

The Relationship of Problem Based Learning Approach with the Soft Skills among High School Students

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Abstract

This study examines the moderating role of student engagement in the relationship between Problem-Based Learning (PBL) and soft skill development among high school students in Anhui Province, China. Soft skills, such as communication, teamwork, and critical thinking, are crucial for success in the 21st-century workforce. Addressing a gap in understanding, this research utilizes a cross-sectional survey of 172 high school students engaged in English courses employing PBL. Data analysis through SPSS reveals that positive perceptions of PBL significantly enhance soft skills, with student engagement amplifying this effect. These findings emphasize the importance of fostering engaging learning environments to maximize PBL's impact, offering practical insights for educators and policymakers integrating student-centered methodologies in high school curricula.

Keywords: Problem-Based Learning, Soft Skills, Student Engagement, High school Curricula

Introduction

In today's evolving educational landscape, there is a growing recognition of the importance of soft skills for student success, particularly in preparing individuals for the complexities of the modern workforce. Soft skills, such as communication, teamwork, problem-solving, and critical thinking, are increasingly valued alongside traditional academic skills (Sergeieva et al., 2023; Malicay, 2023). In China, the emphasis on these skills has become especially crucial as the country seeks to equip its youth with the tools necessary for both personal success and societal progress (Chen, 2023). The traditional teacher-centered approach, characterized by rote memorization and passive learning, has shown limitations in fostering these essential skills, prompting educational reforms toward more student-centered pedagogies (Ahmed Al-Rashed, 2020; McGowan et al., 2023).

Problem-Based Learning (PBL) has emerged as a promising approach to address the deficiencies of traditional teaching methods, particularly in the development of soft skills. PBL emphasizes active, student-centered learning through the exploration of real-world problems, fostering both self-directed and collaborative learning (Kim, 2022; Luo et al., 2022).

This approach has gained considerable attention within the Chinese education system, especially in highschool settings, where there is a need to enhance students' adaptability, creativity, and interpersonal abilities (Zhang, 2023; Chen et al., 2023). Despite government support for PBL and its growing implementation in various subjects, there remains a significant gap in understanding the factors that influence its effectiveness in developing soft skills among high school students (Lietal., 2022).

Student engagement has been identified as a critical factor that can significantly affect the success of educational approaches like PBL. Engagement, which encompasses behavioral, cognitive, and emotional dimensions, plays a pivotal role in determining how deeply students interact with and benefit from learning activities (Subagja, 2023; Zhao et al., 2023). The degree of student engagement can influence how effectively students develop key soft skills through PBL, as higher engagement levels are associated with increased motivation, deeper learning, and more meaningful participation in collaborative tasks (Seo, 2022; Gong & Cen, 2020). However, the moderating effect of student engagement on the relationship between PBL and soft skill development has not been thoroughly explored, particularly within the context of Chinese high school education (Zhao et al., 2023).

The purpose of this study is to investigate the moderating role of student engagement in the relationship between PBL and the development of soft skills among high school students in Anhui Province, China. By examining this relationship, the study aims to provide valuable insights into how engagement can enhance or hinder the effectiveness of PBL in fostering essential skills. The findings are expected to contribute to the existing literature on educational methodologies and offer practical recommendations for educators and policymakers seeking to optimize the benefits of PBL in high school settings.

Literature Review

Soft Skills in Education

The importance of soft skills in education has been widely acknowledged, particularly as they are essential for success in the 21st-century workforce. Soft skills, which include communication, teamwork, problem-solving, and critical thinking, are critical for students to effectively navigate complex work environments (Wanget al., 2023; Li et al., 2022). Employers increasingly prioritize these skills as they are crucial for productivity, adaptability, and the ability to work in diverse teams (Leitão et al., 2020; Horváthová et al., 2022). According to Gangoda et al. (2023), soft skills such as critical thinking, problem-solving, and emotional intelligence are among the top skills required for the future workforce.

Research indicates that traditional teacher-centered approaches, which focus heavily on rote memorization, have not been effective in developing these skills (Chen et al., 2022). The traditional education system, which emphasizes academic performance through standardized testing, often neglects the development of non-cognitive skills that are vital for students' overall growth and success in real-world scenarios (Mukhametkairov et al., 2023). This has led to a growing demand for educational reforms that incorporate approaches fostering active learning and the development of soft skills (Munishi, 2022).

