# Enroll an EMI Course Offered by NSTs or not? 

# Perspective of Undergraduates in Taiwan 

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#### Abstract

English has become one of the most vital skills that non-Westerners university students need to acquire. Most universities in Taiwan have either expanded the percentage of English medium instruction (EMI) lectures offered by native-speaking teachers (NST). Why, or why not, do students endroll an EMI course offered by a NST? The purpose of this paper is to propose a partial least squares (PLS) model on the relationship between EMI determinants and the enrollment from the perspective of students in Taiwan. The result shows that student determinants comprise the key factor affecting the EMI enrollment; teacher determinants, course determinants and keyman determinants all play stimulator and bridging roles regarding the students' EMI evaluation. It provides insights for the related entities regarding enhancement of higher education in an EMI context.


Key-Words: - English medium instruction (EMI), native speaking teachers (NST), partial least squares (PLS), undergrates, Taiwan

## 1 Introduction

Globalization is spreading throughout all aspects of society, and an increasing number of people worldwide are using English in a growing number of occupational contexts. As English is the world's most prevalent language, it comes closest to fulfilling the need for a common global language. Thus, English as a Foreign Language (EFL) or English as a Second Language (ESL) has become one of the most vital and relevant skills that university students, especially non-Westerners, need to acquire. In order that they can do so while still attaining specialized knowledge, English has become widespread as a medium of instruction in higher education in Asian countries.

Taiwanese universities are trying to keep up with this trend through a variety of efforts. Specifically, some universities have expanded the percentage of English medium instruction (EMI) lectures in the curriculum, have added textbooks written in English, or have increased the number of English-only courses offered by native-speaking teachers (NST). The idea is that, as more professional courses are offered in English, students can both learn "English for general purposes" (EGP), and also "English for specific purposes" (ESP)[23]. EMI broadens the opportunities for English teachers
and researchers to explore the curriculum, to plan and implement courses, and to maximize the impact of EMI education on learners.

The monolingual approach has long been prescribed by official policies in the field of English language teaching (ELT) [31, 34] as well as in other contexts [38]. But some pedagogical and sociolinguistic research indicates that judicious firstlanguage (L1) use can enhance second-language (L2) learning and, therefore, the learner's developing identity as an aspiring bilingual [5]. McMillan and Rivers (2011) also found that many teachers at Japanese universities believe that selective use of the students' L1 could enhance L2 learning in various ways. Yet despite the preponderance of evidence clearly favoring judicious L1 use, "English only" continues to enjoy hegemonic status in some teaching contexts, in which students and teachers are prevented or dissuaded from using the students' L1 - in ways that are, in fact, pedagogically principled.
Researchers have also studied EMI or English-only courses at universities in non-NST countries. For example, Kim et al. (2009) [29] developed a customized EMI class system for Korean university students by using conjoint analysis to determine the most influential attributes of an EMI class. Chien
and Hsu (2010) [11] investigated whether student participants in an ESP course in Taiwan displayed greater improvement in English proficiency. Liu et al. (2011) [32] explored the needs of EFL university students enrolled in EGP and ESP courses at six universities in Taiwan. Ljosland (2011) [33] focused on language policies of a Norwegian university, while Oakes (2013) [41] emphasized motivational variables of EFL learning amongst students in French and Spanish universities. Chiang (2015) first established a multiple-criteria-decision-making (MCDM) model on EMI enrolment determinants from the perspectives of college students in Taiwan [8]. Chiang et al (2015) further discussed the macro and micro results by dividing three groups of undergradutes [9]. However, scant attention has been paid to the students' perspectives on the relationship between determinants and enrollment of EMI courses offered by NST. Why, or why not, do students endroll an EMI course offered by a NST? Is the teacher determinant significant? Is there any relationship between students' determinants and their enrollment of EMI courses offered by NST? The answers have implications not only for the English-learning capacities of students, but also the training quality of higher education human capital, and involves students, teachers, schools, and government authorities. Thus, this study applies a Partial Least Squares (PLS) and path analysis to advance our understanding of the processes involved in EMI course consideration from the perspectives of university students in Taiwan. This paper is organized as follows. Section 2 describes the method and hypothesis. Section 3 shows the result and Section 4 is discussion. Finally, conclusions are drawn from the findings.

