Research on Learning Motivation for Project-Based Learning in Online Art Education: A Qualitative Study in A Higher Vocational College

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Abstract: With the extensive integration of Internet technology and intelligent applications, online education has become the new normal of modern education. As a teaching strategy that emphasises student initiative and deep participation, project-based learning (PBL) has also been increasingly valued and widely used. Based on self-efficacy theory, this study adopts a qualitative research method to explore the motivation of art and design students in higher vocational colleges under the online PBL mode, to examine students' understanding and adaptation to the online PBL mode, and to analyse the advantages, difficulties and challenges of students in the PBL learning process. In addition, how PBL shapes students' perceptions of learning and career aspirations is also the focus of this study. Teachers' supportive role is crucial for optimising teaching strategies and improving the quality of education. This study provides suggestions for strategies to improve students' motivation and future career development in higher vocational art education, as well as a theoretical basis for pedagogical reform and student support services in art programmes.

Keywords: Project-based learning, Online learning, Learning motivation, Art classroom, Higher vocational college.

1. Introduction

In art education, PBL promotes creativity and technical skills by integrating the design process, thereby enhancing students' problem-solving and self-confidence (Shin, 2023). This pedagogical approach improves design skills and enhances teamwork and critical thinking (Poli & Batistello, 2023). Also, the design approach combined with PBL optimised the learning experience and outcomes in design education (Su et al., 2022). However, from the pandemic to the post-pandemic era, the field of education has rapidly adapted to new technological revolutions, especially the widespread use of "Internet+" and "Smart+" technologies, which have made online learning environments the norm. When it comes to online learning environments, learning motivation is an issue that needs to be analysed in depth (Burston, 2003). In recent years, learning motivation in online courses has been receiving attention (Kyewski & Krämer, 2018; Li & Tsai, 2017; Özhan & Kocadere, 2020). While online teaching offers unprecedented flexibility and accessibility, it poses many challenges, particularly sustaining student motivation, engagement, and learning experiences. Furthermore, given the importance of online art education in modern education and the significant effect of the PBL model in facilitating students' learning, this study aims to delve deeper into the motivation of art students in a higher vocational college in this mode of teaching and learning, to provide theoretical support for online teaching and learn in art education.

1.1 Research Background

PBL is a teaching method focusing on practice, cooperation and independent learning, which originated from the "doing middle school" advocated by the American educator Dewey (1930) and was developed into a new educational model by the design teaching method proposed by Kilpatrick (1918). It is widely implemented in the United States, Germany, Japan, and other developed countries, as well as in China's vocational education, which is widely concerned. Especially in art and design majors in higher vocational colleges, PBL has been widely adopted and promoted due to its practical, dynamic and exploratory characteristics. By emphasising group cooperation, communication and interaction, and inquiry and innovation, this teaching mode effectively cultivates students' situational experience ability, which is conducive to students' clarification of learning objectives and career orientation, thus broadening the connotation of art design professional teaching.

Secondly, with the spread of information technology in education, especially the "pandemic" which has had a profound impact on the global education system, many colleges have adopted online teaching to ensure the continuation of education (Alsuwaida, 2022), which has had a profound impact on the development of online education. Online learning environments are seen as an alternative to traditional learning environments and can be considered one of the embodiments of new technologies in the field of education. It can be said that motivation is essential for improving students' academic performance, both in traditional learning environments and online learning environments. Therefore, the issues of academic performance, cognitive load and motivation encountered in conventional learning environments should also be examined in online learning environments (Hoskins & Van Hooff, 2005). However, online course learning is the most prevalent mode of learning in open education, and the online learning experience is an essential indicator of learners' effectiveness in online courses (Li, 2023).

