Analyzing Differences and the Relationship Model between Learning Satisfaction and the Willingness of International Students: A University of Technology in Taiwan

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ABSTRACT

Owing to the low number of births in Taiwan, the shortage of students has reached a new peak, which is a severe problem in higher education. To attract international students, the internationalization of higher education has become a necessary trend. Moreover, qualified services and support enable international students to remain at the same school and share a good reputation with students in their countries. Therefore, this research examines the disparities in learning satisfaction and willingness among international students from diverse backgrounds at the University of Technology in Taiwan. Furthermore, it analyzes the impact of learning satisfaction and motivation on students' willingness. The research design used a questionnaire comprising two questionnaires concerning learning satisfaction and willingness to study. A total of seventy-two valid samples participated in the study. The quantitative analysis of the questionnaires was conducted through descriptive statistics, t-test, ANOVA, and structural equation modeling (S.E.M.). The findings revealed significant disparities in learning satisfaction and willingness to study across international students at different program levels. Specifically, graduate-level international students demonstrated higher satisfaction and willingness to study than their undergraduate counterparts. Concerning the medium of instruction, English medium of instruction (E.M.I.) programs demonstrated higher levels of satisfaction than Chinese-medium instruction in the sub-factors of learning satisfaction and willingness to study. Specifically, in the sub-factors of "life function," "course materials," and "teaching methods and assessment" of learning satisfaction, as well as the "willingness to study" factor, E.M.I. showed significantly higher scores than the Mixed teaching in English and Chinese. The outcomes of the study further demonstrated that "learning satisfaction" was positively and significantly influenced by factors such as "life function," "learning environment," "course materials," "teaching methods and assessment," "teacher teaching," and "administrative support." Moreover, it was found that "willingness to study" was positively and significantly affected by "learning satisfaction." This research can aid Taiwanese universities in enhancing their competitiveness and attracting and retaining international students.

Keywords: E.M.I., internationalized higher education, student satisfaction

Introduction

The selection of Taiwan as the preferred destination for higher education among international students has shown a consistent upward trend (Moslehpour et al., 2020). From 2013 to 2021, the number of international students in Taiwan steadily increased from 57,920 to 92,963 (Statista, 2023). This surge in international student enrollment is particularly significant because of the student shortage faced by Taiwanese educational institutions due to declining birth rates (Moslehpour et al., 2020). The shortage of students reached a new peak in 2022 (Taipei Times, 2022), with Taiwan's population experiencing its third consecutive year of decline, primarily attributable to a record-low number of births (Taiwan News, 2023).

In 2018, international students accounted for 10% of the total number of university and college students in Taiwan, with enrollment figures increasing yearly (DeAeth, 2019). As the demand for studying abroad continues to increase, higher education institutions have recognized the importance of understanding international student satisfaction and fostering loyalty (Kéri et al., 2022), prompting many universities to prioritize enhancing student satisfaction and their reputation to attract top international students (Moslehpour et al., 2020).

In recent years, the internationalization of higher education has become a focal point of research interest (Buckner & Stein, 2020; Garwe & Thondhlana, 2021; Ghazarian, 2020). Empirical evidence consistently demonstrates that higher satisfaction levels reduce negative word-of-mouth communication and complaint behavior while increasing repurchase intentions (Richins, 1983; Smith & Bolton, 1998; Andreassen, 2001; Szymanski & Henard, 2001). However, international students may transfer and build an unfavorable reputation owing to negative learning attitudes such as depression or frustration (Tran et al., 2023). From an institutional research perspective, it is important to investigate strategies that meet the essential needs of international students for enhancing university retention and enrolling potential peers. Recognizing these critical factors is substantially significant. However, limited literature explores the relationship between learning satisfaction and the intention to continue learning. Consequently, this study aims to establish a framework for investigating the impact of learning satisfaction on the willingness of international students to study in Taiwan. The objectives of this study are as follows:

1. To compare the differences in learning satisfaction and willingness to study among international students based on different factors, such as program level and medium of instruction.
2. To explore the causal relationship between learning satisfaction and willingness to study.

This study seeks to provide valuable insights into the factors influencing the learning satisfaction of international students and their subsequent willingness to pursue higher education in Taiwan.

Literature Review

Learning Satisfaction

Shahsavar and Sudzina (2017) provided an elaborate definition of student satisfaction, characterizing it as the subjective evaluation of the perceived value of educational content and services acquired in exchange for the invested time and resources of the student. The concept of learning satisfaction draws inspiration from the notion of customer satisfaction proposed by Cardozo (1965). Scholars such as Greiner (2000) and Knight (2002) have emphasized the interrelation between the quality of service, teaching, and engagement within the learning environment and students' overall satisfaction, ultimately leading to successful learning outcomes. Holford and Patkar (2003) expound this by identifying five crucial factors of students' overall satisfaction: the quality of facilities, learning process, service provided, curriculum, and implementation of teaching. Correspondingly, Wu et al. (2015) have conducted a comprehensive investigation of learning satisfaction and identified five influential factors: teaching methods, course content, learning environment, encounters with administrative services, and the convenience of learning, all exhibiting significant associations with learning satisfaction.