## 2 Method

### 2.1 The Delphi technique

"Two heads are better than one." The Delphi technique has been recognized as an effective method for reaching a consensus of opinion from a group of experts. It was originally developed by the Rand Corporation for technological forecasting in the 1950s, and has been widely used in numerous fields and research [28]. There is no established rule for sample size [52]. The Delphi technique is not prescriptive in terms of the number of participants, the number of rounds that are conducted or the degree of consensus that should be achieved; it aims to measure the potential advantages and disadvantages at each level. Skulmoski et al. (2007)[48] observed that a homogeneous group needs a smaller sample (ten to fifteen) and
recommend purposive sampling with "snowballing" for expert recruitment. This study includes thirteen representative experts, including eight professors and five students who had participated in least two EMI courses. Among them, eight professors are from departments of international business (IB), business administration (BA), financial management (FM), and applied foreign language (AFL), respectively; the five students include two from IB, and one each from BA, FM, and AFL, respectively.

The first round is typically qualitative in nature so that a wide range of views may be elicited. Openended questions are important, since the resulting data are the basis for closed-end questionnaires in subsequent rounds. In this round, most panelists emphasized two factors that are not in the proposed lists: "the course time fits my schedule" and "the course belongs in a business foreign language program". Announcing a course schedule in advance is an important incentive for students, because most seniors desire to pre-arrange their selective courses in order to leave time for other activities.

In round two, an adjusted and structured questionnaire was sent to panelists. Questions were to be rated using a five-point scale. The rule for consensus was that $92 \%$ of the responses had to fall into the inter-quartile range around the median. The panelists then analyzed these ratings for the degree of consensus and the level of support or opposition regarding each factor. The third round mirrored the second, but with information about group response and individual ratings for each factor. Factors reaching consensus in the second round were marked in bold and were not re-rated. Panelists had the opportunity to change their ratings in response to those made by the rest of the panel. They could rerate factors where they were not in agreement, explain new ratings that significantly differed from the group, comment on the perspectives from which they responded, denominate the determinants of each factor, and offer any thoughts they had on the topic of the study.

### 2.2 Partial least squares (PLS) path analysis method

PLS path modeling and linear structural relations (LISREL) are two major structural equation modeling (SEM) approaches to modeling relationships between latent variables [49]. Unlike LISREL, with its assumption of homogeneity in the observed population, PLS path modeling is more suitable for real-world applications, and is particularly advantageous when used with complex models [25]. More importantly, PLS path modeling is better suited for analyzing exploratory models
with no rigorous theory grounding, because it requires minimal assumptions about the statistical distributions of data sets. Moreover, it can work with smaller sample sizes' causal relationships, small samples (minimum sample size is 30 ), missing values, or display of co-linearity [42,51]. Such a general and flexible framework also enriches data analysis methods with non-parametric validation procedures (such as bootstrap, jackknife, and blindfolding) for estimated parameters; the framework fits indices for different blocks that are more classical in a modeling approach than in data analysis [18]. PLS gained popularity in chemometric research, and later in industrial applications, e.g. computer information and management, marketing, and social sciences [6, 7, 35].

A PLS path model is described by two models: a measurement model relating the manifest variables (MVs) to their own latent variables (LVs); and a structural model relating some endogenous LVs to other LVs. The measurement model is also called the outer model (MVs $\rightarrow$ LVs) and the structural model is called the inner model (LVs $\rightarrow \mathrm{LVs}$ ). Arrows show the assumed causal relations. SmartPLS 2.0 software, developed by Hansmann \& Ringle (2005)[20], was used to estimate the model.