In addition, the researcher used an online art classroom for H5 advert design and production as an example to explore project-based online learning strategies and students' learning feedback. This study uses open online courses (MOOC), Tencent Meeting (TM), and JS Design to assist teaching and create an informative and open learning environment to

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stimulate students' interest in learning and improve their independent learning ability. Meanwhile, this study will focus on analysing the key factors affecting students' motivation in online learning, exploring how students' internal drive, teacher support, peer influence and emotional response work together to influence students' coping strategies to challenges. It reveals the intrinsic mechanisms influencing motivation and helps art educators refine effective teaching strategies to improve students' self-efficacy and learning outcomes.

1.2 Purpose of the Study and Research Questions

This study aims to comprehensively explore the key factors affecting the motivation of art design students in a higher vocational college during the online PBL process. Through a qualitative research approach, this study will explore students' understanding and adaptation of the online PBL model and its impact on motivation and efficiency. It also identifies the key strengths and challenges students encounter in this mode of teaching and learning and analyses how these factors contribute to students' learning experience and academic achievement. In addition, this study examines how online PBL shapes or changes students' perceptions of learning and career aspirations, which in turn affects their perceptions of the field of art and design and the planning of their future career paths. This study aims to provide educators with insights and strategies to optimise instructional design and enhance student motivation and educational outcomes, especially in response to the new challenges posed by the rapidly evolving online courses. Based on the nature of the research, this study was guided by three research questions.

(1) How do art design students in a higher vocational college understand and adapt to the methods and requirements of online PBL?

(2) What do art design students face the specific strengths and challenges in a higher vocational college in the online PBL model?

(3) How does online PBL affect art design students' learning experiences, feelings and expectations in higher vocational colleges?

1.3 Significance of the Study

This study focuses only on a group of art design students in a higher vocational college in China to understand the multidimensional factors affecting their motivation during online PBL. Firstly, the results of this study contribute to an in-depth understanding of students' learning habits, learning initiative, willingness to learn and learning effects when using online course platforms and interactive collaboration software to facilitate PBL, which is of great value in optimising instructional design and enhancing students' learning experience. Secondly, it provides strategic suggestions for higher vocational colleges and educational institutions to use modern technological tools to improve the quality of education and adapt to the development trend of education information. Finally, this study provides valuable insights into the sustainable development of vocational education and a theoretical basis for educational policy-making and teaching practice.

2. Overview of Relevant Research

PBL in arts programmes has significantly impacted students' self-efficacy, which is a belief in their ability to succeed in a given situation. As explored in various studies, integrating PBL into arts education highlights the multifaceted benefits of pedagogical approach, including enhanced this problem-solving skills, creativity, and communication, which are critical in today's knowledge-based, technologically advanced, and multicultural society (Lai, 2021). Ease of use and a positive attitude significantly affect students' intention to learn (Hewei & Youngsook, 2022). Meanwhile, advocated the inclusion of student-led projects in online courses to enhance students' learning initiative and autonomy (Heflin & Macaluso, 2021). This approach is expected to increase student engagement and learning outcomes, especially in areas such as art and design requiring high creativity. Specifically, PBL has been identified as an engaging and promising pedagogy in online art courses that emphasises the creation of artefacts, collaboration and the use of technology for learning, which meets the educational needs of the digital age (Kang & Lee, 2015). Applying PBL in multidisciplinary settings, especially those involving STEAM (Science, Technology, Engineering, Arts and Mathematics) education, further highlights its potential to promote long-term interdisciplinary learning and improve teaching strategies for art projects (Mohamad et al., 2015). This approach not only aids in understanding the curriculum but also helps to enhance student leadership and creativity. Incorporating creative arts activities into a PBL programme can enrich the learning experience, develop an attachment to the subject matter and improve study skills (Pratama et al., 2017). Meanwhile, information technology helps provide accurate education for online learning, which can provide teachers and students with learning resources. online collaboration rich and communication platforms, data analysis and visualisation tools, and so on, which is an essential indicator of learners' online learning effectiveness. The Fuzzy Delphi methodology for PBL activities in design art and design courses demonstrates the strategic use of PBL in curriculum development to ensure that learning activities are aligned with students' competencies and develop higher-order thinking skills (Mohamad et al., 2015).