Instead, educational reforms have increasingly turned to student-centered learning methods, such as Problem-Based Learning (PBL), which encourage active participation and

foster the growth of essential competencies (Xie, 2022). The growing body of literature highlights the need for integrating soft skills training into formal education to ensure that students are well-prepared for both higher education and the workforce (Boiko, 2022; Bosco, 2014). Studies have shown that students with strong soft skills are more likely to succeed academically, as well as in their personal and professional lives (Goggin et al., 2019). For example, research indicates that social-emotional learning (SEL) programs significantly enhance students' social behaviors, academic performance, and attitudes toward learning (Müller et al., 2023; Colagrossi et al., 2023).

Problem-Based Learning (PBL)

Problem-Based Learning (PBL) has increasingly attracted scholarly attention as an effective educational method. Rooted in cognitive theory, PBL encourages learners to actively solve problems, fostering knowledge construction and conceptual growth (Zahara et al., 2020). This learner-centered approach contrasts sharply with traditional educational methods where instruction is mostly passive. PBL encourages dynamic interaction between teachers and students, promoting mutual learning and adapting to the cognitive levels of the students, which in turn ignites their enthusiasm for learning (Azimah et al., 2020). Additionally, the integration of interactive learning strategies, such as augmented reality, enhances communication and social skills while raising awareness of non-verbal cues in young learners (Hanid et al., 2020).

PBL has gained traction in Chinese education as a means to address the shortcomings of conventional teaching methods (Zhang, 2023). Unlike traditional approaches, PBL involves students actively engaging with real-world problems, encouraging them to work collaboratively and independently to find solutions (Zhang, 2023). This active learning approach has been shown to enhance soft skills, including critical thinking and communication, by promoting a more interactive and student-driven learning experience (Xie, 2022). Studies have demonstrated that PBL can be effective in cultivating these skills in diverse educational settings, including high schools in China, where there is a need to better prepare students for the demands of modern society (Zhang, 2023).

Student Engagement

Student engagement plays a pivotal role in determining the success of PBL in enhancing soft skills. Engagement refers to the degree of attention, curiosity, and interest that students exhibit in their learning activities, and it can significantly influence their learning outcomes (Gong & Cen, 2020). Reeve (2023) identified different dimensions of engagement, including behavioral, emotional, and cognitive, all of which are crucial for effective learning. High levels of engagement are associated with greater motivation, deeper learning, and improved skill development, which are essential for the successful implementation of PBL (Sarsale & Langub, 2023).

The moderating role of student engagement in the relationship between PBL and soft skills development has been a topic of interest in recent educational research. While PBL has been widely adopted, its effectiveness is often influenced by how engaged students are during the learning process (Gong & Cen, 2020). Engaged students are more likely to actively participate in discussions, collaborate with peers, and take ownership of their learning, which enhances the development of soft skills such as teamwork and problem-solving (Xie, 2022).

However, the specific moderating effect of engagement on PBL outcomes in Chinese high schools remains underexplored (Zhang, 2023).

Theoretical frameworks such as Self-Determination Theory (SDT) and Social Cognitive Theory (SCT) provide valuable insights into how PBL and student engagement interact to influence learning outcomes. SDT emphasizes the importance of autonomy, competence, and relatedness in fostering intrinsic motivation, which is crucial for student engagement in PBL settings (Filho et al., 2021). When students feel a sense of autonomy and competence, they are more likely to be engaged and take an active role in their learning, leading to better development of soft skills (Boisadan et al., 2022). SCT, on the other hand, highlights the role of observational learning and social interactions in skill development (Schunk, 2012). In PBL environments, students learn from each other through collaboration and modeling, which can enhance their communication and teamwork abilities (Kristensen et al., 2020).

Despite the potential benefits of PBL, there are challenges associated with its implementation in Chinese high schools. Traditional educational practices, which prioritize exam performance and teacher authority, can hinder the adoption of student-centered methods like PBL (Jaeger & Adair, 2018). Additionally, the success of PBL depends on the readiness of both teachers and students to embrace a more active and participatory learning environment (Zhang et al., 2023). Teacher training and support are crucial to ensure that educators are equipped to facilitate PBL effectively, as their role shifts from being the primary source of knowledge to a guide and facilitator (Divito et al., 2023).

In conclusion, the literature highlights the substantial potential of PBL in enhancing soft skills development among high school students, especially when student engagement is high. However, the moderating role of student engagement in this relationship warrants further investigation, particularly within the context of Chinese high schools. By exploring these dynamics, this study aims to address two key hypotheses:

H1: There is a positive relationship between students' perceptions of the PBL approach and soft skills enhancement among high school students in Anhui Province.