## 3 Hypothesis

There are at least four factors supporting the possible implementation of EMI at non-NTS universities. First, bilingualism gives cognitive advantages [3, 4]. Second, the crucial role that English plays in a global society presumably motivates students and teachers to learn the language [37]. Third, EMI would provide students and teachers with more exposure to English and more chances to acquire it [20, 30], Fourth, the literacy skills and strategies that a learner acquired within the native language may transfer to her/his second language [2].
For non-NTS university students, four determinants regarding EMI courses are suggested by the literature review and Delphi panelists. Is there a relationship between determinants of EMI and satisfaction with the EMI experience? The latent variables and manifest variables of the proposed model are shown in Table 1 and are described as follows.

### 3.1 Student determinant

Gardner and Lamberts (1972) [19] suggest that motivation plays a major role in L2 acquisition. They identified two types of motivation for learning a language. Integrative motivation suggests that
learners want to acculturate and become full-fledged members of the target language community. On the other hand, instrumental motivation occurs within learners whose reasons for attempting to acquire an L2 are largely socioeconomic or utilitarian ones (e.g. getting a job). The study of Rodriguez et al. (1987)[43] showed that university students in three different education tracts (bilingual, linguistic, and cultural) held different attitudes and motivation regarding a college-level foreign language. Rodriguez et al. (1987) suggest that attitudes regarding the L1, L2, and L2 teacher all affect L2 learning. Along with numerous others, the studies show a positive relationship between motivation/attitude and successful acquisition of L2s.

Dewey (1913) [13] suggests that interest is an important criterion used in evaluating teaching in higher education. Interest differs from effort, and it is interest that leads to deeper learning. Several researchers in the field of educational psychology argue that interest is one of a set of motives that may result in intrinsically motivated behavior [24, 48]. A student's high extent of interest may lead to deeper learning, recall and retention of information, global understanding of text and favorable personal reactions to a text [16]. Hellekjær \& Westergaard (2003) and Ljosland (2011) [23,33] also suggest that a desire for foreign language learning in itself should be listed as one of the motivations for pursuing EMI in higher education and master programs. Given these viewpoints, the following hypothesis is proposed:
$\mathbf{H}_{1}$ : Student determinants are positively related to the EMI enrollment. Statements such as "I am interested in EMI or English-only courses", "I have great confidence in English", "I am curious about the content provided by NST", and "the course time will fit my schedule' are all proxy statements of student determinants.

### 3.2 Teacher determinant

Kachru (1985) [27] divided English-speaking countries into three groups with reference to historical, sociolinguistic, and literary contexts: the inner circle, where English is spoken as a L1 or native language of the country, e.g. the U.S., UK, Canada, and Australia; the outer circle, where it is spoken as an L2 or additional language in a multilingual country, e.g. Singapore, India, and Nigeria; and the expanding circle, where it is studied as a foreign language, e.g. Japan, Korea, and Taiwan. The custom of distinguishing between language users has influenced English teaching and learning: NST are considered to be the best model
and type of language teacher for non-NST to follow. It is a widely accepted assumption that the goal of ESL and EFL is for learners to acquire the NST's linguistic knowledge and imitate their pronunciation. This nativeness paradigm has affected non-NST' feelings and attitudes regarding the English language $[10,15,45,46,50]$.

Ibrahim (2001) [26] suggests that EMI can provide a more effective means of solving learners' language problems than teaching English as a subject, because it allows learners more exposure to the language (comprehensible input) and more opportunity to use it (comprehensible output). Do"rnyei (2009) [13] also indicates that the L2 learning experience relates to the learning environment (e.g. the impact of the teacher, the content of the curriculum, the peer group, the experience of success). Given these viewpoints, the following hypothesis is proposed:
$\mathbf{H}_{2}$ : Teacher determinants are positively related to the EMI enrollment.

Statements such as "NST can form an Englishonly learning environment", "the teaching of NST is full of lively and positive guidance", "NST make use of diverse methods to help me learn", and "the pronunciation and grammar use of NST is accurate" are all proxy statements of teacher determinants.