Second, applying PBL in online education faces a series of challenges. Art and design courses are convenient and require high student autonomy. While online PBL offers flexibility and convenience, it also brings pressures such as time management, environmental issues, and technical difficulties. A study reveals several problems with PBL in online environments, including communication, collaboration, and technical skill challenges (Motogna et al., 2022). Another study also pointed to the double-edged effect of digital technology in arts education: while it can expand audiences, foster collaboration, and increase creativity, it can also replace traditional artistic practices or create problems of unequal access to technology (Lavrentieva et al., 2023).

Thirdly, art design students in higher vocational colleges generally need to improve in learning self-motivation. Online teaching requires more initiative, which is challenging for students with low self-control. Online education requires students to take more initiative, which can reduce classroom efficiency for students with low self-control. When it comes to subjects such as sports and art, it is challenging to teach them directly through verbal instruction, which can also reduce students' enthusiasm for learning (Lee et al., 2024). In addition, art design students invest more time in their academics, but the decline in interest and efficiency in their studies is a problem that should not be ignored (Korkmaz & Toraman, 2020).

In short, using PBL in online art education shows excellent potential but faces many challenges. Future research should explore optimising the PBL model to improve student motivation and effectiveness, especially among art and design students in higher education institutions. There is also a need to consider how to balance the utilisation of technology with the retention of traditional artistic practices to ensure that all students benefit equitably from the development of online education.

3. Theoretical Framework

Self-efficacy refers to a learner's confidence in their abilities in any subject area. Bandura's (1995) self-efficacy theory states that learners' self-efficacy skills are closely related to learning motivation. Individuals' confidence in their abilities affects their actions and achievements regarding personal motivation and behaviour and the ability to control the social environment. Specifically, individuals with high self-efficacy tend to perform tasks they believe they can complete and, thus, are more likely to achieve good outcomes. In contrast, individuals with low self-efficacy may avoid more difficult challenges. Such beliefs figure prominently in learners' motivational processes. Ways to enhance self-efficacy include providing experiences and models of success, and social support and positive feedback are also critical factors in developing positive self-evaluations. Self-efficacy plays a vital role in the self-regulatory role of motivation (Gömleksiz & Serhatlıoğlu, 2013). Therefore, it enables learners to set goals for themselves. It also determines the level of resistance, the amount of effort put in by the learner in the face of difficulties and the resilience of the learner in the face of failure (Bandura, 1995). Bandura (1997) stated that self-efficacy is mainly composed of (1) Mastery Experiences (Performance Outcomes), which include successes and failures, (2) Vicarious Experiences (Social Models), the experiences of others, (3) Social Persuasion, and (4) Psychological and Affective States, such as stress and anxiety. (Figure 1. shows an example).



Figure 1: Bandura's model of the sources of self-efficacy and the outcomes

What makes self-efficacy theory (Bandura, 1995) helpful in this study is that this theory explains how students shape their behaviour through cognitive processes and environmental factors and guides their motivation to achieve their goals and the likelihood of success, especially in terms of enhancing their confidence and adaptability in the face of online learning.

4. Research Method

4.1 General Inductive Approach

This study adopted the general inductive method (Thomas, 2006), a systematic approach to extracting themes and categorising from qualitative data. The general inductive approach enabled the researcher to identify data patterns effectively, leading to a deeper understanding of the student learning process. By generalising participants' perspectives, the researcher understands how these reflect their interpretations of their role transitions and implications. The choice of the generalised inductive approach to the underlying qualitative research data was justified by the high degree of flexibility and adaptability of the method in exploring participants' experiences and extracting in-depth data.

