

Determinants of Students' Learning Satisfaction in Project-Based Learning Class, in a Foreign Language School, China

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Abstract

This study explores the impact of project-based learning on students' learning satisfaction in a foreign language school. Using quantitative research, students' motivation, communication and collaboration skills, and behavioral attitudes in relation to their learning satisfaction within PBL classes were analyzed. A sample of grade 9 students from a foreign language middle school participated. The study employs a questionnaire survey method, utilizing SPSS for analyzing reliability and Jamovi for comprehensive data analytics and hypothesis testing. Results indicate a significant influence of collaboration skills on learning satisfaction (28.9% variance, $p = 0.001$, $\beta = .6436$). However, motivation, communication skills, and behavioral attitudes did not significantly impact satisfaction. Future research directions are proposed for a more comprehensive understanding. A longitudinal study could reveal the sustained effects of PBL over time, while comparative analyses across grade levels and cultural backgrounds would offer insights into developmental trajectories and cultural influences. Exploring teachers' and parents' perspectives could provide a holistic view of PBL implementation. Lastly, a mixed-methods approach might deepen insights by combining qualitative and quantitative data. These recommendations aim to enhance an understanding of PBL's impact and inform effective educational practices. This research contributes to a nuanced perspective on the intricate dynamics between PBL and students' learning satisfaction.

Keywords: Project-Based Learning; Learning Satisfaction; Chinese Culture; Foreign Language School

Introduction

The study of foreign languages and cultures is increasingly crucial in our interconnected and globalized world. Chinese, in particular, stands out as one of the most sought-after languages in schools due to China's growing economic and cultural influence on the international stage (Zhu & Li, 2014). Consequently, Chinese culture education has garnered significant attention, aiming to foster cross-cultural understanding and communication among students. The Chinese Ministry of Education, in the Chinese Curriculum Standards for Compulsory Education (2022 Edition), emphasizes the need to enhance curriculum implementation's contextuality and practicality. Junior high school Chinese education should focus on improving students' subject literacy through independent, cooperative, and exploratory learning methods based on real situations (Chinese Ministry of Education, 2022). Additionally, the Shanghai Municipal Education Commission's Implementation Measures for the Management of Social Practice of Students in Junior High Schools in Shanghai recommends guiding students to strengthen ideals and beliefs through social practice and enhancing their sense of social responsibility, innovation, and practical ability (Shanghai Municipal Education Commission, 2019). These policy directions reflect the increasing emphasis on cultivating students' learning ability, practicality, and cooperation in Chinese education, promoting cross-disciplinary and cross-level approaches.

As for the project located place, Shanghai Ganquan Foreign Language Middle School, a public school in Shanghai, China, places a strong emphasis on cultivating students' language learning literacy. The school offers practical courses such as *Chinese Folk Culture*, *Chinese Studies*, *Chinese Studies in Poetry*, and *Shanghai Dialect*, to promote cultural characteristics and the combination of Chinese subjects, enhancing students' humanistic literacy. However, the current curriculum has limitations and lacks innovative practices outside the classroom. The teacher-centered learning approach and the lack of hands-on projects do not align with the student-centered teaching philosophy.

In view of Project-Based Learning (PBL), which is a teaching methodology where students engage in extended projects centered around complex questions or problems. The approach involves students actively participating in design, problem-solving, decision-making, or investigative activities, with the aim of producing realistic products or presentations that demonstrate their understanding and application of knowledge (Thomas, 2000).

Motivation: PBL has been shown to enhance students' motivation to learn, as they play an active role in the learning process and have autonomy in working collaboratively on meaningful

projects (Wongdaeng & Hajihama, 2018). The PBL method fosters student engagement by connecting their interests to the learning content, making learning more relevant and appealing (Walsh, 2010).

Communication Skills: PBL provides opportunities for students to communicate using the target language, improving their speaking skills and social interactions (Yin & Huat, 2021). Collaborative group work in PBL enables students to communicate effectively and openly with peers, enhancing their communication competencies (Crespí et al., 2022).

Collaboration Skills: PBL emphasizes collaboration and teamwork, developing students' cooperation skills through effective communication, negotiation, and coordination to achieve common goals (Ibrahim & Mat Rashid, 2022). Working in groups and engaging in group assignments in PBL enhances students' collaboration and cooperation abilities (Al Rasyida & Khoirunnisa, 2021).

Behavioral Attitudes: Students' attitudes towards PBL are crucial to its success (Melguizo-Garín et al., 2022). Successful implementation of PBL depends on student acceptance, as high levels of student participation are required (Thomas, 2000).

Lu Xun's profound connection to Chinese traditional culture is evident through his ideas and philosophy of the 'intermediate object'. As highlighted by Wu (2016), his study and practice in translation aimed to deduce and develop excellence in Chinese traditional culture while absorbing advanced thoughts from the West, acting as a bridge to explore new cultural factors arising from the collision of Chinese and Western cultures. Furthermore, Deng (2020) reveals that Lu Xun's writings reflect the mental state of people influenced by the examination and autocratic system in modern China, offering insights into the impact of the examination system on Chinese society. Additionally, Guo (2019) discusses how Lu Xun's short stories are richly loaded with Chinese cultural elements, including traditional thought, conventions, local folk customs, Chinese names, appellations, and historical backgrounds, thereby highlighting the profound cultural messages embedded in his works. For this research, Lu Xun's works from Chinese textbooks for grades 6 and 7 were incorporated into the PBL approach. Specifically, using the memorable essay *Mr. Fujino* as an example, students conducted inquiry activities in small groups. They visited Lu Xun Park, Lu Xun Memorial Hall, and Lu Xun's former residence in Putuo District, Shanghai, to understand relevant cultural knowledge and explore the life of Lu Xun and his teacher, Mr. Fujino, as portrayed in the essay. This inquiry process focused on three aspects: understanding the relationship between Lu Xun and Mr. Fujino, exploring Lu Xun's life and feelings towards his

teacher through the exhibition hall, and fostering teacher–student friendships and cherishing a happy life.

