Mapping Institute, Wenzhou, 325600, China

Abstract

Constructivism believes that practice is an important means of teaching and a necessary method for mastering engineering skills. This article starts from the characteristics of vocational education architectural design courses, takes project-based practical teaching as the research content, and starts from the perspective of professional teachers. The article is based on the constructivist teaching method and uses the three dimensions of communication ability, reflection ability, and problem-solving ability in project-based teaching as the theoretical basis. Quantitative analysis is used to analyze the focus of project-based teaching in the above three dimensions, and explore implementation strategies suitable for project-based practical teaching in architectural design courses.

Keywords

Project-oriented; Practical teaching; Constructivism; Implementation path.

1. Introduction

Constructivism, as an educational philosophy, holds that knowledge transfer is accomplished through practical cognition rather than information transmission, and emphasizes that students should actively participate in practice and actively improve their ability to acquire. The learning process includes active acceptance, active analysis, active practice, and active summary. The learning mode of passive acceptance is abandoned, and learners build knowledge acquisition paths through their own active practice. Students become the subject of constructivism, and the way of acquiring knowledge is transformed from passive acceptance to active exploration. Students will build their own knowledge structure and knowledge system mainly through interaction with the surrounding environment. In the whole teaching process, the teacher mainly helps to solve the problems encountered by the students in the practice process to explain and improve the practice approach.

Constructivism believes that the content of knowledge construction has the characteristics of active construction, active interaction and situation, and advocates the "re-legitimization" of knowledge as the standard and basis of teaching evaluation, and attaches importance to the learning experience of individuals and learning communities. Teachers should respect students' learning initiative, do a good job of introducing situations, create a good environment for students' learning, and be good at using various teaching resources to help students complete the construction of meaning. The project-based teaching referred to in this paper is based on the practice of architectural design courses. It is based on actual projects, combined with course standards and teaching content, and in a task-driven way, students are encouraged to take the initiative to practice, discover and solve problems. In this way, in the process of teacher teaching and student learning, students are the main body to achieve learning goals and improve vocational skills.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202402_7(2).0010

2. Project-based Practical Teaching Basis from The Perspective of Teachers

2.1. Research objects and problems of practical teaching

Project-based teaching is a teaching method with problem solving as the core, which advocates that every learner should actively participate in learning activities, formulate and implement plans according to research problems to solve problems, and solve problems encountered in learning through communication and cooperation between teachers, students and students, so as to cultivate learners' problem awareness, innovative spirit and practical ability.

This study will take 45 teachers majoring in architectural design from 6 higher vocational colleges in China as the research objects. Based on the practical teaching process in the first semester of 2022-2023, this study will collect relevant data through questionnaire star and conduct quantitative analysis and collation of the data to evaluate the research on communication skills, reflective skills and problem-solving skills based on project-based teaching. The teaching mode and teaching effect of PBL teaching method in the teaching process of architectural design major.

2.2. Analysis of research data from the perspective of teachers

Statistical indicators were used to describe the data collected from respondents. The square test is a tool for comparing actual results with predicted results. The Pearson correlation coefficient is used to find a statistical relationship or correlation between two variables, and the results are shown in the table below:

Table 1. Teachers' assessment of project-based teaching practices in communicative skills

Indicators *Project-based Learning…*	Weighted Mean	Verbal Description	Interpretation*
1.lets me learn how to communicate.	1.94	Sometimes	Fairly Satisfactory
2.makes me willing to exchange topics with teachers.	1.95	Sometimes	Fairly Satisfactory
3. makes me willing to exchange practical experience with seniors.	1.79	Sometimes	Fairly Satisfactory
4. makes me willing to exchange practical experience with classmates.	1.78	Sometimes	Fairly Satisfactory
5.makes me willing to exchange practical experience with enterprise experts.	1.87	Sometimes	Fairly Satisfactory
Over-all Weighted Mean	1.87	Sometimes	Fairly Satisfactory

