A Novel Approach to Explore "Seamless Learning" and "Employment Connection": a Case Study of Two "paradigm" University of Technology and Science in Taiwan

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ABSTRACT: Education in the 21st century has now become diversified in Taiwan. Strategic Innovations and reforms in teaching, how to enable students to "seamless learning" and the preparation of "graduating as employment" that is "employment connection" are the important topics worthy of research at present.
 This study aims to understand the correlation "between" traditional teaching, MOOCs, Flipped Teaching, learning effectiveness, Topping Practice Course, Sandwich Practice Course, and employment rates, with Learning Effectiveness, Topping Practice Course, and Sandwich Practice Course as the mediators. Take the senior students of two science and technology universities in Taiwan as the research interview objects, and Purposive sampling method was adopted to sample the population, and PLS-SEM is used to understand the fitting-effect of Inner model and Outer model, and then to realize between the path coefficients of Implicit variables / unobservable variables of Inner Model. So this study uses Bayesian Estimation to analyze the path effect of the Inner model and does Bootstrapping testing to see if the overall effect of the model's mediation effect is significant.
These findings can provide a reference for decision makers and employers in relevant units of colleges and universities, and can also provide a reference for the education authorities when formulating education policies. In summary, the Inner Model and the Outer Model in this study have a good fitting-effect, which shows that the established model can truly reflect the implication of "seamless learning" and "employment connection".
KEY WORD: Traditional Teaching, MOOCs, Flipped Teaching, Learning Achievement, Topping Practice Course, Sandwich Practice Course, Employment Rate

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I. INTRODUCTION

Education in the twenty-first century has become multicultural education in Taiwan, emphasizing respect for individual differences among students, paying attention to the ideas of each student, realizing the teaching environment under the joint leadership of teachers and students, which teachers should encourage students to express their ideas in the classroom, when faced with difficult problems, teachers should do timely guidance, and let students discuss with each other, communicate, find the best way to solve problems, so that students can get a deeper impression (Huang, 2013). In traditional teaching, some students often find class boring and therefore distracted, resulting in poor academic performance, and gradually give up learning, even in the classroom dazed, sleep. Low-achieving students in the class cannot quickly keep up with the teacher's teaching progress because of poor learning ability, so they feel that learning difficulties and then give up learning.

Therefore, how teachers to carry out teaching changes is one of the important issues of contemporary teacher cultivation, teachers' teaching changes in the course of how to develop is a curious question to be solved.

Moreover, in recent years, school teachers have been engaged in strategic innovation and reform in teaching, one of the current hot examples is flip teaching, so that young learners can face the learning model and modern digital technology development (Huang, 2018). Flip teaching is different from the traditional teaching model, but student-centered, its core concept emphasizes the importance of individual learning process, encourages students to learn independently, changes the traditional teaching process, flips the teaching mode, students watch the teacher's pre-made course content before class, and then go to the classroom to discuss, practice, and complete the homework of the class mode (Abeysekera& Dawson, 2015).

With the vigorous development of the Internet, the technology of E-learning is the learning method of using information technology to transmit and collect learning information, which aims to create meaningful

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learning experience and achieve learning goals by using the digital learning content and context provided (Chen, 2016).

Although information technology is not a panacea to solve all educational problems, and it is not possible to completely replace traditional teaching, but it's amazing potential for reform education cannot be ignored, therefore, in order to make up for the lack of practical teaching in schools, the school also cooperate with enterprises, modify the curriculum, and implement the interaction between theory and practice, so that practical internship courses in technical vocational education from the past classroom internship have changed into the field of internship outside the school industry. Let students learn the theoretical basis in school, but also from the workplace to learn practical experience, In the face of these new challenges and shocks, school organizations must adjust their pace at any time, and have the concept and ability to learn new knowledge, in order to meet the future challenges for students in the workplace. Sandwich teaching as a theory and practice complement each other's learning methods, in order to promote good sandwich teaching, we must cooperate with space-time constraints and the impact of the main objective environment, from time to time to make adjustments and constant review to meet social needs, in order to students, schools and the business community close to one another, so that it can get the maximum benefit.

In addition, Topping Practice Course is currently implementing a last-mile internship course for seniors at various technical and vocational colleges in Taiwan, hoping that graduates will be able to "graduate and become employed", so this study uses the seniors of one of Taiwan's two science and technology universities as the research population, and then Purposive sampling method is adopted to sample the population. The main purposes of this study are as below.