Overall, implementing PBL at Shanghai Ganquan Foreign Language Middle School is poised to enrich the learning experiences of its students, empowering them to become confident and effective communicators, collaborators, and critical thinkers. By addressing the existing issues and embracing innovative teaching approaches, the school can reaffirm its position as a beacon of excellence in language education in Shanghai.

Research Objectives

The research is guided by the following objectives, shaping the direction and intended outcomes of the study.

1. To determine the effect of motivation on the students' learning satisfaction toward Project–Based Learning.
2. To determine the effect of communication skills on the students' learning satisfaction toward Project–Based Learning.
3. To determine the effect of collaboration skills on the students' learning satisfaction toward Project–Based Learning.
4. To determine the effect of behavioral attitudes on the students' learning satisfaction toward Project–Based Learning.

Literature Review

Motivation

In the realm of education, motivation plays a pivotal role in shaping learners' engagement and outcomes. Two main types of motivation, extrinsic and intrinsic, exert distinct influences on learners' behaviors and attitudes. Extrinsic motivation hinges on external rewards or incentives to stimulate learning actions, while intrinsic motivation draws from learners' inherent interest and enjoyment in the activity itself (Chang et al., 2018).

The literature surrounding Project–Based Learning (PBL) offers a nuanced exploration of its intersection with student motivation. On one hand, studies such as those conducted by Harding et al. (2007), and Susetyarini et al. (2019) spotlight the potential benefits of PBL, underscoring its capacity to enhance motivation and cultivate a sense of responsibility among students. Engaging in hands–on materials engineering projects (Harding et al., 2007) and fostering active

ownership in the learning process (Susetyarini et al., 2019) are lauded as catalysts for bolstering students' motivation.

Conversely, other studies delve into the challenges and limitations of PBL concerning motivation. The work of Rini et al. (2020) acknowledges the complexity of catering to diverse learning styles within a PBL framework, recognizing the potential impact on student motivation. Similarly, Ambiyar et al. (2020) delve into the intricacies of applying PBL to sketch drawing instruction, highlighting the need for tailored planning and adaptation to optimize motivation within specific subject areas and student cohorts.

Exploring the impact of PBL on intrinsic motivation, diverse perspectives emerge from studies like Zhang (2021). Zhang's research reveals the positive influence of engaging in PBL projects on students' intrinsic motivation levels.

In sum, the literature delving into the interplay between PBL and motivation underscores the potential of PBL to invigorate students' learning drive and sense of agency. While PBL exhibits favorable attributes in promoting comprehensive learning experiences and intrinsic motivation, it is crucial to acknowledge the obstacles posed by varying learning styles and contexts. As educators navigate PBL implementation strategies, as proposed by Lopez-Gazpio (2022), and delve into learners' perspectives, as explored by Ren (2022), a holistic comprehension of the intricate relationship between motivation and PBL emerges.

Communication Skills

Expanding on the theme of communication skills, this vital aspect encompasses the expression of thoughts and ideas through verbal, non-verbal, and written means across diverse contexts. It also encompasses the ability to understand and infer values, attitudes, and intentions from spoken communication. Moreover, adept utilization of media and technology for both information reception and effective communication in various environments further exemplifies the scope of communication skills (Wongdaeng & Hajihama, 2018).

In the realm of education, communication skills have emerged as a linchpin within the framework of Project-Based Learning (PBL), as attested by a myriad of perspectives found in the literature. A chorus of studies (Fitriani & Arifa, 2020; Hart, 2019; Megayanti et al., 2020) resoundingly underscores the positive nexus between PBL and the development of robust communication skills. Notable examples span various disciplines, revealing the holistic impact of PBL on communication competency. In Science Degree programs, PBL modules have been observed to not only nurture domain-specific knowledge but also essential employability skills,

with communication skills being a notable beneficiary (Hart, 2019). Echoing this sentiment, (Sofya & Ritonga, 2021) delve into the domain of Economics Education Study Programs, where the crafting of a learning plan via PBL surfaces as a catalyst for refining the 4Cs skills, particularly prioritizing communication skills. In a related vein, the exploration conducted by (Denuga & Nkengbeza, 2022) sheds light on pre-service teachers' experiences within a PBL milieu, pointing towards the imperative of delving deeper into how communication skills can be optimally nurtured within teacher education programs.

Collaboration Skills

Collaboration skills are paramount in today's diverse and interconnected world, encompassing respectful collaboration with team members, adaptability, responsibility, and valuing diverse contributions (Wongdaeng & Hajihama, 2018). The existing literature delves into the intricate interplay between collaboration skills and Project-Based Learning (PBL), elucidating both positive and negative facets.

On a positive note, numerous studies extol the virtues of PBL in nurturing collaboration skills among students. For instance, Trisdiono et al. (2019) underscore the efficacy of multidisciplinary integrated Project-Based Learning models in cultivating critical thinking and collaboration among elementary school students. Likewise, Warr and West (2020) elucidate the integration of an interdisciplinary design studio as a conduit for teaching creative problem-solving through PBL, emphasizing its role in fostering collaborative endeavors. However, Notari et al. (2014) introduce a dimension of complexity by investigating how social skills at both personal and group levels impact task-related email communication, performance satisfaction, and perceived collaboration quality in PBL environments. This highlights that while PBL facilitates collaboration, potential challenges in communication and coordination among students may arise.