Zhu et al. (2020) focus on evaluating online learning satisfaction among university students, from first-year students to seniors. Their research reveals that several factors primarily influence student satisfaction. They include the introduction of courses, learning objectives, teacher-student interaction, the transmission of positive values, the attention given by teachers to students' progress, the construction of a comprehensive knowledge system, and the cultivation of independent learning abilities. Considering these findings, this study aims to investigate learning satisfaction as a *dependent variable* across six key factors, which are the independent variables: life function (Wu et al., 2015), learning environment (Greiner, 2000; Knight, 2002; Wu et al., 2015), course materials (Wu et al., 2015), teaching methods and assessments (Wu et al., 2015), teacher teaching (Greiner, 2000; Knight, 2002; Zhu et al., 2020), and administrative support (Holford and Patkar, 2003; Wu et al., 2015). Building on this premise, the following hypotheses are proposed:

H1: Life function positively affects learning satisfaction.

H2: Learning environment positively affects learning satisfaction.

H3: Course materials positively affect learning satisfaction.

H4: Teaching methods and assessment positively affect learning satisfaction.

H5: Teacher teaching positively affects learning satisfaction.

H6: Administrative support positively affects learning satisfaction.

Furthermore, numerous scholars have highlighted the significant influence of individual characteristics on the learning satisfaction of international students, with particular attention given to factors such as gender (Chen, 2022; Li et al., 2020; Russell et al., 2010; Sauer, 2003), educational level (Li et al., 2020; Sauer, 2003), and language skills (Mori, 2000; Russell et al., 2010; Shery, Thomas, & Chui, 2010). Thus, the present study seeks to analyze the differences in learning satisfaction and willingness to study among international students from diverse backgrounds.

Willingness to Study

Drawing on insights from social psychology literature, willingness to study can be understood

within the customer loyalty framework, where customers' intentions to repurchase and their inclination to refer an institute or brand to others are considered key dimensions (Martensen et al., 2000). Loyalty initially conceptualized as synonymous with satisfaction and customer retention (Reichheld & Teal, 1996; Reichheld & Sasser, 1990), is influenced by factors such as the quality of teaching and students' learning satisfaction (Hennig-Thurau et al., 2001), indicating their significance in maintaining students' loyalty.

To assess learning satisfaction and continuing learning intentions, Wu et al. (2015) employed the SERVPERF (service performance) scale developed by Cronin and Taylor (1992) to measure service quality. Their study revealed a significant relationship between learning satisfaction and the intention to continue learning. Moslehpour et al. (2020) identified student satisfaction as a mediator between service quality and institutional reputation. Pedro et al. (2020) found that loyal students were willing to give back to the University. Building on these empirical findings, this study proposes the following hypothesis:

H7: Learning satisfaction positively affects willingness to study.

Methodology

Research Design and Framework

Based on an extensive review of the previous literature, a conceptual framework was developed for this study, as presented in Figure 1. The framework integrates various theoretical perspectives and empirical findings to understand the research topic comprehensively.

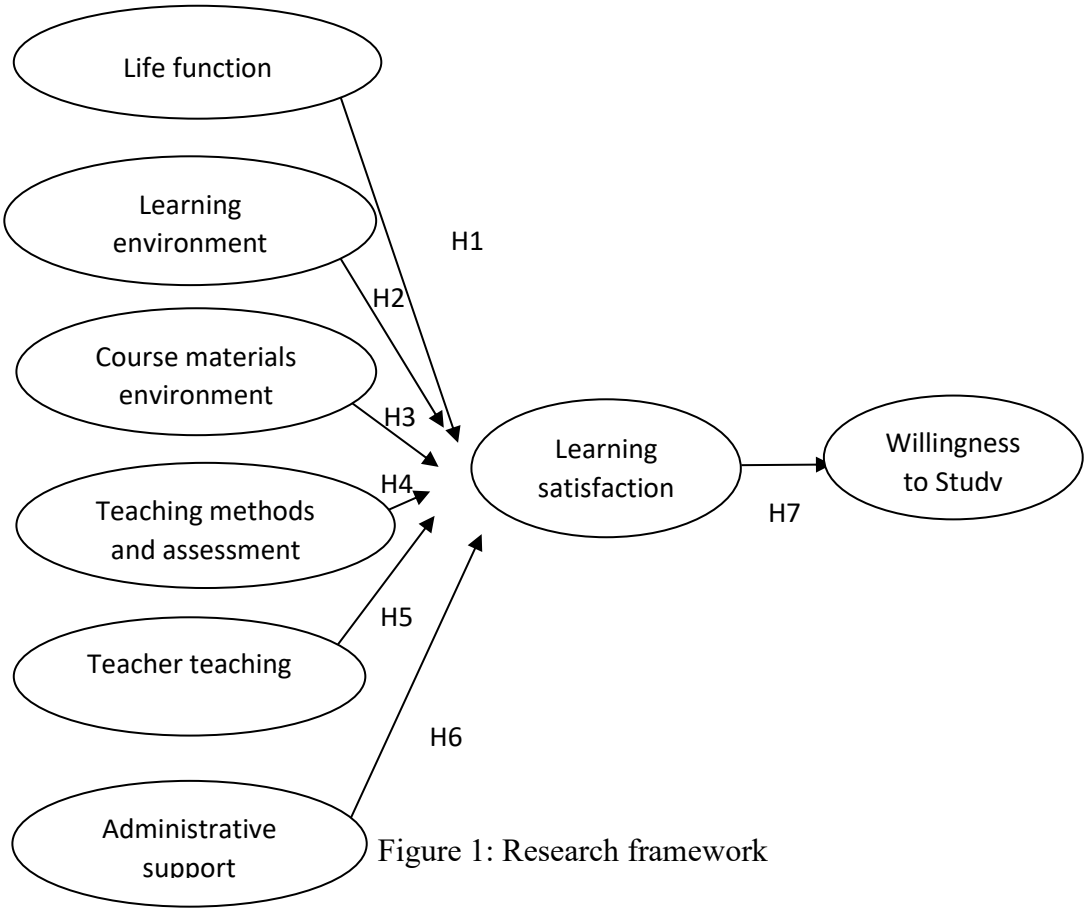


Figure 1: Research framework

Instruments

The instruments used in this study were developed based on a comprehensive review of previous research on learning satisfaction and willingness to study. During the conceptualization stage of the scale tool, this research initially distilled the definition of international students. Subsequently, it synthesized diverse dimensions for measuring their demands, as evidenced by the contents presented in Table 1.