(1) Explore whether Traditional Teaching has significant impact on Learning Achievement or not;
(2) Explore whether MOOCs has significant impact on Learning Achievement or not.
(3) Explore whether Flipped Learning has significant impact on Learning Achievement
(4) Explore whether Learning Achievement has significant impact on Topping Practice Course or not;
(5) Explore whether Learning Achievement has significant impact on Sandwich Practice Course or not;
(6) Explore whether Topping Practice Course has significant impact on Employment Rate or not;
(7) Explore whether Sandwich Practice Course has significant impact on Employment Rate or not; and
(8) Examine whether the implicit variables of Topping Practice Course, Sandwich Practice Course and Learning Achievement, three of which are mediation factors in this constructed model or not.

From the above (1) to (8) results to understand whether the extended educational policy and the established model can truly reflect the implication of "seamless learning" and "employment connection" or not.

II. LITERATURE REVIEW
2.1 Definition of the Main Constructs
2.1.1 The conceptual Definition of Traditional Teaching

The conceptual definition of Traditional Teaching in this study is "it is a teacher-oriented teaching method. The content of the curriculum is often determined by the teacher. Learners are less able to learn independently. It is a teaching activity that follows the inherent teaching format". The above definitions are synthesized with reference to the following documents.

Huang (1997) pointed out that traditional teaching is a teacher-oriented teaching method; the main purpose is to let students familiar with the teacher's teaching objectives. The common teaching methods of traditional teaching are to tell the teaching method, which discuss the teaching method, practice the teaching method, and publish the teaching method and so on.

Lin &Nian (2000) thought that traditional education is a kind of "general education", which does not have to consider the individual differences of learners, is mainly teachers, learning as a supplement, the curriculum content is often decided by teachers, learners are less able to learn independently, and lack of complete and appropriate teaching materials and teaching media. Traditional teaching is Didactic Instruction only in the classroom, which is the most traditional, most representative and generally accepted teaching method, by teachers with a theme as the center, do systematic, and organized oral teaching (Cai, 2009).

Shi (2004) referred to the traditional teaching activities carried out in accordance with the inherent form of teaching. That is, a class has a teacher who teaches dozens of students, let each student learns a subject or a skill, and regularly tests the scores of students.

Wang (2013) believed that traditional teaching is a way of telling, that is, teachers telling, students listening in the classroom, and which is also the blackboard as the basic medium of teaching activities.

2.1.2 Conceptual Definition of MOOCs.

MOOCs are short for Massive Open Online Courses or "large-scale open online courses" which, as the name suggested, involve online users in the teaching process through online open courses.

This study combines the views of the following scholars and defines the concept of MOOCs as "the use of information technology to transmit and capture learning information in a way that promotes self-regulation and personalized learning through the digital learning content and context provided in order to achieve learning objectives". The above definition is based on the following literature.

Wu (2013) defined MOOCs as native digital classrooms, where film materials are the core elements of MOOCs, and where teachers shoot lectures in front of the camera, with briefing software or animated materials, with practice questions interspersed with the film, and sometimes the film content is designed as an expert talk.

The MOOCs consists of five elements: (1) Instructors, (2) Learners, (3) Topics, (4) Materials, and (5) Context (Tabaa&Medouri, 2013), which are briefly described as below. () Instructors: simplify the learning process by producing appropriate textbooks, trigger communication between learners and manage assessments of expected learning outcomes; (2) Learners: anyone who wants to learn about a topic is authorized to register, and the learner can pursue a formal degree or credit from some courses, or just access specific content; (3) Topic: themes that are triggered by learners, teachers, textbooks, and contexts are introduced through the system, limited but broad enough to cover a wide variety of fields; (4) Materials: existing on different websites and come in a variety of styles, accessed through a variety of technical solutions; and (5). Context: representing the different members of a curriculum environment, combined with online social networking, common sources of information, different types of information delivery methods, communication systems, expected learning outcomes, and group-building courses (Yu, 2019).

2.1.3 Conceptual Definition of Flipped Teaching

The conceptual definition of Flip Teaching in this study is "a pattern of self-study online teaching materials by students, then by teachers in the classroom to demystify, guide discussion and practice, flipping the traditional - first taught by teachers in the classroom, and then by students do homework at home, so it is also known as flip classroom". The above definition is based on the following literature.

Francl (2014) believed that the educational value of flipping classrooms lies in the ability of teachers to guide students, give those more opportunities to apply, participate more actively in the curriculum, and develop high-level thinking.