Furthermore, Denuga and Nkengbeza (2022) center their study on pre-service teachers' encounters with PBL, shedding light on its influence on collaboration. Although the specific findings are not delineated, the employment of a quantitative research approach suggests a need for a more nuanced exploration of PBL's impact on collaboration skills.

Behavioral Attitudes

The behavioral component of attitudes holds significant sway over individuals' actions and behaviors toward various objects (Tran & Tran, 2020). Project-Based Learning (PBL) has been extensively examined to gauge its impact on students' behavioral attitudes, revealing a complex interplay of positive outcomes and challenges.

Numerous studies have underscored PBL's affirmative influence on students' attitudes and academic performance. For instance, (Çevik & Üredi, 2016) found that implementing PBL approaches positively affected both the academic achievement and attitudes of students with mild intellectual disabilities. Similarly, (Yang, 2021) highlighted the pivotal role of attitudes in knowledge transfer within the realm of PBL, indicating that favorable attitudes facilitate effective application of acquired knowledge. Furthermore, (Hartikainen et al., 2021) delved into the connections between students' attitudes towards school and their behavioral engagement within PBL classrooms. Their study unveiled a correlation between positive attitudes towards the learning environment and heightened task-focused behavior and emotional engagement among students. Nevertheless, challenges concerning behavioral intentions and technology adoption have also come to the fore. Studies such as Faham and Asghari (2019) explored the determinants of users' behavioral intention to adopt e-textbooks and e-Learning. These investigations emphasized the need to address behavioral barriers and privacy concerns to cultivate favorable behavioral intentions in the context of technology-driven learning.

Moreover, (Zhou et al., 2020) examined the intricate interplay of personal, environmental, and behavioral factors influencing individuals' use of YouTube as a learning resource. This study illuminated the intricate web of factors influencing behavioral attitudes toward technology-based learning, underscoring the necessity for comprehensive strategies to harness its benefits effectively.

Learning Satisfaction

Students' learning satisfaction encompasses a spectrum of elements, ranging from individual learning achievements to skill development and group collaboration (Chou & Chang, 2018). The interplay between learning satisfaction and Project-Based Learning within educational contexts has undergone extensive scrutiny. Numerous studies underscore the advantages of Project-Based Learning, particularly its ability to immerse students in authentic problem-solving scenarios, thereby nurturing sustained motivation and continuous cognitive engagement throughout the learning journey (Blumenfeld et al., 1991). Project-Based Learning, along with its counterpart problem-based learning, deviates from conventional teaching methods, centering on the learning process itself and providing a fertile ground for mutual inspiration and growth (Kolmos, 1996).

The exploration of Project-Based Learning's impact spans diverse subjects and learning environments. Learning by Design (LBD), an inquiry-based project approach to science education, has yielded theoretical insights and practical lessons on designing effective learning environments

(Kolodner et al., 2003). Similarly, the integration of Project-Based Learning and e-portfolio assessment in undergraduate courses has yielded promising outcomes in enhancing collaborative learning and student satisfaction (Gülbahar & Tinmaz, 2006). Moreover, investigations have delved into the effect of continuous learning technologies, such as Project-Based Learning, on English language learning outcomes within university programs (Syakur et al., 2020). However, the application of Project-Based Learning presents challenges due to the distinctive needs of each educational institution. Researchers have sought innovative solutions, proposing deep learning-based methodologies and reinforcement learning approaches to create intelligent agents tailored for Project-Based Learning (Chen et al., 2019; Jeerige et al., 2019). Notwithstanding its numerous merits, challenges endure in the implementation of Project-Based Learning, particularly within the realm of global project-based organizations, where learning spans diverse levels and contexts (Wiewiora et al., 2020).

Research Questions

As shown in Figure 1, this research endeavors to address the specific research questions outlined in the subsequent sections of this paper.

How the motivation affects students' learning satisfaction toward Project-Based Learning?

How the communication skills affect students' learning satisfaction toward Project-Based Learning?

How the collaboration skills affect students' learning satisfaction toward Project-Based Learning?

How the behavioral attitudes affect students' learning satisfaction toward Project-Based Learning?

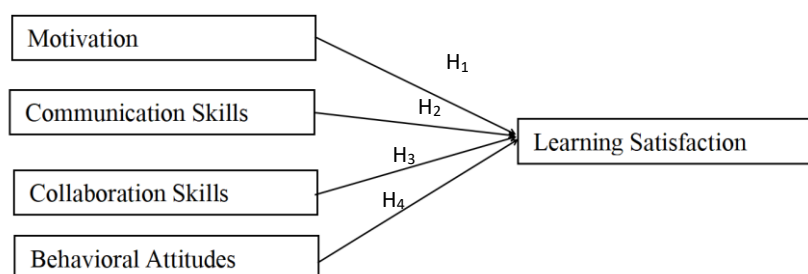


Fig.1 Conceptual Framework

Research Methods and Instruments

Research Design

The present study uses a quantitative research approach, employing surveys to explore how Project-Based Learning (PBL) impacts student satisfaction in a Chinese foreign language school. Data is collected from grade 9, class 4 students at Shanghai Ganquan Foreign Language Middle School, who have previous PBL experience in grade 7. A carefully selected sample is surveyed to assess motivation, communication and collaboration skills, behavioral attitudes, and their relationship to learning satisfaction in a PBL setting.