4.2 Participants and Recruitment

Based on a purposive sampling strategy (Creswell & Tashakkori, 2007; Merriam, 2009), the researchers recruited and invited 12 participants for the focus groups, comprising seven men and five women. Firstly, 12 participants were contacted and invited to participate in this study based on the researchers' networks, and invitation letters were emailed to potential participants in this study; 18 invitation letters were sent out. Eventually, 12 people decided to participate in the study. Next, once the participants agreed to this study, the researcher formally sent consent forms, the purpose of the study, data collection protocol, risk statements, procedures, and related materials. All signed and agreed to the procedures of the study. In addition, participants were required to meet all of the following conditions.

(1) All were art and design students in a higher vocational college.

(2) Must have taken an online course on H5 advert design and

be able to use online learning software and tools.

(3) Be at least 18 years old and willing to share their stories.

4.3 Data Collection

Three data collection tools were used: 1) participant observation, 2) semi-structured interviews and 3) focus group activities. Firstly, participant observation is a commonly used data collection method in qualitative research. It obtains the data needed for research by observing the behaviour, context and environment of the research participants. Participant observation methods can obtain real behavioural and contextual information and non-verbal behavioural information. In this study, students' progress in completing the project and online participation performance were observed and recorded on the MOOC, as well as the instructor's posting of learning tasks, group discussions, and interactive games. This participant observation lasted for four weeks.

According to Creswell, the interview instrument is a commonly used data collection tool in qualitative and educational research. According to Seidman, multiple interviews are recommended to collect rich and comprehensive qualitative data in social science and academic research. Indeed, life stories and personal backgrounds cannot be answered in a short period. If multiple interviews are conducted with individuals, some depth of understanding and life stories may be gained. Therefore, the researcher decided to conduct two interviews with each participant. Per this protocol and arrangement, the researcher asked the participants to participate in a virtual, semi-structured, private one-on-one interview.

After all participants completed the interviews, the researcher scheduled focus groups to collect stories based on the group discussions. Due to geographic location and time difference, the focus group activity was also conducted through a virtual application. Four participants were in each focus group, so two focus group activities were conducted. Each focus group activity lasted 50-65 minutes with an 8-minute break in between. All participants consented to the data they provided. Please note that a digital voice recorder recorded all data collection processes. All participants agreed to this arrangement.

4.4 Data Analysis

After data collection, the researcher transcribed the information, verbal messages and stories from the online course platform into text for analysis. During the data analysis process, the researcher used grounded theory methodology (Saldana, 2013; Tang & Dos Santos, 2017) and general induction (Thomas, 2006) to systematically narrow down and explore the data. Firstly, preliminary themes and sub-themes in the data were identified and categorised using open coding. Secondly, the researcher further refined and connected these initially identified themes and sub-themes through axial coding techniques to reveal deeper relationships and patterns in the data. Finally, this process generalised two significant themes with their respective three sub-themes, which provided the basis for further theory building.

5. Findings and Discussion

In this study, through a qualitative study of art majors in a higher vocational college, the factors influencing students' motivation to learn based on PBL were explored in depth and parsed by relying on self-efficacy theory as a theoretical framework in an online art course. Self-efficacy, as a learner's confidence and expectation of their abilities, has significantly impacted students' motivation and behaviour. In the following, the researcher will elaborate and discuss the findings from internal and external perspectives. The themes are summarised in Table 1.

| Table | 1: | Themes. |
|-------|----|---------|
|-------|----|---------|

| Themes | | |
|----------------------|------------------------------|--|
| 5.1 Internal factors | 5.1.1 Intrinsic motivation | |
| | 5.1.2 Course Satisfaction | |
| | 5.1.3 Successful Experiences | |
| 5.2 External Factors | 5.1.2 Course Satisfaction | |
| | 5.2.2 Peer co-operation | |
| | 5.2.3 Learning environment | |

5.1 Internal Factors

Internal factors are mainly concerned with the psychological and emotional state of the individual student, and they significantly impact the development and maintenance of motivation.