Weng (2015) pointed out that the purpose of flipping teaching is to find the essence of learning, stimulate children's learning motivation, return learning sovereignty to students, and thus achieve teacher-specific teaching, students' educational ideals of independent learning, and enhance students' learning achievements. Its teaching philosophy is to cultivate students' spirit of active learning, exploring problems and thinking deeply (Tong, 2016).

Huang (2018) pointed out that in the field of education classroom, teaching is the mode of the most commonly used, but it also compresses the interaction between teachers and students in the classroom, lacking of sufficient time in the classroom, so that students cannot completely think and absorb the knowledge. As it is more difficult for educators to have sufficient time to teach students one-on-one guidance, flipping classroom is a new teaching mode from the United States through science and technology, how to take into account students' academic work and high-level learning in the classroom is difficult, because teaching time is limited, so that it is difficult for educators to take into account the implementation of appropriate teaching; therefore, flipping teaching is one of the good teaching methods.

Wang (2018) pointed out that flip teaching needs to have the following curriculum design elements and processes, teachers design pre-class pre-study materials and provide students, students pre-class self-study, classroom student group discussions, teacher-student exchanges and peer feedback, step-by-step approach to flip teaching elements. And flip teaching consists of four constructs-"autonomous learning, exchange feedback, science and technology assistance, and multi-assessment"; in the four constructs, the higher the score, indicating that the higher the flip teaching level, the lower the score means the lower the flip teaching level.

2.1.4 Conceptual Definition of Learning Achievement

The conceptual definition of Learning Achievement in this study is "the way in which students participate in learning and the employer's satisfaction with the trainee students, and the level of satisfaction is related to whether both the student and the employer are willing to continue their employment relationship after graduation". The above definition is based on the following literature.

Kirkpatrick & Kirkpatrick (2006) proposed four projects, namely, reaction, learning, behavior, and outcomes; to assess learning outcomes, reflecting the thoughts and feelings of students after learning the training course; learning the professional knowledge and techniques gained after learning the course, and behavior being the changes in cognition; behavior and attitude that students receive after learning the course, the result of which is whether students can use the skills correctly and efficiently after learning the course (Li, 2017).

Qi (2015) believed that learning effectiveness is oriented towards diversity; when students actively participate in the teaching process, and after the end of the course students accumulated professional knowledge, technology and value, which are the student's learning results.

Wu (2016) proposed that learning effectiveness for students which are through the course of learning, their learning attitude to learning objectives, learning strategies changes, and the satisfaction of learning outcomes.

Huang (2018) defines learning effectiveness as learning outcomes obtained by learners during or at the end of their learning activities. As far as the teaching field is concerned, learning effectiveness refers to the learning outcomes obtained by students in the course's learning activities, through practical participation in action, through the cognition, skills and sentiment of teaching objectives, and by means of diversified assessment.

2.1.5 Conceptual Definition of Topping Practice Course

The concept of Topping Practice Course in this study is defined as "the last year of university course's science and technology, a collaboration and partnership between academia and industry that seek to embed the skills students' need to enter the work environment" (Chen & Lee, 2006). The above definition is based on the following literature.

Chen & Lee (2006) pointed out that participating in Topping Practice Course makes students to achieve the "last mile" of their main basic and sideline studies, making it possible for students to "graduate and get employed". At the same time, that study also pointed out that the Topping Practice course aims to meet the capability needs of the industry and solve the missing of grouping by capability.

2.1.6 Conceptual Definition of Sandwich Practice Course

The conceptual definition ofSandwich Practice Course in this study refers to a kind of curriculum arrangement that combines theory and practice, which is much like a sandwich because the curriculum is often conducted in the form of " theory-practice-theory" or "practice-theory-practice". The above definition is based on the following literature.

Li (2000) pointed out that in Sandwich course, "British-course" is equivalent to American-program which let students rotate through school and workplace learning in an effort to learn matching courses, usually for three to six months each time. Therefore, the sandwich course is a rotational, block release-based cooperative education or co-op education, or work experience course.

Hsu (2007) proposed that the old system sandwich teaching department for the first semester of the first and second grade in the school classes, and the next semester of the first and second grade to the off-campus internship. Moreover, the "improved sandwich teaching" refers to the first semester of the first grade and the second semester of the second grade in class; the second semester of the first grade and the first semester of the second grade to the industry internship, which combine theory and practice, which refers to a way of arranging a course that combines theory and practice, and is called a sandwich course because it is often conducted in a "theoretical-practical-theoretical" or "practical-theoretical-practical" manner.