Population and Sample

Shanghai Ganquan Foreign Language Middle School boasts a vibrant educational institution, comprising a diverse population of 1,600 students, 200 local teachers, 8 foreign teachers, and over 80 foreign students. With an expansive infrastructure, the school encompasses seven grades, distributed across 43 classes. Specifically, the junior high school segment spans grades 6 to 9, accommodating approximately 200 students per grade. For the purpose of this study, the focal group consists of 800 junior high school students currently enrolled at Shanghai Ganquan Foreign Language Middle School. For the study's purpose and effective data collection, the necessary characteristics required for the participants include being currently enrolled in the junior high school program at the specified school. Additionally, participants should be willing to voluntarily take part in the research and provide their informed consent, ensuring ethical considerations are met. This ethical consideration underscores the paramount importance of safeguarding participants' autonomy and rights throughout the research process.

Specifically, the study focused on grade 9 class 4 students enrolled at Shanghai Ganquan Foreign Language Middle School. This specific subset of students, totaling 36 individuals, was selected based on their prior participation in unified Project-Based Learning during their grade 7 curriculum.

In the context of this study, the purposive sampling method was deliberately chosen as the sampling technique due to its alignment with the research objectives and focus. Purposive sampling is a non-random method that involves the intentional selection of participants based on predetermined criteria, ensuring that the chosen individuals possess specific characteristics or experiences relevant to the research focus (Palinkas et al., 2015).

The utilization of the purposive sampling method aligns with the specific nature of the research questions and the need to obtain insights from individuals who have direct experience with Project-Based Learning. This methodological approach is particularly advantageous when researchers seek to explore a specific phenomenon within a well-defined context (Creswell & Creswell, 2017). However, it is important to acknowledge the limitation that the findings may not be readily generalizable to the broader population due to the intentional selection of participants based on predetermined criteria.

Research Instruments

The study's quantitative orientation necessitated the adoption of a structured questionnaire as the primary tool for data collection. Two prominent experts in the field of Chinese and foreign language studies meticulously examined and critiqued the questionnaire. The questionnaire, as a research instrument, employs a 5-level Likert scale to gauge participants' levels of agreement with the statements presented. To ensure the robustness of the data, the widely recognized SPSS data analytics software version 25 was employed. The survey instrument employed in this study was a meticulously crafted questionnaire consisting of 22 concise and precisely formulated questions. The questionnaire was thoughtfully divided into two distinct sections, denoted as Part A and Part B, each serving a specific purpose.

The questionnaire's consistency was confirmed by the high reliability coefficient determined through Cronbach Alpha analysis, yielding a noteworthy value of .969.

Motivation: The survey tool used in the study for measuring student motivation was adapted from Ngereja et al. (2020), which employed a 5-point Likert scale. The questionnaire suits similar study contexts and can be modified for other settings while retaining its core structure.

Communication Skills: For assessing communication skills, the survey tool adopted a 5-point Likert scale. This adaptation was based on Wongdaeng and Hajihama (2018), with some modifications from the original 5 items to 4 items.

Collaboration Skills: The survey tool utilized a 5-point Likert scale to measure collaboration skills. This adaptation was derived from Wongdaeng and Hajihama (2018), with 4 items used instead of the original 5 items.

Behavioral Attitudes: To gauge behavioral attitudes, the survey tool employed a 5-point Likert scale. This adaptation was based on Tran and Tran (2020), with 3 items used instead of the original 5 items.

Learning Satisfaction: The survey tool for assessing learning satisfaction was adapted from Chou and Chang (2018). It utilized a 5–point Likert scale with 4 items used in the adaptation, as opposed to the original 5 items.

Results

Consistency Reliability (Cronbach's Alpha)

The study employed Statistical Package for the Social Sciences (SPSS) version 25, a widely recognized tool for quantitative analysis, to ensure the robustness of the measurement instrument. Cronbach's Alpha was applied to key variables: motivation, communication skills, collaboration skills, behavioral attitudes, and learning satisfaction. This rigorous assessment gauged the internal consistency of the survey items. The level of the Chronbach's Alpha use Hair et al. (2010) to evaluate the level of acceptable reliability value. Initially, the Item Objective Congruence (IOC) Index validity test was used to align each item with research constructs. This iterative review, guided by experts, refined items for clarity and relevance. Analysis findings uncovered a statistically significant and robust positive relationship between independent factors and learning satisfaction.

Table 1 The Level of the Chronbach's Alpha

Cronbach's Alpha Level	Strength of Association
< 0.6	Poor
0.6 to < 0.7	Moderate
0.7 to < 0.8	Good
0.8 to < 0.9	Very Good
≥0.9	Excellence

Source: Hair et al. (2010)

Based on the calculation, we obtained the following Chronbach's Alpha level.

Table 2 Results of Cronbach's Alpha of the research instruments

Variable	Number of Items	Cronbach's Alpha	Interpretation
Motivation	3	0.70	Good
Communication Skills	4	0.89	Very good
Collaboration Skills	4	0.94	Excellent
Behavioral Attitudes	3	0.87	Very good
Learning Satisfaction	4	0.94	Excellent

The level of Chronbach's alpha in the variables are within the moderate to excellent level. Thus, this indicate the acceptable level of internal consistency of the research instrument.