5.1.1 Intrinsic Motivation

Intrinsic motivation is the cornerstone of students' learning motivation, especially in art courses, which stems from students' deep interest in art, immense love for art, and the constant pursuit of the growth of personal artistic attainments. This drive not only meets the deep psychological needs of learners but also enhances their interest in learning, their perception of the value of the art task, their autonomy in learning, and their sense of self-efficacy. In addition, it can increase students' tolerance for frustration, which promotes the formation of active and stable learning attitudes, strong motivation and positive behaviours, and the overall development of students' learning initiative. Consistent with a previous study (Malone & Lepper, 2021), the genuine willingness to learn is rooted in an intrinsic motivation that finds its source in personal practice and exercise, from which a sense of fulfilment and reward is derived. Therefore, educators should actively explore and stimulate this intrinsic motivation in the teaching and learning process so that the learning process becomes enjoyable and self-fulfilling, which will undoubtedly be incredibly beneficial to developing students' motivation to learn. Three participants said,

...I am motivated by the interest in learning itself when designing in a project-based manner... (Participant 4#, focus group, female)

...I find the subject matter of the design project interesting, allowing me to develop an ongoing interest and attitude towards learning, and I am happy and positive in the process...because I want to do it... (Participant 10#, focus group, female)

...I am always happy and positive when exploring issues and solving problems... (Participant 1#, focus group, male)

However, one was frustrated and said,

...The content of this course is complex, and learning visual design and interaction logic simultaneously is beyond my ability. I was worried that I would not be able to handle it, which made me both anxious and scared. I still had to complete the tasks set by the teacher until the end of the course. (Participant 3#, focus group, male)

Researchers have found that educators need to pay attention to the content of the curriculum to ensure that it is challenging but within the students' capacity, in addition to stimulating their intrinsic drive. In the PBL instructional model, students' intrinsic drive becomes the key to their self-directed inquiry into the problem and their efforts to find a solution. This process continuously advances and enhances students' artistic skills and creativity. Those students with intrinsic solid motivation tend to be more focused and deeply engaged in their learning, showing higher enthusiasm and autonomy. From a psychological perspective, intrinsic motivation and self-efficacy are essential pillars that motivate students to learn. According to Bandura (1995), self-efficacy refers to an individual's confidence in his or her ability to perform the actions required in various situations. This confidence largely determines how much effort a student is willing to put in and how long he or she can persevere when faced with difficulties. A high level of self-efficacy is closely linked to greater environmental resilience and makes students more inclined to view challenging problems as opportunities for self-improvement. This attitude fosters a more profound interest in learning activities and increases students' ability to recover from setbacks, improving their academic performance. In other words, in PBL teaching in art courses, educators should focus on developing students' intrinsic drive and self-efficacy, helping students grow through challenges, and maximising their self-worth by reasonably designing the difficulty of the project and the learning path.

5.1.2 Course Satisfaction

Course satisfaction reflects students' overall feelings about the course content, teaching methods, learning effectiveness, and the fit between art education and students' learning needs. High satisfaction means that the course content can inspire students' artistic inspiration, and the teaching method can help students master the core artistic creation skills to realise their artistic pursuits and learning goals. PBL in the art classroom, through the art creation project as a carrier, students learn how to transform theoretical knowledge into practice in practical operation, further improving their artistic creation ability and teamwork ability. Teamwork ability. This student-centred teaching mode allows students to experience the fun of art creation in the learning process and increases their satisfaction with the course. Two participants said,

...it will allow me to initially apply what I learnt in the course and solve specific problems in this course... (Participant 12#, focus group, female)

...This open-ended training allowed theory to be linked to practice, stimulated my creative potential..., and allowed me to complete the course well... (Participant 7#, focus group, male)

