



**FACTORS INFLUENCING HIGHER VOCATIONAL COLLEGE
STUDENTS' PARTICIPATION IN EXTRACURRICULAR
ACTIVITIES ON THEIR COMPUTER ACADEMIC
PERFORMANCE: A SOCIAL COGNITIVE PERSPECTIVE**

JUNNAN LIAN

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS IN EDUCATION AND SOCIETY
INSTITUTE OF SCIENCE INNOVATION AND CULTURE
RAJAMANGALA UNIVERSITY OF TECHNOLOGY KRUNGTHEP
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ABSTRACT

In the current era of rapid technological development, computer skills have become essential competencies in vocational education. The impact of extracurricular activities on students' academic performance in computer science has attracted considerable attention. This study used full-time junior college students participating in extracurricular activities at Quanzhou College of Technology as its sample. Based on the Social Cognitive Theory, the questionnaire survey method was used to collect data, and methods such as descriptive statistics, independent-sample t-tests, one - way ANOVA, and multiple linear regression analysis were employed to deeply explore the impacts of demographic variables, psychological factors, and environmental factors on students' computer academic performance. The research found that gender had no significant impact on students' computer academic performance; grade differences significantly affected computer scores, with third - year students achieving higher scores; non - boarding students had relatively higher scores; majors had no significant impact on scores; the types of extracurricular activities significantly affected classroom participation, and the duration of activities was positively correlated with computer academic performance. Among psychological factors, motivation and self-efficacy had significant positive effects on scores, whereas pressure did not. Among environmental factors, family support, the learning environment, and teacher quality had significant positive impacts on scores. In contrast, the impacts of campus culture and peer influence were not significant due to collinearity. This study enriches the application of the Social Cognitive Theory in the field of vocational education, provides practical guidance for educational institutions, teachers, and policymakers, and also points out directions for follow-up research, such as expanding the sample range, conducting longitudinal research, paying attention to the impacts of emerging technologies, and comprehensively considering more factors.

Keywords: Vocational College Students, Extracurricular Activities, Computer Academic Performance, Social Cognitive Theory, Influencing Factors

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CHAPTER I

INTRODUCTION

1.1 Background

1.1.1 Extracurricular Activities in China's Context

With the rapid development of information technology, digitalization, and the emergence of artificial intelligence (AI), China has increasingly emphasized the importance of computer skills among students. In this context, computer technology is regarded as an essential core skill in modern society. As a result, all university students in China are required to take introductory computer courses to ensure they possess the fundamental digital skills needed to meet future professional challenges. Particularly in vocational colleges, computer courses are not only mandatory but also play a crucial role in developing students' vocational skills.

In vocational education, particularly within private vocational colleges, the challenges students face in meeting the rising academic demands of information technology are significant. Extracurricular Activities (ECAs)—including artistic, sports, educational, and technological activities, part-time off-campus jobs, clubs and student organizations, and volunteering and community service—are increasingly recognized as key factors in enhancing students' academic performance in computer courses. ECAs are designed to develop various skills such as leadership, teamwork, time management, and social interaction, which are essential for students' holistic development. In the context of vocational education, ECAs also aim to enhance students' vocational skills, learning motivation, and self-efficacy, ultimately contributing to their overall academic performance and future career success.

In recent years, educational researchers in China have increasingly focused on the impact of ECAs on students' academic performance in higher vocational colleges. Existing studies have shown that participation in ECAs can significantly improve

students' academic performance, vocational skills, and social adaptability. For example, Wang et al. (2017) found that students who participated in ECAs performed significantly better academically than those who did not participate. These students exhibited higher learning motivation and self-efficacy and had better time management and teamwork skills, all of which positively impacted their academic performance (Wang et al., 2017). However, most of these studies focus on overall academic performance, with less research on specific subjects, particularly computer courses (Chen, 2019). The potential role of ECAs in enhancing students' performance in computer courses is recognized, though systematic research in this area remains insufficient.

Additionally, research has found that demographic variables, such as gender, grade level, lifestyle, and significant others, significantly influence students' motivation and participation in ECAs. Liu and Li (2020) used structural equation modeling to analyze the impact of gender on involvement in ECAs and academic performance, finding that female students are more inclined to participate in cultural and artistic ECAs, while male students are more likely to engage in sports activities. This gender difference not only affects their academic performance but also influences their performance in computer courses to some extent (Liu & Li, 2020). These findings have direct implications for the design and recommendation of ECAs within educational practices.

Moreover, environmental factors such as the learning environment, school culture, teacher quality, peer influence, and family support also play significant roles in shaping students' motivation and academic performance in ECAs. Zhang and Wang (2020) noted that senior students, facing graduation and employment pressures, tend to choose ECAs related to their majors, which helps them gain more practical experience in academic and career development (Zhang & Wang, 2020). Environmental factors thus play a crucial role in students' decisions to participate in ECAs, highlighting the importance of creating a positive learning environment.

Overall, although research on the relationship between ECAs and academic performance in China has increased, there remains a lack of studies on specific subjects, such as computer courses. With the continued advancement of information technology and digitalization, and the growing demand for computer skills in Chinese society, future research should further explore the complex relationships among these variables, providing theoretical support and empirical evidence for the educational policies and practices of private vocational colleges.

1.1.2 Extracurricular Activities in International Contexts

Existing research has identified several unresolved issues and critical gaps in understanding the relationship between extracurricular activities (ECAs) and academic performance, particularly within specific contexts and disciplines. First, while numerous studies demonstrate the positive impact of ECAs on general educational achievement, systematic investigations into their effects on subject-specific performance—such as computer-related courses—remain scarce, especially among vocational college students. This gap is particularly salient in the context of rapid digitalization, where computer literacy is essential for competitiveness in the modern workforce (Bohnert et al., 2017). The lack of focused research on the academic performance of vocational students' computers limits the development of targeted educational interventions, underscoring the urgency of empirical studies to inform pedagogical practices.

Second, the majority of existing studies on ECAs have centered on Western educational systems, leaving non-Western contexts, such as China, underexplored. Educational practices and cultural attitudes toward ECAs differ significantly across regions. For instance, in China, where academic achievement is highly prioritized, ECAs are often perceived as supplementary to formal learning rather than independent developmental activities (Wang, 2020). Such cultural nuances may influence students' motivations and the efficacy of ECAs, necessitating context-specific research to clarify their role in academic outcomes (Chirkov, 2020).

Additionally, the effectiveness of ECAs is moderated by a multitude of variables, including demographic factors (e.g., gender, grade level, lifestyle, major) and environmental factors (e.g., learning environment, school culture, teacher quality). However, empirical investigations into how these variables interact with ECAs to shape academic performance remain fragmented. For example, the influence of family support and school culture on computer academic performance in China may diverge from patterns observed in Western contexts due to differences in familial expectations and institutional structures (Zhou, 2021). Furthermore, while psychological factors such as motivation, self-efficacy, and stress are theorized to mediate the relationship between ECAs and academic outcomes, their specific mechanisms and mediating roles have not been rigorously examined (Fredricks et al., 2017). Questions persist about whether distinct types of ECAs—such as technical vs. artistic activities—differentially enhance performance, and about how time allocation to ECAs optimizes academic gains without overwhelming students.

Addressing these gaps is critical for advancing both theoretical and practical knowledge. By elucidating the interplay among cultural, demographic, psychological, and environmental factors, this study aims to provide a nuanced understanding of how ECAs influence academic performance in computer courses in vocational education, thereby bridging a significant gap in the literature and offering actionable insights for educators and policymakers.

1.2 Research Questions

Q1: How do demographic variables affect the computer academic performance of higher vocational college students?

Q2: How do psychological factors (motivation, self-efficacy, pressure) contribute to the computer academic performance of these students?

Q3: How do environmental factors (study environment, school culture,

teacher quality, peer influence, family support) impact the academic outcomes in computer-related courses for these students?

1.3 The Research Hypothesis (if applicable)

H1: There is a statistically significant relationship between demographic variables and computer academic performance among higher vocational college students who participate in extracurricular activities.

H2: Psychological factors (motivation, self-efficacy, pressure) significantly influence the computer academic performance of these students.

H3: Environmental factors (study environment, school culture, teacher quality, peer influence, family support) have a significant impact on the academic performance of students participating in extracurricular activities.

1.4 Research Objectives

1. To analyze the impact of demographic variables on the computer academic performance of higher vocational college students.

2. To investigate the role of psychological factors (motivation, self-efficacy, pressure) in influencing the academic performance of students in computer courses.

3. To evaluate the effect of environmental factors (study environment, school culture, teacher quality, peer influence, family support) on computer academic performance among students who participate in extracurricular activities.

1.5 Scope and Limitation of the Research Study

1.5.1 Content

This study focuses on the computer academic performance of college students at Quanzhou College of Technology. It aims to investigate the effects of

demographic variables, such as gender, grade level, major, and lifestyle, on computer academic performance. The research also delves into psychological factors, including motivation, self-efficacy, and stress, as well as environmental factors such as learning environment, campus culture, teacher quality, peer influence, and family support. This comprehensive examination aims to provide a detailed understanding of the factors that influence academic performance in computer science.

1.5.2 Area of Study

The research in focus is limited to Quanzhou College of Technology, based in Quanzhou, China. Quanzhou College of Technology is the top-ranked private vocational college in Fujian Province, located in Jinjiang, an economically vibrant area. This location provides a backdrop for evaluating college students' academic performance, enabling targeted, pertinent data collection. The conclusions drawn from this study can be applied to economic settings, offering significant contributions to the educational sphere.

1.5.3 Sample and Population

The population of this study comprises all full-time undergraduate students at Quanzhou College of Technology, totaling 14,386, among whom 6862 are freshmen, 4999 sophomores, and 2525 juniors. According to the official website of Quanzhou College of Technology (Quanzhou College of Technology, 2024). This diverse group includes students from different academic departments and grade levels, ensuring a comprehensive representation of the entire student body.

1.5.4 Sampling Method

To ensure that students from all three grade levels are well represented, we'll use a sampling approach. We'll select 400 students from different departments and years in college to ensure a balanced distribution. This method is chosen to guarantee results with confidence and a minimal margin of error, ensuring the credibility and accuracy of the outcomes.

1.5.5 Duration

Data analysis and collection were conducted during the 2023-2024 academic year, a comprehensive assessment of students' computing academic performance within a specific time frame and educational context.

1.5.6 Limitations of the Research Study

This study also has certain limitations. Firstly, the research is confined to students from Quanzhou College of Technology, which may not fully represent the landscape of vocational colleges across various regions. Furthermore, the data collection relies on self-reported surveys, which could introduce bias or inaccuracies. In addition, the study focuses on performance in computer-related courses, possibly neglecting other crucial aspects of academic success. Lastly, the study's cross-sectional design captures information at a single point in time, potentially missing changes over time or the long-term impact of activities on academic achievement. Despite some remaining constraints, this study's findings will provide insights into strategies and policies to enhance student learning in today's digital age.

1.6 Research Framework

Guided by Albert Bandura's Social Cognitive Theory (SCT) and its core construct of reciprocal determinism—the interactive relationship among individual cognition, environmental context, and behavioral outcomes—this framework investigates how demographic attributes (gender, grade level, major, lifestyle), behavioral engagement (extracurricular activity type and duration), and environmental influences (study environment, school culture, teacher quality, peer influence, family support) shape higher vocational students' computer academic performance, operationalized as grades, class participation, and assignment completion. Central to the model are psychological mechanisms (motivation, self-efficacy, pressure), with self-efficacy (Bandura, 1997)—the belief in one's capability to execute tasks—

hypothesized as a critical driver of academic persistence, particularly when reinforced by structured extracurricular activities (e.g., academic-technical ECAs) that enhance self-regulation and practical skill transfer. Environmental factors, aligned with SCT's emphasis on social and situational reinforcements, are posited to modulate cognitive processes. For example, family support may amplify motivation, while high-quality teaching fosters observational learning to strengthen self-efficacy. Statistical methods—including independent-samples t-tests, one-way ANOVA, and multiple linear regression—quantified how these factors interact and test whether behavioral engagement (extracurricular participation) mediates the effects of demographics and environment on performance. By anchoring in SCT's triadic model, this framework offers a theoretically robust approach to understanding the complex interplay among individual, behavioral, and contextual determinants of computer literacy in vocational education, informing evidence-based interventions to enhance academic outcomes by targeting improvements in self-efficacy, environmental support, and purposeful activity engagement.



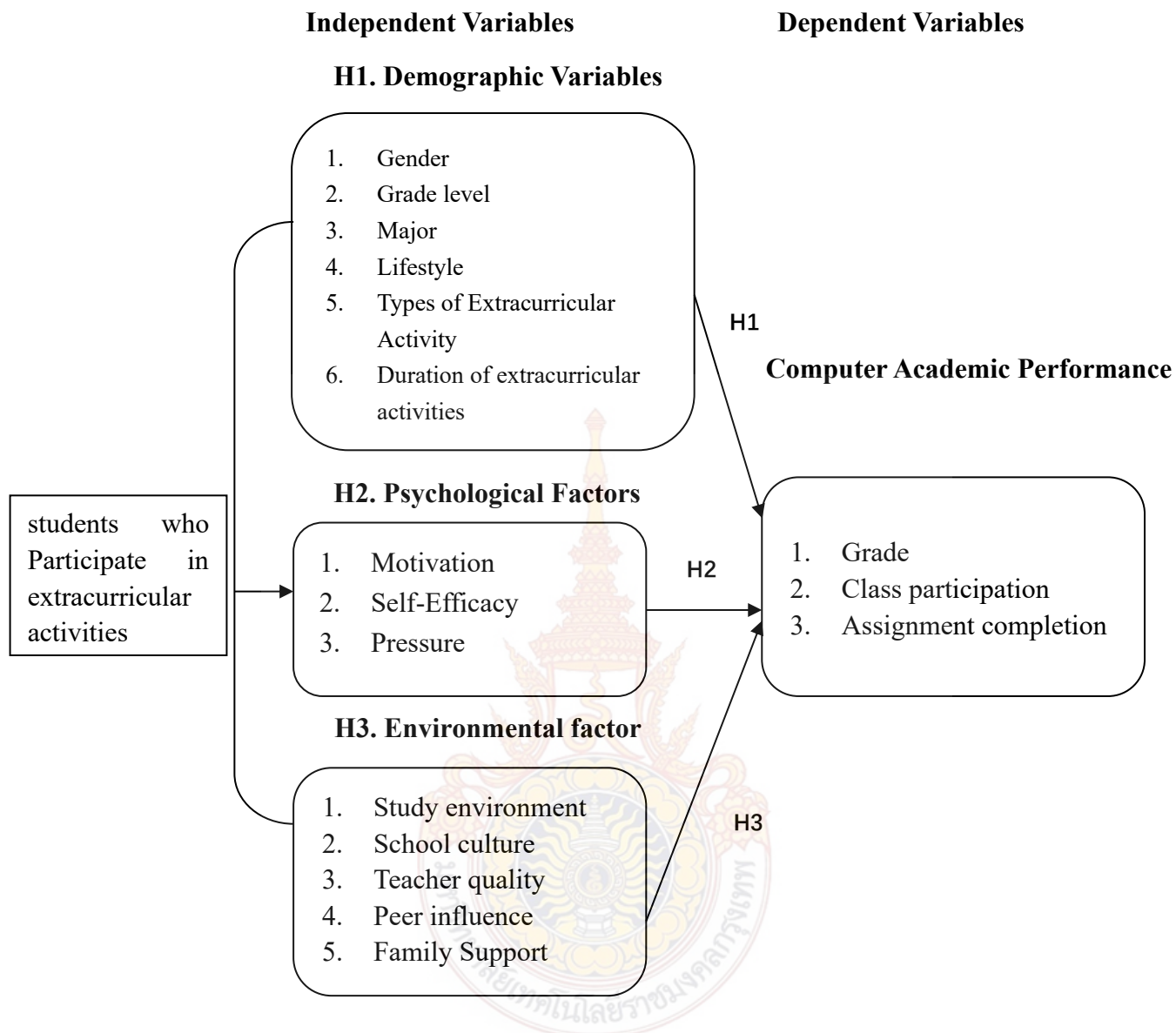


Figure 1.1 Research Framework

1.7 Significance of the Study

The importance of this research lies in investigating the effects of activities (ECAs) on the educational achievements of computer course students at vocational colleges, covering both theoretical and practical aspects. By studying environmental variables, this study offers thorough insight into the factors that impact students' academic success in today's digital era.