Demographic Information

The study encompassed a targeted sample of 36 participants drawn from a distinguished foreign language school in China. The participants consisted of 19 girls (47.2%) and 17 boys (52.8%), representing a balanced gender distribution within the sample. A thorough examination of the participants' age distribution revealed that an overwhelming majority (97.2%) fell within the age range of 13 to 16 years, underlining the cohort's homogeneity in terms of age. Notably, only one participant exceeded the age of 17, illustrating the study's alignment with the grade 9 class 4 students from Shanghai Ganquan Foreign Language Middle School. Within the context of Project-Based Learning (PBL) classes, it was observed that an encouraging proportion of students actively participated in the PBL experience. Specifically, 91.7% (33 students) of the participants embraced PBL as an integral part of their learning journey. However, a small subset of students, comprising three individuals, demonstrated a perceptible bias against PBL, reflecting the diverse range of attitudes within the sample. The temporal dimension of PBL task completion exhibited noteworthy diversity among the participants. A substantial portion of the students (44.4% or 16 students) demonstrated adeptness in completing PBL tasks within a relatively short span of 1 to 3 days. Meanwhile, 38.9% (14 students) opted for a moderate timeframe of 4 to 7 days for task completion, highlighting their commitment to a comprehensive engagement with the PBL process. In contrast, a minority of participants (16.7% or 6 students) extended their task completion timeline beyond 7 days, showcasing their meticulous and methodical approach.

Delving into the dynamics within the context of the foreign language school in China is facilitated by the comprehensive statistical breakdowns provided in Table 3.

Table 3 Demographic Information of Samples

Variable	Categories	N	Percentage
Gender	Male	17	47.2%
	Female	19	52.8%
	Total	36	100%
Age	Less than 13 years old	0	0%
	13–16	35	97.2%
	More than 17 years old	1	2.8%
	Total	36	100%
Learning experience of Project-Based Learning class	Yes	33	91.7%
	No	3	8.3%
	Total	36	100%
Time spent in Project-Based Learning	1–3 days	16	44.4%
	4–7 days	14	38.9%
	More than 7 days	6	16.7%
	Total	36	100%

Arbitrary Level of Questionnaire

To ensure a thorough interpretation of the collected data, a deliberate threshold was employed to categorize mean values for each variable, drawing upon the approach proposed by Pimentel (2010). Detailed information regarding this categorization is presented in Table 4.

Table 4 Arbitrary Level for Interpretation of Questionnaire Data

Arbitrary Level	Interpretation
1.00 – 1.79	Strongly Disagree
1.80 – 2.59	Disagree
2.60 – 3.39	Neutral
3.40 – 4.19	Agree
4.20 – 5.00	Strongly Agree

Source: Pimentel (2010)

Descriptive Statistics of Motivation

Table 5 provides a comprehensive insight into the students' motivation levels within the Project-Based Learning class. The calculated total mean of 4.42 signifies a robust level of motivation, corresponding to a classification of 'Strongly Agree' based on the arbitrary scale. This finding underscores the participants' notable enthusiasm and commitment to the Project-Based Learning approach. Particularly noteworthy is the students' clear recognition of the connection

between project assignments and their overall subject scores. This awareness is evidenced by the substantial mean scores of 4.47 (SD: 0.77) and 4.42 (SD: 0.73) for the first and second statements, respectively, both indicative of a resounding 'Strongly Agree' response. The consistently high scores point to a deep-seated motivation among students, driven by the understanding that their efforts in Project-Based Learning contribute significantly to their academic achievements. Furthermore, the data highlights the students' genuine enjoyment and enthusiasm for collaborative teamwork. This is evident in the statement reflecting a positive experience while working with fellow team members, yielding an average mean of 4.36 (SD: 0.99). This collective positivity resonates throughout the survey responses, resulting in an overall mean of 4.42 (SD: 0.66).

Table 5 Descriptive Statistics of Motivation

	Item Statement	Mean	SD	Interpretation
1	Knowing that the project assignment counted for the total score in the subject has motivated me to put in extra effort.	4.47	.77	Strongly Agree
2	Knowing that the results of my project will be used as a learning aid in the subject has motivated me to put in extra effort.	4.42	.73	Strongly Agree
3	I enjoyed working with my fellow team members very much.	4.36	.99	Strongly Agree
	Total	4.42	.66	Strongly Agree

Descriptive Statistics of Communication Skills

Table 6 provides a comprehensive overview of the participants' communication skills within the Project-Based Learning class. The computed total mean communication skills score of 4.46, when referenced against the arbitrary scale, corresponds to a classification of 'Strongly Agree.' The insights gleaned from the analysis of student engagement in Project-Based Learning yield valuable insights. It is evident that participants exhibit a pronounced inclination towards leveraging project-based activities to enhance their communication competencies. This is evident from their consistently high agreement (Mean: 4.46, SD: 0.71) with statements that underscore the pivotal role of communication in the overall learning experience. Notably, the participants demonstrate a remarkable enthusiasm for partaking in activities that involve sharing their work not only among peers but also with the larger online community. This enthusiasm is highlighted by the consistently elevated mean scores (ranging from 4.39 to 4.61) and relatively low standard deviations (ranging from 0.69 to 0.93).