In addition, the art classroom also focuses on students' emotional experiences and the enhancement of their aesthetic ability. Teachers skillfully combine the course's independent learning and group discussion, providing students with a highly interactive and participatory learning environment. This teaching method not only helps students deeply understand the emotions and meanings behind the artworks but also broadens their artistic horizons and enriches their personal artistic feelings in the exchange. One said,

...The course grade evaluation will combine the usual exercises and the final complex design project, as well as the performance of the group activities, the status of individual publications, etc. The teacher will track our learning progress, intervene on the MOOC, and allow us to grade each other... (Participant 1#, focus group, male)

The researcher observed that the instructor added robocall

questions, group discussions, and mutual grading to the online course on H5 advert design, a move that students widely praised. This indicates that modern students are more inclined towards learning experiences that are highly interactive and engaging. The PBL teaching model responds to this pedagogical trend, which is student-centred and drives the learning process through real-world problem-solving and project implementation. In this mode, students can actively explore and construct knowledge and exercise critical thinking and teamwork skills in group cooperation and problem-solving, thus increasing their satisfaction with the course. In summary, introducing the PBL teaching mode can effectively enhance students' course satisfaction and thus promote their overall development and deep learning.

5.1.3 Successful Experiences

In arts learning, students' self-efficacy and interest in learning can be significantly enhanced by the successful experiences they gain through completing works and participating in competitions or exhibitions. These successful experiences allow students to see their progress and achievements and stimulate their desire to explore their knowledge further and challenge their projects. Therefore, teachers can create more opportunities for students to help them gain experience, thus enhancing their motivation to learn. Three participants said,

...I won a competition for my work... (Participant 7#, focus group, male)

...I learned brand new design software and mastered the primary HTML language. It was amazing... (Participant 4#, focus group, female)

...Design does not stop at the visual but can be assumed through conditions, set variables, and parameters, allowing me to complete the H5 advert's question-and-answer interaction design. (Participant 11#, focus group, male)

According to Bandura's (1997) self-efficacy theory, successful experiences can increase students' confidence in their learning ability. Consistent with previous findings (Schneider & Preckel, 2017), when students feel they can control the technological tools needed for learning effectively, their self-efficacy increases, leading to more active participation in learning activities. This enhanced self-efficacy can motivate students to set higher learning goals and persevere in the face of challenges, especially in technically demanding art projects.

5.2 External Factors

External factors, mainly teacher support, learning environment, and peer cooperation, influence students' motivation equally.

5.2.1 Teacher Support

In the PBL model, the role of the teacher changes from the traditional knowledge transmitter to the problem guide and the counsellor of the solution process. In the online course on H5 advert design, the teacher guides students to actively explore, research and innovate by setting challenging design

problems. For example, "How can the advertising message be effectively conveyed in the limited screen space while maintaining the simplicity and visual appeal of the design?" "How can you design a time-sensitive H5 advert by combining current social hotspots or popular trends? Students are guided to take the initiative to explore, research and innovate. Teachers provide professional design guidance, give students timely feedback, and encourage them to keep trying new design ideas and technical means. This targeted guidance and support helped students solve the practical problems they encountered in the design process and greatly stimulated their creativity and desire for exploration. Two participants said that,

... Teachers are not only our instructors but also our partners... (Participant 2#, focus group, male)

... Teachers will discuss and solve problems with us, whether in the Tencent conference or on the discussion board of the online course... (Participant 5#, focus group, female)

At the same time, teachers enhance students' self-confidence and design enthusiasm through positive evaluation and recognition, making them more determined and courageous when facing design challenges. Some participants said this external driving factor, centred on teacher guidance, is indispensable in enhancing students' design ability and innovative spirit. Two participants said,

...The support of the teacher was critical to me. Whenever I encountered difficulties or was unsure how to proceed, she encouraged me to try different methods and ideas, making me feel I was progressing. (Participant 7#, focus group, male)

...During the design process, the teacher should have mandated what or how it must be done. The equal communication style made me feel comfortable and more willing to take the initiative to learn and explore... (Participant 4#, focus group, female)