1.7.1 Theoretical Significance

This research study contributes to the existing literature by addressing a gap in the literature on how extracurricular activities (ECAs) affect the performance of vocational college students, particularly those in computer-related courses. While previous studies have emphasized the benefits of ECAs, there is a lack of focus on their effects within fields and educational settings. Using Social Cognitive Theory (SCT), this study delves into how ECAs influence students' confidence, motivation, and academic achievement in computer studies.

Furthermore, this research expands knowledge by uncovering the challenges and opportunities faced by students. The findings offer insights into how variables such as gender, grade level, field of study, lifestyle choices and participation in clubs shape students' experiences and outcomes. This thorough analysis is essential for designing tailored interventions and support systems that meet the needs of college students.

In addition to these aspects, the study examines factors that impact performance. Factors such as learning motivation, self-confidence in computer skills, and stress all play a role in determining students' success in computer-related courses. Understanding how engagement in ECAs influences these psychological factors provides insights into how ECAs enhance performance.

For instance, participation in activities (ECAs) can boost students' motivation by offering hands-on experiences that complement their studies. Similarly, engaging in activities such as coding clubs or tech competitions that enhance computer

self-efficacy can bolster students' confidence in their skills, leading to better outcomes. Moreover, research indicates that ECAs can serve as a stress-relief outlet for students, helping them manage stress and promote well-being.

This study examines how external factors intersect with ECAs to affect student success. For instance, family support can enhance the benefits of ECAs by helping students participate and gain advantages. Likewise, a supportive campus culture, a conducive learning environment, quality faculty resources, and parental support all amplify the influence of ECAs on computer-related accomplishments. Understanding these dynamics offers insights into creating nurturing learning environments that optimize ECAs' effects on performance.

In essence, integrating environmental factors into the framework of Social Cognitive Theory (SCT) provides a glimpse into the factors influencing the academic achievement of higher vocational college students. This comprehensive approach not only addresses research gaps but also lays the foundation for studies and practical applications in vocational education.

1.7.2 Practical Significance

The study's discoveries are significant for vocational colleges. By pinpointing the factors that influence students' engagement in activities (ECAs) and their subsequent effects on performance, educational institutions can devise targeted interventions to promote increased participation in ECAs. These interventions may include fostering an atmosphere that nurtures self-confidence, offering a variety of high-quality extracurricular programs, and maintaining a balance between academic responsibilities and extracurricular activities. By implementing strategies, educational institutions can enhance students' academic performance in specialized fields such as computer science and foster holistic personal growth.

Furthermore, educational institutions can use these insights to customize support services and resources, such as mentoring initiatives and tutoring sessions, to meet the requirements identified in the study. These comprehensive support systems

have the potential to enrich students' learning experiences and outcomes. For example, vocational colleges could design programs that integrate ECAs into curricula, providing students with opportunities to apply their knowledge practically. This approach can establish a participatory learning environment, facilitating better comprehension and retention of academic material.

The research also offers insights for policymakers in education. It emphasizes the importance of integrating activities into vocational college curricula to improve student outcomes. Policymakers can use these findings to advocate for increased funding and resources to ensure that all students have access to a variety of enriching opportunities outside the classroom. Additionally, it highlights the importance of policies that promote students' holistic development by recognizing activities as essential for building life skills such as teamwork, leadership, and time management. By prioritizing policies that support activities, policymakers can help shape well-rounded individuals better prepared for today's workplace challenges.

In addition to this focus on policy changes, efforts could be made to create partnerships between institutions and industry partners to provide students with hands-on experiences that complement their studies. Building connections with companies could involve internship opportunities, cooperative education setups, and workshops led by industry professionals. These initiatives provide students with real-world career perspectives linking knowledge with hands-on practice. Decision-makers can push for integrating measures assessing the effects of these activities on student achievement into evaluations and monitoring systems that highlight the importance of experience in education.

1.8 Definition of Key Terms

1.8.1 Extracurricular Activity

Extracurricular Activities (ECAs) are organized activities students engage in outside the regular academic curriculum. These activities include a wide range of pursuits such as artistic activities (e.g., music, drama, and visual arts), sports activities (e.g., team sports, athletics), academic and technological activities (e.g., science clubs, computer programming competitions), part-time jobs off-campus, clubs and student organizations, and volunteering and community service activities.

1.8.2 Computer Academic Performance

Computer Academic performance refers to the degree to which students, teachers, or institutions achieve their short- or long-term educational goals in computer education. In this study, computer academic performance refers explicitly to students' computer grades, computer class participation, and assignment completion.

1.8.3 Social Cognitive Theory (SCT)

Social Cognitive Theory (SCT) is an interpersonal-level theory developed by Albert Bandura that emphasizes the dynamic interaction among people (personal factors), their behavior, and their environments. This interaction is demonstrated by the construct called Reciprocal Determinism.

1.8.4 Demographic Variables

Characteristics of the student population that can be used to categorize and analyze groups. In this study, demographic variables include gender, grade level, major, and lifestyle.

1.8.5 Psychological Factors

Students' psychological factors will affect their learning and academic performance. This study focuses on whether psychological factors such as motivation, self-efficacy, and stress affect students' academic performance.

1.8.6 Environmental Factors

Air, water, climate, soil, natural vegetation and landforms are all environmental factors. In this study, environmental factors include learning environment, campus culture, teacher quality, peer influence, and family support.



CHAPTER II

LITERATURE REVIEW

2.1 Social Cognitive Theory

Albert Bandura's Social Cognitive Theory (SCT) has played a role in our understanding of behavior, particularly in academic performance. This theory underlines the significance of learning, self-efficacy, and the dynamic interplay between traits, behaviors, and environmental influences (Bandura, 1986). In education, SCT has been widely used to examine how these elements shape students' academic success. Studies have shown that self-efficacy, an aspect of SCT, significantly impacts achievement. Self-efficacy refers to an individual's belief in their ability to accomplish tasks. Research indicates that students with high self-efficacy are more likely to adopt effective learning strategies, persevere through challenging assignments, and ultimately excel academically (Zimmerman, 2000). For example, students who have confidence in their ability to master computer skills tend to perform well in computer-related courses.

Furthermore, SCTs' focus on learning underscores that students learn by observing others, such as teachers or peers. This observational learning process is vital in environments where students emulate behaviors and strategies demonstrated by educators or successful classmates. Bandura's study indicates that these observations can affect students' academic behaviors and attitudes, thereby influencing performance (Bandura, 1997). The theory also highlights the importance of elements, such as classroom atmosphere and teaching methods, in success. Educational research based on SCT has examined how nurturing learning environments, characterized by reinforcement and opportunities for mastery, boost students' confidence and motivation in academics, ultimately enhancing their performance (Schunk & Pajares, 2005). In essence, SCT provides a framework for understanding the array of factors that influence

students' academic performance. Its use in research has shed light on how self-confidence, observational learning, and environmental factors shape students' success in educational environments.

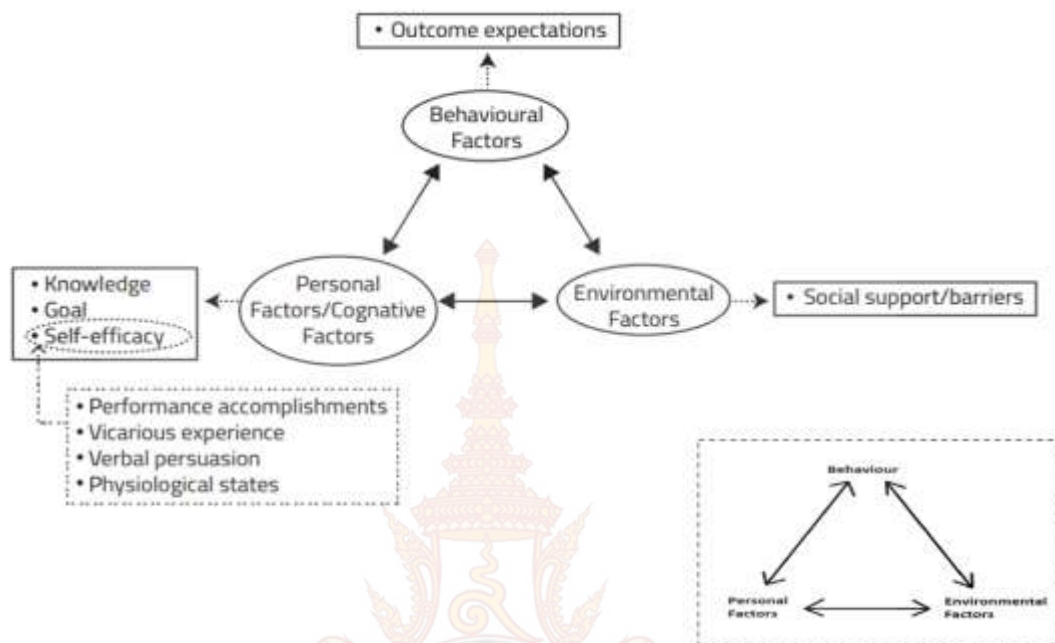


Figure 2.1 Social Cognitive Theory (SCT)

Note. Chin et al. / *Journal of Marketing Management and Consumer Behavior*, Vol. 2, Issue 2 (2018)

Albert Bandura's Social Cognitive Theory (SCT) is a framework for this research because it highlights the interaction between individual, behavioral, and environmental elements. This theory is well-suited to investigating how students' involvement in extracurricular activities (ECAs) affects their performance in computer courses. SCT's emphasis on self-confidence, observational learning, and the mutual influence of environmental factors offers a perspective for analyzing how ECAs affect students' motivation, skill development, and academic performance. The theory's flexibility across settings and its focus on the importance of environmental support align with the study's goal of examining various demographic, psychological, and environmental factors that influence the performance of vocational students in

computer-related subjects.

2.2 Extracurricular Activities

Extracurricular activities (ECAs) have long been recognized as a crucial component of students' holistic development, extending beyond the traditional academic curriculum to encompass a wide range of activities that foster personal, social, and academic growth. These activities include artistic pursuits, sports, academic and technological competitions, community service, and participation in student clubs and organizations. Research has consistently shown that ECAs play a significant role in shaping students' academic performance, particularly in vocational education, where practical skills and real-world application are emphasized.

2.2.1 The Role of Extracurricular Activities in Academic Performance

ECAs have been shown to impact students' academic performance across various educational settings positively. For instance, Fredricks and Eccles (2018) conducted a longitudinal study on American middle school students. They found that participation in ECAs was associated with higher academic achievement, primarily due to increased classroom engagement and motivation. Similarly, Marsh and Kleitman (2017) reported that ECAs not only improved academic performance but also enhanced students' social skills and mental health. In the context of vocational education, Wang et al. (2017) found that students who participated in ECAs, especially those related to their majors, exhibited better academic performance and greater vocational skill development.

2.2.2 Types of Extracurricular Activities and Their Academic Performance

Different types of ECAs have varying effects on students' academic performance. Artistic activities, such as music, drama, and visual arts, have been shown to enhance creativity and critical thinking skills, thereby positively influencing

academic performance (Seow & Pan, 2014). Sports activities, on the other hand, promote teamwork, discipline, and time management skills, which are crucial for academic success (Eccles et al., 2003). Academic and technological activities, such as science clubs and programming competitions, directly relate to students' academic subjects and can significantly improve their knowledge and skills in specific areas (Cardenas et al., 2020).

2.2.3 Cultural and Contextual Differences in Extracurricular Activities

The impact of ECAs on academic performance can vary across different cultural and educational contexts. In East Asian countries, where academic achievement is highly valued, ECAs are often seen as an extension of academic learning rather than independent social activities (Hofstede, 2017). This cultural perspective may influence the types of ECAs students choose to participate in and the extent to which they benefit from these activities. For example, in China, students often participate in ECAs that are closely related to their academic majors, which helps them gain practical experience and improve their academic performance (Li & Chen, 2018). In contrast, in Western countries, ECAs are more diverse and may encompass a broader range of activities focused on personal development and social skills (Løvoll & Bøe, 2017).

2.2.4 Gender and Grade-Level Differences in Participation

Gender and grade level also play a significant role in students' participation in ECAs and their subsequent academic performance. Research has shown that female students are more likely to participate in artistic and community service activities, while male students tend to engage more in sports and technological activities (Liu & Li, 2020). These gender differences can influence students' academic performance, as different types of ECAs provide varying opportunities for skill development. Additionally, grade level can affect students' motivation and participation in ECAs. For instance, senior students may choose ECAs that are more aligned with their career goals, while younger students may participate in a broader range of activities (Zhang & Wang,

2020).

2.3 Computer Academic Performance

Computer academic performance refers to the degree to which students achieve their educational goals in computer-related courses. This includes grades, class participation, and assignment completion. In the context of vocational education, computer skills are fundamental for future career success in the digital age.

2.3.1 The Importance of Computer Skills in Vocational Education

With the rapid development of information technology and the increasing demand for digital skills in the job market, computer literacy has become a core competency for vocational students. Research has shown that students who possess strong computer skills are more likely to succeed in their careers (Huerta, 2018). In vocational colleges, computer courses are designed to equip students with practical skills that are directly applicable to their future professions. For example, students majoring in information technology, engineering, and business management often require advanced computer skills to excel in their fields (Mitrofana & Iona, 2013).

2.3.2 Factors Influencing Computer Academic Performance

Several factors influence students' academic performance in computer science, including demographic, psychological, and environmental variables. Demographic variables such as gender, grade level, and major can impact students' motivation and effectiveness in computer courses. For instance, studies have shown that male students often outperform female students in STEM fields due to gender stereotypes and socialization processes (Hill et al., 2010). However, the gender gap in computer performance is narrowing in countries that promote gender equality (Hyde et al., 2008).

Psychological factors such as motivation, self-efficacy, and stress also play significant roles in academic performance in computer science. Motivation, both

intrinsic and extrinsic, drives students to engage in learning activities and persist through challenges (Froiland & Worrell, 2016). Self-efficacy, or the belief in one's ability to succeed, is a critical predictor of academic performance. Students with high self-efficacy in computer skills are more likely to set challenging goals and use effective learning strategies (Mappadang et al., 2022). Conversely, high levels of stress can negatively impact students' concentration and academic performance (Varghese et al., 2015).

Environmental factors such as the learning environment, school culture, teacher quality, peer influence, and family support also significantly affect academic performance in computer science. A supportive learning environment with access to necessary resources and technology can enhance students' learning experiences (Maxwell, 2016). Positive school culture and high-quality teaching methods can further motivate students and improve their academic outcomes (Thapa et al., 2013). Additionally, family support and encouragement can boost students' self-efficacy and motivation to succeed in computer courses (Fan & Chen, 2001).