Table 6 Descriptive Statistics of Communication Skills

Item Statement	Mean	SD	Interpretation
4 Participating in the project allow me to communicate with teachers and friends.	4.61	.69	Strongly Agree
5 The project outweighed the difficulties of talking about Chinese culture.	4.44	.81	Strongly Agree
6 Reading the letter to other students is a good way to practice communication.	4.39	.80	Strongly Agree
7 Capturing a video to show to friends and post online makes me feel more eager to speak.	4.39	.93	Strongly Agree
Total	4.46	.71	Strongly Agree

Descriptive Statistics of Collaboration Skills

Table 7 presents a detailed overview of the collaboration skills observed within the Project-Based Learning class. The collective mean score of 4.56, which corresponds to the 'Strongly Agree' level on the rating scale, serves as a strong indicator of the participants' unanimous endorsement of the collaborative aspects inherent in their learning environment. Participants consistently expressed substantial appreciation for witnessing their peers' active participation in shared projects, yielding a mean score of 4.50 (SD: 0.78). Similarly, the observation of students extending mutual assistance during interactions with the teacher garnered a mean score of 4.47 (SD: 0.85), showcasing the integral role of collaboration in the learning process. Participants also attributed their enhanced learning outcomes to group discussions, underscoring the value of collaborative learning with a mean score of 4.61 (SD: 0.69). Noteworthy is the affirmation that the utilization of Project-Based Learning strategies distinctly promoted collaborative learning, as evidenced by a robust mean score of 4.64 (SD: 0.68) for the corresponding statement. Taken together, these findings accentuate a prevailing consensus among participants, as the composite mean score for collaboration skills attains a noteworthy value of 4.56 (SD: 0.69).

Table 7 Descriptive Statistics of Collaboration Skills

Item Statement	Mean	SD	Interpretation
8 I like seeing other students paying attention to the same project.	4.50	.78	Strongly Agree
9 I like seeing other students helping each other to discuss with the teacher.	4.47	.85	Strongly Agree
10 I learned more because of group discussion.	4.61	.69	Strongly Agree
11 Use of the project promoted my collaborative learning.	4.64	.68	Strongly Agree
Total	4.56	.69	Strongly Agree

Descriptive Statistics of Behavioral Attitudes

Table 8 illustrates the detailed breakdown of behavioral attitudes observed within the Project-Based Learning class. The cumulative mean score, calculated at 4.28, significantly surpasses the arbitrary benchmark, indicating a resounding consensus of 'Strongly Agree'. A closer examination of the data uncovers the noteworthy dedication of participants towards self-directed study endeavors (Mean: 4.28, SD: 0.85). This finding not only aligns with the 'Strongly Agree' category but also highlights a high degree of enthusiasm for autonomous learning. Similarly, students' commitment to honing their oral communication skills through dedicated practice is evident (Mean: 4.25, SD: 0.84). The overwhelming concurrence in the 'Strongly Agree' range accentuates their proactive approach to linguistic proficiency enhancement. Further delving into the realm of collaborative dynamics, the data showcases a particularly striking behavioral trait. Participants consistently exhibit a proactive role in fostering peer interaction, actively engaging in constructive feedback exchanges with their classmates (Mean: 4.31, SD: 0.95). In totality, these findings paint a vivid picture of the students' remarkable commitment to both independent learning endeavors and meaningful interaction with their peers. The cumulative mean score of 4.28 (SD: 0.79) for behavioral attitudes reinforces their resolute endorsement of the Project-Based Learning approach.

Table 8 Descriptive Statistics of Behavioral Attitudes

Item Statement	Mean	SD	Interpretation
12 I spend more time for self-study when doing the project.	4.28	.85	Strongly Agree
13 I spend more time practicing speaking skill when doing the project.	4.25	.84	Strongly Agree
14 I pay attention to providing constructive feedback to my friends.	4.31	.95	Strongly Agree
Total	4.28	.79	Strongly Agree

Descriptive Statistics of Learning Satisfaction

Table 9 provides a comprehensive overview of the learning satisfaction experienced within the Project-Based Learning class. The aggregate mean satisfaction score, calculated at 4.51 (SD: 0.69), significantly surpasses the arbitrary threshold for 'Strongly Agree'. This robust level of satisfaction underscores the efficacy of Project-Based Learning in eliciting positive responses from students. Particularly noteworthy is the remarkably positive reception of the group work model, evidenced by a mean score of 4.39 (SD: 0.84). This result highlights the participants' enthusiastic embrace of collaborative learning dynamics, indicative of their comfort and proficiency in engaging

within group contexts. Furthermore, the participants' contentment with their workload allocation is apparent, as exemplified by a mean score of 4.56 (SD: 0.70). This score reflects a meticulously balanced and manageable distribution of tasks, promoting a harmonious interplay between academic requirements and individual capabilities. Equally significant is the acquisition of vital professional knowledge and skills, which garnered a mean score of 4.56 (SD: 0.74). This outcome accentuates the Project-Based Learning program's effectiveness in equipping students with practical competencies that are pertinent to their academic pursuits and future undertakings. An essential aspect contributing to the positive learning environment is the fostering of a collaborative ethos, as underscored by the mean score of 4.53 (SD: 0.70) concerning the acknowledgment and integration of participants' viewpoints within their respective groups.

Table 9 Descriptive Statistics of Learning Satisfaction

Item Statement	Mean	SD	Interpretation
15 I was satisfied with the group work model.	4.39	.84	Strongly Agree
16 I obtained a satisfied score based on my workload.	4.56	.70	Strongly Agree
17 I acquired the professional knowledge and skills I needed.	4.56	.74	Strongly Agree
18 Most of my opinions could be accepted or were emphasized by my group members.	4.53	.70	Strongly Agree
Total	4.51	.69	Strongly Agree

Hypotheses Testing

H₀1: Motivation does not affect the students' learning satisfaction toward Project-Based Learning.

H_a1: Motivation affects the students' learning satisfaction toward Project-Based Learning.

H₀2: Communication skills do not affect the students' learning satisfaction toward Project-Based Learning.

H_a2: Communication skills affect the students' learning satisfaction toward Project-Based Learning.

H₀3: Collaboration skills do not affect the students' learning satisfaction toward Project-Based Learning.