2.1.7 Conceptual Definition of Employment Rate

The concept of Employment rate in this study is defined as the ratio of the total number of students who remain in the internship company after graduation. The above definition is based on the following literature.

Lin (2007) believed that for the awareness of current job market, in brief, is the extent to which individuals understand the job market. It can also explain familiarity with employment opportunities, economic and market conditions, and probability of alternatives.

2.2 Correlation Between Two Constructs
2.2.1 Traditional Teaching and Learning Achievement
The literature on the Traditional Teaching and Learning Achievement of this study has not been found so far.

2.2.2 MOOCs and Learning Achievement
The results of Liu (2016) showed that students' acceptance of flip teaching combined with MOOCs and interested learning can improve learning motivation and learning effectiveness.

2.2.3 Flipped Learning and Learning Achievement
The results of Hong (2015) showed that learning motivation, interaction and self-efficacy in flip classes have a significant impact on learning achievement, while learning achievement also has a significant impact on satisfaction.

Pan (2016) adopted the flip teaching strategy, which can effectively improve the learner's learning effectiveness of mathematics.

Lin (2017) proposed that the implementation of flip teaching has a positive impact on learning achievement.

2.2.4 Learning Achievement and Topping Practice Course

As for the literature of Learning Effectiveness and Topping Practice Course, this study has not been found so far.

2.2.5 Learning Achievement and Sandwich Practice Course

The literature of Learning Effectiveness and Sandwich Practice Course, so far, this study has not been found.

2.2.6 Topping Practice Course and Employment Rate

So far, .the Literature on Topping Practice Course and Employment Rate in this study has not been found

2.2.7 Sandwich Practice Course and Employment Rate

The literature on Sandwich Practice Course and Employment Rate in this study has not been found so far.

Synthesis of the above, the relationship between the two constructs of the main constructs in this study, most of the constructs, so far this study has not been found, in order to enhance the hypotheses more rigorous, so this study use questionnaire survey methods, and propose the following hypotheses as below.

As for the senior students of two Science and Technology Universities in Taiwan,

Hypothesis 1 (H_1): Traditional Teaching has a significant impact on Learning Achievement.

Hypothesis 2 (H_2): MOOCs has a significant impact on Learning Achievement.

Hypothesis 3 (H_3): Flipped Learning has a significant impact on Learning Achievement.

Hypothesis 4 (H_4): Learning Achievement has a significant impact on Topping Practice Course.

Hypothesis 5 (H_5): Learning Achievement has a significant impact on Sandwich Practice Course.

Hypothesis 6 (H_6): Topping Practice Course has a significant impact on Employment Rate.

Hypothesis 7 (H_7): Sandwich Practice Course has a significant impact on Employment Rate.

In addition, through the above seven hypotheses, this study intends to use Bayesian Estimation to analyze the path effect of Inner Model and to do Bootstrapping testing to understand whether the mediation effect of the constructs is significant or not, so this study proposes the following hypothesis.

Hypothesis 8 (H_8): The Topping Practice Course, Sandwich Practice Course, and Learning Achievement of three implicit variables are the mediating factors.

III.   RESEARCH METHODS

3.1 Study the architecture diagram

Through the above research motivation, purposes, literature review and hypotheses, this research framework are developed, as shown in Figure 1.
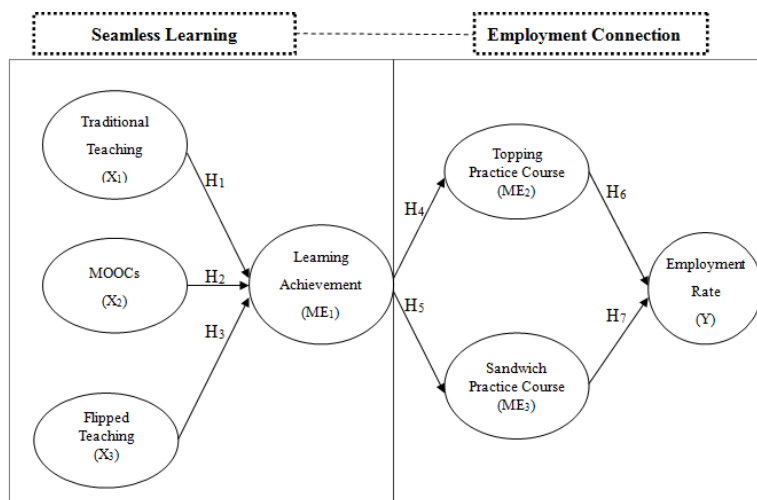

Figure 1 Research Framework

3.2 Research object and questionnaire design

This research uses senior students from two universities in Taiwan as the subjects of questionnaires, and uses Purposive sampling to sample the population. In order to increase the validity of Content Validity and Reliability of the questionnaire, after the questionnaire design, the expert questionnaire was carried out first, and then the pilot test was carried out, the inappropriate questionnaire items were revised or eliminated, and finally the Post-test issued a total of 250 questionnaires, the effective recovery of 208 questionnaires, the effective recovery rate of 83.2%. This study is based on the Questionnaire Number Structure Table, as shown in Table 1.