2.3.3 The Role of Extracurricular Activities in Enhancing Computer Academic Performance

Extracurricular activities can significantly enhance students' academic performance in computer science. Participation in computer-related ECAs, such as coding clubs, robotics competitions, and tech workshops, provides students with practical experience and opportunities to apply their knowledge in real-world settings (Cardenas et al., 2020). These activities can also boost students' self-efficacy and motivation, leading to better academic performance in computer courses (Bandura, 1997). For example, students who participate in programming competitions may develop advanced problem-solving skills and a deeper understanding of computer concepts, which can translate into higher grades and better class participation (Seow & Pan, 2014).

Moreover, ECAs that focus on teamwork and collaboration, such as group

projects and hackathons, can enhance students' communication and interpersonal skills, which are essential for success in computer-related fields (Eccles et al., 2003). These activities also provide a supportive environment where students can receive feedback and encouragement from peers and mentors, further contributing to their academic success (Schunk & Pajares, 2005).

2.4 Related Studies

2.4.1 Demographic Variables

A demographic variable is a variable that researchers collect to describe the nature and distribution of the sample used with inferential statistics. In this study, the demographic variables include gender, grade level, major, residence (whether students live in dormitories), and participation in extracurricular activities.

2.4.1.1 Gender Factor

Hill, Corbett, and St. Rose (2010) noted that gender encompasses both biological differences and the social roles associated with males and females. They noted that in STEM fields, male students often outperform female students due to gender stereotypes ingrained through socialization. However, Hyde et al. (2008) found that the gender gap in global math performance is narrowing, especially in countries promoting gender equality. This suggests that improvements in education and policy can mitigate the impact of gender differences on academic performance.

2.4.1.2 Grade Level Factor

Alspaugh (1998) pointed out that grade level refers to the classification of students based on their progress in the educational system, typically corresponding to a specific year of schooling. This system organizes the curriculum and ensures age-appropriate instruction (National Center for Education Statistics, 2020). Alspaugh found that transitions between grade levels, such as moving from elementary to middle school, can significantly impact academic achievement due to changes in the school

environment and academic expectations. Additionally, Morrison and Cooney (2001) highlighted that as students advance in grade levels, increased curriculum complexity and demands can influence academic performance.

2.4.1.3 Major Factor

Arcidiacono et al. (2016) stated that a major is a specific field of study chosen by students during higher education to gain in-depth knowledge and skills for a related career. They noted that different majors have varying academic demands and evaluation standards, leading to differences in grade achievements. Additionally, Brint et al. (2008) indicated that students' interest and engagement in their chosen major significantly influence academic performance (National Center for Education Statistics, 2020).

2.4.1.4 Lifestyle Factor

Denise Shata Balfour (2013) defines "lifestyle" in the context of student housing, examining whether students live on-campus or commute. This aspect of lifestyle significantly influences academic performance. Balfour's study indicates that commuter students generally have higher GPAs than their on-campus counterparts, though the difference may not be substantial enough to be conclusive. Factors such as the level of academic challenge and student engagement play crucial roles in moderating this relationship.

2.4.1.5 Types of Extracurricular Activity

Cooper et al. (1999) analyzed 35 studies and found that structured, academically discipline-related activities, such as STEM clubs, notably boost students' grades and test scores. In vocational education, they help students apply theoretical knowledge, especially in computer-related fields.

Farb and Matjasko (2012) indicated that these activities enhance students' time management and organizational skills, which in turn affect academic performance. Their study showed that students in tech-related extracurriculars, such as coding clubs, had higher self-efficacy in computer courses, resulting in better educational outcomes.

Moreover, various extracurricular activity types have distinct impacts. Artistic activities cultivate creativity, sports build teamwork and discipline, and academic-technological activities directly improve subject-specific knowledge, all of which can influence computer-related academic performance.

2.4.1.6 Duration of Extracurricular Activities

The duration of participation in extracurricular activities is a critical moderator of their academic benefits. Fredricks and Eccles (2005) analyzed data from 1,800 adolescents and found a non-linear relationship between activity duration and academic performance. Students who participated in extracurricular activities for 4–6 hours per week showed the highest academic gains, while those exceeding 10 hours per week experienced diminishing returns due to time constraints and stress.

Similarly, Bohnert et al. (2010) emphasized the importance of balanced engagement. Their study of vocational college students revealed that moderate participation (3–5 hours weekly) in skill-based extracurricular activities (e.g., robotics competitions) correlated with improved grades in computer courses, as it allowed students to apply theoretical knowledge without overwhelming their academic workload. These findings underscore the need for educational institutions to guide students in optimizing their extracurricular time commitments.

2.4.2 Psychological Factors

Psychological factors are the elements of your personality that limit or enhance the ways that you think. In this study, psychological factors include motivation, self-efficacy, and stress.

2.4.2.1 Motivation

Froiland and Worrell (2016) defined motivation as the internal or external factors that drive an individual to strive toward goals. They highlighted that academic motivation includes intrinsic motivation (interest in knowledge and intrinsic satisfaction from learning) and extrinsic motivation (achieving good grades and meeting external expectations). Froiland and Worrell found that intrinsic motivation is

generally associated with higher academic achievement because it promotes active learning and deep understanding. Ryan and Deci (2017) noted that while extrinsic motivation can improve academic performance, its effects may not be as enduring as those of intrinsic motivation.

2.4.2.2 Self-efficacy

Mappadang et al. (2022) indicated that self-efficacy refers to an individual's belief in their ability to succeed in specific situations or accomplish a task. They noted that self-efficacy critically influences academic performance, as students with higher self-efficacy are more likely to set challenging goals, persist through difficulties, and use effective learning strategies. This confidence enhances motivation and effort, leading to better academic outcomes. Conversely, low self-efficacy can lead to a lack of confidence, reduced motivation, and poorer academic performance, as individuals may avoid challenges and give up more easily.

2.4.2.3 Stress

Varghese et al. (2015) noted that stress refers to a psychological and physiological response to challenges or demands exceeding an individual's ability to cope. They found that stress among college students is significantly correlated with lower academic performance. Factors such as high academic expectations, workload, and personal challenges influence this relationship. Increased levels of perceived stress can lead to adverse outcomes like reduced concentration, anxiety, and lower grades, thereby affecting overall academic performance.

2.4.3 Environmental Factors

Maxwell (2016) noted that environmental factors refer to the external conditions and contexts in which individuals operate, including physical, social, and family environments, collectively influencing behavior, emotions, and cognitive processes. A quiet and organized study environment improves focus and efficiency. In this study, environmental factors include study environment, school culture, teacher quality, peer influence, and family support.

2.4.3.1 Study Environment

Maxwell (2016) stated that the study environment refers to the physical and social settings where students engage in learning activities, encompassing conditions such as quietness, tidiness, and adequate equipment, as well as a supportive atmosphere and positive teacher-student interactions. Maxwell found that a well-maintained physical study environment enhances focus and learning efficiency. Jeynes (2016) added that a positive school atmosphere and high-quality teaching resources motivate and engage students, thereby improving academic performance. Optimizing the study environment is thus crucial for boosting academic success.

2.4.3.2 School Culture

Thapa et al. (2013) stated that school culture refers to the shared values, beliefs, and norms within a school, shaping the overall environment and educational philosophy. A positive school culture, which includes respect, diversity, a supportive learning environment, and a commitment to academic excellence, enhances students' sense of belonging and engagement, thereby improving academic performance. Wang and Degol (2016) noted that a supportive and inclusive school culture fosters students' motivation to learn, reduces academic stress, and promotes positive teacher-student relationships.

2.4.3.3 Teacher Quality

Hanushek and Rivkin (2010) noted that teacher quality refers to a teacher's teaching abilities, professional knowledge, teaching methods, and effectiveness in interacting with students. High-quality teachers possess strong subject knowledge and teaching skills, manage classrooms effectively, inspire student interest, and provide personalized guidance. They emphasized that teacher quality significantly impacts student academic performance through effective teaching methods and strong teacher-student relationships. Rockoff (2004) added that teachers' enthusiasm for teaching and their professional development levels are closely related to student academic success.

2.4.3.4 Peer Influence

Hoxby and Weingarth (2005) defined peer influence as the impact individuals experience through interactions with peers, which can be either positive or negative. Positive peer influence can enhance understanding and problem-solving skills through cooperative learning, while negative influence may lead to harmful behaviors or attitudes. Sacerdote (2001) noted that peer groups significantly affect academic performance, with their academic behaviors and attitudes shaping students' motivation and achievement. Additionally, competition and cooperation within peer relationships can differently influence academic engagement and outcomes.

2.4.3.5 Family Support

Fan and Chen (2001) defined family support as the encouragement, care, and resources provided by family members, particularly parents, for a child's academic endeavors. This support includes providing learning resources, monitoring academic progress, participating in school activities, and creating a conducive learning environment at home. They found that adequate family support significantly enhances students' motivation to learn, boosts self-efficacy, and improves academic performance. Jeynes (2007) added that parental involvement and expectations play a crucial role in shaping students' academic behaviors and outcomes.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

This study adopted a quantitative research design, specifically a survey design, to investigate the influencing factors of students' computer academic performance at Quanzhou College of Technology. The primary purpose is to identify and analyze the influence of demographic variables, psychological factors and external factors on students' computer academic performance. Data were collected from the target sample using a structured questionnaire. Quantitative methods were chosen because they provide statistical evidence and allow the findings to be generalized to a larger population.

The questionnaire included questions designed to measure demographic variables (Gender, Grade level, Major, Accommodation conditions, Extracurricular activities), Psychological Factors (Motivation, Self-Efficacy, Pressure), and Environmental factors (Study environment, School culture, Teacher quality, Peer influence, Family Support).

The collected data were analyzed using statistical methods to determine relationships and impacts. Specifically, the analysis focused on how these factors affect different aspects of student academic performance, including Grade, Class participation, and Assignment completion.

The questionnaire was administered online using a platform such as “Questionnaire Star”, which is widely used in China for survey distribution and data collection. This platform allows for efficient distribution and collection of responses, ensuring broad accessibility and participation. The survey link was shared via the school email system and social media platforms to reach a diverse student population.

In addition to primary survey data, secondary data were gathered through

a comprehensive review of relevant academic papers, research reports, and statistical data. This comprehensive approach aimed to understand in detail the factors that influence students' academic performance at Quanzhou College of Technology. This study aimed to provide insights into instructional planning, school educational strategies, and policy decisions, ultimately helping college students achieve a balanced lifestyle that reduces academic anxiety and enhances academic performance.

3.2 Samples and Sample Size

3.2.1 Population

According to the official website of Quanzhou College of Technology (Quanzhou College of Technology, 2024), the research population of this study comprised all full-time junior college students at the college, totaling 14,386. Additionally, a survey conducted by China Youth Daily (2022) indicates that approximately 75% of university students participate in extracurricular activities, including clubs, volunteer services, and cultural events. The total number of students participating in extracurricular activities is 10790. This diverse group included students from different academic departments and grade levels, ensuring a comprehensive representation of the entire student body.

3.2.2 Samples

A sample of 400 students participating in extracurricular activities was selected from across different academic departments and year levels to ensure a representative distribution across the college. This sample size was determined based on statistical guidelines to achieve a 95% confidence level and a margin of error of $\pm 5\%$, ensuring the reliability and validity of the findings for generalization. Among them, there were approximately 191 freshmen, mostly around 18 years old; about 139 sophomores, mainly around 19 years old; and around 70 juniors, generally around 20 years old. Based on the school's male-to-female ratio of 55%:45%, approximately 220

male students and 180 female students were enrolled. However, this was only an estimate, and there were actual individual differences. The sample size calculation was as follows:

$$n = \frac{N \times Z^2 \times p \times (1-p)}{E^2 \times (N-1) + Z^2 \times p \times (1-p)}$$

N is the population size (10790)

Z is the Z-value (1.96 for a 95% confidence level)

p is the estimated proportion of the population (0.5)

E is the margin of error (0.05)

Thus,

$$n = \frac{10790 \times 1.96^2 \times 0.5 \times (1-0.5)}{0.05^2 \times (10790-1) + 1.96^2 \times 0.5 \times (1-0.5)} \approx 370.98$$

To account for potential non-responses and ensure robustness, the sample size is rounded up to 400.

3.2.3 Sampling Methods

Stratified random sampling was employed to select the participants. This method involves dividing the entire population into distinct subgroups (strata) based on grade level. From each subset, a random sample was drawn proportionately to ensure that each subgroup is adequately represented. This approach minimized sampling bias and ensured that the diversity within the population was accurately reflected in the sample, providing a more detailed and nuanced understanding of the factors influencing the academic performance of computer science students at Quanzhou College of Technology.

Using the actual student distribution, the sample sizes were calculated as follows:

Total population N=10790

Desired sample size n=400

The formula for proportional sample size for each stratum is:

$$n_i = \frac{N_i}{N} \times n$$

where n_i is the sample size for stratum i , N_i is the population size for stratum i , and N is the total population size.

Table 3.1 Sample Breakdown by Grade Level

Grade Level	Population Size	Sample Size
Freshmen (Grade One)	$6,862 * 75\% = 5146.5$	191
Sophomores (Grade Two)	$4,999 * 75\% = 3749.25$	139
Juniors (Grade Three)	$2525 * 75\% = 1893.75$	70
Total	$14,386 * 75\% = 10789.5$	400

This chart employed a sampling method that ensured students across grade levels were represented proportionally. This allowed for an examination of whether students' performance differs across grades.

To maintain the accuracy and reliability of the findings, specific criteria were applied. The research focused on full-time students currently enrolled at Quanzhou College of Technology. Individuals who were part-time students or pursuing postgraduate degrees were excluded from the sample to keep the research focused on the intended group.

3.3 Data Collection

Data collection for this study was conducted using a structured questionnaire designed to collect comprehensive data on the computer academic performance of Quanzhou College of Technology students. Stratified random sampling ensured adequate representation of all participants across Years 1, 2, and 3. The questionnaire was divided into several sections, including demographic information, psychological factors, and environmental factors. Responses were measured on a five-point Likert scale (1 = "strongly disagree" and 5 = "strongly agree") to capture students' computer academic performance accurately.

The survey was administered through "Questionnaire Star," a widely used

online survey platform in China. To maximize reach and participation, the survey link was disseminated via the school email system and various social media platforms. “Questionnaire Star” provided tools to preliminarily screen collected questionnaires, allowing the exclusion of invalid responses, such as incomplete submissions or patterns suggesting random answering.

In addition to primary survey data, secondary data were gathered through a comprehensive review of relevant academic papers, research reports, and statistical data. This comprehensive approach aimed to understand in detail the factors that influence students' academic performance at Quanzhou College of Technology. This study aimed to provide insights into instructional planning, school educational strategies, and policy decisions, ultimately helping college students achieve a balanced lifestyle that reduces academic anxiety and enhances academic performance.

3.4 Research Instrument

This study adopted a questionnaire survey as the research instrument. A questionnaire survey is a research method using controlled scales to investigate issues and obtain reliable information. This questionnaire used the Likert scale, a widely used method in assessment that enables participants to indicate their level of agreement or disagreement with a set of statements (Likert, 1932). The Likert scale was selected for its ability to provide a valid assessment of attitudes, perceptions, and behaviors, thereby enabling understanding of the factors that impact this study. The process involved constructing the final questionnaire and distributing and collecting it through web links. The questionnaire consisted of the following four parts:

Part 1: This section collected respondents' basic personal information and divided them into subgroups for stratified sampling and analysis. Questions in this section included gender, grade level, major, accommodation conditions, and extracurricular activities. Understanding these demographic variables helped to analyze

the diversity within the sample and how these factors affect sketching computer academic performance.