H_a3: Collaboration skills affect the students' learning satisfaction toward Project-Based Learning.

H₀4: Behavioral attitudes do not affect the students' learning satisfaction toward Project-Based Learning.

H_a4: Behavioral attitudes affect the students' learning satisfaction toward Project-Based Learning.

A multiple linear regression analysis was conducted to test if independent variables; four competencies – motivation (M), communication skills (CMS), collaboration skills (CLS) and behavioral attitudes (BA) have a significant influence to the students' learning satisfaction toward Project-Based Learning.

Table 10 ANOVA Omnibus Tests

	SS	df	F	p	η^2p
Model	14.20341	4	46.6949	<.001	0.858
M	0.18154	1	2.3873	0.132	0.072
CMS	0.00442	1	0.0582	0.811	0.002
CLS	0.96015	1	12.6263	0.001	0.289
BA	0.05585	1	0.7344	0.398	0.023
Residuals	2.35735	31			
Total	16.56	35			

Table 10 showed the multiple linear regression model. Based on the ANOVA Omnibus Tests conducted, the p-values for the variables were as follows: motivation (p = 0.132), communication skills (p = 0.811), collaboration skills (p = 0.001) and behavioral attitudes (p = 0.398). Analyzing these results in the context of the hypotheses tested in the study, the following conclusions can be drawn:

For motivation: The p-value of 0.132 exceeds the conventional significance level of 0.05, indicating that there is no significant evidence to reject the null hypothesis. Therefore, it can be concluded that motivation does not have a statistically significant effect on students' learning satisfaction toward Project-Based Learning. For communication skills: With a p-value of 0.811, the null hypothesis cannot be rejected. This suggests that there is no significant relationship between communication skills and students' learning satisfaction in the context of Project-Based Learning. For collaboration skills: The p-value of 0.001 is considerably lower than 0.05, providing strong evidence to reject the null hypothesis. Thus, collaboration skills have a statistically significant influence on students' learning satisfaction in the Project-Based Learning class. For behavioral attitudes: The p-value of 0.398 is higher than 0.05, implying that the null hypothesis is not

rejected. It can be concluded that behavioral attitudes do not exert a statistically significant impact on students' learning satisfaction within the Project-Based Learning environment.

Table 11 Fixed Effects Parameter Estimates

Construct	β	t	p
M	0.2053	1.545	0.132
CMS	0.0502	0.241	0.811
CLS	0.6436	3.553	0.001
BA	0.0850	0.857	0.398

Table 11 presents a comprehensive analysis of the independent variables' impact on the dependent variable, shedding light on their relative strengths. Notably, one of the indices demonstrated statistical significance, yielding valuable insights into the factors influencing students' learning satisfaction. In this regard, collaboration skills emerged as a significant contributor, accounting for a substantial 28.9% of the variance in students' learning satisfaction. This relationship was found to be statistically significant ($p = 0.001$), as indicated by a robust Beta value of .6436. Upon further examination, the study delved into the influence of other independent variables on students' learning satisfaction. The analysis revealed intriguing patterns. Specifically, motivation, communication skills and behavioral attitudes were subjected to scrutiny. It was observed that motivation exhibited a Beta value of 0.2053 with a p-value of 0.132, indicating that while the relationship hinted at an influence, it did not reach the threshold of statistical significance. Similarly, the examination of communication skills ($\beta = 0.0502$, $p = 0.811$) and behavioral attitudes ($\beta = 0.0850$, $p = 0.398$) unveiled non-significant associations with students' learning satisfaction.

The formula for the model of the independent variables towards students' learning satisfaction is:

$$\hat{Y} = .205X_1 + .050X_2 + .643X_3 + .085X_4$$

Table 12 provides a concise overview of the hypotheses testing results.

Table 12 Summary of the Hypothesis Testing

Statement	Results
H _{a1} : Motivation affects the students' learning satisfaction toward Project-Based Learning.	Not Support
H _{a2} : Communication skills affect the students' learning satisfaction toward Project-Based Learning.	Not Support
H _{a3} : Collaboration skills affect the students' learning satisfaction toward Project-Based Learning.	Support
H _{a4} : Behavioral attitudes affect the students' learning satisfaction toward Project-Based Learning.	Not Support

Discussion and Conclusions

Research Question 1

The study's examination of motivation's influence on learning satisfaction in Project-Based Learning reveals compelling insights. With an overall mean of 4.42, denoting 'Strongly Agree' on the arbitrary level, participants display a strong motivation. Notably, the data underscores students' heightened commitment to project assignments, contributing to their subject scores, evident in mean scores of 4.47 (SD: 0.77) and 4.42 (SD: 0.73) for two distinct statements. Moreover, students' enthusiasm for collaborative teamwork is highlighted by a robust mean of 4.36 (SD: 0.99) when expressing enjoyment during collaborative tasks. The cumulative mean of 4.42 (SD: 0.66) across all responses reaffirms the overall positive attitude toward Project-Based Learning. This study underscores the potency of integrating real-world applicability and collaborative experiences in fostering student motivation and enhancing learning satisfaction. However, the p-value of 0.132 exceeds the conventional significance level of 0.05, indicating that there is no significant evidence to reject the null hypothesis. Therefore, it can be concluded that motivation does not have a statistically significant effect on students' learning satisfaction toward Project-Based Learning.