Table 1 shows the level of teacher respondents' assessment of project-based teaching practices in terms of communication skills. Teacher respondents found project-based teaching practices quite satisfying because they felt that project-based learning sometimes made them willing to exchange topics with teachers (WM=1.95), sometimes allowed them to communicate (WM=1.94), and sometimes made them willing to exchange practical experiences with enterprise experts (WM=1.87). Sometimes it makes them willing to exchange practical experience with senior students (WM=1.79), and sometimes it makes them willing to exchange practical experience with classmates. Overall, teacher respondents rated project-based teaching practices at a fairly satisfactory level in terms of communication skills, with an overall weighted mean of 1.87.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202402_7(2).0010

Table 2. Teachers' assessment of project-based teaching practices in terms of reflective skills

Indicators *Project-based Learning…*	Weighted Mean	Verbal Description	Interpretation*
1. improves my ability to analyze problems.	1.86	Sometimes	Fairly Satisfactory
2. lets me actively reflect .	1.84	Sometimes	Fairly Satisfactory
3. improves my learning methods.	1.92	Sometimes	Fairly Satisfactory
4. facilitates me to find more solutions to problems.	1.86	Sometimes	Fairly Satisfactory
5. Lets me learn to analyze ways to solve problems better.	1.94	Sometimes	Fairly Satisfactory
Over-all Weighted Mean	1.88	Sometimes	Fairly Satisfactory

Table 2 shows the level of teacher respondents' assessment of project-based teaching practices in terms of reflective skills. Teacher respondents rated project-based teaching practices quite satisfactorily, as they felt that project-based learning sometimes allowed them to better analyze problem-solving methods (WM=1.94), sometimes improved their learning methods (WM=1.92), and sometimes improved their ability to analyze problems. It also helps them find more solutions to problems (WM=1.86) and sometimes allows them to reflect positively (WM=1.84). When dealing with unpredictable and complex situations, reflective exercises have potential benefits for practitioners. It can help professionals draw useful lessons for future practice. It has aroused interest in many professional fields including teaching, nursing and management (Sun Hua, 2022). Reflective teaching contributes to the establishment of teachers' reflective consciousness, so as to improve teaching quality and efficiency (Wang Juqing, 2022). Reflective teaching method is conducive to enhancing the formation of reflective consciousness, enabling project-based teaching participants to think and analyze problems more deeply, and completing the teaching process and practice through active exploration. Reflect on their own teaching behavior, decision-making and the content of phased teaching evaluation given by interns, identify potential problems, and take appropriate solutions, so as to improve teaching quality and effect (Zhu Weiping, 2020). Overall, teacher respondents rated project-based teaching practices at a fairly satisfactory level in terms of reflective skills, with an overall weighted mean of 1.88.

Table 3. Teachers' assessment of project-based teaching practices in terms of problem-solving skills

Indicators *Project-based Learning…*	Weighted Mean	Verbal Description	Interpretation*
1. provides us with methods to actively explore.	1.84	Sometimes	Fairly Satisfactory
2.improves our ability to solve problems.	1.78	Sometimes	Fairly Satisfactory
3. provides conditions for collaborative task completion.	1.86	Sometimes	Fairly Satisfactory
4. Improves our learning efficiency.	1.87	Sometimes	Fairly Satisfactory
5. lets me like to solve problems by myself.	1.84	Sometimes	Fairly Satisfactory
Over-all Weighted Mean	1.84	Sometimes	Fairly Satisfactory

Table 3 shows teacher respondents' views on project-based teaching practices in terms of problem-solving skills. Teacher respondents assessed project-based teaching practices to be quite satisfactory, as it sometimes increased learning efficiency (WM=1.87) and sometimes provided conditions for collaborative task completion. (WM=1.86), sometimes offering them ways to actively explore and making them enjoy solving problems on their own (WM=1.84).

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202402_7(2).0010

Overall, teacher respondents rated project-based teaching practices at a fairly satisfactory level in terms of problem-solving skills, with an overall weighted mean of 1.84.

3. The Improvement Path of Project-based Practice Teaching

3.1. The path to improve the communication ability of project-based teaching

Create an environment for communication. In project-based teaching, actively create an exchange environment and encourage students to participate in discussions and exchanges. By organizing group discussions, case studies, role playing, etc., students can have more opportunities to express their own views and opinions, and also learn how to listen to the views of others.