The changing role of the teacher is closely linked to the core element of "social persuasion" emphasised in Bandura's theory of self-efficacy. Firstly, teachers' professional guidance, timely feedback during students' explorations, and encouragement to try out new ideas and technological means constitute an essential part of social persuasion. In particular, the positive comments and recognition from teachers and the encouragement and support given to students when encountering difficulties significantly boosted their self-confidence and enthusiasm for design. This kind of social persuasion gave students a deep sense of their progress and value, reinforcing their self-efficacy, i.e. confidence in their ability to complete the task. Secondly, equal communication and cooperation between teachers and students also positively affected students' self-efficacy. In PBL, teachers are not only instructors but also partners of students. This collaborative learning approach allows students to feel that their voices are valued and their opinions are respected.

5.2.2 Peer Cooperation

...Our group would have a clear division of labour at the beginning of the project, with each person taking part of the

responsibility. Some students are responsible for planning and content creation, some for dynamic design, and others for technical support. Everyone has their role but maintains close communication and collaboration... (Participant 9#, focus group, male)

In online art creation, interaction and collaboration among students can stimulate their passion for learning and creativity. Through group discussions and project cooperation, students can learn from each other and progress together, thus improving their self-efficacy and learning effectiveness. At the same time, peer support and encouragement can help students better face difficulties and challenges in learning. Two participants said,

...in our group, everyone has expertise and unique ideas, and we can complement each other and progress together... (Participant 5#, focus group, female)

...Seeing other students doing so well in their fields inspired me to want to work hard to improve myself and contribute more to the team... (Participant 12#, focus group, female)

However, the random assignment of team members and the increased cost of communication in group collaboration in online environments may pose challenges to collaboration. One stated that,

... In group work in an online classroom, team members are randomly assigned, leading to an increased workload when someone in the group has a different opinion while working on a project assignment but cannot relay it to others promptly and make repeated revisions." (Participant 6#, focus group, female)

In addition, online learning needs more face-to-face interaction and discipline, which can lead to less effective teamwork. One said,

... teamwork is one of the most critical aspects of learning in arts programmes. As a result of online learning, there is an increase in communication costs and a lack of cooperation. Lack of discipline, especially when the design project needs to be adjusted quickly, some students will interfere and delay the progress due to various things... (Participant 2#, focus group, female)

According to Bandura (1997), self-efficacy is an individual's subjective assessment of his or her ability to perform a particular aspect of work. The results of this assessment will directly impact a person's motivation for behaviour, including willingness and motivation to work with peers. First, peer collaboration enhances students' self-efficacy by providing role models for success. In a group, when one member succeeds in a task or demonstrates exceptional skills, the other members will see him or her as a role model and draw confidence and motivation. Second, verbal persuasion among peers is also essential in enhancing self-efficacy. In group work, members will encourage, support and affirm each other. This positive feedback can enhance students' self-efficacy and make them more confident in completing tasks. Peer encouragement and support often motivate members and help them overcome difficulties or challenges.

In addition, peer cooperation can also affect self-efficacy through emotional arousal. Members face challenges and solve problems together, and this shared experience can stimulate positive emotions such as excitement and pride. These positive emotions can boost students' self-confidence and self-efficacy, making them more willing to take the initiative to explore and try new things.

5.2.3 Learning Environment

An active, open and resource-rich learning environment provides students more learning opportunities and resource support. It helps them to maintain a high degree of concentration and engagement in the learning process. The H5 advert design course adopts JS Designed online collaboration platform, Tencent conference, online course resources and other auxiliary tools, which enable students to interact in real-time and provide instant feedback, thus enhancing the immediacy and effectiveness of learning. Students can practice and explore advertising design anytime, anywhere, through the Instant Design platform. At the same time, Tencent Conferences provide online, face-to-face communication opportunities for teachers and students, making question-answering and work presentations more intuitive and efficient. Two participants said,