### 3.3 Course determinant

Ushioda (2001) [53] identifies eight motivational variables that have been grouped into three broader clusters by extending the content of Noels (2001) [39]: actual learning process (including language-related enjoyment/liking, positive learning history, and personal satisfaction); external pressures/incentives; and integrative disposition (including personal goals, desired levels of L2 competence, academic interest, and feelings about L2-speaking countries or people). Do"rnyei (2009) also indicates that the L2 learning experience relates to the learning environment (e.g. the impact of the teacher, the content of the curriculum, the peer group, the experience of success). Given these viewpoints, the following hypothesis is proposed:
$\mathbf{H}_{3}$ : Course determinants are positively related to the EMI enrollment.

Statements such as "the course belongs in a business foreign language program", "the online syllabus of the course is clear", "the practicality of the course is high", and "the course is challenging" are all proxy statements of course determinants.

### 3.4 Keyman determinant

Noels et al. (2000) and Noels (2001)[39, 40] propose a model of individual self-determination in
the learning process, from motivation through extrinsic orientation to intrinsic orientation. Whereas intrinsically-oriented students engage in language-learning because of inherent pleasure in the activity (e.g. satisfaction of curiosity, intellectual stimulation, thirst for knowledge, sense of accomplishment), extrinsically oriented students do so for reasons external to the enjoyment of the activity itself (e.g. parental pressure, peer influence, because it is a requirement for a career). Do"rnyei (2009) also indicates that the L2 learning experience relates to the learning environment (e.g. the impact of the teacher, the content of the curriculum, the peer group, the experience of success). Given these viewpoints, the following hypothesis is proposed:
$\mathbf{H}_{4}$ : Keyman determinants are positively related to the EMI enrollment. Statements such as "recommendation of elder classmates", "together with companions in class", "recommendation of teachers", and "recommendation of parents or relatives" are all proxy statements of keyman determinants.

### 3.5 The EMI enrollment

The students' interest level not only play a crucial role in learning, but also affects theirs election and processing of information, as well as degree of persistence at the task $[1,44]$. According to Davies et al. (1997)[12], the interest level of individual ESL learners will depend on three factors: language factors (e.g. external factors such as the degree of distance of their language and culture from English), learning contexts (e.g. external factors such as culture, education system and teaching method), and profile of learners (e.g. internal factors such as their level of ability in spoken English, their degree of literacy in their first language, motivation, learner autonomy, and language aptitude). Do"rnyei (2009) also indicates that the L2 learning experience relates to the learning environment (e.g. the impact of the teacher, the curriculum, the peer group, and the experience of success).

Given these viewpoints, statements such as "the EMI enrollment can let me learn more than expected", "the EMI enrollment can improve my oral and listening English level", and "the EMI enrollment is helpful" are all proxy statements of the "EMI enrollment".

### 3.6 The relationship between determinants

As Do"rnyei (2009) indicates the L2 learning experience relates to the learning environment (e.g.
the impact of the teacher, the content of the curriculum, the peer group, the experience of success). The following hypotheses are proposed:
$\mathbf{H}_{5}$ : Teacher determinants are positively related to student determinants regarding the EMI enrollment.
$\mathbf{H}_{6}$ : Course determinants are positively related to student determinants regarding the EMI enrollment.
$\mathbf{H}_{7}$ : Keyman determinants are positively related to student determinants regarding the EMI enrollment.
$\mathbf{H}_{8}$ : Teacher determinants are positively related to course determinants regarding the EMI enrollment.


Fig.1. Conceptual framework

The conceptual framework of the proposed model is shown in Fig.1. Table 1 shows the manifest