Table 1: Research-aspect operational definition

Construct	Definition	Number	Indicator	Reference sources
Life function	The school's geographical location, service facilities, and physical equipment	8	The school is in a great location; The school has convenient transportation functions; Meal service hours provided by the school; The quality of the food served in the restaurant; Provides a safe and comfortable accommodation environment; Clear rental information; Provides comprehensive sports and leisure facilities; The University's signs are identified.	Parasuraman et al. (1988); ; Cheng & Wang (2007); Deng & Li(2007)
Learning environment	The teaching space environment and equipment resources provided by the school	5	The classroom's quantity and space; Teaching equipment update; E-learning and information environment; The school provides sufficient library resources; Internationalized learning environment	Beattie and Collins (2000); Chang(2011)
Course materials	The content of teaching materials provided by the school	7	Clear teaching objectives; Online query of teaching materials; Abundant elective courses; Well-planned professional courses; Good cohesion between courses; Innovation of course content; Meaningful "Labor Education" training	Branch (1994); Beattie and Collins (2000); Chang(2011)
Teaching methods and assessment	Course selection and assessment criteria provided by the school	4	Flexible and reasonable course arrangement; Public learning content of the course before choosing the course; Clear and easy-understanding teaching methods; Reasonable evaluation criteria	Beattie and Collins (2000); Cheng & Wang (2007); Chang(2011)
Teacher teaching	Course majors provided by teachers to students and interaction with students	6	Teacher's professional knowledge; Frequency of teacher-student interaction; Serious attitude of teachers' teaching; Encouraging students to discuss; Caring about student learning; Teaching assistant system Teacher's professional knowledge; Frequency of teacher-student	Beattie and Collins (2000); Branch (1994); Cheng & Wang (2007); Chang(2011)

			interaction; Serious attitude of teachers' teaching; Encouraging students to discuss; Caring about student learning; Teaching assistant system	
Administrative support	The school provides friendly administrative assistance so that students can study with peace of mind	8	Sufficient information that the school had provided me before I came here; Good mannered administrators; Club activities offered by the school; After-school academic tutoring service provided by the school; Counseling services provided by the school; For international students' activities organized by the Office of International and Cross-Strait Cooperation (ICSC); The information of part-time campus jobs provided by the school; The information of scholarships provided by the school	Beattie and Collins (2000); Cheng & Wang (2007); Chang(2011)
Learning satisfaction	The reaction of international students to positive or negative feelings after attending school	-	Consists of six dimensions (life function, learning environment, teaching materials, teaching methods, and assessment, teacher teaching, administrative support)	Binner et al.(1994); Ting et al. (2011); Tsai et al.(2012)
Willingness to Study	The actual feelings of international students towards the school determine the willingness of international students to return to school and recommend school	3	If you can choose again, you will choose the school again. You are willing to promote its advantages for the school to attract other students (s). Based on your experience at this school, you would not recommend friends or family members to attend this school (R)	Wu et al. (2015); Astin (1993); Ting et al. (2011); Tsai et al.(2012); Deng & Li(2007)

R: Reverse question

To enhance the questionnaire's face validity and content validity, three experts were invited to review its semantics: the director of the office of institutional research, an international student tutor, and an educational research teacher. A pre-test analysis was conducted based on the relevant questionnaire items using a sample of international students selected from a university in Taiwan. The primary methodology of this study is an online questionnaire.

The learning satisfaction scale comprised 38 items, all measured using a 5-point Likert-type scale ranging from very dissatisfied (1 point) to very satisfied (5 points). The willingness to study scale consisted of three questions, measured using a 5-point Likert-type scale, with responses ranging from strongly disagree (1 point) to strongly agree (5 points).

The survey was conducted between February 14, 2023, and March 2, 2023, and 38 international students participated in the preliminary test. However, 8 questionnaires were deemed invalid, leaving 30 valid questionnaires for further analysis of the reliability of the individual variable. After their feedback was received, the questionnaire was revised. Additionally, a pilot study was

conducted before the actual test to enhance the validity of the questionnaire. The reliability scores, indicated by Cronbach's alpha, ranged from 0.7 to 0.9 for all constructs, signifying the satisfactory measurement of the variables of interest. This adherence to Nunnally and Berstein's (1994) recommendation suggests that Cronbach's alpha should exceed 0.7 in more mature studies. Through expert interviews and extensive pilot testing, we established confidence in the face and content validity of the final instrument.

Population and Sample

The formal survey used a convenience sampling method. Data were collected from international students enrolled at a university in Taiwan. The Google online questionnaire survey was administered from March 14, 2023, to April 17, 2023. After excluding 19 incomplete surveys, 72 valid questionnaires remained for analysis (Table 2).