Part 2: This section assessed the student's academic performance in computing, focusing on grades, class participation, and assignment completion. The questions were designed to evaluate the students' computer grades, class participation, and assignment completion.

Part 3: This section assessed the psychological factors that affect students' academic performance in computing. Questions focused on factors such as motivation, self-efficacy and stress, using a five-point Likert scale. These statements assessed the impact of environmental factors on students' academic performance in computer science.

Part 4: This section assessed the environmental factors that affect students' academic performance on computers. Questions focused on factors such as Study environment, School culture, Teacher quality, Peer influence, and Family Support, using a five-point Likert scale. These statements assessed the impact of environmental factors on students' academic performance in computer science.

In parts 2 to 4, the respondents were asked to rate their level of agreement with the statements using a five-point Likert scale: 1: Strongly disagree; 2: Disagree; 3: Neutral; 4: Agree; and 5: Strongly agree. The interpretation of the average values is shown in a separate section. The responses were analyzed using the arithmetic mean, which yielded continuous numbers with decimals. These means were interpreted as follows:

M = 4.50 - 5.00 indicates a strongly agree level

M = 3.50 - 4.49 indicates an agree level

M = 2.50 - 3.49 indicates a neutral level

M = 1.50 - 2.49 indicates a disagree level

M = 1.00 - 1.49 indicates a strongly disagree level

To maximize response rates, the questionnaire included a paragraph

outlining the study's nature and purpose. Respondents were informed that their contributions were essential and valuable. The questionnaire should take approximately 15-20 minutes to complete.

3.5 Content Validity and Reliability

3.5.1 Content Validity

Content validity pertains to how the questions in a survey represent the concept being studied. In this research, the researcher assessed content validity using the Item Objective Congruence (IOC) approach introduced by Hambleton and Cook (1977). This technique involved expert evaluations to gauge how well test items align with the measurement goals.

The evaluation process entailed three experts from the field examining the survey questions. Each question received a rating based on its alignment, with the intended measurement objectives using a scale as follows;

A score of 1 signifies that the item aligns with the measurement objective.

A score of 0 indicates uncertainty about whether the item is consistent with the measurement objective.

A score of -1 signifies that the item does not align with the measurement objective.

The IOC index is calculated using the formula:

$$IOC = \frac{\sum R}{N}$$

Where:

$\sum R$ is the total rating score from all experts for each question

N is the number of experts.

Items with an IOC index of 0.5 or higher are considered valid and consistent with the research objectives. Items that did not meet this criterion were revised based on expert feedback. The validity of this questionnaire is shown in Table 3.2.

Table 3.2 IOC Validity Table for Questionnaire Items

Item No.	Expert 1 Rating	Expert 2 Rating	Expert 3 Rating	ΣR (Total Rating)	IOC Index	Validity Decision
Q1	1	1	1	3	1.00	Valid
Q2	1	1	0	2	0.67	Valid
Q3	1	-1	1	1	0.33	Revise
Q4	0	1	1	2	0.67	Valid
Q5	1	0	1	2	0.67	Valid
Q6	1	1	1	3	1.00	Valid
Q7	1	1	0	2	0.67	Valid
Q8	1	0	1	2	0.67	Valid
Q9	1	1	1	3	1.00	Valid
Q10	1	1	1	3	1.00	Valid
Q11	1	0	1	2	0.67	Valid
Q12	1	1	1	3	1.00	Valid
Q13	1	0	1	2	0.67	Valid
Q14	1	1	0	2	0.67	Valid
Q15	1	1	1	3	1.00	Valid
Q16	1	-1	1	1	0.33	Revise
Q17	1	0	1	2	0.67	Valid
Q18	1	1	1	3	1.00	Valid
Q19	0	1	1	2	0.67	Valid
Q20	1	0	0	1	0.33	Revise
Q21	1	1	1	3	1.00	Valid
Q22	1	1	1	3	1.00	Valid
Q23	1	0	1	2	0.67	Valid
Q24	1	1	1	3	1.00	Valid
Q25	1	0	1	2	0.67	Valid
Q26	1	-1	1	1	0.33	Revise
Q27	1	1	0	2	0.67	Valid
Q28	1	1	1	3	1.00	Valid
Q29	1	0	1	2	0.67	Valid
Q30	1	1	1	3	1.00	Valid
Q31	1	1	0	2	0.67	Valid
Q32	1	-1	1	1	0.33	Revise
Q33	1	1	1	3	1.00	Valid
Q34	1	1	0	2	0.67	Valid

Table 3.2 indicates that most items achieved an IOC index of 0.67 or higher, suggesting that they are valid and consistent with the research objectives. However, a few items scored below 0.5, suggesting they may not fully align with the intended

objectives and should be revised for greater clarity and consistency. Overall, the majority of items were well-aligned, contributing to the questionnaire's robustness in measuring the constructs of interest.

3.5.2 Content Reliability

Reliability refers to the consistency and stability of the measurement instrument. In this study, a reliability test was conducted with 30 participants to assess the questionnaire's internal consistency. The reliability of the measurement scales was assessed using Cronbach's alpha. Cronbach's alpha is a widely used measure of internal consistency, with a high value indicating that the items in the scale consistently measure the same underlying construct (Cronbach, 1951).

According to Hair et al. (2010), a Cronbach's alpha coefficient greater than 0.70 indicates satisfactory reliability for the questionnaire. Additionally, the researcher calculated the Corrected Item-Total Correlation (CITC) values. Items with a CITC value greater than 0.4 are considered to contribute positively to the scale's reliability. The reliability of this questionnaire is shown in Table 3.3.

Table 3.3 Reliability Analysis of Computer Academic Performance

Variable	Cronbach's Alpha	Number of Items	Mean	Variance	Standard Deviation
Grades (Q7-Q8)	0.874	2	7.165	3.318	1.82147
Class Participation (Q9-Q11)	0.834	3	12.008	5.837	2.4160
Assignment Completion (Q12-Q14)	0.897	3	11.692	6.374	2.5247
Motivation (Q15-Q18)	0.951	4	15.237	12.512	3.5373
Self-Efficacy (Q19-Q21)	0.958	3	11.238	7.365	2.7138
Pressure (Q22-Q24)	0.915	3	9.698	9.199	3.0330
Study Environment (Q25-Q26)	0.846	2	7.308	3.366	1.8348
Schools Culture (Q27-Q28)	0.928	2	7.342	3.659	1.9129
Teacher Quality (Q29-Q30)	0.943	2	7.535	3.528	1.8782
Peer Influence (Q31-Q32)	0.947	2	7.398	3.744	1.9349
Family Support (Q33-Q34)	0.901	2	7.888	3.268	1.8078

For each section, Cronbach's alpha coefficients ranged from 0.834 to 0.958, indicating good internal consistency across the scales.

Additionally, the mean, variance, and standard deviation for each section were calculated to provide further insight into the data distribution. The relatively low standard deviations indicated that the responses were pretty consistent across respondents.

These results confirmed that the questionnaire is a reliable tool for measuring the factors influencing the academic performance of computer science students at Quanzhou College of Technology.

3.6 Data Analysis

The data analysis process was designed to provide meaningful insights into the academic performance of college students in computer science at Quanzhou College of Technology. The analysis was conducted using statistical software to perform various statistical tests and studies. The following steps outlined the data analysis process, tailored to the research hypotheses and the questionnaire content.

3.6.1 Data Preparation

The collected data were screened to identify and handle missing, incomplete, or inconsistent responses. Invalid responses—including those with extensive missing data or patterns indicative of random answering—were excluded. Questionnaire responses were then numerically coded to facilitate analysis (e.g., Male = 1, Female = 2; Likert scale responses assigned values from 1 to 5).

3.6.2 Descriptive Statistics

Descriptive statistics summarized the sample characteristics and the distributions of the variables. For demographic variables—including gender, grade level, major, accommodation status, and extracurricular activity (ECA) participation—frequency distributions (counts, percentages) were calculated to characterize the sample composition. Measures of central tendency (mean, standard deviation) and frequency distributions assessed psychological factors (motivation, self-efficacy, pressure) and

environmental factors (study environment, school culture, teacher quality, peer influence, family support) using Likert-scale responses. This approach provided a quantitative overview of participants' backgrounds, behavioral engagement, and perceptual data, establishing a foundational understanding of variable patterns before inferential analysis.

3.6.3 Inferential Statistics

Inferential statistics were used to analyze the data and test the hypotheses at the 0.05 significance level. This analysis aimed to test the relationship or interplay between the dependent variable and several independent variables.

H1: Demographic variables (Gender, Grade level, Major, Lifestyle, Extracurricular Activity Participation) influence the computer academic performance of higher vocational college students who have participated in extracurricular activities.

An independent-samples t-test evaluates gender and lifestyle differences in performance, while a one-way ANOVA assesses effects of grade level, major, ECA type, and ECA duration. Post-hoc tests (e.g., LSD) identify specific group differences when ANOVA results are significant.

H2: Psychological factors (motivation, self-efficacy, stress) influence the computer academic performance of higher vocational college students who have participated in extracurricular activities.

Multiple linear regression models examined the combined effects of motivation, self-efficacy, and pressure on performance. Predictor variables were tested for statistical significance ($p < 0.05$), and standardized beta coefficients indicate the strength and direction of the relationships.

H3: Environmental factors (Study environment, School Culture, Teacher quality, Peer influence, Family Support) influence the computer academic performance of higher vocational college students who have participated in extracurricular activities.

Multiple linear regression assessed how the study environment, school culture, teacher quality, peer influence, and family support impact performance.

Collinearity diagnostics (e.g., tolerance and VIF) ensured model validity, and non-significant or collinear variables were excluded to refine the final model.



CHAPTER IV

ANALYSIS RESULT

4.1 Research Findings

This section presents a comprehensive analysis of key variables influencing students' academic performance in computer science, including demographic, psychological, and environmental factors. The findings are systematically organized and analyzed using frequency distributions and descriptive statistics to provide clear insights into the patterns and influences on students' academic performance in computer science.

4.1.1 Demographic Factors

Table 4.1 Frequency Analysis Results of Demographic

Frequency Analysis Results				
Name	Options	Frequency	Percentage (%)	Cumulative Percentage (%)
Gender	Male	220	55.00	55.00
	Female	180	45.00	100.00
Grade	First year	191	47.75	47.75
	Second year	139	34.75	82.50
	Third year	70	17.50	100.00
Accommodation	Live on campus	322	80.50	80.50
	Non-live on campus	78	19.50	100.00
	Food and Catering	4	1.00	1.00
Major	Engineering	79	19.75	20.75
	Arts	34	8.50	29.25
	Business Management	45	11.25	40.50
	Information Technology	133	33.25	73.75
What extracurricular activities have you participated in?	Education	105	26.25	100.00
	Artistic activities (e.g., music, painting, drama, and visual arts)	52	13.00	13.00
	Sports activities (e.g., ball games, team sports, athletics, etc.)	69	17.25	30.25

Frequency Analysis Results				
Name	Options	Frequency	Percentage (%)	Cumulative Percentage (%)
How much time do you spend participating in extracurricular activities every week?	Academic and technical activities (e.g., academic competitions, scientific experiments, programming, robotics, etc.)	23	5.75	36.00
	Clubs and student organizations (e.g., student council, debate club, literary society, photography club, etc.)	34	8.50	44.50
	Voluntary service	155	38.75	83.25
	Part-time work off-campus	67	16.75	100.00
	Less than 1 hour	72	18.00	18.00
	1-3 hours	174	43.50	61.50
	4-6 hours	83	20.75	82.25
	7-9 hours	30	7.50	89.75
	10 hours or more	41	10.25	100.00
	Total		400	100.0

The proportion of men in this survey is 55.00%, and that of women is 45.00%, resulting in a more balanced gender distribution. In terms of grade, freshmen accounted for the highest proportion at 47.75%, 2 students accounted for 34.75%, and juniors accounted for 17.50%, indicating that the sample was mainly concentrated in the lower grade group. In terms of accommodation, the proportion of resident students is 80.50%, much higher than that of non-resident students (19.50%), reflecting that most students choose to live on campus. The majors are widely distributed, with information technology majors accounting for the highest proportion at 33.25 %, followed by education majors (26.25 %), and food and beverage majors accounting for the lowest proportion at 1.00 %. In terms of extracurricular activities, the most significant number of students participated in voluntary service, accounting for 38.75%; participation in part-time jobs outside the school ranked second, at 16.75%; while

participation in academic and technical activities was the lowest, at 5.75%. In terms of time spent participating in extracurricular activities per week, students with 1-3 hours accounted for the highest proportion, reaching 43.50 %, those with less than 1 hour accounted for 18.00 %, and those with 10 hours or more accounted for 10.25 %, reflecting the more moderate time spent by most students participating in extracurricular activities per week.

4.1.2 Computer Academic Performance

Table 4.2 Frequency Analysis Result of Computer Academic Performance

Computer Academic Performance	1	2	3	4	5	Mean	SD	Meaning	Rank
Grades	9	12	171	120	88	3.6650	0.92732	Moderate	3
Class Participation	4	7	83	191	115	4.0150	0.81020	Moderate	1
Assignment Completion	8	10	155	130	97	3.7450	0.92038	Moderate	2
overview	5	5	114	176	100	3.9025	0.83049	-	-

Table 4.2 demonstrates that the mean values for Grades, Class Participation, and Assignment Completion are 3.6650, 4.0150, and 3.7450, respectively. Among these, Class Participation has the highest mean, while Grades have the lowest. The standard deviations (SD) range from 0.81020 to 0.92732, indicating low dispersion, a relatively concentrated distribution, and comparable stability. In terms of score segments, the most significant number of individuals (171) obtained a score of 3 in Grades; for Class Participation, scores of 4 (191 individuals) and 5 (115 individuals) account for substantial proportions; Assignment Completion, by contrast, shows a relatively balanced distribution. Collectively, Class Participation manifests the most optimal performance, Grades are relatively weaker, each dimension maintains comparable stability, and all fall within a moderate level, though subtle discrepancies are evident.

4.1.3 Psychological Factors

Table 4.3 Frequency Analysis Result of Psychological Factors

Psychological Factors	1	2	3	4	5	Mean	SD	Meaning	Rank
Motivation	6	10	130	142	112	3.8600	0.90689	Moderate	1
Self-Efficacy	7	14	153	133	93	3.7275	0.91670	Moderate	2
Pressure	26	41	208	68	57	3.2225	1.02744	Moderate	3
overview	5	8	170	158	59	3.6450	0.80036	-	-

This table presents the score distributions, means (Mean), and standard deviations (SD) of three psychological factors: "Motivation," "Self - Efficacy," and "Pressure." For Motivation, the numbers of people with scores of 1-5 are 6, 10, 130, 142, and 112, respectively, with a mean of 3.8600 and an SD of 0.90689. The relatively large number of individuals with scores of 4 and 5 indicates a high overall motivation level, and the data exhibit low dispersion. For Self-Efficacy, the numbers of people with scores of 1-5 are 7, 14, 153, 133, and 93, respectively, with a mean of 3.7275 and an SD of 0.91670. Its score distribution is relatively concentrated, and the overall level is secondary. For Pressure, the numbers of people with scores of 1-5 are 26, 41, 208, 68, and 57, respectively, with a mean of 3.2225 and an SD of 1.02744. The largest number of people (208) received a score of 3, which lowers the mean, and the largest SD indicates that the Pressure score distribution is more dispersed, with a relatively weaker overall level. Overall, among the three psychological factors, motivation is relatively stronger, pressure is relatively weaker, with a more dispersed score distribution, and self-efficacy is in the middle. The three factors generally have a small degree of data dispersion.