Table 1. Latent variables and manifest variables

| LVs | MVs |
| :---: | :---: |
| $\mathrm{L}_{1}$ Student determinant | $\mathrm{M}_{11}$ I am interested in EMI or English-only courses <br> $\mathrm{M}_{12} \mathrm{I}$ have great confidence in English <br> $\mathrm{M}_{13} \mathrm{I}$ am curious about the content provided by NST <br> $\mathrm{M}_{14}$ The course time slot fits my schedule |
| $\mathrm{L}_{2}$ Teacher determinant | $\mathrm{M}_{21}$ NST can form an English-only learning environment $\mathrm{M}_{22}$ The teaching of NST is full of lively and positive guidance $\mathrm{M}_{23}$ NST make use of diverse methods to help me learn $\mathrm{M}_{24}$ The pronunciation andgrammar use of NST is accurate |
| $\mathrm{L}_{3}$ Course determinant | $\mathrm{M}_{31}$ The course belongs ina business foreign language program <br> $\mathrm{M}_{32}$ The online syllabus of the course is clear <br> $\mathrm{M}_{33}$ The practicality of the course is high <br> $\mathrm{M}_{34}$ The course is challenging |
| $\mathrm{L}_{4}$ Keyman determinant | $\mathrm{M}_{41}$ Recommendation of elder classmates <br> $\mathrm{M}_{42}$ Together with companions in class <br> $\mathrm{M}_{43}$ Recommendation of teachers <br> $\mathrm{M}_{44}$ Recommendation of parents or relatives |

Figure 1. A MCDM evaluation model on student internship

## 4 Result and Discussion

### 4.1 Background

At M university, the IB department has striven to keep pace with the shifting emphasis upon English. This is evident in the offering of two EMI lectures offered by NTS teachers as of 2010. Simultaneously, IB has collaborated with AFL departments to initiate a business foreign language program, which includes seven subjects worth a total of 20 academic points. There are two NST in the AFL department, each with over 10 years of experience. The two EMI courses are "English for Business Presentations" and "Employment and English". The target students are junior and senior undergraduates in the two aforementioned departments. Students within other departments also are welcome to enroll in the EMI courses.

### 4.2 Data collection

Our investigation of the student viewpoints regarding EMI courses offered by NST included a questionnaire. A total of 27 out of 30 students from the Institute of Management of M University in Taiwan completed the questionnaire. After an initial examination of the data, three further responses were deleted for implementation purposes. Thus, 25 usable surveys were collected. The valid response rate is $83 \%$. The research period ranged from November 2012 to March 2013. All the respondents were first-time participants in the EMI course. The demographic profile and description of the 25 surveys is listed below and shown in Table 2.
(1) Gender: Males comprise $32 \%$, and $68 \%$ are female.
(2) Age: Seniors comprise 80\%, and juniors 20\%; ages are on average 21-22 years.
(3) Department: IB students comprise 60\%, BA $12 \%$, and AFL 28\%.
(4) English certificate holders: TOEIC holders accounted for $52 \%$, while $48 \%$ had no certificates.

### 4.3 Results by PLS

(1) AVE, CR, and $R^{2}$

In general, we anticipated that CR should be greater than 0.7 and AVE greater than 0.5 [17]. Table 3 shows the data of AVE, CR and $R^{2}$. All of the CR and AVE values reach the threshold level for significance, suggesting that all the variables in the model are reliable and that each construct has high convergent validity. $R^{2}$ value exceeds 0.52 , indicating that the model, and each construct, have significant explanatory power. Discriminant validity was assessed using the latent variable correlations matrix (Table 4), where the correlations between the constructs are reported in the lower left off-diagonal elements in the matrix. Fornell \& Larcker (1981) suggest that average variance shared between a construct and its measures should be greater than the
variance shared between the constructs and other constructs in the model. Discriminant validity is given when the diagonal elements (square root AVE) are greater than the off-diagonal elements in the corresponding rows and columns. As seen in Table 4, discriminant validity is satisfactory.
(2) Structural model

The bootstrap re-sampling technique (500 runs) was employed to determine the statistical significance of the paths. Four of eight paths meet the $p<0.05$ criterion. Table 5 displays the path coefficients and their significance levels. The influence of " $L_{1}$ Student determinant $\rightarrow$ EMI enrollment" is the most powerful.
(3) Measurement model

The weights of the measurement model are displayed in Table 6. All the $t$ values for the outer weights exceed 1.96, indicating that the measurement model is significant and the manifest variables are confirmable. A summary of the aggregate results of the model is presented in Table 7.

