From Classroom to Cuisine: Empirical Insights into the Factors Affecting Culinary Learning Outcomes in Zhejiang's Higher Vocational Education

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Abstract

Purpose: The expanding Higher Vocational Education sector in China has prompted vocational colleges to focus on improving the academic performance of higher vocational students. **Research design, data, and methodology:** This research investigates the factors influencing culinary students' learning outcomes, utilizing a case study and empirical analysis involving higher vocational students in Zhejiang, China. To ensure the validity and reliability of the content before distributing the questionnaire, we conducted Item-Objective Congruence (IOC) and a pilot test using Cronbach's Alpha. Our study selected eighty culinary students from a higher vocational institution in Zhejiang through intervention methods. Both qualitative and quantitative approaches were utilized to assess the effectiveness of the intervention. **Results:** The study was organized into three phases: pre-intervention design and implementation, intervention, and post-intervention. The results revealed that self-efficacy, behavioral engagement, cognitive engagement, emotional engagement, and student-instructor interaction have a significant effect on learning performance. The five proposed hypotheses were confirmed, meeting the research objectives. **Conclusions:** The study suggests that educators in Higher Vocational universities and colleges should emphasize these factors and teaching strategies to improve student learning outcomes, considering the study's findings.

Keywords: Learning Performance, Self-Efficacy, Behavioral Engagement, Cognitive Engagement, Emotional Engagement

JEL Classification Code: I23, J28, L2

1. Introduction

Both undergraduate and vocational colleges regard learning performance as an indicator of institutional quality and teaching effectiveness. Considering economic growth and a shortage of skilled labor, the country is enhancing its vocational education system. While vocational students emphasize practical skills, they often lack theoretical and research capabilities. Therefore, investigating the factors influencing their learning performance is essential to address these gaps, improve academic outcomes, and elevate the standards of vocational education. By evaluating academic performance, students are motivated to study harder, and

refining assessment methods can enhance the branding and unique development of vocational colleges (Tian, 2009).

To strengthen vocational education, the researcher intends to analyze the factors impacting the academic performance of Chinese vocational students, with the goal of enhancing teaching quality and developing exceptional talent. Focusing on the well-regarded culinary program at Zhejiang Vocational and Technical College, the study explores five factors: Self-Efficacy (SE), Behavioral Engagement (BE), Cognitive Engagement (CE), Emotional Engagement (EE), and Student-Instructor Interaction (SII). Understanding these factors is vital for both educators and

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students to improve learning performance.

2. Literature Review

2.1 Learning Performance

In this study, the researchers used exam scores as a proxy measure for assessing students' academic learning performance. Learning performance is defined as including both implicit factors (such as interest, attitude, and behavior) and explicit factors (such as exam scores, evaluations, and competitions) throughout the preparation, process, and outcome stages. Implicit factors are challenging to quantify, whereas explicit factors can be measured more easily.

2.2 Self-Efficacy

Self-efficacy is defined as an individual's belief in their ability to succeed in specific tasks or responsibilities (Wilde & Hsu, 2019). It can be tailored to activities or generalized, resulting in a set of beliefs about one's own capabilities. These beliefs significantly influence a person's motivation, thoughts, and feelings, leading to considerable differences in behavior among individuals with varying levels of self-efficacy (Wilde & Hsu, 2019). Self-efficacy is regarded as a crucial component of Bandura's Social Cognitive Theory and reflects a person's confidence in their ability to plan and carry out actions to achieve desired results (Domenech-Betoret et al., 2017). Research self-efficacy predicts performance by indicating students' confidence in their research skills. Students with low research self-efficacy tend to doubt their abilities and lack confidence in the success of their efforts. In summary, self-efficacy pertains to the belief in one's ability to complete tasks, while academic self-efficacy specifically relates to students' confidence in fulfilling learning tasks.

H1: Self-efficacy has a significant influence on learning performance.