Table1 Questionnaire Number Structure Table

Main facet	Number of questions	Questionnaire reference
Traditional Teaching	3	Wang (2013)
MOOCs	3	Yu (2019)
Flipped Teaching	3	Wang (2018)
Learning Achievement	3	Huang (2018).
Topping Practice Course	3	Chen & Lee (2006)
Sandwich Practice Course	3	Hsu (2007)
Employment Rate	3	Lin (2007)

Source: this study

3.3 PLS-SEM

The two main families of SEMs, one called Covariance-based SEM (CBSEM) and the other called Variance-based SEM, or Partial Least Square SEM (PLS-SEM), the latter has functional features as shown in Table2. This study has the following advantages: (1) Model Complexity by taking into account the partial least square- linear structure equation model (PLS-SEM); (2) Exploratory Research; (3) Non-Normal Data; (4) Focus on Prediction; (5) Theory Development; (6) Convergence ensured; (7) Use of Categorical Variables; and (8) Theory Testing etc. (Hair, Hult, Ringle&Sarstedt, 2014) and to understand the modest fitting effects of Inner Model and Outer Model, PLS-SEM is used to understand the fitting effect of the Inner Model and the Outer Model in this study.

Table 2 Functional characteristics of PLS-SEM

	PLS-SEM
Goal	Endogenous variables have the greatest ability to be explained
Data source	raw data (format: .csv or .txt)
Software	Smart PLS, PLS-Graph, Visual PLS etc.

Source: Hair et al (2014) & this study

3.4 Questionnaire Data-processing and Measurement System.

In addition to classing the questionnaire into seven potential variables (Inner/Latent Variables) such as Traditional Teaching, MOOCs, Flipped Teaching, Learning Effectiveness, Topping Practice Course, Sandwich Practice Course, and Employment Rate, the former of top four constructs in this study falls under the category of "Seamless learning" and the latter of three constructs falls under the category of "Employment connection". In addition, each potential variant is divided into the following measurable variants (Outer /Observable variables), and each observable variable has several questions to survey. Moreover, the information from the survey is then processed and the files of original questionnaire information document are established. In order to understand the fitting effect of Inner Model and Outer Model in this study, so this study uses the partial least square-linear structure equation pattern (PLS-SEM) to examine it. Besides, the path coefficient between the various implicit variables (or non-observable variables) is analyzed by using Bayesian Estimation for the path effect of the Inner Model and by using the Bootstrapping method to see whether the mediation effect of the model is significant or not.