Develop expression skills. Organize some speech, debate, writing and other activities, so that students have more opportunities for expression training. At the same time, it guides students to have in-depth communication. Through questions, guidance, discussion and other ways, students can deeply think and analyze problems, and at the same time learn how to look at problems from different perspectives.

Develop critical thinking. To improve communication skills by developing students' critical thinking skills. Some critical thinking training activities can be organized, such as debating and critical reading, so that students can learn how to think critically about problems.

3.2. How to improve the problem-solving ability of project-based teaching

Improve the implementation plan. For the identified problem, students need to develop a plan to solve the problem. Students are encouraged to learn how to analyze problems, propose feasible solutions, and develop specific implementation plans. Through investigation, data analysis, experimental verification and other methods, so that students learn how to adjust and revise the plan effectively and timely.

Promote problem feedback and summary. In the process of solving problems, students need to constantly collect feedback information and make timely adjustments and corrections to the solutions. Students also need to evaluate and reflect on the process and results of problem solving in order to draw lessons and further improve their problem-solving skills.

Encourage learning practices. Improve your problem-solving skills by learning and drawing on the experiences and practices of others. Students can read relevant literature, attend academic conferences, visit practice bases and other ways to understand and learn other people's experience and practices in problem solving, so as to provide reference and reference for their own problem solving.

3.3. The improvement path of reflective skills in project-based teaching

Create reflective situations. Create the setting of project objectives, the formulation and implementation of plans, the process and results of problem solving, etc., encourage students to think and analyze deeply, and sum up experience and lessons.

Teachers and students participate together. Teachers and students jointly organize group discussions, case studies and other activities in class, and encourage students to actively participate and exchange experiences. Teachers give students necessary guidance and help in project-based teaching, and guide students to reflect; Students evaluate their own projects and write reflective reports to help students improve their reflective skills.

4. Conclusion

Based on the research of this project, it is suggested to strengthen and improve PBL from the following aspects:

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202402_7(2).0010

First, actively participate in seminars organized by the education department, provide targeted training, and engage in PBL practices and reflections on communication skills, reflection skills, interest levels, and problem-solving skills.

Second, strive to improve PBL teaching methods, increase students' interest in learning, and enhance their learning motivation

Third, continue to monitor PBL teaching practices and effectiveness, regularly monitor and record evaluations focused on reflection, self evaluation, and peer evaluation, and continuously improve PBL teaching methods.

As all it is recommended that the education department provide research support for relevant topics, timely identify new challenges encountered in PBL, and promote the improvement of sustainable teaching quality through project-based teaching.

Acknowledgments

The Department of Higher Education Students of the Ministry of Education of China, Supply and demand docking & employment and education projects (20230114101)

Wenzhou Polytechnic Foundation, Feedback Teaching Comprehensive Research Project (WZYYFFP2021002)

Wenzhou Polytechnic Foundation, Research on project-based teaching of BIM courses (WZYYB202123015)

References

[1] Xia Xiaoqun, Mo Deyun, Zhu Huixia, Wang Juncheng. Teaching reform and practice of Mechanical Subject Teaching Theory based on OBE education concept [J]. Theoretical Research and Practice of innovation and Entrepreneurship,2021(21):156-160

[2] ZHAO Yongjun. Motivation Analysis of both sides of school-Enterprise Cooperation in Art design major of Higher vocational colleges [J]. Adult Education, 2011(03):116-117

[3] Yuan Haiming. Investigation and countermeasure research on problems existing in practical teaching of Art design in higher vocational colleges [J]. Research on Vocational Education. 2011 (01): 38-40

[4] Lisa Bolin, et al.(2018). Educational Psychology: Stimulating Interest in Independent Learning. China Machine Press, 2018,(6), 40-45.

[5] EDUCAUSE.(2021).Horizon Report: Teaching and Learning Edition[EB/OL].[2021-05-01].https://researchers.cdu.edu.au/en/publications/2021-educause-horizon-report-teaching-and-lea rning-edition