The sample comprised undergraduate students, representing the most popular program choice among international students (69.4%). This was followed by Ph.D. programs (23.6%) and Master's programs (7.0%). Regarding the duration of their stay, 47.2% of the international students had been in Taiwan for one year, 27.8% for two years, 12.5% for three years, and 12.5% for four or more years. The majority of respondents were female (62.5%). Regarding age distribution, 62.5% were within the age range of 18–24, 19.4% were aged 25–30, and 18.1% were over 31. Regarding the medium of instruction, 50.0% of the international students reported Chinese, 36.1% indicated English, and 13.9% reported a mixed teaching approach involving both English and Chinese.

Table 2: Respondents' profile

Demographics	Level	Count	Percentage
Program Level	Master's program	5	7.0
	Ph.D. program	17	23.6
	Undergraduate program	50	69.4
Grade	1 year	34	47.2
	2 years	20	27.8
	3 years	9	12.5
	4 or more years	9	12.5
Gender	Female	44	61.1
	Male	28	38.9
Age	18–24	45	62.5
	25–30	14	19.4
	above 31	13	18.1
Medium of Instruction	Chinese	36	50.0
	English	26	36.1
	Mixed teaching in English and Chinese	10	13.9

Data Analysis

Quantitative data analysis was conducted using SPSS 25.0. SmartPLS 3.0 software was also employed specifically for the partial least squares path analysis, as Ringle et al. (2015) recommended. The statistical methods employed in this study were as follows.

1. Descriptive statistical analysis: Using measures such as mean and standard deviation, the characteristics of the sample were examined, providing insights into the average levels and variability of students' learning satisfaction and willingness to study.
2. Independent sample t-test: Independent t-test analyses were conducted to detect significant differences among various categories concerning international students' learning satisfaction and willingness to study, including program level. To ensure an adequate number of samples for analysis, the program level was divided into two groups: Master's degree or above (including Master's and Ph.D. programs; this group comprises 30.6% of all respondents, with 23.6% of the respondents being Ph.D. students); and undergraduate programs.
3. Analyses of variance (ANOVA): ANOVA was used to detect significant differences among mediums of instruction.
4. Structural equation modeling (S.E.M.): S.E.M. was a comprehensive approach to analyzing measurement and structural models. This facilitated exploring the causal relationships between learning satisfaction and willingness to study.

Finding and Discussion

Analysis of the Average Learning Satisfaction and Willingness to Study

Upon close examination of Table 3, it becomes evident that the average score for each item measuring the learning satisfaction of international students surpassed 3 points, with a maximum score of 5 points. Several items demonstrated exceptional satisfaction levels, scoring 4 points or higher. These items include "8. The university logo is clear" (M = 4.01), "12. The school provides adequate library resources" (M = 4.17), "25. Teachers' professional knowledge" (M = 4.07), "27. Teacher's serious attitude toward teaching" (M = 4.10), "28. Encouraging students to discuss" (M = 4.17), and "29. Caring about student learning" (M = 4.04).

However, it is imperative to direct attention to aspects and specific items with average scores below 3.5, as they may indicate areas of concern. In particular, one notable area that requires further attention is the aspect of "Life Function": "1. The school is well located," which received an average score of 3.39.

Table 3: The average score of each item for learning satisfaction (n = 72)

Facts	Item	M	SD
Life Function	1. The school is in a great location	3.39	1.157
	2. The school has convenient transportation functions	3.67	1.101
	3. Meal service hours provided by the school	3.81	1.070
	4. The quality of the food served in the restaurant	3.63	0.971
	5. Provide a safe and comfortable accommodation environment	3.74	1.007
	6. Clear rental information	3.58	1.045
	7. Provide comprehensive sports and leisure facilities	3.72	1.129
	8. The University's signs are identified	4.01	0.896
Learning Environment	9. The classroom's quantity and space	3.74	1.151
	10. Teaching equipment update	3.78	1.038
	11. E-learning and information environment	3.67	1.035
	12. The school provides sufficient library resources	4.17	0.888
	13. Internationalized learning environment	3.54	1.113
Course Materials	14. Clear teaching objectives	3.81	1.016
	15. Online query of teaching materials	3.68	0.990
	16. Abundant elective courses	3.69	0.988
	17. Well-planned professional courses	3.79	1.047
	18. Good cohesion between courses	3.78	1.010
	19. Innovation of course content	3.74	0.979
	20. Meaningful "Labor Education" training	3.53	1.048
Teaching Methods and Assessment	21. Flexible and reasonable course arrangement	3.79	0.934
	22. Public learning content of the course before choosing the course	3.61	1.042
	23. Clear and easy-understanding teaching methods	3.85	0.974
	24. Reasonable evaluation criteria	3.83	0.949
Teacher Teaching	25. Teacher's professional knowledge	4.07	0.954
	26. Frequency of teacher-student interaction	3.97	0.934
	27. Serious attitude of teachers' teaching	4.10	0.825
	28. Encouraging students to discuss	4.17	0.856
	29. Caring about student learning	4.04	0.911
	30. Teaching assistant system	3.78	1.051
Administrative Support	31. Sufficient information that the school had provided me before I came here	3.60	1.195
	32. Good manners of administrators	3.83	1.061
	33. Club activities offered by the school	3.71	0.911
	34. After-school academic tutoring services provided by the school	3.63	0.985
	35. Counseling services provided by the school	3.69	0.959
	36. Foreign students' activities organized by the Office of International and Cross-Strait Cooperation (ICSC)	3.97	0.919
	37. The information on part-time campus jobs provided by the school	3.68	0.962
	38. The information on scholarships provided by the school	3.85	1.002

Upon carefully examining Table 4, it is apparent that the average score for each item assessing foreign students' willingness to study exceeds 3 points. Except for the reverse question in item 41, which fell slightly below the 3.5-point threshold, the remaining two questions surpassed the 3.5-point mark. These findings indicate that international students are willing to pursue further studies and have a favorable intention to recommend their educational experience to others.