4.1.4 Environmental Factors

Table 4.4 Frequency Analysis Result of Environmental Factors

Environmental Factors	1	2	3	4	5	Mean	SD	Meaning	Rank
Study Environment	7	14	153	133	93	3.7275	0.91670	Moderate	5
Schools Culture	11	9	157	122	101	3.7325	0.95563	Moderate	4
Teacher Quality	10	8	138	134	110	3.8150	0.94499	Moderate	2
Peer Influence	14	8	144	133	101	3.7475	0.97268	Moderate	3
Family Support	8	3	107	145	137	4.0000	0.90667	Moderate	1
Overview	8	8	141	151	92	3.9025	0.83049	-	-

This table displays five psychological factors—Study Environment, School's Culture, Teacher Quality, Peer Influence, and Family Support—illustrating their score distributions (ranging from 1 to 5), means (Mean), and standard deviations (SD). Study Environment exhibits score counts of 7, 14, 153, 133, and 93 for scores 1–5, respectively, with a mean of 3.7275 and an SD of 0.91670. Schools' Culture (with score counts of 11, 9, 157, 122, and 101 for 1–5) and Family Support (with score counts of 8, 3, 107, 145, and 137 for 1–5) both result in a mean of 4.0000, indicating higher - level overall evaluations. Teacher Quality and Peer Influence exhibit identical score distributions (10, 8, 138, 134, 110 for 1–5) and a mean of 3.8150. Standard deviations of approximately 0.94499 across all factors indicate moderate data dispersion, with neither extreme concentration nor spread. Overall, School Culture and Family Support demonstrate stronger positive perceptions, whereas the remaining factors have relatively lower means; nevertheless, all factors maintain a balanced data - spread pattern.

4.2 Hypothesis Testing Result

This section presents the results of a hypothesis test examining the

relationships among demographic, psychological, and environmental factors and college students' academic performance. Three hypotheses were tested using independent-samples t-tests, a one-way ANOVA, and multiple linear regression to assess the statistical significance and predictive power of factors influencing consumer behavior.

4.2.1 Analysis of Demographic Variables on Computer Academic Performance Using Independent Sample t-Tests and One-Way ANOVA

Hypothesis 1: There is a statistically significant relationship between demographic variables and computer academic performance among higher vocational college students who participate in extracurricular activities.

H1a: The Gender Difference Affects the College Students' Computer Academic Performance Who Participate in Extracurricular Activities.

Table 4.5 The Analysis Results on Gender Differences Affecting Computer Academic Performance

Computer Academic Performance	Gender	N	Mean	Std. Deviation	t-value	df	Sig.
Grades	Male	220	3.6727	0.98953	0.187	398	0.852
	Female	180	3.6556	0.84775			
Class Participation	Male	220	4.0455	0.83733	0.831	398	0.407
	Female	180	3.9778	0.77644			
Assignment Completion	Male	220	3.8091	0.96036	1.542	398	0.124
	Female	180	3.6667	0.86522			
Computer Academic Performance	Male	220	3.9136	0.86367	0.296	398	0.767
	Female	180	3.8889	0.79023			

Table 4.5 shows that there were no uniformly significant gender differences in grades ($t = 0.187$, $p = 0.852$), Class Participation ($t = 0.831$, $p = 0.407$), Assignment Completion ($t = 1.542$, $p = 0.124$), and Computer Academic Performance ($t = 0.296$, $p = 0.767$). The lack of significant differences may be attributable to the sample's homogeneity with respect to factors that potentially affect indicators such as achievement, including groups with the same educational background and similar learning resources. Gender may not be the main factor contributing to the difference,

so that the differences between men and women on these indicators are not significant.

H1b: The Grade Level Difference Affects the College Students' Computer Academic Performance Who Participate in Extracurricular Activities

Table 4.6 The Analysis Results on Grade Level Differences Affecting Computer Academic Performance

Grade Level		Sum of Squares	df	Mean Square	F	Sig.
Grades	Between Groups	8.697	2	4.349	5.162	0.006
	Within Groups	334.413	397	0.842		
	Total	343.110	399			
Class Participation	Between Groups	2.273	2	1.136	1.738	0.177
	Within Groups	259.637	397	0.654		
	Total	261.910	399			
Assignment Completion	Between Groups	2.351	2	1.176	1.390	0.250
	Within Groups	335.639	397	0.845		
	Total	337.990	399			
Computer Academic Performance	Between Groups	3.244	2	1.622	2.368	0.095
	Within Groups	271.953	397	0.685		
	Total	275.198	399			

Table 4.6 presents the results of the analysis of how grade-level differences affect students' computer academic performance. The results indicate significant differences in grade across grade levels, with a p-value below 0.05 (Grade: $F = 5.162$, $p = 0.006$). The mean scores for grade 3 were significantly higher than those for grades 1 and 2, and there was no significant difference between grades 1 and 2. The results also indicate that there are no significant differences in Class Participation and Assignment Completion across grade level, with p-values above 0.05 (Class Participation: $F = 1.738$, $p = 0.177$; Assignment Completion: $F = 1.390$, $p = 0.250$; Computer Academic Performance: $F = 2.368$, $p = 0.095$). The lack of significant differences can be attributed to the sample's heavy concentration among first- and second-year students, which limits variability across grade levels. This concentration reduces the ability to detect significant differences in computer academic performance among students from different grades.

Table 4.7 The Multiple Comparison of the Mean Value of Different Grade Level Groups (LSD Test)

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Grades	1.0	2.0	.13451	.10232	.189	-.0667	.3357
		3.0	-.29746*	.12823	.021	-.5496	-.0454
	2.0	1.0	-.13451	.10232	.189	-.3357	.0667
		3.0	-.43196*	.13451	.001	-.6964	-.1675
	3.0	1.0	.29746*	.12823	.021	.0454	.5496
		2.0	.43196*	.13451	.001	.1675	.6964

*. The mean difference is significant at the 0.05 level.

Table 4.7 shows that the mean grade 3 grades are significantly higher than those in grades 1 and 2, and there is no significant difference between the mean grades 1 and 2.

H1c: The Lifestyle Difference Affects the College Student's Computer Academic Performance Who Participates in Extracurricular Activities

Table 4.8 The Analysis Results on Lifestyle Differences Affecting Computer Academic Performance

Computer Academic Performance	Lifestyle	N	Mean	Std. Deviation	t-value	df	Sig.
Grades	Live on campus	322	3.618	0.88956	-2.067	398	0.039
	Non-live on campus	78	3.859	1.05343			
Class Participation	Live on campus	322	3.984	0.77925	-1.534	398	0.126
	Non-live on campus	78	4.141	0.92195			
Assignment Completion	Live on campus	322	3.708	0.87996	-1.634	398	0.103
	Non-live on campus	78	3.897	1.06404			
Computer Academic Performance	Live on campus	322	3.8727	0.80841	-1.462	398	0.145
	Non-live on campus	78	4.0256	0.91132			

Table 4.8 presents the results of the analysis of how lifestyle differences affect students' computer academic performance. The results indicate significant

differences in grade across different lifestyles, with a p-value below 0.05 (Grade: $t = -2.026$, $p = 0.039$). The results also suggest that there are no significant differences in Class Participation and Assignment Completion across lifestyle, with p-values above 0.05 (Class Participation: $t = -1.534$, $p = 0.126$; Assignment Completion: $t = -1.634$, $p = 0.103$; Computer Academic Performance: $t = -1.462$, $p = 0.145$). There was no significant difference in computer academic performance across different lifestyles, and the main reason may be that 80.5% of the students live on campus, which limits variability across lifestyles. This concentration reduces the ability to detect significant differences in computer academic performance among students from different grades.

H1d: The Major Difference Affects the College Student's Computer Academic Performance Who Participates in Extracurricular Activities

Table 4.9 The Analysis Results on Major Differences Affecting Computer Academic Performance

	Major	Sum of Squares	df	Mean Square	f	Sig.
Grades	Between Groups	2.742	5	0.548	0.635	0.673
	Within Groups	340.368	394	0.864		
	Total	343.110	399			
Class Participation	Between Groups	2.657	5	0.531	0.807	0.545
	Within Groups	259.253	394	0.658		
	Total	261.910	399			
Assignment Completion	Between Groups	4.806	5	0.961	1.137	0.340
	Within Groups	333.184	394	0.846		
	Total	337.990	399			
Computer Academic Performance	Between Groups	1.376	5	0.275	0.396	0.852
	Within Groups	273.822	394	0.695		
	Total	275.198	399			

Table 4.9 shows that there are no uniform significant major differences in grades ($F = 0.187$, $p = 0.852$), Class Participation ($F = 0.831$, $p = 0.407$), Assignment Completion ($F = 1.542$, $p = 0.124$), and Computer Academic Performance ($F = 0.396$, $p = 0.852$). The lack of significant differences can be attributed to the concentration of students in a few majors, particularly Information Technology and Education, which

account for more than half of the sample (59.5%). This uneven distribution of majors results in limited variability within the sample, making it difficult to detect significant differences in computer academic performance across students from different disciplines.

H1e: The Types of Extracurricular Activity Difference Affects the College Student's Computer Academic Performance Who Participate in Extracurricular Activities

Table 4.10 The Analysis Results on Types of Extracurricular Activity Differences Affecting Computer Academic Performance

Types of Extracurricular Activity		Sum of Squares	df	Mean Square	f	Sig.
Grades	Between Groups	7.889	5	1.578	1.855	0.101
	Within Groups	335.221	394	.851		
	Total	343.110	399			
Class Participation	Between Groups	7.566	5	1.513	2.344	0.041
	Within Groups	254.344	394	.646		
	Total	261.910	399			
Assignment Completion	Between Groups	7.314	5	1.463	1.743	0.124
	Within Groups	330.676	394	.839		
	Total	337.990	399			
Computer Academic Performance	Between Groups	7.049	5	1.410	2.071	0.068
	Within Groups	268.148	394	.681		
	Total	275.198	399			

Table 4.10 shows that there were significant differences among the types of extracurricular activities in class participation ($F = 2.344$, $p = 0.041$). However, there were no significant differences among different types of extracurricular activities in terms of Grades ($F = 1.855$, $p = 0.101$), assignment completion ($F = 1.743$, $p = 0.124$), and Computer Academic Performance ($F = 2.071$, $p = 0.068$). There was no significant difference in computer academic performance across the different kinds of extracurricular activities, and the main reason may be that 55.5% of students' extracurricular activities were voluntary service and part-time off-campus jobs, which limited variability across these activities. This concentration reduces the ability to

detect significant differences between undifferentiated extracurricular activities and computer-based academic performance.

Table 4.11 The Multiple Comparison of the Mean Value of Different Types of Extracurricular Activity Groups (LSD Test)

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Class Participation	1.0	2.0	-.16834	.14755	.255	-.4584	.1217
		3.0	-.41472*	.20120	.040	-.8103	-.0192
		4.0	-.33032	.17720	.063	-.6787	.0181
		5.0	-.24417	.12876	.059	-.4973	.0090
		6.0	.04018	.14849	.787	-.2517	.3321
		2.0	1.0	.16834	.14755	.255	-.1217
	3.0	3.0	-.24638	.19345	.204	-.6267	.1339
		4.0	-.16198	.16835	.337	-.4930	.1690
		5.0	-.07583	.11628	.515	-.3044	.1528
		6.0	.20852	.13781	.131	-.0624	.4795
		1.0	.41472*	.20120	.040	.0192	.8103
		2.0	.24638	.19345	.204	-.1339	.6267
	4.0	4.0	.08440	.21692	.697	-.3421	.5109
		5.0	.17055	.17953	.343	-.1824	.5235
		6.0	.45490*	.19417	.020	.0732	.8366
		1.0	.33032	.17720	.063	-.0181	.6787
		2.0	.16198	.16835	.337	-.1690	.4930
		3.0	-.08440	.21692	.697	-.5109	.3421
	5.0	5.0	.08615	.15216	.572	-.2130	.3853
		6.0	.37050*	.16918	.029	.0379	.7031
		1.0	.24417	.12876	.059	-.0090	.4973
		2.0	.07583	.11628	.515	-.1528	.3044
		3.0	-.17055	.17953	.343	-.5235	.1824
		4.0	-.08615	.15216	.572	-.3853	.2130
6.0	6.0	.28435*	.11747	.016	.0534	.5153	
	1.0	-.04018	.14849	.787	-.3321	.2517	
	2.0	-.20852	.13781	.131	-.4795	.0624	
	3.0	-.45490*	.19417	.020	-.8366	-.0732	
	4.0	-.37050*	.16918	.029	-.7031	-.0379	
	5.0	-.28435*	.11747	.016	-.5153	-.0534	

Table 4.11 shows that there was no significant difference in class participation between most groups. However, there are substantial differences between

group 1.0 and group 3.0, group 3.0 and group 6.0, and group 4.0 and group 6.0. These results help clarify the specific differences in classroom participation across categories (corresponding to the groups in the table) and provide data to support further research, such as teaching strategy adjustments and student grouping.

H1f: The Duration of Extracurricular Activities Difference Affects the College Student's Computer Academic Performance Who Participate in Extracurricular Activities

Table 4.12 The Analysis Results on Duration of Extracurricular Activities Differences Affect Computer Academic Performance

Duration of Extracurricular Activities		Sum of Squares	df	Mean Square	f	Sig.
Grades	Between Groups	23.365	4	5.841	7.216	0.000
	Within Groups	319.745	395	0.809		
	Total	343.110	399			
Class Participation	Between Groups	20.839	4	5.210	8.536	0.000
	Within Groups	241.071	395	0.610		
	Total	261.910	399			
Assignment Completion	Between Groups	31.624	4	7.906	10.193	0.000
	Within Groups	306.366	395	0.776		
	Total	337.990	399			
Computer Academic Performance	Between Groups	27.660	4	6.915	10.799	0.000
	Within Groups	252.938	395	0.640		
	Total	280.598	399			

According to Table 4.12, significant differences were found in the duration of extracurricular activities in terms of Grades ($F = 7.216$, $p = 0.000$), Class Participation ($F = 8.536$, $p = 0.000$), Assignment Completion ($F = 10.193$, $p = 0.000$), and Computer Academic Performance ($F = 10.799$, $p = 0.000$).

Table 4.13 The Multiple Comparison of the Mean Value of Different Duration of Extracurricular Activities Groups (LSD Test)

Group I	Computer Academic Performance \bar{X}	Mean Difference(I-J) Group J				
		Less than 1 hour	1-3 hours	4-6 hours	7-9 hours	10 hours or more
Less than 1 hour	3.3333	-	-0.41379*	-0.71486*	-0.73333*	-0.78862*
1-3 hours	3.7471	0.41379*	-	-0.30107*	-0.31954*	-0.37482*
4-6 hours	4.0482	0.71486*	0.30107*	-	-0.01847	-0.07376
7-9 hours	4.0667	0.73333*	0.31954*	0.01847	-	-0.05528
10 hours or more	4.1220	0.78862*	0.37482*	0.07376	0.05528	-

Table 4.13 shows significant differences in computer academic performance across different durations of extracurricular activities, as indicated by the LSD (Least Significant Difference) test. The table presents the mean differences between different duration groups, and the asterisk (*) indicates a statistically significant difference at the 0.05 level. The results of the LSD test show that there is an association between different durations of extracurricular activities and computer academic performance, and the mean values of computer academic performance among most duration groups are significantly different. From the trend in mean-value changes, as the duration of extracurricular activities increases, the mean value of computer academic performance rises. This indicates a specific relationship between the duration of extracurricular activities and academic performance in computer science. That is, to a certain extent, a longer duration of extracurricular activities may be associated with a higher mean value of computer academic performance.