H2: Students' engagement positively moderates the relationship between students' perceptions of the PBL approach and the enhancement of soft skills.

Methodology

This study employs a quantitative research design to investigate the moderating role of student engagement in the relationship between Problem-Based Learning (PBL) and the development of soft skills among high school students. A cross-sectional survey method will be used to collect data from students in Anhui Province, China. This approach is suitable for examining the relationships among variables at a specific point in time and allows for the analysis of large samples, providing a comprehensive understanding of the research problem.

The target population for this study consists of high school students in Anhui Province who are currently enrolled in Grades 10, 11, or 12 and have experienced the Problem-Based Learning (PBL) approach in their English coursework. A stratified random sampling method was employed to ensure adequate representation from various schools and grade levels. The sample size for this study was determined using G*Power statistical power analysis,

targeting a minimum of 138 students to provide sufficient power for detecting significant relationships among the study variables.

Data will be collected using a structured questionnaire, which will include sections on students' perceptions of the PBL approach, their engagement levels, and the development of soft skills. The questionnaire will be adapted from validated instruments used in previous studies (Ibrahim et al., 2013; Surif et al., 2013; Phuti et al., 2023) and will include items measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire will also collect demographic information such as age, gender, and grade level.

The data collection process will involve obtaining permission from school administrators and distributing the questionnaires to students during class hours. Participants will be informed about the purpose of the study, and their consent will be obtained prior to participation. The survey will be administered anonymously to ensure confidentiality and encourage honest responses. Data will be analyzed using SPSS software. Descriptive statistics will be used to summarize the demographic characteristics of the sample and the key variables. Inferential statistics, including correlation analysis and multiple regression, will be used to test the hypotheses.

Findings

The demographic data from the survey indicate that the unit of analysis for this study was high school students in Anhui Province. The survey was distributed to 200 students enrolled in Grades 10, 11, or 12, who were actively participating in English classes that implemented the Problem-Based Learning (PBL) approach. Out of the 200 distributed questionnaires, 180 responses were received, resulting in a response rate of 90%. After excluding 8 unusable responses (5 incomplete and 3 not meeting the criteria), 172 valid questionnaires remained, giving a usable response rate of 86%. The majority of respondents were male, with 92 males representing 51.1% of the sample, while females represented 48.9%, with 88 respondents. This near-equal gender distribution suggests a balanced representation of male and female students in the study. In terms of grade level, Grade 12 students formed the largest group, accounting for 36.1% of the respondents, followed by Grade 11 students at 33.3%, and Grade 10 students at 30.6%. This distribution ensures that the study captures a broad range of experiences across the different stages of high school education.

Regarding the reliability of the scales used in the study, Table 1 presents the results of the reliability test using Cronbach's Alpha for three constructs: PBL Perceptions, Soft Skills Development, and Student Engagement. Cronbach's Alpha is used as a measure of internal consistency to determine the reliability of the items within each scale. For PBL Perceptions, Cronbach's Alpha was 0.832, indicating good reliability, as values above 0.7 are generally considered acceptable. The Cronbach's Alpha for Soft Skills Development was 0.807, and for Student Engagement, it was 0.891, both reflecting high internal consistency. These findings indicate that all scales were reliable and effectively captured the intended constructs.

Table 1

Reliability Test

	N of Items	Cronbach's Alpha
Soft Skills	46	.832
PBL Perceptions	13	.807
Student Engagement	14	.891

The correlation analysis presented in Table 2 examines the relationship between students' perceptions of PBL and soft skills development. The Pearson Correlation coefficient between PBL Perceptions and Soft Skills Development was 0.480, indicating a moderate positive correlation. This suggests that students who perceived PBL positively were more likely to report improvements in their soft skills. The significance level (Sig. 2-tailed) for this correlation was 0.000, which is highly significant ($p < 0.001$), confirming that the relationship between the two variables is statistically significant and not due to random chance.

Table 2

Correlations Analysis

		PBL Perceptions	Soft Skills
PBL Perceptions	Pearson Correlation	1	0.480**
	Sig.		<.001
Soft Skills	Pearson Correlation	0.480**	1
	Sig.	<.001	

** Correlation is significant at the 0.01 level

Based on the correlation analysis presented in Table 2, the hypothesis (H1) that there is a positive relationship between students' perceptions of the PBL approach and soft skills enhancement among high school students is supported. The Pearson Correlation coefficient of 0.480 indicates a moderate positive relationship, meaning that higher levels of positive perceptions of PBL are associated with increased soft skills development. Furthermore, the significance level confirms that this relationship is statistically significant at the 0.01 level, implying strong evidence against the null hypothesis. Therefore, the data validate H1, showing a positive and significant relationship between students' perceptions of the PBL approach and soft skills development among high school students.