2.3 Behavioral Engagement

In the study by Hospel et al. (2016), behavioral engagement is defined as students' active involvement in school and classroom activities. This includes their positive interactions with teachers, compliance with classroom rules, regular attendance at school and classes, and participation in social activities within the school setting. Furthermore, Monteiro et al. (2021) note that behavioral engagement is evident in students' diligent completion of homework, focused attention in the classroom, active participation in discussions, consistent school attendance, dedicated effort, and enthusiastic involvement in both classroom and school-wide activities. Several studies have identified a significant and direct relationship between behavioral engagement and academic performance. Overall, however, empirical research on the connection between behavioral engagement and learning performance is notably insufficient, highlighting a significant research gap.

H2: Behavioral engagement has a significant influence on learning performance.

2.4 Cognitive Engagement

Li et al. (2021) describes cognitive engagement as the extent to which students think strategically while solving problems and learning during specific activities. Researchers have proposed various and relatively comprehensive definitions and conceptual frameworks for cognitive learning. In summary, empirical studies examining the effect of cognitive engagement on learning performance are insufficient, highlighting a research gap in this area.

H3: Cognitive engagement has a significant influence on learning performance.

2.5 Emotional Engagement

Emotional engagement refers to the emotional responses and affective connections that students develop towards classroom learning activities (Schnitzler et al., 2021). According to Cents-Boonstra et al. (2021), emotional engagement encompasses students' affective reactions to classroom activities, including positive emotional expressions like enjoyment and enthusiasm for the lessons. Overall, the definitions of emotional engagement provided by researchers and scholars show significant similarities, indicating a consensus within the academic community on how to conceptualize this important aspect of student engagement. The literature suggests that most researchers support the idea that emotional engagement positively influences students' learning performance.

H4: Emotional engagement has a significant influence on learning performance.

2.6 Student-Instructor Interaction

Interactions in the learning process can be classified into three distinct types: learner-content interaction, learner-learner interaction, and learner-instructor interaction (Martin & Bolliger, 2018). The interaction between students and instructors includes aspects such as presence, support, communication, and other related elements (Seo et al., 2021). Positive student-instructor interactions involve teachers who effectively use technology, competently manage course expectations, and provide personal attention by knowing their students' names. Students value and need a caring

relationship with their teachers, who should act as compassionate leaders in navigating complex interactions with learners. Caring teachers demonstrate a strong work ethic, showing enthusiasm for their profession and respect for their students and others (Solis & Turner, 2017). In summary, the definitions offered by researchers and scholars for student-instructor interactions seem to be relatively limited compared to those for other previously discussed variables.Top of FormBottom of Form

H5: Student-instructor interaction has a significant influence on learning performance.

3. Research Methods and Materials

3.1 Research Framework

The researcher utilized three theoretical models: the Technology Acceptance Model (Davis, 1989), the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), and the Theory of Planned Behavior (Ajzen, 1991). These theoretical frameworks supported and aided in the creation of the conceptual framework shown in Figure 1.
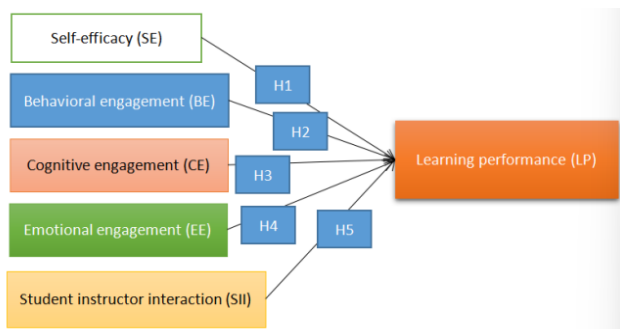

Figure 1: Conceptual Framework

H1: Self-efficacy has a significant influence on learning performance.
H2: Behavioral engagement has a significant influence on learning performance.
H3: Cognitive engagement has a significant influence on learning performance.
H4: Emotional engagement has a significant influence on learning performance.
H5: Student-instructor interaction has a significant influence on learning performance.

3.2 Research Methodology

This research utilized both interviews and questionnaires. Initial SWOT interviews were conducted to analyze student feedback on the IDI. Follow-up interviews evaluated the progress of the IDI. After the qualitative interviews, a questionnaire survey was administered, which underwent reliability and validity testing. Data analysis was performed using jamovi and multiple linear regression, leading to the development of an IDI plan based on the influencing variables. A sample of 25 participants was assessed post-intervention through a questionnaire. The goal of the IDI plan was to facilitate transformation among the participants. The combined analysis demonstrated the effectiveness of the IDI. The study aimed to implement the IDI among culinary students in Zhejiang to improve their academic performance.