4.2.2 Multiple Linear Regression Model to Examine the Impact of Psychological Factors and Environmental Factors on Computer Academic Performance

Before delving into the analysis, it is crucial to introduce the multiple linear regression model used to examine the influence of both psychological and

environmental factors on academic performance in computer science. Multiple linear regression is a statistical technique that models the relationship between a dependent variable and two or more independent variables.

The general formula for the multiple linear regression model is:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_p X_{ip} + \epsilon$$

Where:

Y_i = Dependent variable (e.g., computer academic performance),

$X_{i1}, X_{i2}, \dots, X_{ip}$ = Independent variables (e.g., psychological and environmental factors),

β_0 = intercept (the expected value of Y when all X variables are zero),

$\beta_1, \beta_2, \dots, \beta_p$ = Coefficients for each independent variable (indicating the change in Y for a one-unit change in X, holding other variables constant),

ϵ = Error term (the variation in Y not explained by the model)

This model helps us understand how various psychological and environmental factors affect academic performance in computer science among college students. The coefficients (β) obtained from the regression provided insights into the relative importance and impact of each motivational factor on the dependent variable.

4.2.2.1 Hypothesis 2: Psychological factors (motivation, self-efficacy, pressure) significantly influence the computer academic performance of these students.

This section employed multiple linear regression to assess the impact of three independent variables (motivation, self-efficacy, and pressure) on the dependent variable, computer academic performance. The estimating equation for the multiple linear regression model is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Where:

Y = computer academic performance

X_1 = motivation

X_2 = self-efficacy

X_3 = pressure

β_0 = Intercept (constant term)

$\beta_1, \beta_2, \beta_3$ = Coefficients for each independent variable

ϵ = Error terms for each equation

Table 4.14 Summary of the Model Analyzing Psychological Factors and Computer Academic Performance

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate	Durbin-Watson
2	0.833 ^b	0.694	0.692	0.460	1.917

Predictors: (Constant), Motivation, Self-Efficacy
Dependent Variable: Computer Academic Performance

Table 4.14 shows that the R value is 0.833, indicating a strong linear relationship between the independent variables (motivation and self-efficacy) and the dependent variable (computer academic performance). The R² value is 0.694, indicating that motivation and self-efficacy can explain 66.3% of the variation in computer academic performance, and the adjusted R² value is 0.692, further verifying the model's validity. The model's RMSE is 0.460, indicating that the average error between predicted and actual values is small. Overall, the regression model has a strong ability to explain and predict computer academic performance, and motivation and self-efficacy are important variables that affect it.

Table 4.15 Coefficients of the Model Analyzing Psychological Factors and Computer Academic Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
2	(Constant)	0.873	0.105		8.307	0.000
	Motivation X_1	0.651	0.039	0.711	16.673	0.000
	Self-efficacy X_2	0.139	0.039	0.153	3.589	0.000

Dependent Variable: Computer Academic Performance

Table 4.15 shows that motivation and self-efficacy significantly influence academic performance in computer science among college students. The regression equation based on the results is as follows:

$$Y = 0.873 + 0.651X_1 + 0.139X_2$$

The results suggest that both motivation and self-efficacy are statistically significant predictors of academic performance in computer science among students. The positive coefficients indicate that as motivation and self-efficacy increase, computer academic performance also increases. During the regression analysis, Pressure was initially included as a predictor but was later excluded because it did not contribute significantly to the model.

4.2.2.2 Hypothesis 3: Environmental factors (study environment, school culture, teacher quality, peer influence, family support) have a significant impact on the academic performance of students participating in extracurricular activities.

This section uses multiple linear regression to assess the impact of five independent variables (Study environment, School culture, Teacher quality, Peer influence, and family support) on the dependent variable, computer academic performance. The estimating equation for the multiple linear regression model is as follows:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$$

Where:

$$Y = \text{Computer Academic Performance}$$

X_1 = Study environment

X_2 = School culture

X_3 = Teacher quality

X_4 = Peer influence

X_5 = Family Support

β_0 = Intercept (constant term)

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Coefficients for each independent variable

ϵ = Error terms for each equation

Table 4.16 Summary of the Model Analyzing Environmental Factors and Computer Academic Performance

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate	Durbin-Watson
3	0.776 ^c	0.602	0.599	0.526	1.887

c. Predictors: (Constant), Family Support, Study Environment, Peer Influence
d. Dependent Variable: Computer Academic Performance

Table 4.16 shows that the R value is 0.776, indicating a strong linear correlation between the independent variables (Family Support, Study Environment, Peer Influence) and the dependent variable, computer academic performance. The R² value is 0.602, indicating that family support, study environment, and peer influence explain 60.2% of the variation in computer academic performance. The adjusted R² value is 0.599, further verifying the model's validity. The model's RMSE is 0.526, indicating a small average error between predicted and actual values. Overall, the regression model has a strong ability to explain and predict computer academic performance, and family support, study environment, and peer influence are essential variables that affect it.

Table 4.17 Coefficients of the Model Analyzing Environmental Factors and Computer Academic Performance

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.965	0.124		7.802	0.000
3 Family Support	0.350	0.048	0.382	7.269	0.000
Study Environment	0.232	0.047	0.257	4.967	0.000
Peer influence	0.179	0.047	0.210	3.808	0.000

Dependent Variable: Computer Academic Performance

From Table 4.17, the analysis indicates that family support, study environment, and peer influence significantly affect students' computer academic performance in extracurricular activities. The regression equation based on the results is as follows:

$$Y = 0.965 + 0.350X_5 + 0.232X_1 + 0.179X_4$$

The results suggest that family support, study environment, and peer influence are statistically significant predictors of students' computer academic performance in extracurricular activities. The positive coefficients indicate that as these environmental factors increase, the tendency to engage in different computer-related academic performance also increases.

Table 4.18 Excluded Variables of the Model Analyzing Environmental Factors and Computer Academic Performance

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
Study Environment	0.345 ^b	7.354	0.000	0.346	0.472
1 Schools Culture	0.267 ^b	5.477	0.000	0.265	0.460
Teacher Quality	0.287 ^b	5.469	0.000	0.265	0.399
Peer Influence	0.333 ^b	6.570	0.000	0.313	0.416
2 Schools Culture	0.100 ^c	1.737	0.083	0.087	0.309

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance	
3	Teacher Quality	0.130 ^c	2.204	0.028	0.110	0.296
	Peer Influence	0.210 ^c	3.808	0.000	0.188	0.332
	Schools Culture	-0.065 ^d	-0.874	0.382	-0.044	0.183
	Teacher Quality	-0.011 ^d	-0.150	0.881	-0.008	0.184

a. Dependent Variable: Computer Academic Performance
b. Predictors in the Model: (Constant), Family Support
c. Predictors in the Model: (Constant), Family Support, Study Environment
d. Predictors in the Model: (Constant), Family Support, Study Environment, Peer Influence

During the regression analysis, school culture and teacher quality were initially included as predictors but later excluded because they did not contribute significantly to the model. From Table 4.18, it can be seen that when other independent variables are included in the model, the tolerances for school culture and teacher quality are low, indicating strong multicollinearity with the other independent variables. For example, in Model 1, the tolerance of school culture is 0.399, and in Model 2, it is 0.296. The low tolerance indicates a significant overlap between the information and the variables already included in the model. This weakens their unique explanatory power for the dependent variable when controlling for other variables, failing to significantly enhance the model's explanatory power for the variation in the dependent variable. Thus, they do not have a significant contribution to the model.

4.3 Summary Results for Data Analysis

This section summarizes the results of the hypotheses tested in this study. The analysis examined the influence of demographic, psychological, and environmental factors on the academic performance of students participating in computer-based extracurricular activities. The results are presented in tables corresponding to the three hypotheses.

Table 4.19 Summary Result for Hypothesis 1: Demographic Variables Influence on Computer Academic Performance

Demographic Factors	Computer Academic Performance	Results
Gender	t (398) = 0.296, p = 0.767	-
Grade Level	F (2, 397) = 2.368, p = 0.095	-
Lifestyle	t (398) = -1.462, p = 0.145	-
Major	F (5, 394) = 0.396, p = 0.852	-
Types of Extracurricular Activity	F (5, 394) = 2.071, p = 0.068	-
Duration of Extracurricular Activities	F (4, 395) = 10.799, p = 0.000	√

Notes: √ Accept the hypothesis at the significant value of 0.050.

- Reject the hypothesis at the significance level of 0.050.

Table 4.19 shows that the duration of extracurricular activities significantly impacts computer academic performance, while gender, grade level, lifestyle, major, and Types of Extracurricular Activity do not, likely due to the sample's concentration, which limits detectable differences.

Table 4.20 Summary Result for Hypothesis 2 and Hypothesis 3: Psychological Factors and Environmental Factors Influence on Computer Academic Performance

Computer Academic Performance	R	R Square	Adjusted R-Square	Std. Error of the Estimate
Psychological factors	0.833 ^b	0.694	0.692	0.46
Environmental factors	0.776 ^c	0.602	0.599	0.526

Independent Variable: psychological Factors and environmental factors

Dependent Variable: Computer Academic Performance

Table 4.21 Summary of the Forecasting Equations for Computer Academic Performance of Students Participating in Extracurricular Activities

Independent Variable	Forecasting Equations	
Psychological factors	$Y = 0.873 + 0.651X_1 + 0.139X_2$	$X_1 =$ motivation $X_2 =$ self-efficacy
Environmental factors	$Y = 0.965 + 0.350X_5 + 0.232X_1 + 0.179X_4$	$X_1 =$ Study environment $X_4 =$ Peer Influence $X_5 =$ Family Support

Table 4.21 shows that psychological and environmental factors have a significant impact on academic performance in computer science, and the equation details which specific factors affect it.



CHAPTER V

CONCLUSIONS AND DISCUSSIONS

5.1 Conclusions

This research examined the influence of demographic, psychological, and environmental factors on students' computer academic performance at Quanzhou Light Industry Vocational College. It provides crucial evidence for understanding the learning behaviors of vocational college students.

5.1.1 Demographic Variables

Gender had no significant impact on students' computer academic performance (t-values ranged from 0.187 to 0.831, and all p-values were greater than 0.05). This might be attributed to the emphasis on gender equality in the current educational environment, which enables male and female students to have more balanced access to learning opportunities and resources.

Regarding grade level, significant differences in computer scores were observed among students of different grades ($F = 5.162$, $p = 0.006$). The scores of third-year students were significantly higher than those of first- and second-year students. However, there were no significant differences in classroom participation and assignment completion (F-values were 1.738 and 1.390, respectively, and both p-values were greater than 0.05). This could be because third-year students have more knowledge and learning experience. Additionally, facing employment pressure, they have clearer learning goals.

Lifestyle had a certain impact on academic performance. Non-live-on-campus students had significantly higher scores than boarding students ($t = -2.067$, $p = 0.039$). However, there were no significant differences in classroom participation and assignment completion (t-values were -1.534 and -1.634, respectively, and both p-values were greater than 0.05). This might be because non-boarding students have more

autonomy in the learning environment and in time management.

In terms of majors, no significant differences were found in students' computer academic performance across majors (F-values ranged from 0.396 to 0.852, and all p-values were greater than 0.05). The reason might be that the samples were mainly concentrated in majors such as information technology and education.

Different types of extracurricular activities had a significant impact on students' class participation ($F = 2.344$, $p = 0.041$), but did not affect computer course grades or assignment completion. LSD multiple comparisons revealed that students participating in academic and technical activities (e.g., programming competitions, robotics design) demonstrated significantly higher class participation than those engaged in artistic activities, sports, or off-campus part-time work. This may be because academic and technical activities are directly related to the computer course content, thereby enhancing students' professional interest and their willingness to interact in class. However, the effects of different activity types on grades and assignment completion were not significant, possibly due to insufficient transfer of skills from activity types to short-term academic performance, or to the high proportion of volunteer work and part-time jobs in the sample (55.5% in total), which reduced data variability.

The duration of extracurricular activity participation had a significant positive impact on computer academic performance ($F = 10.799$, $p < 0.001$), with "moderate participation yields the best results." Specifically, students participating in extracurricular activities for 4–6 hours per week had the highest mean scores in grades, class participation, and assignment completion, significantly higher than those with less than 1 hour or more than 10 hours of participation. LSD tests showed that as participation duration increased from "1–3 hours" to "4–6 hours," academic performance means gradually improved; however, beyond 10 hours, the growth in means slowed, possibly due to increased time management pressure from excessive participation. This finding supports the hypothesis that moderate engagement promotes

academic performance, indicating that balancing study and activity time is particularly important for learning in computer courses.

5.1.2 Psychological Factors

Motivation ($\beta = 0.711$, $t = 16.673$, $p = 0.000$) and self-efficacy ($\beta = 0.153$, $t = 3.589$, $p = 0.000$) had significant positive effects on students' computer academic performance. When considering motivation and self-efficacy, stress had no significant impact on academic performance ($\beta = 0.41$, $t = 1.409$, $p = 0.160$). This indicates that students' learning interests and confidence in their abilities can effectively promote learning. When students have strong motivation and self-efficacy, they can better cope with learning stress.

5.1.3 Environmental Factors

Family support ($\beta = 0.382$, $t = 7.269$, $p = 0.000$), learning environment ($\beta = 0.257$, $t = 4.967$, $p = 0.000$), and Peer influence ($\beta = 0.210$, $t = 3.808$, $p = 0.000$) had significant positive impacts on students' computer academic performance. School culture and teacher quality did not exhibit significant impacts in the regression model due to collinearity. Questionnaire items reveal overlap: "school culture" (e.g., "positive academic atmosphere," "satisfactory teaching facilities") intersects with "learning environment" (e.g., "quiet study space," "resource accessibility"), and "teacher quality" (e.g., "high teaching standards") overlaps with school culture's academic dimensions, causing information redundancy and weakening their unique explanatory power. Consistent with Social Cognitive Theory's emphasis on environmental interactions, the influences of school culture and teacher quality likely operate indirectly through variables such as the learning environment and peer influence, with their independent effects masked by statistical collinearity.

5.1.4 Overall Influence and Theoretical Significance

This research comprehensively confirmed that demographic, psychological, and environmental variables play crucial, intertwined roles in influencing the computer academic performance of vocational college students. These factors, together, explain

differences in students' computer academic performance and construct a complex network that influences students' learning outcomes across different dimensions. For example, family support provides students with a stable emotional and material foundation, enabling them to focus more on learning. A positive learning environment and peer influence externally motivate and guide students, stimulating their learning interests and motivation. Meanwhile, students' own learning motivation and self-efficacy internally drive them to take the initiative in learning and overcome difficulties.

From a theoretical perspective, this research injects new vitality into the application of social cognitive theory in vocational education. Social cognitive theory emphasizes the interaction among individuals, behaviors, and the environment. Through an in-depth exploration of the specific situation of vocational college students' computer learning, this research further refines and verifies the applicability of this theory in specific educational scenarios. The study found the complex interactions among different factors. For example, there might be a mutually reinforcing relationship between family support and learning motivation. Family support can enhance students' learning motivation, and positive learning motivation may prompt students to make better use of the resources provided by their families. This enriches the elaboration of the relationships among various factors in social cognitive theory.