Table 4: The average score of each item of willingness to study (n = 72)

Facts	Item	M	SD
Willingness to Study	39. If you have the opportunity to choose again, you will choose the school again	3.72	0.953
	40. You are willing to promote its advantages for the school to attract other students	3.67	0.993
	41. Based on your experience at this school, you would not recommend friends or family members to attend this school(R)	3.44	0.963

R: reverse question

Analysis of Differences in Learning Satisfaction and Willingness to Study

a) **Program Level:** Through t-test analysis, it was determined that the average scores for the sub-factors of learning satisfaction and willingness to study among international students with a master's degree or above were notably higher than those of undergraduate students. This significant difference, with a *p*-value of less than 0.01, was observed across all sub-factors, as shown in Table 5. The t-values of the "Teaching Methods and Assessment" and "Teacher Teaching" factors were higher than 4.5 for graduate students, and the professional teachers had the highest satisfaction scores.

Table 5: t-test analysis table for different program levels

Factors	Group	n	M	SD	t
Life Function	Undergraduate program	50	3.45	0.76	−4.29**
	Master's degree or above	22	4.26	0.69	
Learning Environment	Undergraduate program	50	3.58	0.83	−2.97**
	Master's degree or above	22	4.24	0.96	
Course Materials	Undergraduate program	50	3.46	0.79	−4.36**
	Master's degree or above	22	4.31	0.69	
Teaching Methods and Assessment	Undergraduate program	50	3.45	0.76	−5.80**
	Master's degree or above	22	4.51	0.61	
Teacher Teaching	Undergraduate program	50	3.77	0.73	−4.51**
	Master's degree or above	22	4.58	0.64	
Administrative Support	Undergraduate program	50	3.56	0.73	−3.11**
	Master's degree or above	22	4.16	0.83	
Willingness to Study	Undergraduate program	50	3.43	0.67	−3.13**
	Master's degree or above	22	4.02	0.84	

* $p < 0.05$, ** $p < 0.01$

Medium of Instruction: Table 6 shows the average scores for different teaching languages. It was determined that the international students instructed in English (English-medium instruction or E.M.I.) manifest the highest average scores across the sub-factors encompassing learning

satisfaction and willingness to study. Expanding upon these revelations, ANOVA was conducted to ascertain the impact of E.M.I. on international students' learning satisfaction and t willingness to study. As detailed in Table 7, the ANOVA outcomes affirm the substantial implications of E.M.I., evoking statistically significant differences among international students' learning satisfaction levels and willingness to study. Therefore, a post-hoc test using the Scheffé method was conducted. Levene's test for homogeneity of variance in the "Course Materials" sub-factor was significant among these tests. Thus, the Dunnett's T3 method was employed. The results indicated that E.M.I. led to significantly higher scores than Chinese-medium instruction in the sub-factors of learning satisfaction and willingness to study. Specifically, in the sub-factors of "Life Function," "Course Materials," and "Teaching Methods and Assessment" of learning satisfaction, as well as the "Willingness to Study" factor, E.M.I. showed significantly higher scores than the Mixed teaching in English and Chinese.

Table 6: The average scores for different teaching languages

Factors	Chinese (n=36)		Mixed teaching in English and Chinese (n=10)		English (n=26)	
	M	SD	M	SD	M	SD
Life Function	3.54	0.76	3.15	0.61	4.11	0.82
Learning Environment	3.57	0.86	3.42	0.65	4.20	0.94
Course Materials	3.55	0.83	3.30	0.51	4.12	0.85
Teaching Methods and Assessment	3.51	0.72	3.38	0.36	4.17	0.87
Teacher Teaching	3.79	0.80	3.80	0.53	4.43	0.71
Administrative Support	3.66	0.74	3.23	0.55	4.07	0.86
Willingness to Study	3.58	0.69	3.38	0.41	4.18	0.69

Table 7: ANOVA analysis table for different teaching languages

Factors	Sum of Squares	F	df	Sig.	Post-hoc test
Life Function	8.31	7.17	2	0.001**	EMI>M, EMI> C
Learning Environment	7.49	4.96	2	0.010*	EMI > C
Course Materials	6.91	5.38	2	0.007**	EMI>M, EMI> C
Teaching Methods and Assessment	8.12	7.28	2	0.001**	EMI>M, EMI> C
Teacher Teaching	6.80	6.22	2	0.003**	EMI > C
Administrative Support	5.69	4.87	2	0.010*	EMI > C
Willingness to Study	7.16	8.16	2	0.001**	EMI>M, EMI> C

* $p < 0.05$, ** $p < 0.01$

E.M.I.: English-medium instruction; M: Mixed teaching in English and Chinese; C: Chinese-medium instruction

Data Analysis and Assessment of Reliability and Validity

According to the suggestion of Bagozzi and Yi (1988) regarding using three commonly employed indicators, the reactivity indicators were evaluated in terms of the measurement mode, as presented in Table 8.