3.3 Research Population, Sample Size, and Sampling Procedures

3.3.1 Research Population
The research population comprises 360 culinary students at a vocational college in Zhejiang Province, China. Of these, 240 students are studying Chinese cuisine, while 120 are focused on Western cuisine. The population is relatively well-defined and small in scale.

3.3.2 Sample size
The pre-IDI questionnaire survey had a sample size of 80 respondents, consisting of 53 students from the Chinese cuisine class and 27 from the Western cuisine class. In the analysis of progression, many researchers suggest having at least ten observations per variable (Hair et al., 2014). Thus, the minimum sample size is calculated as 6 (the number of variables in the Proposed Conceptual Framework) multiplied by 10, resulting in 60 respondents. Therefore, the selected sample size of 80 respondents is deemed appropriate.

For the pre-IDI interviews, the sample size is 15, while the sample size for the IDI intervention project is 25, both before and after the IDI. During the pre-IDI stage, the 15 interviewees were chosen for the reliability test. The questionnaire data collected are used for multiple linear regression tests, with a sample size of 80. In the IDI stage, 25 students participated, and after the IDI, these same 25 participants were surveyed again for a T-test.

3.3.3 Sampling Procedures
Sampling methods can be classified into random/probability sampling and non-random/probability sampling (Bhardwaj, 2019). In this dissertation, purposive sampling is utilized as a form of non-probability sampling (Suri, 2011) to select participants from a vocational school, specifically including students of both Chinese and Western cuisine to ensure their relevance to the research topic. All 360 students received an email requesting their consent to participate. From this group, 80 students were chosen to support the researcher by completing the questionnaire survey prior to the IDI, while 15 students were selected for

the pre-IDI interviews. The 80 students for the pre-IDI questionnaire survey were selected using stratified random sampling, with the sample size detailed as follows:

3.4 Research Instruments

3.4.1 Design of Questionnaire

The questionnaire serves as a pre-IDI tool for testing hypotheses and examining factors influencing respondents' learning performance. It is based on previous research related to independent variables: Self-efficacy (SE), Behavioral Engagement (BE), Cognitive Engagement (CE), Emotional Engagement (EE), and Student-Instructor Interaction (SII), with Learning Performance (LP) as the dependent variable. The IOC method is used to validate the questionnaire items.

The questionnaire is divided into three sections: the first collects demographic information, the second includes questions on the independent variables, and the third addresses the dependent variable of learning performance. A five-point Likert scale (ranging from strongly agree to strongly disagree) is employed in the second section, allowing participants to express their opinions on various statements (Joshi et al., 2015). This approach enables an overall distribution of attitudes or opinions to be analyzed (Harpe, 2015). The questionnaire comprises 27 items: 8 for self-efficacy, 4 for behavioral engagement, 4 for cognitive engagement, 3 for emotional engagement, 3 for student-instructor interaction, and 4 for learning performance, as detailed in the table below.

3.4.2 Components of Questionnaire

The questionnaire is divided into three parts. The first part is about the demographic information of the respondents. The second part is the questions regarding the independent variables: self-efficacy, behavioral engagement, cognitive engagement, emotional engagement, and student-instructor interaction. The third part is the questions about the dependent variable learning performance. The respondents' basic characteristics are included in the questionnaire to support the subsequent analysis of their intentions and opinions. A five-point Likert scale is applied in the second part, including strongly agree, agree, neutral, disagree, and strongly disagree (Joshi et al., 2015). Participants choose the appropriate option based on their own opinions on the statement, where 1 and 5 are usually extreme options, 2 and 4 are intermediate options, and 3 are neutral options. By analyzing the choices of participants, an overall distribution of attitudes or opinions can be obtained (Harpe, 2015). There are altogether 27 items in the questionnaire. Self-efficacy (SE) has eight items; behavioral engagement (BE) has four items; cognitive engagement (CE) has four items; emotional engagement (EE) has three items; student-instructor

interaction (SII) has three items; learning performance (LP) has four items. They are illustrated in the table below:

3.4.3 IOC Results

In this research, as mentioned above, the researcher invites five experts to assess the content validity of the questionnaire, including the tutor for the researcher at Thailand University and four doctor-degree professors at the vocational college where the researcher works. Therefore, four experts are Chinese, while one expert is Thai. The experts are professionals in the fields involved in the questionnaire. After the testing by the experts, the IOC dimensions all got a rating higher than 0.67 as the standard critical value.

3.4.4 Pilot survey and Pilot test results

The questionnaires, which consist of 25 items, are administered to the 25 participants in the experiment for reliability testing, as all items remain following the Item Objective Congruence (IOC) process. The results of the testing and the level of correlation are presented in the table below. Every item in the research tool successfully meets the reliability criteria, achieving a score greater than 0.8. Specifically, the scores are as follows: Self-Efficacy (SE) at 0.932, Behavioral Engagement (BE) at 0.892, Cognitive Engagement (CE) at 0.879, Emotional Engagement (EE) at 0.882, Student-Instructor Interaction (SII) at 0.811, and Learning Performance (LP) at 0.879.

Table 1: Pilot Test Result

Variables	No. of Items	Sources	Cronbach's Alpha	Strength of association
Self-Efficacy (SE)	8	Wilde and Hsu (2019)	0.932	Excellent
Behavioral Engagement (BE)	4	Hospel et al. (2016)	0.892	Good
Cognitive Engagement (CE)	4	Li et al. (2021)	0.879	Good
Emotional Engagement (EE)	3	Schnitzler et al. (2021)	0.882	Good
Student-Instructor Interaction (SII)	3	Martin and Bolliger (2018)	0.811	Good
Learning Performance (LP)	4	Gilbert (2012)	0.879	Good

4. Results and Discussion

4.1 Results

4.1.1 Demographic Profile

The researcher presented the demographic profile of the entire research population (n=80), and IDI Participants (n=15), as illustrated in Table 2.

Table 2: Demographic Profile

Entire Research Population (n=80)		Frequency	Percent
Gender	Male	25	31.25%
	Female	55	68.75%
Age	18	25	31.25%
	19	22	27.50%
	20	20	25.00%
	More than 20	13	16.25%
Class	Chinese cuisine	53	66.25%
	Western cuisine	27	33.75%
Total		**80**	**100%**
IDI Participants (n=15)		Frequency	Percent
Gender	Male	9	60.00%
	Female	6	40.00%
Age	18	3	20.00%
	19	4	26.67%
	20	3	20.00%
	More than 20	5	33.33%
Class	Chinese cuisine	8	53.33%
	Western cuisine	7	46.67%
Total		**15**	**100%**

4.1.2 Results of multiple linear regression

The survey participants consist of 80 students majoring in cuisine, with ages ranging from 18 to over 20 years. The demographic details of the respondents are presented in the table below:

Table 3: The multiple linear regression of five independent variables on learning performance

Variables	Standardized Coefficients Beta	t	P-value	VIF	R Square
Self-Efficacy (SE)	0.179	2.629	0.010*	2.173	
Behavioral Engagement (BE)	0.203	3.076	0.003*	2.040	0.842
Cognitive Engagement (CE)	0.188	2.856	0.006*	2.040	
Emotional Engagement (EE)	0.267	3.609	0.001**	2.570	
Student-Instructor Interaction (SII)	0.321	5.741	0.000**	1.467	

Note: p-value <0.05*, p-value <0.001**

According to the findings of the hypotheses testing, the hypotheses finally determined are related to the variations of all the sub-variables at the pre-IDI and post-IDI stages:

H6: There is a significant mean difference in Self-Efficacy (SE) between pre-strategic plan and post-strategic plan stages.

H7: There is a significant mean difference in behavioral engagement (BE) between the pre- and post-strategic planning stages.

H8: There is a significant mean difference in Cognitive Engagement (CE) between pre-strategic plan and post-strategic plan stages.