| Variable | $\mathrm{M}_{11}$ | $\mathrm{M}_{12}$ | $\mathrm{M}_{13}$ | $\mathrm{M}_{14}$ | $\mathrm{M}_{21}$ | $\mathrm{M}_{22}$ | $\mathrm{M}_{23}$ | $\mathrm{M}_{24}$ | $\mathrm{M}_{31}$ | $\mathrm{M}_{32}$ |
| :---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| $M$ | 5.8 | 4.2 | 4.8 | 5 | 4.3 | 5.4 | 4.9 | 3.6 | 5.4 | 4.2 |
| Mdn | 6 | 4 | 5 | 5 | 4 | 6 | 5 | 5 | 6 | 4 |
| Min | 3 | 1 | 3 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| Max | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| SD | 1.3 | 1.4 | 1.3 | 1.7 | 2.1 | 1.7 | 1.4 | 1.4 | 1.5 | 1.4 |
| Variable | $\mathrm{M}_{33}$ | $\mathrm{M}_{34}$ | $\mathrm{M}_{41}$ | $\mathrm{M}_{42}$ | $\mathrm{M}_{43}$ | $\mathrm{M}_{44}$ | $\mathrm{M}_{51}$ | $\mathrm{M}_{52}$ | $\mathrm{M}_{53}$ |  |
| $M$ | 6.1 | 5.2 | 5.6 | 5.5 | 5.1 | 5.8 | 2.3 | 3.4 | 3.2 |  |
| Mdn | 7 | 5 | 6 | 6 | 5 | 6 | 2 | 4 | 3 |  |
| Min | 3 | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 1 |  |
| Max | 7 | 7 | 7 | 7 | 7 | 7 | 4 | 6 | 5 |  |
| $S D$ | 1.2 | 1.6 | 1.4 | 1.6 | 1.5 | 1.6 | 1.1 | 1.4 | 1.2 |  |

Table 3. AVE, CR and $R^{2}$

|  | AVE | Composite Reliability | $R^{2}$ |
| :--- | :---: | :---: | :---: |
| $\mathrm{~L}_{1}$ Student determinants | 0.53 | 0.82 | 0.72 |
| $\mathrm{~L}_{2}$ Teacher determinants | 0.60 | 0.86 | --- |
| $\mathrm{L}_{3}$ Course determinants | 0.50 | 0.81 | 0.66 |
| $\mathrm{~L}_{4}$ Keyman determinants | 0.52 | 0.80 | -- |
| EMI enrollment | 0.66 | 0.88 | 0.52 |

Table 4. Latent Variable Correlations matrix

|  | $\mathrm{L}_{3}$ | enrollment | $\mathrm{L}_{4}$ | $\mathrm{~L}_{1}$ | $\mathrm{~L}_{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{~L}_{3}$ | $\mathbf{0 . 7 2}$ |  |  |  |  |
| EMI enrollment | 0.38 | $\mathbf{0 . 8 1}$ |  |  |  |
| $\mathrm{~L}_{4}$ | 0.60 | 0.43 | $\mathbf{0 . 7 0}$ |  |  |
| $\mathrm{~L}_{1}$ | 0.77 | 0.65 | 0.74 | $\mathbf{0 . 7 3}$ |  |
| $\mathrm{~L}_{2}$ | 0.82 | 0.12 | 0.42 | 0.55 | $\mathbf{0 . 7 8}$ |

Table 5. Path coefficients of the structural model

| The structural model/ path coefficients | Sample Mean <br> (M) | Standard Deviation (STDEV) | T Statistics <br> (t) |
| :---: | :---: | :---: | :---: |
| $\mathrm{L}_{3} \rightarrow$ EMI enrollment | 0.02 | 0.48 | 0.20 |
| $\mathrm{L}_{3} \rightarrow \mathrm{~L}_{1}$ | 0.58 | 0.29 | 2.09 * |
| $\mathrm{L}_{4} \rightarrow$ EMI enrollment | 0.07 | 0.32 | 0.39 |
| $\mathrm{L}_{4} \rightarrow \mathrm{~L}_{1}$ | 0.47 | 0.16 | 2.72 * |
| $\mathrm{L}_{1} \rightarrow$ EMI enrollment | 0.91 | 0.38 | 2.35 * |
| $\mathrm{L}_{2} \rightarrow \mathrm{~L}_{3}$ | 0.81 | 0.09 | 9.04 * |
| $\mathrm{L}_{2} \rightarrow$ EMI enrollment | 0.40 | 0.35 | 1.15 |
| $\mathrm{L}_{2} \rightarrow \mathrm{~L}_{1}$ | 0.11 | 0.28 | 0.44 |