Table 3

Moderated Regression Analysis

	Standardized Coefficients (β)	Sig.
PBL Perceptions	0.410	<.001
Student Engagement	0.423	<.001
Interaction Term (PBL*Engagement)	0.132	<.001

The regression analysis results, presented in Table 3, demonstrate that student engagement significantly moderates the relationship between PBL Perceptions and Soft Skills Development. The standardized coefficients (β) for PBL Perceptions, Student Engagement,

and the Interaction Term (PBL * Engagement) were 0.410, 0.423, and 0.132, respectively, all of which were statistically significant at $p < 0.001$. These findings indicate that both PBL Perceptions and Student Engagement independently contribute to the enhancement of soft skills, while the interaction term further highlights the moderating effect of engagement. Specifically, the positive effect of PBL on soft skills development was amplified for students with higher engagement levels. This finding supports the second hypothesis (H2), indicating that student engagement acts as a crucial factor in enhancing the effectiveness of PBL in fostering soft skills. When students are more engaged, their active participation and motivation contribute to deeper learning and better soft skills development outcomes.

Discussion

The findings of this study provide substantial evidence supporting the effectiveness of the Problem-Based Learning (PBL) approach in enhancing soft skills among highschool students in Anhui Province. The positive correlation between students' perceptions of PBL and soft skills development aligns with the existing literature, which emphasizes the value of student-centered learning in promoting key competencies such as communication, problem-solving, and teamwork (Cheriani et al., 2015; Zhao et al., 2023). The results indicate that students who perceive PBL positively are more likely to experience improvements in these essential skills, highlighting the importance of fostering a supportive and engaging learning environment. Furthermore, the study reveals that student engagement plays a crucial moderating role in the relationship between PBL and soft skills development. The interaction between PBL perceptions and student engagement was found to be statistically significant, indicating that higher levels of engagement amplify the positive effects of PBL on soft skills. This finding underscores the importance of student engagement as a key factor in maximizing the benefits of PBL. When students are actively engaged, they are more motivated to participate in group activities, collaborate with peers, and take ownership of their learning, all of which contribute to the development of soft skills (Kitetal., 2022; Zhao et al., 2023).

The implications of these findings are significant for educators and policymakers seeking to enhance the quality of education in high school settings. To maximize the effectiveness of PBL, it is essential to create learning environments that foster high levels of student engagement. This can be achieved by providing meaningful and challenging learning tasks, encouraging student autonomy, and fostering a supportive classroom environment. Additionally, teacher training programs should focus on equipping educators with the skills necessary to facilitate PBL effectively, as their role is crucial in guiding students through the problem-solving process and maintaining high levels of engagement (Cherianiet al., 2015; Zhao et al., 2023).

Conclusion and Recommendations

In conclusion, this study provides strong evidence that the Problem-Based Learning (PBL) approach is effective in enhancing soft skills among high school students in Anhui Province. The findings show that positive perceptions of PBL are significantly linked to improved soft skills, such as communication, teamwork, and problem-solving, which are crucial for students' future success. Furthermore, student engagement was found to be a key moderating factor that amplifies the positive impact of PBL on soft skills development. This underscores the importance of fostering an engaging learning environment to maximize the benefits of PBL.

The results of this study have important implications for educational practice. To fully harness the potential of PBL, educators should focus on creating supportive and engaging learning environments that encourage active participation. This involves providing meaningful, real-world problems for students to solve, promoting collaboration, and supporting student autonomy. Teacher training programs should also emphasize the skills needed to effectively facilitate PBL, as teachers play a crucial role in maintaining student engagement and guiding the learning process.

Policymakers should consider integrating PBL and other student-centered learning approaches into the high school curriculum to enhance soft skills development. Given the increasing demand for these skills in both higher education and the workforce, prioritizing their development within the educational system is essential. Additionally, efforts should be made to provide resources and support for teachers to implement PBL effectively, including professional development opportunities and instructional materials.

Future research should address the limitations of this study by employing longitudinal designs to better understand the causal relationships between PBL, student engagement, and soft skills development. Qualitative studies, such as interviews or focus groups, could also provide deeper insights into students' experiences and help identify factors that contribute to successful PBL implementation. By continuing to explore the impact of PBL on soft skills development, researchers can help improve educational practices that prepare students for success in an ever-changing world.

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