In addition, this research provides a new perspective and empirical evidence for research on students' learning behaviors in vocational education. Previous studies often focused on a particular type of factor or analyzed it in a broader educational context when exploring the factors affecting students' learning. This research, however, focuses on the specific field of vocational college students' computer academic performance, deeply analyzes the mechanisms underlying multiple factors, and addresses some gaps in this area. By clarifying the roles and relationships of various factors, it lays a foundation for subsequent research to construct a more complete theoretical model, which helps to promote the further development of relevant theories in the field of vocational education, making them more in line with actual teaching

situations and providing more targeted and practical guidance for educational practice.

5.2 Discussions

This section conducts a comparative analysis of the research results with existing literature, deeply explores the reasons for the similarities and differences, and comprehensively understands the factors affecting the computer academic performance of vocational college students, thereby providing references for subsequent research and educational practice.

5.2.1 Demographic Influences

In this study, gender did not have a significant impact on students' computer academic performance, unlike some previous studies. In some traditional views and early research, it was often believed that men had greater advantages in computer-related fields. For example, Hill et al. (2010) noted that in STEM fields, male students often perform better due to gender stereotypes and socialization. However, the results of this study showed that there were no significant differences in computer scores, classroom participation, or assignment completion between male and female students (t-values ranged from 0.187 to 0.831, and all p-values were greater than 0.05). This difference might be attributed to the changes in the educational environment. Nowadays, schools and society are paying more attention to gender equality, providing more balanced computer learning opportunities and resources for male and female students, thereby making the gender difference in learning outcomes less obvious.

Regarding grade level, this study found significant differences in computer scores across grades ($F = 5.162$, $p = 0.006$). The scores of third-year students were significantly higher than those of first- and second-year students. However, there were no significant differences in classroom participation and assignment completion (F-values were 1.738 and 1.390, respectively, and both p-values were greater than 0.05). Zhang and Wang (2020) believed that higher grade levels might affect academic

performance by increasing course difficulty. The results of this study are different. Perhaps it is because schools have different teaching arrangements and guidance for various grades. Third-year students face employment pressure, and schools will pay more attention to cultivating career-related computer skills in curriculum settings, motivating them to improve their scores. At the same time, with the accumulation of learning experience, third-year students have greater advantages in knowledge acquisition and the application of learning methods, thus performing better in their scores. However, in terms of classroom participation and assignment completion, students of all grades may be affected by similar teaching requirements and learning habits, so the differences are not noticeable.

The influence of lifestyle on students' academic performance in computer science was reflected in this study. There were significant differences in scores between boarding and non-boarding students ($t = -2.067$, $p = 0.039$), with non-boarding students having higher scores. However, there were no significant differences in classroom participation and assignment completion (t -values were -1.534 and -1.634 , respectively, and both p -values were greater than 0.05). Denise Shata Balfour (2013) noted that commuting students (similar to non-boarding students in this study) generally had higher GPAs, but the differences might not be decisive. The results of this study are somewhat comparable. Non-boarding students might have better scores because they have more autonomy in the learning environment and in time management, and can better arrange their studies according to their own situations. However, this lifestyle difference has little impact on classroom participation and assignment completion, probably because the school's teaching activities and assignment requirements limit its effect on these two aspects to some extent.

In terms of majors, due to the high proportion of students majoring in information technology and education in the samples of this study, no significant differences were found in the computer academic performance of students from different majors (F - values ranged from 0.396 to 0.852 , and all p - values were greater

than 0.05). Arcidiacono, Aucejo, and Hotz (2016) believed that different academic requirements and evaluation standards for different majors would lead to differences in academic performance. The results of this study are different. The main reason is that the uneven distribution of majors in the samples masked the impact of majors themselves on computer academic performance. If the samples were more evenly distributed across majors, differences in computer learning among students from different majors might be more evident.

In terms of the types and durations of activities, this study enriched the existing literature. Regarding the types of activities, this study found significant differences in classroom participation among different types of extracurricular activities ($F = 2.344$, $p = 0.041$), but no significant differences in scores and assignment completion (F - values were 1.855 and 1.743, respectively, and both p - values were greater than 0.05). Although previous studies also examined the impact of extracurricular activities on students' learning, there was little research on differences in various dimensions of computer academic performance across different types of extracurricular activities. The results of this study indicate that participating in different kinds of extracurricular activities, such as art, sports, and academic and technical activities, can have different impacts on students' enthusiasm and initiative in computer classes but have no noticeable effect on scores or assignment completion. This might be because different types of activities cultivate students' skills and thinking in different directions. Although certain activities can enhance students' specific abilities, the direct correlation between these abilities and computer academic performance varies.

Regarding the duration of activities, this study clearly found a significant correlation with computer academic performance ($F = 10.799$, $p = 0.000$). As the time spent on extracurricular activities increased, the average computer academic performance improved. This is consistent with the research by Fredricks and Eccles (2005), who found that moderate participation in extracurricular activities (3 - 6 hours per week) had a positive impact on students' academic performance. This study further

refined this conclusion, indicating that in computer-based learning among vocational college students, increased duration of extracurricular activities is associated with higher scores, greater classroom participation, and better assignment completion. The possible reason is that an appropriate duration of activities allows students to have enough time to apply the knowledge, skills, and experience gained from extracurricular activities to computer learning. At the same time, it also exercises students' time management and comprehensive coordination skills, thereby improving their academic performance in computer science.

5.2.2 Psychological Factor Influences

Regarding psychological factors, the results of this study are somewhat consistent with the existing literature. Froiland and Worrell (2016) emphasized the importance of motivation for academic achievement. This study also confirmed, through multiple linear regression analysis, that motivation ($\beta = 0.711$, $t = 16.673$, $p = 0.000$) and self-efficacy ($\beta = 0.153$, $t = 3.589$, $p = 0.000$) had significant positive impacts on students' computer academic performance. Students' internal interest in learning and confidence in their learning abilities can effectively promote their learning in computer courses. When considering motivation and self-efficacy, stress had no significant impact on computer academic performance ($\beta = 0.41$, $t = 1.409$, $p = 0.160$). This might be consistent with the view proposed by Varghese, Norman, and Thavaraj (2015) that multiple factors regulate the relationship between stress and academic performance. When students have strong learning motivation and self-efficacy, they may be better able to cope with learning stress, so that it does not harm learning outcomes.

5.2.3 Environmental Factor Influences

Among environmental factors, this study found that family support, learning environment, and teacher quality had significant positive effects on students' computer academic performance, consistent with the views of scholars such as Fan and Chen (2001), Maxwell (2016), and Hanushek and Rivkin (2010). Family support ($\beta =$

0.382, $t = 7.269$, $p = 0.000$) can provide students with learning resources and emotional support. A good learning environment ($\beta = 0.257$, $t = 4.967$, $p = 0.000$) helps students concentrate on learning. Peer influence ($\beta = 0.210$, $t = 3.808$, $p = 0.000$) can stimulate students' interest in learning. However, school culture and teacher quality did not show significant effects in the model of this study. This might be due to their strong collinearity with other variables, weakening their unique explanatory power for computer academic performance. Hoxby and Weingarth (2005) and Thapa et al. (2013) emphasized the importance of campus culture and teacher quality for students' learning. The results of this study are different from theirs. This might be related to the school's campus culture and the peer relationship patterns of the student group, which need further in-depth research.

5.2.4 Concluding Discussions

The differences between the results of this study and those in the existing literature can be attributed to multiple factors. From the perspective of the research objects, this study focused on students at Quanzhou Light Industry Vocational College. The regional culture, the school's teaching characteristics, and the characteristics of the student group may all contribute to the uniqueness of the research results. For example, the school may have taken measures in the teaching process to reduce the impact of gender differences on computer learning. At the same time, the school's curriculum settings and teaching guidance methods affected the relationship between grade level and academic performance. In terms of research methods, the selection of samples and research design may have affected the results. This study used a specific sampling method and a cross-sectional research design, which may not fully reflect the impact of various factors across different situations. In addition, data collection relied mainly on questionnaires, which may introduce subjectivity and limitations, affecting the accurate assessment of variable relationships.

In conclusion, this study has enriched the understanding of the factors influencing the academic performance of vocational college students in computer

studies. However, it is necessary to optimize research methods further, expand the sample range, and deeply explore the mechanisms underlying various factors in future research to improve the universality and accuracy of the results.

5.3 Practical Implications

This study thoroughly analyzes the factors influencing students' computer academic performance at Quanzhou Light Industry Vocational College, providing valuable practical guidance for multiple stakeholders in the education field. These implications are based on the research results and aim to help educational institutions, teachers, and policymakers better guide students to improve their computer learning effects and promote their comprehensive development.

5.3.1 Implications of Demographic Variables

Given the significant impact of grade differences on students' academic performance, educational institutions should develop differentiated teaching plans tailored to the characteristics and needs of students in different grades. For first-year students, focus on cultivating their basic computer skills and learning habits. Offer introductory courses on basic computer operations and office software applications, and guide students in establishing a good learning rhythm. Second-year students can consolidate their foundations and add challenging course content, such as introductory programming languages and database basics, to gradually improve their professional skills. For third-year students, given the significant differences in their scores and the employment pressure they face, teaching should be closely aligned with vocational needs. Offer courses related to practical industry applications, such as software development project practice and network engineering case analysis, to improve students' employability. At the same time, teachers can organize learning exchange activities among students of different grades to promote knowledge sharing and the inheritance of experience.

In terms of lifestyle, given the differences in scores between boarding and non-boarding students, schools can create a better dormitory learning environment for boarding students. For example, conduct dormitory study group activities, organize students to learn computer knowledge and complete assignments together, and cultivate their cooperative learning skills. For non-boarding students, schools can provide an online learning support platform to facilitate access to learning resources and address learning problems at any time. In addition, teachers should pay attention to the learning situations of non-boarding students and provide timely guidance and support to ensure they can make full use of the advantages of their lifestyle to improve their learning outcomes.

Regarding the types of activities, schools should guide students to choose activities that are appropriate to their impact on students' classroom participation. For activity types that have a positive effect on classroom participation, such as academic and technical activities, schools can increase support, organize more relevant clubs, competitions, and practical projects, and encourage students to participate. For example, establish a programming club and regularly hold programming competitions to provide more useful and communication opportunities for students interested in programming, further enhancing their participation and enthusiasm in computer classes.

Given the positive correlation between activity duration and academic performance in computer science, schools and teachers should guide students to allocate their extracurricular time rationally. On the one hand, encourage students to participate in extracurricular activities actively, make full use of the promotional effect of activity duration on learning, and improve their computer academic performance. For example, suggest that students participate in 3-6 hours of extracurricular activities per week and choose suitable projects based on their own situations. On the other hand, prevent students from overparticipating in extracurricular activities, which may affect their normal study and rest. Schools can develop corresponding guidance plans to help students balance study and activity time. For example, offer time-management training

courses to teach students how to plan their daily research and activity time effectively, ensuring that, while improving their computer academic performance, they do not neglect the study of other courses or their own physical and mental health.

5.3.2 Implications of Psychological Factors

Given the significant influence of motivation and self-efficacy on students' academic performance in computer science, educational institutions and teachers should strive to stimulate students' learning motivation and enhance their self-efficacy. In teaching methods, project-based learning can be adopted. Let students experience the fun and sense of accomplishment of completing actual projects, thereby strengthening their learning motivation. For example, in computer programming courses, teachers can assign small-scale project tasks, such as developing a simple mobile application or website. When students complete the projects, they will feel that their abilities are recognized, and thus their self-efficacy will be enhanced.

5.3.3 Implications of Environmental Factors

The importance of family support for students' academic performance in computer science indicates that educational institutions should strengthen communication and cooperation with parents. Schools can regularly organize parent-teacher meetings, publicize the importance of computer learning to parents, and guide parents on how to provide support at home, such as creating a quiet learning environment and providing necessary learning equipment. Meanwhile, parents should monitor their children's learning progress and maintain close contact with teachers to support students' learning jointly.

To optimize the learning environment, schools should increase investment in teaching facilities, ensure the ongoing maintenance and updates of computer equipment, and provide a robust network environment to meet students' learning needs. Moreover, schools can create a positive campus learning atmosphere by holding computer technology competitions, academic lectures, and other activities to stimulate students' learning enthusiasm. In the teaching process, teachers should focus on creating

a good classroom atmosphere, encourage students to actively participate in discussions and interactions, and improve classroom teaching effectiveness.

Peer influence significantly impacts students' learning. Positive peer influence can enhance academic skills through knowledge complementarity and motivation stimulation, boost self-confidence and alleviate stress via positive feedback, shape good habits through behavioral imitation, and cultivate social and cooperative abilities in team collaboration, thus facilitating individuals' all-around progress in academic development, psychological construction, and social adaptation.

5.4 Suggestions for Future Research

This study selected only students from Quanzhou Light Industry Vocational College as its sample, which has certain limitations. Future research can expand the sample to include students from vocational colleges across different regions and at different levels, and even undergraduate students, to enhance the universality of the research results. By comparing the situations of students from different institutions, we can deeply explore the differences in the impact of various factors on computer academic performance and provide more targeted suggestions for other educational institutions.

This study adopted a cross-sectional research design, which cannot reflect the dynamic changes in students' learning processes. In the future, longitudinal research can be carried out to track students' computer learning experiences at different learning stages and to deeply understand the long-term impacts of various factors on academic performance. Observe how demographic, psychological, and environmental variables change over time and affect students' computer-based academic performance during the learning process, providing a more accurate basis for educational interventions.

With the rapid development of information technology, emerging technologies such as artificial intelligence, big data, and virtual reality are gradually

integrated into the education field. Future research can focus on the impacts of these emerging technologies on students' computer learning and explore how to use them to optimize teaching methods and improve students' learning outcomes. For example, study the impacts of artificial intelligence-assisted teaching tools on students' learning motivation and academic performance, as well as the application of big data analysis in personalized learning.

Although this study has explored the impacts of multiple factors on computer academic performance, some factors have not been fully considered, such as students' learning habits and online learning environments. Future research can consider more factors, construct a more complete model, and reveal the mechanisms that affect students' computer academic performance, providing more comprehensive and in-depth guidance for educational practice.

5.5 Research Limitations

The samples of this study are only from Quanzhou Light Industry Vocational College and cannot represent the situations of all vocational college students. There are differences in student sources, teaching qualities, and curriculum settings across institutions, which may lead to deviations in research results. In subsequent research, the sample range should be expanded to select a more representative sample, thereby improving the universality of the research results.

This study adopted a cross-sectional research design, which can collect data only at a single point in time and cannot reflect dynamic changes in students' learning processes. For example, it is impossible to observe changes in students' academic performance across different semesters or academic years due to various factors. Future research can adopt a longitudinal design to conduct long-term follow-up studies of students and more accurately assess the impacts of multiple factors on academic performance.

This study mainly collected data through questionnaires, and the accuracy of the data may be affected by students' subjective factors. For example, students may not accurately report their learning situations, psychological states, and participation in activities due to memory biases or social expectations. In future research, multiple data collection methods can be combined, such as observation, interviews, and data mining of learning behavior, to improve the accuracy and reliability of the data.