Research Question 2

The exploration of communication skills' impact on learning satisfaction in Project-Based Learning yields notable insights. With a total mean of 4.46, corresponding to 'Strongly Agree', students exhibit a strong inclination towards utilizing project-based activities to enhance their communication proficiency. The data underscores participants' enthusiasm for sharing their work, reflected in consistently high mean scores (ranging from 4.39 to 4.61) and low standard deviations (ranging from 0.69 to 0.93). These findings illuminate Project-Based Learning's positive role in cultivating effective communication skills and fostering enthusiasm for exploring aspects of Chinese culture. This alignment between Project-Based Learning, communication skills, and heightened student motivation contributes to elevated learning satisfaction. However, the p-value of 0.811 suggests that the null hypothesis cannot be rejected. This implies that there is no significant relationship between communication skills and students' learning satisfaction in the context of Project-Based Learning.

Research Question 3

The study's examination of collaboration skills' influence on learning satisfaction in Project-Based Learning sheds light on its pivotal role. With an overall mean of 4.56, denoting 'Strongly

Agree', participants unequivocally endorse the significance of collaborative aspects in their learning experience. Mean scores reaffirm this stance, reflecting participants' appreciation for observing peers' active involvement in projects (Mean: 4.50, SD: 0.78), mutual assistance during interactions with teachers (Mean: 4.47, SD: 0.85), and enhanced learning outcomes through group discussions (Mean: 4.61, SD: 0.69). The strong agreement score for the statement on collaborative learning promotion through projects (Mean: 4.64, SD: 0.68) underscores the profound impact of Project-Based Learning methodologies. This collective sentiment is reinforced by the robust total mean of 4.56 (SD: 0.69), emphasizing the efficacy of Project-Based Learning in fostering collaboration, engagement and learning satisfaction. In the case of collaboration skills: The p-value of 0.001, considerably lower than 0.05, provides robust evidence to reject the null hypothesis. This indicates that collaboration skills have a statistically significant influence on students' learning satisfaction in the Project-Based Learning class.

Research Question 4

Investigating the impact of behavioral attitudes on learning satisfaction in Project-Based Learning unveils significant insights. With a total mean of 4.28, corresponding to 'Strongly Agree', students manifest proactive and committed behaviors. Participants' dedication to self-study (Mean: 4.28, SD: 0.85), practicing speaking skills (Mean: 4.25, SD: 0.84), and actively providing constructive feedback (Mean: 4.31, SD: 0.95) collectively underscore their proactive stance. These behaviors highlight Project-Based Learning's role in cultivating self-driven learning and effective collaborative communication. The overall mean score of 4.28 (SD: 0.79) affirms the positive impact of Project-Based Learning on students' behavioral attitudes, accentuating its contribution to learning satisfaction. However, the p-value of 0.398 is higher than 0.05, suggesting that the null hypothesis is not rejected. Consequently, it can be concluded that behavioral attitudes do not exert a statistically significant impact on students' learning satisfaction within the Project-Based Learning environment.

Knowledge from Research

The research outcomes hold valuable implications for 9th graders' educational experiences and present a robust basis for decision-making at the administrative level.

Research objective 1: The research outcomes highlight the significant impact of motivation on 9th graders' learning satisfaction with Project-Based Learning, underscoring its potential to inspire and engage students.

Research objective 2: Although the p-value suggests no statistically significant effect of communication skills on learning satisfaction, the positive attitude towards Project-Based Learning's potential to enhance cultural exploration is noteworthy.

Research objective 3: Collaboration skills play a pivotal role in shaping students' learning satisfaction, offering educators a strategic avenue to create vibrant, student-centered learning environments within the classroom.

Research objective 4: While behavioral attitudes may not hold statistical significance, the overall positive attitudes toward Project-Based Learning reinforce its potential to enhance students' engagement and cultural awareness, which can guide strategic decision-making at the administrative level.

Future Research

To enhance the depth of insight into the impact of Project-Based Learning (PBL) on students' learning satisfaction, several avenues for future research are proposed.

Firstly, a longitudinal study could be undertaken to delve into the sustained effects of PBL over an extended timeframe. This longitudinal approach would uncover whether the positive outcomes cultivated by PBL continue to shape students' academic journey and overall educational experience. Secondly, a comparative study could be conducted to explore potential variations in attitudes and learning satisfaction across different grade levels within the same foreign language school or across diverse institutions. Delving deeper into cultural factors influencing students' attitudes and satisfaction towards PBL represents another fruitful avenue. Such research would guide educators in tailoring PBL approaches to accommodate diverse cultural contexts effectively. Furthermore, incorporating perspectives from teachers and parents could yield a holistic view of PBL's implementation and impact. Finally, integrating a mixed-methods approach could enrich research outcomes by triangulating quantitative data with qualitative insights. In-depth interviews or focus groups involving students, teachers, and administrators would unveil nuanced aspects of PBL's influence that quantitative methods might overlook.

Conclusion

In conclusion, through the strategic integration of PBL methodologies, students engage in a dynamic and student-centric learning milieu that not only catalyzes academic advancement but also cultivates a nuanced cultural appreciation and personal growth. This empowering pedagogical

approach equips students to metamorphose into self-directed, adaptive, and resourceful learners, well-prepared for the challenges of a rapidly evolving educational landscape.

However, it's important to consider limitations such as a small sample size and focus on one language. To further this research, future work should explore long-term PBL effects in diverse settings and employ qualitative methods for deeper insights. Overall, this study contributes to our understanding of PBL's educational value, emphasizing the importance of motivating students, improving communication, fostering collaboration, and nurturing positive attitudes for enriched learning experiences across different educational contexts.

In totality, the implications of this research resonate not only within the confines of foreign language education in China but also cast their echoes across broader educational horizons, underscoring the universality of nurturing empowered and fulfilled learners.

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