3.5 Test of Common Method Variation (CMV test)

After examining the results of Common Method Variation by using Latent marker variable with PLS and One marker variable for controlled, there is no common method variation in this study questionnaire, which will "Marker variable controls post-model" as shown in Figure 2.
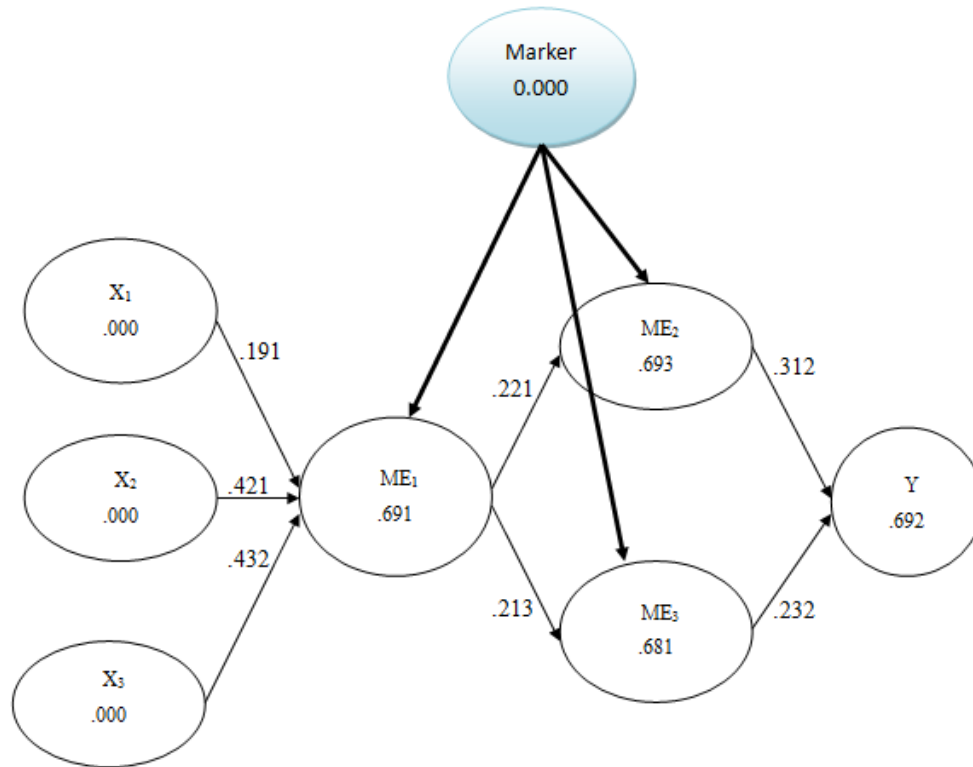
Figure 2 CMV test

IV. RESULTS AND ANALYSIS

4.1 Outer Model.

The Outer Model in this study is a reflective index model, which is aimed at the evaluation results of the reflective index model, as can be seen from Table 3, because the Cronbach's α in this study is greater than 0.8, Composite Reliability (CR) is greater than 0.5 and Average Variance Extracted (AVE) is greater than 0.5, so the Outer Model in this study has Convergence. Validity; in addition, the AVE in this study is also larger than Square of constructs correlation, so the Outer Model in this study also has a discriminate validity, and the Factor loadings in this study are larger than Low cross-loading, as can be known from Table 4. So This Outer Model has discriminate validity (Esposito, Chin, Henseler& Wang, 2010).

Table3 Outer Model's Convergence Validity & Judgment Indexes of AVE Discriminate Validity

	AVE	Composite Reliability	Cronbach's α	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) $X_1 \rightarrow ME_1$	.421	.592	.671	**.681**						
(2) $X_2 \rightarrow ME_1$	.493	.423	.512	.423	**.693**					
(3) $X_3 \rightarrow ME_1$	.482	.433	.522	.531	.542	**.682**				
(4) $ME_1 \rightarrow ME_2$	.453	.412	.441	.434	.423	.414	**.653**			
(5) $ME_1 \rightarrow ME_3$	.521	.451	.423	.412	523	.512	.412	**.631**		
(6) $ME_2 \rightarrow Y$	.632	.623	.504	.524	.541	.524	.531	.543	**.732**	
(7) $ME_3 \rightarrow Y$	.452	.402	.471	.402	.423	.442	.472	.413	.422	**.651**

Source: this study

Table 4 Discriminate Validity

	X_1	**X2**	**X3**	ME_1	ME_2	**ME_3**	Y
X1	.413	.432	.452	**.681**	.442	. 422	-
X2	.421	.463	.463	**.693**	.472	.413	-
X3	.432	*.432*	.442	**.682**	.472	. 452	-
ME_1	**.681**	**.693.682**		.521	**.653 .651**		-
ME_2	.311	.332	.432	.463	*.421*	*.422*	**.732**
ME_3	.413	.443	.423	.511	*.412*	*.-*	**.651**
Y	-	-	-	**.651**	**-.732**	**.651**	.-