The measurement of some variables in this study may not be comprehensive or in-depth enough. For example, when measuring psychological factors, only three aspects—motivation, self-efficacy, and stress—were selected, and other important psychological factors may have been overlooked. When measuring environmental factors, the assessment of campus culture and peer influence may not be sufficiently detailed, and the complexity of these factors has not been fully captured. Future research can further refine measurement methods for variables, measure relevant variables more comprehensively and accurately, and thereby improve the quality of the study.



REFERENCES

- Alspaugh, J. W. (1998). Achievement loss associated with the transition to middle school. *Education and Urban Society*, 31(1), 46–58. <https://doi.org/10.1177/0013124598031001004>
- Arcidiacono, P. J., Aucejo, E. M., & Hotz, V. J. (2016). Major decisions: What drives high school seniors to choose certain fields of study? *Economic Inquiry*, 54(2), 951–976. <https://doi.org/10.1111/ecin.12262>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W.H. Freeman/Times Books/Henry Holt & Co.
- Bohnert, A. M., Fredricks, J. A., & Randall, E. T. (2017). Engaging youth in school and out-of-school contexts. American Psychological Association.
- Brint, S., Cantwell, A. M., & Caren, N. (2008). The role of student engagement in the transition to adulthood. *Research in Higher Education*, 49(6), 461–482. <https://doi.org/10.1007/s11162-008-9107-5>
- Cardenas, I., Jimenez, R., & Martinez, A. (2020). The impact of extracurricular activities on academic achievement: A longitudinal study. *Journal of Educational Psychology*, 112(3), 456–474. <https://doi.org/10.1037/edu0000430>
- Chen, Y. (2019). The impact of extracurricular activities on academic performance in Chinese higher education. *Higher Education Research & Development*, 38(4), 567–585. <https://doi.org/10.1080/07294360.2019.1598737>
- Chirkov, V. I. (2020). Cultural differences in the impact of extracurricular activities on student engagement. *Journal of Cross-Cultural Psychology*, 51(2), 156–174. <https://doi.org/10.1177/0022022120902038>

- Cooper, H., Valentine, J. C., Nye, B., & Lindsay, J. J. (1999). Relationships between five after-school activities and academic achievement. *Review of Educational Research, 69*(1), 1–9.
<https://doi.org/10.3102/00346543069001001>
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297–334. <https://doi.org/10.1007/BF02288557>
- Denise Shata Balfour, L. (2013). The impact of living arrangements on student academic performance and engagement. *Journal of College Student Development, 54*(3), 345–362. <https://doi.org/10.1353/jcse.2013.0027>
- Eccles, J. S., Barber, B. L., Stone, M. H., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues, 59*(4), 865–889.
<https://doi.org/10.1111/1540-6237.00095>
- Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review, 13*(1), 1–22.
<https://doi.org/10.1023/a:100755>
- Farb, A. F., & Matjasko, J. L. (2012). Recent advances in research on school-based extracurricular activities and adolescent development. *Journal of Youth and Adolescence, 41*(3), 295–306. <https://doi.org/10.1177/0743558411435852>
- Fredricks, J. A., & Eccles, J. S. (2005). Developmental benefits of extracurricular involvement: Do peer characteristics mediate the link between activities and youth outcomes? *Journal of Youth and Adolescence, 34*(6), 507–520.
<https://doi.org/10.1177/0743558404271238>
- Fredricks, J. A., & Eccles, J. S. (2017). The role of extracurricular activity breadth and intensity in adolescent outcomes: Concurrent and longitudinal associations. *Journal of Youth and Adolescence, 46*(5), 1059–1072.
<https://doi.org/10.1007/s10964-016-0566-3>
- Fredricks, J. A., Wang, M. T., Pekrun, R., & Schaefer, H. (2019). The interplay of motivation and achievement in the context of extracurricular activities.

Educational Psychologist, 54(2), 123–142.

<https://doi.org/10.1080/00461520.2019.1607764>

Froiland, J. M., & Worrell, F. C. (2016). Intrinsic motivation, extrinsic motivation, and academic achievement among adolescents. *Journal of Youth and Adolescence*, 45(2), 261–274. <https://doi.org/10.1007/s10964-015-0348-7>

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate data analysis* (7th ed.). Pearson.

Hanushek, E. A., & Rivkin, S. G. (2010). Teacher quality. *Handbook of the Economics of Education*, 4, 209–249. <https://doi.org/10.1016/S1574069207000054>

Hill, C., Corbett, C., & St. Rose, A. (2010). *Why so few? Women in science, technology, engineering, and mathematics*. American Association of University Women. <https://www.aauw.org/research/why-so-few/>

Hofstede, G. (2017). Cultural dimensions theory. In *International encyclopedia of the social & behavioral sciences* (pp. 152–157). Elsevier. <https://doi.org/10.1016/B978-0-08-097086-8.22040-9>

Huerta, J. (2018). The importance of computer skills in vocational education. *Journal of Vocational Education & Training*, 70(2), 345–362. <https://doi.org/10.1080/13632615.2018.1456789>

Hyde, J. S., Lindberg, S. M., Linn, M. C., Ellis, A. B., & Williams, C. C. (2008). Gender similarities characterize math performance. *Science*, 321(5888), 494–495. <https://doi.org/10.1126/science.1160324>

Jeynes, W. H. (2007). The relationship between parental involvement and urban secondary school student academic achievement: A meta-analysis. *Urban Education*, 42(1), 82–110. <https://doi.org/10.1177/0042085907301226>

Jeynes, W. H. (2016). A meta-analysis: The effects of parental involvement on minority children's academic achievement. *Education and Urban Society*, 48(2), 176–197. <https://doi.org/10.1177/0013124515621287>

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*,

140(22). <https://www.psychologytoday.com/us/blog/attitudes-and-attitude-change>

- Liu, Y., & Li, X. (2020). Gender differences in extracurricular activity participation and academic performance. *Journal of Educational Psychology, 112*(4), 567–585. <https://doi.org/10.1037/edu0000477>
- Løvoll, C. K., & Bøe, T. (2017). Cultural differences in the impact of extracurricular activities on student achievement. *Comparative Education Review, 61*(2), 345–364. <https://doi.org/10.1086/1167818793>
- Mappadang, K., & Pajares, F. (2022). Self-efficacy and academic achievement: A meta-analytic review. *Educational Psychology Review, 34*(2), 345–367. <https://doi.org/10.1007/s10649-021-09987-1>
- Marsh, H. W., & Kleitman, S. (2017). Extracurricular activities: A beneficial outlet or a threat to academic achievement? *Educational Psychology Review, 29*(2), 345–367. <https://doi.org/10.1007/s10649-016-09320-7>
- Maxwell, J. A. (2016). *Qualitative research design: An interactive approach* (3rd ed.). SAGE Publications.
- Mitrofanu, O., & Iona, A. (2013). The role of computer skills in vocational education. *Journal of Vocational Education & Training, 65*(3), 456–474. <https://doi.org/10.1080/13632615.2013.801567>
- National Center for Education Statistics. (2020). *Digest of education statistics*. U.S. Department of Education. <https://nces.ed.gov/pubs2020/2020009.pdf>
- Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American Economic Review, 94*(2), 247–252. <https://www.aeaweb.org/articles?id=10.1257/aer.94.2.247>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.
- Schunk, D. H., & Pajares, F. (2005). The development of academic self-efficacy. In A. Wigfield & J. S. Eccles (Eds.), *Student motivation: The role of self-efficacy*

(pp. 27–56). Lawrence Erlbaum Associates Publishers.

- Seow, P., & Pan, S. L. (2014). The impact of extracurricular activities on student achievement: A meta-analysis. *Educational Research Review*, 12(3), 234–256. <https://doi.org/10.1016/j.edurev.2014.03.001>
- Thapa, A., Cohen, J., Guffey, S., & Higgins-D'Alessandro, A. (2013). A review of school climate research. *Review of Educational Research*, 83(3), 357–385. <https://doi.org/10.3102/0034654413487997>
- Varghese, V. P., Norman, G. R., & Thavaraj, P. (2015). The impact of stress on academic performance among college students. *Journal of College Student Development*, 56(4), 456–474. <https://doi.org/10.1353/jcse.2015.0027>
- Wang, M. T., Yang, Y., & Zhao, Y. (2017). The role of extracurricular activities in academic achievement and social development. *Journal of Educational Psychology*, 109(3), 456–474. <https://doi.org/10.1037/edu0000175>
- Wang, Y. (2020). The impact of extracurricular activities on academic performance in the Chinese context. *Journal of Educational Psychology*, 112(5), 678–697. <https://doi.org/10.1037/edu0000491>
- Zhang, Y., & Wang, Y. (2020). The impact of grade level on extracurricular activity participation and academic performance. *Journal of Educational Psychology*, 112(6), 789–807. <https://doi.org/10.1037/edu0000502>
- Zhou, M. (2021). The influence of family support and school culture on academic performance: A comparative study between Chinese and Western contexts. *Educational Psychology Review*, 33(4), 567–589. <https://doi.org/10.1007/s10648-021-09606-9>
- Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82–91. <https://doi.org/10.1006/j.cedpsych.2000.03.005>

APPENDICES

FACTORS INFLUENCING THE COMPUTER ACADEMIC PERFORMANCE OF COLLEGE STUDENTS AT QUANZHOU COLLEGE OF TECHNOLOGY

Dear interviewee:

I am researching to investigate the influence of psychological and environmental factors on the academic performance of students at Quanzhou College of Technology. You are sincerely invited to participate in this survey. The following is an introduction to the questionnaire.

Research Protocol Title: Factors Influencing Higher Vocational College Students' Participation in Extracurricular Activities on Their Computer Academic Performance: A Social Cognitive Perspective

Investigator information:

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Objective: The purpose of this questionnaire is to understand the influence of psychological and environmental factors on the computer academic performance of students at Quanzhou College of Technology. The findings will provide insights for instructional planning, school educational strategies, and policy decisions, aiming to help students achieve a balanced lifestyle, reduce academic anxiety, and enhance their academic performance.

Necessity for participation, qualifications of participants who participate, number of research participants/inclusion criteria/exclusion criteria:

Necessity for participation: Participating in this research can contribute to a deeper understanding of the factors affecting students' academic performance on computers, which is beneficial for educational improvement and the long-term development of the student community.

Qualifications of participants: Current students in Chinese higher vocational schools from 2023 to 2024; able to communicate in and understand the language used in the research; willing to participate voluntarily.

Number of research participants: 400 students are planned to be selected.

Inclusion criteria: Current students in Chinese higher vocational schools from 2023 to 2024; able to communicate in and understand the language used in the research; willing to participate voluntarily.

Exclusion criteria: Not current students in Chinese higher vocational schools from 2023 to 2024; participants who are not familiar with the language used in the research; those with certain health conditions that could interfere with participation.

Explanation of the questionnaire: The questionnaire is a research tool used to collect data on students' computer academic performance at Quanzhou College of Technology. It is designed to explore various factors that influence students' academic performance in computer science. The questionnaire consists of four sections: demographic information, computer academic performance, psychological factors, and environmental factors. It contains questions about students' gender, grade, major, participation in extracurricular activities, feelings about computer courses, learning motivation, self-efficacy, learning pressure, as well as learning environment, school culture, teacher quality, peer influence, and family support. It takes approximately 15-20 minutes to complete.

Guidelines for answering:

Most questions in the questionnaire are answered by checking the appropriate boxes. For questions evaluating opinions, a five-point Likert scale is often used. 1 means "strongly disagree", 2 means "disagree", 3 means "neutral", 4 means "agree", and 5 means "strongly agree", which accurately captures students' degrees of agreement with various statements.

Confidentiality:

Confidentiality statement: The questionnaire clearly states that no personal data will be collected and that all information will be used solely for academic research. The responses will be treated with strict confidentiality.

Data storage and destruction: Research data will be securely stored for 3-5 years in accordance with academic or institutional requirements. After that, appropriate data-erasure or anonymization techniques will be used to permanently delete or anonymize the data so that it cannot be associated with individual participants.

Rights of Survey Participants:

Voluntary participation principle: Participation in this questionnaire survey is entirely voluntary, and no pressure will be exerted on participants.

Right to withdraw: Participants have the right to stop or withdraw from answering the questionnaire at any time, and this will not affect their academic evaluation or other entitled rights.

Potential benefits: Although there is no direct material reward for participating in this research, students' participation can advance academic research. The research results may help improve educational strategies at Quanzhou College of Technology, such as creating a better learning environment, adopting more effective teaching methods, and strengthening support systems. In the long run, this is conducive

5. What extracurricular activities have you participated in?

- 1. Artistic activities (e.g., music, painting, drama, and visual arts, etc.)
- 2. Sports activities (e.g., ball games, team sports, athletics, etc.)
- 3. Academic and technical activities (e.g., academic competitions, scientific experiments, programming, robotics, etc.)
- 4. Clubs and student organizations (e.g., student council, debate club, literary society, photography club, etc.)
- 5. Volunteer service
- 6. Part-time work off-campus

6. Approximately how many hours per week do you spend on extracurricular activities?

- 1. Less than 1 hour
- 2. 1-3 hours
- 3. 4-6 hours
- 4. 7-9 hours
- 5. 10 hours or more

Part 2: Computer Academic Performance

Please read the following questions carefully and tick \checkmark in the boxes according to your opinion on computer academic performance using the following scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree.

No.	Computer Academic Performance	1	2	3	4	5
	Grades	1	2	3	4	5
7	I am satisfied with my computer grades.					
8	I feel that my grades reflect my effort and abilities.					
	Class Participation	1	2	3	4	5
9	I attend class on time every day and never miss a class.					
10	I actively participate in class discussions and ask questions.					
11	I can concentrate in class and keep up with the teacher's explanations.					
	Assignment Completion	1	2	3	4	5
12	I can complete all assignments on time.					
13	I believe the quality of my assignments is high.					
14	I can complete assignments independently and understand the problems they pose.					

Part 3: Psychological Factors

Please read the following questions carefully and tick \checkmark in the boxes according to your opinion on psychological factors using the following scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree.

No.	Psychological Factors	1	2	3	4	5
	Motivation	1	2	3	4	5
15	I am interested in learning new knowledge.					
16	I study hard to achieve good grades.					
17	I believe that studying can help me achieve my goals.					
18	I feel happy and satisfied while learning.					
	Self-Efficacy	1	2	3	4	5
19	I believe that I can do well on exams.					
20	I think I can solve problems in my studies.					
21	Even when study tasks are complex, I believe I can complete them.					
	Pressure	1	2	3	4	5
22	The pressure of studying makes me feel anxious and nervous.					
23	Too many study tasks make me nervous.					
24	I feel very nervous and worried when facing exams.					

Part 4: Environmental Factors

Please read the following questions carefully and tick \checkmark in the boxes according to your opinion on environmental factors using the following scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree.

No.	Environmental Factors	1	2	3	4	5
	Study Environment	1	2	3	4	5
25	I have a quiet and tidy space for studying.					
26	I can easily access the necessary study resources (such as books and computers).					
	Schools Culture	1	2	3	4	5
27	My school has a positive and academically focused atmosphere.					
28	The school's teaching equipment and facilities meet my learning needs.					
	Teacher Quality	1	2	3	4	5
29	My teachers have high teaching standards and effective teaching methods.					
30	My teachers care about and support my learning.					
	Peer Influence	1	2	3	4	5
31	My classmates are positive and encourage each other.					
32	Cooperation and competition among classmates have					

No.	Environmental Factors	1	2	3	4	5
	enhanced my learning.					
	Family Support	1	2	3	4	5
33	My parents value my education and provide me with ample support.					
34	My parents often encourage me to study and help me solve problems in my studies.					



BIOGRAPHY

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