* Significance of T Statistics

Table 6. Weights for the measurement model

| Measurement model/weights | (M) | STDEV | $t$ |
| :---: | :---: | :---: | :---: |
| $\mathrm{M}_{11} \leftarrow \mathrm{~L}_{1}$ | 0.36 | 0.42 | 8.75 |
| $\mathrm{M}_{12} \leftarrow \mathrm{~L}_{1}$ | 0.36 | 0.05 | 6.78 |
| $\mathrm{M}_{13} \leftarrow \mathrm{~L}_{1}$ | 0.24 | 0.10 | 2.50 |
| $\mathrm{M}_{14} \leftarrow \mathrm{~L}_{1}$ | 0.35 | 0.08 | 4.60 |
| $\mathrm{M}_{21} \leftarrow \mathrm{~L}_{2}$ | 0.30 | 0.10 | 3.05 |
| $\mathrm{M}_{22} \leftarrow \mathrm{~L}_{2}$ | 0.25 | 0.11 | 2.35 |
| $\mathrm{M}_{23} \leftarrow \mathrm{~L}_{2}$ | 0.39 | 0.11 | 3.56 |
| $\mathrm{M}_{24} \leftarrow \mathrm{~L}_{2}$ | 0.33 | 0.09 | 3.69 |
| $\mathrm{M}_{31} \leftarrow \mathrm{~L}_{3}$ | 0.40 | 0.10 | 4.19 |
| $\mathrm{M}_{32} \leftarrow \mathrm{~L}_{3}$ | 0.30 | 0.08 | 3.58 |
| $\mathrm{M}_{33} \leftarrow \mathrm{~L}_{3}$ | 0.39 | 0.08 | 4.62 |
| $\mathrm{M}_{34} \leftarrow \mathrm{~L}_{3}$ | 0.27 | 0.09 | 3.18 |
| $\mathrm{M}_{41} \leftarrow \mathrm{~L}_{4}$ | 0.21 | 0.10 | 2.29 * |
| $\mathrm{M}_{42} \leftarrow \mathrm{~L}_{4}$ | 0.30 | 0.15 | 1.99 * |
| $\mathrm{M}_{43} \leftarrow \mathrm{~L}_{4}$ | 0.54 | 0.19 | 2.86 |
| $\mathrm{M}_{44} \leftarrow \mathrm{~L}_{4}$ | 0.32 | 0.12 | 3.00 |
| $\mathrm{M}_{51} \leftarrow$ EMI experience enrollment | 0.31 | 0.10 | 3.36 |
| $\mathrm{M}_{52} \leftarrow$ EMI experience enrollment | 0.28 | 0.07 | 3.37 |
| $\mathrm{M}_{53} \leftarrow$ EMI experience enrollment | 0.31 | 0.07 | 4.38 |
| $\mathrm{M}_{54} \leftarrow$ EMI experience enrollment | 0.30 | 0.11 | 2.95 |