H9: There is a significant mean difference in Emotional Engagement (EE) between pre-strategic plan and post-strategic plan stages.

H10: There is a significant mean difference in Student-Instructor Interaction (SII) between pre-strategic plan and post-strategic plan stages.

H11: There is a significant mean difference in learning performance (LP) between the stages of the pre-strategic plan and the post-strategic plan.

4.2 IDI Intervention Stage

The intervention was conducted among the 25 pre-selected participants. Interventions aim to improve their self-efficacy, behavioral engagement, cognitive engagement, emotional engagement, student-instructor interaction, and learning performance as far as the academic courses are concerned. The intervention period is 12 weeks, divided into three stages, each lasting four weeks.
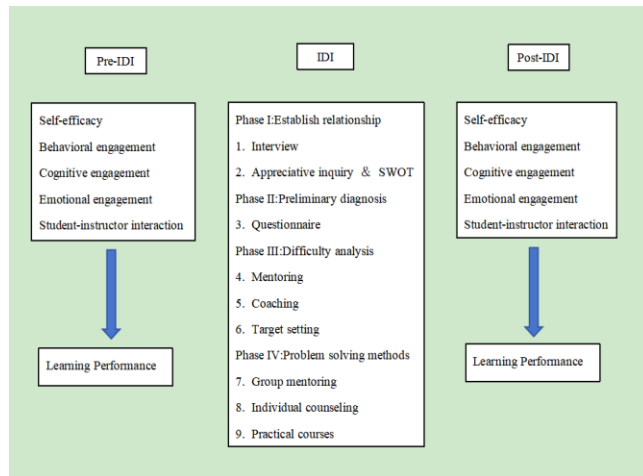
Figure 2: IDI Activities

4.3 Results Comparison between Pre-IDI and Post-IDI

A paired-sample t-test was performed to assess the effectiveness of the IDI intervention experiment and de termine whether the intervention was successful.

Table 4: Paired-Sample T-Test Results

Variables	Mean	SD	t-value	p-value
Self-Efficacy				
Pre-IDI	3.09	0.91	-3.853	0.001
Post-IDI	3.80	0.39		
Behavioral Engagement				
Pre-IDI	3.20	1.14	-3.259	0.003
Post-IDI	4.10	0.46		
Cognitive Engagement				
Pre-IDI	2.74	0.87	-4.692	0.000
Post-IDI	3.74	0.59		
Emotional Engagement				
Pre-IDI	3.32	1.13	-2.701	0.012
Post-IDI	4.07	0.52		
Student-Instructor Interaction				
Pre-IDI	2.77	0.76	-5.261	0.000
Post-IDI	3.84	0.42		
Learning Performance				
Pre-IDI	3.52	0.89	-3.985	0.001
Post-IDI	4.31	0.43		

Table 5 presents the results of the paired-sample t-test comparing the pre-IDI and post-IDI phases. Significant increases were observed across all factors:

Self-Efficacy: There is a significant difference between pre-IDI (M = 3.09, SD = 0.91) and post-IDI (M = 3.80, SD = 0.39) Self-Efficacy (SE) scores. The t-value is -3.853, with a df of 24, and the p-value is 0.001, which is less than 0.05.

Behavioral Engagement: There is a significant difference between pre-IDI (M = 3.20, SD = 1.14) and post-IDI (M = 4.10, SD = 0.46) Behavioral Engagement (BE) scores. The t-value is -3.259, with a df of 24, and the p-value is 0.003, which is less than 0.05.

Cognitive Engagement: There is a significant difference between pre-IDI (M = 2.74, SD = 0.87) and post-IDI (M = 3.74, SD = 0.59) Cognitive Engagement (CE) scores. The t-value is -4.692, with a df of 24, and the p-value is 0.000, which is less than 0.05.

Emotional Engagement: There is a significant difference between pre-IDI (M = 3.32, SD = 1.13) and post-IDI (M = 4.07, SD = 0.52) Emotional Engagement (EE) scores. The t-value is -2.701, with a df of 24, and the p-value is 0.012, which is less than 0.05.