1. Reliability of individual items: This assessment examined the constituent burden of potential variables within the measurement variables. The average value of all constituent burdens in this study was 0.5, which was statistically significant. The constituent burden for the sample ranged from 0.552 to 0.941, which aligned with the values recommended by Hair et al. (2006).
2. Component reliability (C.R.) value of the potential variables reflects the reliability of all measurement variables that constitute a particular construct. This measures the internal consistency of the construct indicators, with high values indicating high internal consistency. Chin (1998) suggested a threshold of 0.7 or higher. In this study, the C.R. values ranged from approximately 0.840 to 0.946, indicating good internal consistency within the research model.
3. Average variance extracted (AVE) of the potential variables: This measure calculates the variance explanatory power of each measurement variable within the potential variables. High values indicate the potential variables' high discriminant and convergent validity. Fornell and Larcker (1981) recommended a minimum threshold of 0.5 for the AVE values. In this study, all the AVE values exceeded 0.5, with the potential variables ranging from 0.647 to 0.764.

These indicators collectively demonstrate the reliability, internal consistency, and validity of the measurement models used in this study.

Table 8: Construct reliability results

Construct	Items	Loadings	CR	AVE
Life Function	The school is in a great location (S1)	0.739	0.929	0.651
	The school has convenient transportation functions (S2)	0.787		
	Meal service hours provided by the school (S3)	0.743		
	The quality of the food served in the restaurant (S4)	0.825		
	Provide a safe and comfortable accommodation environment (S5)	0.788		
	Clear rental information (S6)	0.811		
	Provide comprehensive sports and leisure facilities (S7)	0.825		
	The University's signs are identified (S8)	0.786		
Learning Environment	The classroom's quantity and space (S9)	0.941	0.941	0.764
	Teaching equipment update (S10)	0.904		
	E-learning and information environment (S11)	0.710		
	The school provides sufficient library resources (S12)	0.903		
	Internationalized learning environment (S13)	0.893		
Course Materials	Clear teaching objectives (S14)	0.899	0.946	0.717
	Online query of teaching materials (S15)	0.786		
	Abundant elective courses (S16)	0.858		
	Well-planned professional courses (S17)	0.914		
	Good cohesion between courses (S18)	0.910		

Construct	Items	Loadings	CR	AVE
	Innovation of course content (S19)	0.884		
	Meaningful "Labor Education" training (S20)	0.641		
Teaching Methods and Assessment	Flexible and reasonable course arrangement (S21)	0.934	0.940	0.796
	Public learning content of the course before choosing the course (S22)	0.836		
	Clear and easy-understanding teaching methods (S23)	0.913		
	Reasonable evaluation criteria (S24)	0.882		
Teacher Teaching	Teacher's professional knowledge (S25)	0.836	0.944	0.739
	Frequency of teacher-student interaction (S26)	0.893		
	Serious attitude toward teachers' teaching (S27)	0.882		
	Encouraging students to discuss (S28)	0.839		
	Caring about student learning (S29)	0.859		
	Teaching assistant system (S30)	0.847		
Administrative Support	Sufficient information that the SCHOOL had provided me before I came here (S31)	0.837	0.937	0.651
	Good manners of administrators (S32)	0.718		
	Club activities offered by the school (S33)	0.837		
	After-school academic tutoring services provided by the school (S34)	0.853		
	Counseling services provided by the school (S35)	0.862		
	Foreign students' activities organized by the Office of International and Cross-Strait Cooperation (ICSC) (S36)	0.803		
	The information on part-time campus jobs provided by the school (S37)	0.829		
	The information on scholarships provided by the school (S38)	0.701		
Willingness to Study	If you have the opportunity to choose again, you will choose the school again (W1)	0.888	0.840	0.647
	You are willing to promote its advantages for the school to attract other students (W2)	0.920		
	Based on your experience at this school, you would not recommend friends or family members to attend this school (W3)(R)	0.552		

R: Reverse question

Structural Model and Hypothesis Test

A structural model was used to estimate the path relationships within the research framework, and all seven path relationships specified in the model were examined to test their statistical significance at a significance level of $\alpha = 0.05$. The results indicated that all relevant assumptions associated with the path relationships reached a significant level. The path coefficients obtained from the structural model, as depicted in Table 9, are as follows: life function → learning satisfaction (0.243), learning environment → learning satisfaction (0.169), course materials → learning satisfaction (0.216), teaching methods and assessment → learning satisfaction (0.124), teacher teaching → learning satisfaction (0.169), administrative support → learning satisfaction (0.232), and learning satisfaction → willingness to study (0.762).