* Significance of T Statistics

Table 7. A summary of the aggregate result for the PLS model

| The structural model | Hypothesis | Parameter | Significance | Support Conclusion |
| :--- | :---: | :---: | :---: | :---: |
| $\mathrm{L}_{1} \rightarrow$ EMI enrollment | $\mathrm{H}_{1}$ | 0.91 | $p<0.05$ | Support |
| $\mathrm{L}_{2} \rightarrow$ EMI enrollment | $\mathrm{H}_{2}$ | 0.40 | $p>0.05$ | Not Support |
| $\mathrm{L}_{3} \rightarrow$ EMI enrollment | $\mathrm{H}_{3}$ | 0.02 | $p<0.05$ | Not Support |
| $\mathrm{L}_{4} \rightarrow$ EMI enrollment | $\mathrm{H}_{4}$ | 0.07 | $p>0.05$ | Not Support |
| $\mathrm{L}_{2} \rightarrow \mathrm{~L}_{1}$ | $\mathrm{H}_{5}$ | 0.11 | $p>0.05$ | Not Support |
| $\mathrm{L}_{3} \rightarrow \mathrm{~L}_{1}$ | $\mathrm{H}_{6}$ | 0.58 | $p<0.05$ | Support |
| $\mathrm{L}_{4} \rightarrow \mathrm{~L}_{1}$ | $\mathrm{H}_{7}$ | 0.47 | $p<0.05$ | Support |
| $\mathrm{L}_{2} \rightarrow \mathrm{~L}_{3}$ | $\mathrm{H}_{8}$ | 0.81 | $p<0.05$ | Support |

## (4) Discussion

After we delete the unsupported hypotheses, the final path flow is clear, as seen in Fig.2. It was found that "student determinants" are the direct determinants, while "teacher determinants", "course determinants", and "keyman determinants" are the indirect determinants influencing the EMI enrollment. Among all determinants, "student determinants" are the key determinants influencing the EMI enrollment. That is, "I am interested in EMI or English-only courses", "I have great confidence in English", "I am curious about the content provided by NST", and "The course time fits my schedule’ played crucial roles in affecting students’ EMI enrollment. The result is consistent with the argument that students' interest levels affect their selection and processing of information, as well as degree of persistence at the task $[1,44]$.

A key finding of the investigation is that students' interest and confidence levels regarding spoken English proficiency do matter. The two determinants (teacher and course) play stimulator roles, e.g. keyman determinants. There are two paths to evaluation of EMI experience: (1) " $\mathrm{L}_{2} \rightarrow \mathrm{~L}_{3}$ $\rightarrow \mathrm{L}_{1} \rightarrow$ EMI enrollment"; and (2) " $\mathrm{L}_{4} \rightarrow \mathrm{~L}_{1} \rightarrow$ EMI enrollment". As seen in the following data, the effect of the two paths is similar, and the total effect is 0.86 .
(1) path one $=0.81 * 0.58 * 0.91=0.43$
(2) path two $=0.47 * 0.91=0.43$
(3) total effect $=0.43+0.43=0.86$


Fig.2. Final result of the PLS path model

## 5 Conclusion

Motivated by the need to better understand how student perspectives regarding key aspects of an EMI course affect their enrollment and success in the course, this study attempts to investigate the relationship between determinants and the EMI enrollment from an integrated perspective.

An administered questionnaire drew respondents that had all enrolled in an EMI course for the first time; 32\% are seniors, and $20 \%$ are juniors. A total of $68 \%$ of respondents are female. Sixty percent of the respondents study IB, and 28\%

AFL. Fifty-two percent have TOEIC certificates.
Four of eight hypotheses in the structural model were supported; student determinants comprise the key factor affecting the EMI enrollment; teacher determinants, course determinants and keyman determinants all play stimulator and bridging roles regarding the students' EMI experience.

Most previous research on EMI have focused on the motivation and benefits of EMI courses or NST lectures, but paid scant attention to the decision-making behavior of students, or the relationship between determinants of the EMI enrollment. This study developed a PLS path model regarding students' consideration with the EMI evaluation by using an integrated perspective. The study contributes to the literature by providing an aggregated, comprehensive, and scientific framework for studying university students' evaluation behavior regarding EMI by NST in Taiwan. This proposed model provides a reference point for the decision-makers (i.e. students) when addressing EMI course evaluation. We encourage further research that increases the number of respondents and applies the proposed model to analyze the decision-making behavior of students in different departments or countries. Further research along these lines could result in more generalized ESL-related suggestions and references for higher education students, universities, and government institutions.

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