Student-Instructor Interaction: There is a significant difference between pre-IDI (M = 2.77, SD = 0.76) and post-IDI (M = 3.84, SD = 0.42) Student-Instructor Interaction (SII) scores. The t-value is -5.261, with a df of 24, and the p-value is 0.000, which is less than 0.05.

Learning Performance: There is a significant difference between pre-IDI (M = 3.52, SD = 0.89) and post-IDI (M = 4.31, SD = 0.43) Learning Performance (LP) scores. The t-value is -3.985, with a df of 24, and the p-value is 0.001, which is less than 0.05.

5. Conclusions, Recommendations and Limitations

5.1 Conclusions & Discussions

This study investigates the impact of self-efficacy, behavioral engagement, cognitive engagement, emotional engagement, and student-instructor interaction on the learning performance of culinary students at a vocational college in Zhejiang. The research is conducted in three phases: pre-IDI, IDI, and post-IDI. Initially, the study assessed the current situation of the culinary students to identify areas for improvement. SWOT analyses were performed on both Chinese culinary students in general and those at the Zhejiang vocational college. The conceptual framework was developed by synthesizing theoretical models. After reviewing relevant literature, the researcher adopted variables from Lin and Wang (2018), Raza et al. (2020), and Nguyen and Nguyen (2010) to explore how self-efficacy, various types of engagement, and student-instructor interaction influence learning performance through a combination of qualitative and quantitative methods. A preliminary survey of 25 students was conducted to test reliability and effectiveness, with five experts validating the projects using the IOC method. All projects were deemed reliable, providing a solid foundation for the research. Subsequently, 80 culinary students were surveyed, revealing that self-efficacy, engagement, and student-instructor

interaction positively influenced learning. The IDI intervention was designed to focus on these factors. Pre-IDI interviews with 15 students helped shape the intervention design. Post-IDI, paired-sample t-tests showed significant improvements among participants, indicating the positive impact of the IDI intervention. To ensure robustness, five post-intervention participants were interviewed, and the data were integrated with both quantitative and qualitative insights, enhancing the study's validity. The comprehensive research process, including the literature review, goal setting, expert consultations, data collection, interviews, intervention design, IDI implementation, and analysis, confirmed the IDI's positive effect on learning performance.

5.2 Recommendations

The empirical research found that culinary students in vocational colleges with low levels of self-efficacy, engagement, and student-instructor interaction tend to perform poorly academically, consistent with the literature reviewed in Chapter Two. These students require targeted interventions due to underlying mental and behavioral issues. This study provides recommendations for effectively engaging such students through IDI strategies. Learning difficulties stem from cognitive barriers, emotional factors, and external influences, which, if left unaddressed, can impede comprehension, retention, and overall academic and personal growth. To address these challenges, it is essential to implement personalized plans, utilize differentiated teaching techniques, create a supportive environment, and initiate early interventions through assessments. These strategies equip students to overcome obstacles and achieve academic success.

5.3 Limitations for Future Research

While this dissertation provides valuable insights into the factors affecting student engagement and academic performance in vocational colleges, it has certain limitations. First, the study's sample is limited to a vocational college in Zhejiang Province, China, which may restrict the generalizability of the findings. As a result, these findings may not be applicable to other vocational colleges or educational contexts. Future research should expand the sample size and geographic coverage to include a more diverse range of schools and regions, thereby enhancing the external validity of the results (Polit & Beck, 2010).
Second, the dissertation focuses exclusively on students majoring in cooking, potentially overlooking variations across different academic disciplines within vocational colleges. Future studies could address this limitation by conducting cross-disciplinary comparisons of student engagement and academic performance across various

majors. Such research would offer a deeper understanding of how different academic programs influence student experiences and outcomes (Hashemi & Mahdavirad, 2023). Third, the dissertation does not include a crosstab analysis based on participants' demographic variables, such as gender, family background, and urban or rural origins. This omission limits the study's ability to explore the potential impact of demographic factors on student engagement and academic performance. Future research should incorporate crosstab analyses to investigate the complex relationships between demographic characteristics and key study variables, contributing to a more comprehensive understanding of the factors influencing students' educational experiences (Wang et al., 2024).

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