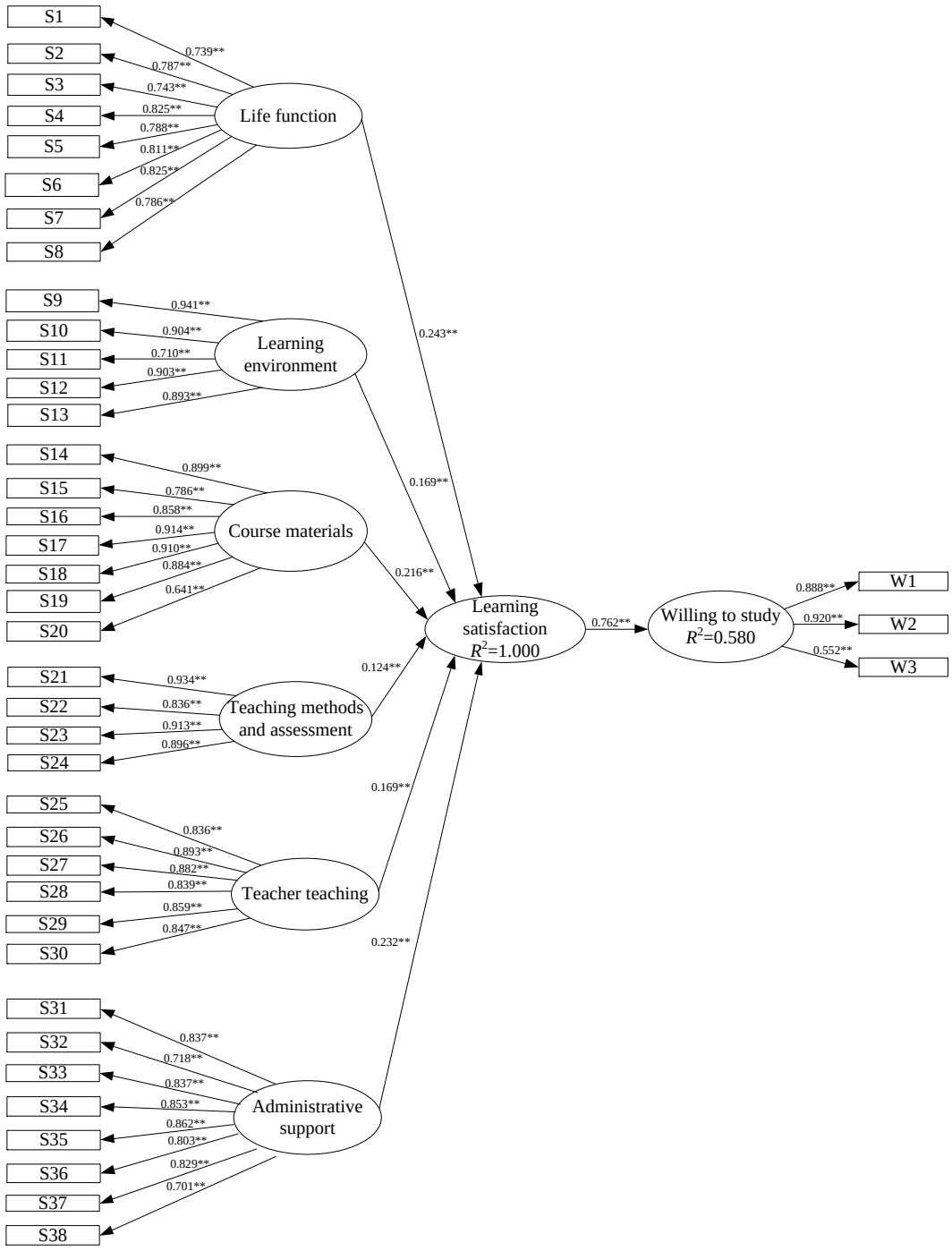
These findings reveal that "learning satisfaction" is positively and significantly influenced by factors such as "life function," "learning environment," "course materials," "teaching methods and assessment," "teacher teaching," and "administrative support," with all effects being statistically

significant. The combined explanatory power, as measured by the coefficient of determination (R^2), for "learning satisfaction" was 1.00, indicating a high level of variation explained by the factors mentioned above. Moreover, the results indicate that "willingness to study" is positively and significantly influenced by "learning satisfaction," with the variance explanatory power (R^2) for "willingness to study" reaching 0.58 (as illustrated in Figure 2).

Table 9: Hypotheses testing results

Hypotheses	Path	Path coefficients	t-value	Result
H1	Life Function > Learning Satisfaction	0.243	17.038**	Supported
H2	Learning Environment > Learning Satisfaction	0.169	20.541**	Supported
H3	Course Materials > Learning Satisfaction	0.216	19.442**	Supported
H4	Teaching Methods and Assessment > Learning Satisfaction	0.124	14.758**	Supported
H5	Teacher Teaching > Learning Satisfaction	0.169	20.575**	Supported
H6	Administrative Support > Learning Satisfaction	0.232	20.389**	Supported
H7	Learning Satisfaction > Willingness to Study	0.762	14.758**	Supported

* $p < 0.05$, ** $p < 0.01$



* $p < 0.05$, ** $p < 0.01$

Figure 2: Path coefficients for the learning satisfaction and willingness to study model

Discussion and Conclusion

Using a theoretical model constructed based on an extensive literature review, along with the implementation of the S.E.M. and appropriateness tests, it was determined that the sub-factors of

learning satisfaction positively influence overall learning satisfaction, which positively impacts the willingness to study. Based on these findings, the following conclusions were drawn:

1. Significant differences existed in learning satisfaction and willingness to study among international students at varying program levels. The results indicated that graduate-level international students exhibited higher satisfaction and willingness to study than undergraduate students. This finding aligns with Li et al.'s (2020) and Sauer (2003) findings.
2. Noteworthy differences existed in international students' learning satisfaction depending on the instruction language. The results revealed that students in E.M.I. programs demonstrated higher satisfaction levels than Chinese-medium instruction in the sub-factors of learning satisfaction and willingness to study. Specifically, in the sub-factors of "Life Function," "Course Materials," and "Teaching Methods and Assessment" of learning satisfaction, as well as the "Willingness to Study" factor, E.M.I. showed significantly higher scores than the Mixed teaching in English and Chinese.
3. Each sub-factor of learning satisfaction significantly influenced the overall learning satisfaction, providing empirical support for Hypotheses 1 to 6. These findings corroborate the work of Greiner (2000), Knight (2002), Holford and Patkar (2003), Wu et al. (2015), and Zhu et al. (2020).
4. The higher the learning satisfaction among foreign students, the more positively and significantly it impacts their willingness to study. This finding supported Hypothesis 7 and was consistent with the research conducted by Hennig-Thurau et al. (2001), Moslehpour et al. (2020), and Kéri et al. (2022).