Source: this study

Remarks: (1) Bold is factor loadings
   (2) Serif word is cross loadings

4.2 Inner Model.

The validity evaluation indicators of the Inner Model are as follows: (1) Coefficient of determination (R Square): According to Hair et al (2014), it is pointed out that R Square >0.67 of Dependent Inner Variables is of practical value, R Square =0.33 Left and right indicate moderate explanatory ability, R Square =0.19 or so indicates weak explanatory ability; (2) Path Coefficient; and (3) Effect size (f Square): This means the Influence effect of independent variables on endogenous variables.; According to Cohen (1988) pointed out that when f Square >0.35 indicates that independent variables have a strong influence on endogenous variables, when f Square =0.15 indicates that independent variables have medium influence on endogenous variables, and when f Square =0.02, it means that the influence of independent variables on endogenous variables is weak; in addition, predictive relevance (Q Square>0 means exogenous variables (independent variables) have an influence on dependent variables, and the larger the Q Square, the stronger the predictive correlation, which must be obtained with the blindfolding function; and (4) Goodness of Fit (GOF), the formula of this indicator is $\sqrt{}$ R Square *AVE=$\sqrt{}$redundancy when GOF small=0.1, GOF medium=0.25, GOF large=0.36. It can be seen from Table 5 that in the Path Coefficients of the inner model of this study, the P-Value of all path coefficients are less than .001 and reach a significant level. In addition, it can be seen from Table 6 that the R square of the endogenous variables (ME_1, ME_2, ME_3& Y) are respectively .691, .693, .681 and .692, which are all greater than 0.670 and their Redundancy value is as high as .674, which represents the Inner of this model has a Goodness of Fit.

Table 5 Path Coefficients (Mean, STDEV, *t*-Values)

	Original Sample (O)	Standard Deviation (STDEV)	T statistic or *t*-value (O/STERR)	p-value
(1) $X_1{\rightarrow}ME_1$	.191	.111	1.721	
(2) $X_2{\rightarrow}ME_1$	.421	.121	3.479	.000
(3) $X_3{\rightarrow}ME_1$	.432	.113	3.823	.000
(4) $ME_1{\rightarrow}ME_2$	.221	.101	2.188	.000
(5) $ME_1{\rightarrow}ME_3$	.213	.094	2.266	.000
(6) $ME_2{\rightarrow}Y$	.312	.093	3.355	.000
(7) $ME_3{\rightarrow}Y$	.232	.112	2.071	.000

Source: this study

Remarks:(1) The bootstrap procedure is just used to compute standard error and *t*-values of outer loadings, outer weights, and path coefficients. For these reasons: *t* =original/ std. error
   (2)Report→Html Report
   (3) *t*>1.96 at p < 0.05; *t*>2.58, at p < 0.01; *t*> 3.29 at p<0.001 for two-tailed tests

Table 6 R Square and Redundancy values of endogenous variables (ME_1, ME_2, ME_3& Y)

	R^2	Communality	AVE	Redundancy
X_1		.681	.681	.674
X_2		.683	.683	
X_3		.674	.674	
ME_1	.691	.642	.642	
ME_2	.693	.683	.683	
ME_3	.681	.673	.673	
Y	.692	.684	.684	

Source: this study

Remarks: (1) Factor loadings>0.7
   (2)AVE=Communality>0.5(reflective index)
   (3)Composite Reliability≒Cronbach's α>0.7
   (4) Redundancy=$\sqrt{}$Average Communality* Average AVE, and the larger the Redundancy, the better the model.
   (5) The four main constructs of ME_1, ME_2, ME_3& Y in this research model are endogenous variables (Dependent Variables).

4.3 Overall model estimation

The path coefficient of standardized regression and the R Square of endogenous variables estimated by the overall model of this study are shown in Figure 3.
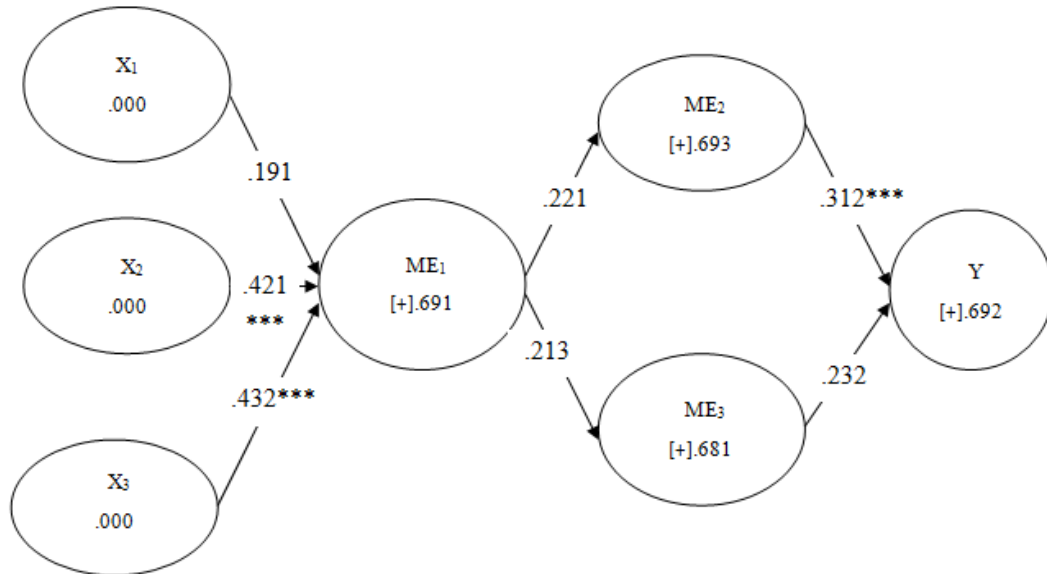
Figure3 Overall model estimation results (Standardized)