...MOOC online courses provide many online resources that can be downloaded and watched anytime, anywhere, which is very convenient... (Participant 10#, focus group, male)

...JS designed an online platform that allows us to collaborate with our classmates in real time to complete projects (Participant 8#, focus group, male)

However, the environment of learning. The multiple distractions students face when studying online, such as roommate distractions, dormitory environments, and unstable network environments, affect learners' motivation and persistence in learning and may reduce their self-efficacy, thus affecting learning outcomes. Two participants pointed out,

...there is a delay in the dormitory network, and even when using Tencent conferencing, the sound frequency is different, and sometimes it is hard to hear what the teacher is saying... (Participant 5#, focus group, female)

...the online assistance platform sometimes lags or can no longer be used because it takes up much memory.... (Participant 9#, focus group, male)

Self-efficacy theory suggests that when individuals face difficulties and challenges, if they do not think they can overcome them, their self-efficacy will be lowered, affecting their learning motivation, persistence and perseverance. Thus, distractions in the online learning environment will likely reduce students' learning outcomes if not adequately dealt with. In short, the impact of the learning environment on self-efficacy must be addressed. In order to enhance students' learning effectiveness, educators should create a positive, open, and resource-rich learning environment and minimise distractions to help students build their self-efficacy and stimulate their motivation and creativity.

6. Conclusion

Through qualitative analyses of art majors in a higher vocational college, this study explored the factors influencing students' motivation to learn based on PBL in an online art course. It provided an in-depth analysis of self-efficacy theory. The findings suggest that self-efficacy, as learners' confidence and expectation of their abilities, plays a crucial role in students' motivation and behaviour. Firstly, internal factors such as intrinsic drive and successful experiences significantly impact students' motivation. Intrinsic drive stems from students' deep interest in art and the pursuit of self-realisation, which can motivate students to take the initiative to explore, learn profoundly and innovate continuously. Successful experiences, on the other hand, can enhance students' self-confidence and self-efficacy and further stimulate their learning motivation. This confirms the importance of "successful experience" in Bandura's self-efficacy theory for self-efficacy enhancement.

Secondly, external factors such as teacher support, peer cooperation and learning environment significantly impact students' motivation. Teachers' professional guidance, timely feedback and encouraging comments can effectively enhance students' self-efficacy and motivation. Peer cooperation and support can enhance students' self-confidence and willingness to cooperate, promoting learning effectiveness. A positive, open and resourceful learning environment provides students with more learning opportunities and resource support, which helps them maintain high concentration and engagement. These external factors reflect the influence of the two sources of social persuasion and emotional arousal in Bandura's self-efficacy theory on self-efficacy.

However, the study also found that some distractions in the online learning environment, such as roommate interference and unstable network environment, may reduce students' self-efficacy and thus affect their learning outcomes. This suggests that we need to pay more attention to optimising the learning environment and reducing distracting factors in the future design of online courses to enhance student's learning experience and effectiveness.

7. Contribution to Practice

Online learning will continue to play an essential role in the post-epidemic era. For art and design students, PBL remains an effective method to enhance learning dynamics. Learning vigour refers to students' motivation and initiative in the learning process and is one of the most important indicators for evaluating the quality of student learning. In today's booming information technology, art education has created some problems in the online education environment, and it is a long way to explore the factors of online PBL that affect students' learning motivation. Its contribution can be summarised in three aspects. First, school administrators can be inspired by the findings of this study. Targeted support and counselling should be established to encourage students to fully experience self-determination and self-management in their learning to support their success and well-being.

Secondly, as policymakers, we should actively promote online art and design courses to support and guarantee the

development of art education. Relevant training mechanisms should be established to train and guide educators to improve their teaching ability and practice.

Third, government leaders can use this study as a blueprint to promote online art education reform further, strengthen online education platforms' supervision and management, and safeguard educational equity and quality.

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