An empirical analysis involving a sample of international students showed that the structural equation model exhibited a good fit, supporting the proposed theoretical model. Consequently, this study confirmed the existence of significant relationships among the seven factors under investigation.

Implications

The present study has significant academic and practical implications based on these theories. The overall outcomes indicate that "learning satisfaction" is positively and significantly influenced by factors such as "life function," "learning environment," "course materials," "teaching methods and assessment," "teacher teaching," and "administrative support." Consequently, international students' satisfaction with their educational experience is crucial in shaping their willingness to study further. This University has brought in numerous internationally renowned scholars with master-level expertise to instruct and guide graduate students in their research endeavors. Consequently, faculty members have received the highest ratings in terms of graduate student satisfaction. Moving forward, the University can sustain its recruitment of top-tier international scholars and foster collaborations with academics from various countries to entice more international students seeking to pursue their studies here.

Besides, universities can focus on addressing areas of low satisfaction, such as improving the convenience of transportation by providing additional buses to alleviate concerns related to the item "The school is well located." Similarly, offering more training activities centered around "Meaningful 'Labor Education' training" can enhance students' understanding and appreciation of

labor education. Moreover, assessing the sufficiency of the internationalized learning environment can help international students integrate into academic pursuits and Taiwanese culture seamlessly. Finally, ensuring clear and readily available rental information can effectively support foreign students in finding suitable accommodations and facilitating their adjustment to life in Taiwan.

Additionally, the study revealed that international students with Master's degrees and above exhibit higher levels of learning satisfaction and willingness to study than international students with undergraduate degrees. Notably, each dimension attains average scores exceeding 4 points. This discrepancy may arise because first-year college students, who are international students entering the University for the first time, encounter a lower degree of adaptation to the school environment than undergraduate students. As a potential solution, universities can establish an "international partnership" initiative involving undergraduate students who have successfully acclimated to the school environment and demonstrate high levels of learning satisfaction and willingness to study. This collaboration aims to assist undergraduate international students in swiftly integrating themselves into academic and social fabrics, enhancing their learning satisfaction and willingness to pursue further studies.

Furthermore, this study identified the differential impacts of the medium of instruction, particularly in English, on learning satisfaction. This finding underscores the significance of language media in shaping students' learning performance in educational settings. Consequently, schools have been encouraged to provide more E.M.I. courses, offering international students a broad range of academic options. To broaden the scope of available courses for international students, schools can collaborate with language centers to provide language training and certification services. This endeavor involves training additional educators proficient in delivering content in English. Ultimately, this preparation will facilitate the introduction of a greater selection of future E.M.I. courses for international students.

Limitations

The main strength of this study is that it represents a comprehensive examination of international students' learning satisfaction and willingness to study in higher education institutions. However, this study has some limitations that require further exploration.

The first limitation of the current study pertains to the assessment employed. Using a Likert scale to gauge the respondents' perceptions of each variable necessitates reliance on subjective judgments and retrospective completion. Consequently, the data collected in this study may exhibit divergences and deviations. To address this, conducting qualitative interviews with international students would provide a more comprehensive understanding of their perspectives and evaluations of the various services offered by the educational institution, thereby aligning the empirical findings of the research more effectively with practical requirements.

The second limitation is the time constraint imposed on the study. Owing to time limitations, longitudinal data collection was not feasible; therefore, cross-sectional data were utilized as the empirical foundation. Consequently, temporal deviations in the data generated in this study are possible.

The third limitation is the international student divisions of the spring and fall semesters. For students undertaking off-campus internships, tracking their responses may be challenging, which

could reduce the number of respondents. The fourth limitation is the analysis of differences in groups was constrained by the sample size, which resulted in a combined analysis, such as for program level (which includes master's and Ph.D. programs). However, these two groups of students' learning satisfaction and willingness to study may differ.

Recommendations

This study offers several recommendations for future research. First, questionnaires were administered to investigate and refine a comprehensive theoretical model. Subsequent researchers could explore the inclusion of alternative measurement methods or additional significant dimensions and indicators from different literature sources to enrich the model for further analysis. For example, learning satisfaction can be used as a measurement variable, establishing a more comprehensive theoretical framework.

Moreover, this study primarily focused on comparative analyses of schooling systems and language teaching. A larger sample comprising individuals from diverse backgrounds is recommended to enhance the breadth and depth of future studies. To increase the sample size of international students for a more representative research outcome, the school could consider offering incentive measures to boost the number of questionnaire responses. By employing a multi-way analysis of variance, researchers can delve deeper into the test data of students from various backgrounds, for example, analyzing Ph.D. students and Master's students separately, thereby gaining a comprehensive understanding of the influence of different backgrounds on international students' learning satisfaction and willingness to pursue their studies. This endeavor will aid in uncovering the crucial factors that shape the learning satisfaction and willingness of international students from distinct backgrounds.

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