4.4 Testing of Significance

For the overall model of this study by using the significant test results of Smart PLS, as shown in Figure 4; in Inner Model, the numbers on the line are t-values, $t>1.96$ is "significant", and the numbers in the Outer Model represent the coefficients of non-standardized measurement.
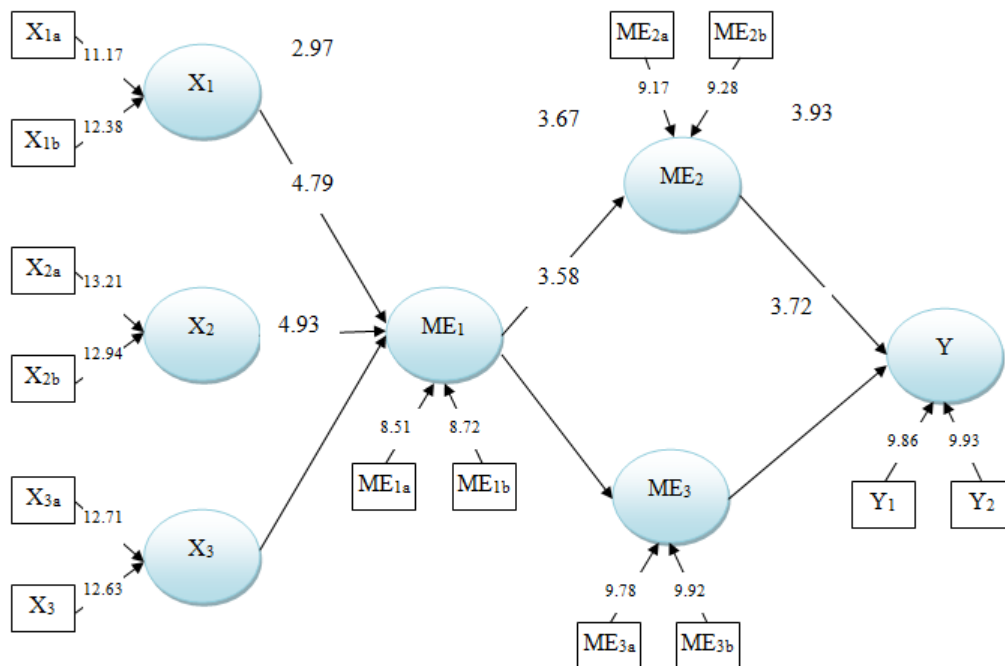

Figure 4 Significance test results by using Smart PLS **(Unstandardized)**

4.5 Bayesian Estimation and Bootstrapping Test

It can be seen that the estimated values of the 95% confidence interval by using the Bias-Corrected and Percentile dimensions do not contain zero, which shows that the mediating effect of the variables (ME_1, ME_2, ME_3) in this study are all present, as shown in Table 7.

Table 7 Bayesian Estimation and Bootstrapping test (Verification of Mediating Effect)

Variables	Point-of-Estimate	Product of Coefficients		Bootstrapping			
				Bias-Corrected 95% CI		Percentile 95% CI	
		SE	Z	Lower	Upper	Lower	Upper
				Total Effect (Un-standard Value)			
X1→ME1	.191	.111	1.721	1.610	1.832	1.608	1.835
X2→ME1	.834	.121	3.479	3.358	3.600	3.351	3.602
X3→ME1	.851	.113	3.823	3.710	3.936	3.707	3.938
ME1→ME2	.221	.101	2.188	2.087	2.289	2.084	2.291
ME1→ME3	.213	.094	2.266	2.172	2.360	2.171	2.364
ME2→Y	.812	.093	3.355	3.262	3.448	3.260	3.449
ME3→Y	.232	.112	2.071	1.959	2.183	1.957	2.185

Source: this study

4.6 Verification of Path Effect Analysis of Inner Model

Aiming at the path coefficients between the various "implicit variables" (or unobservable variables) of the Inner Model, this study uses Bayesian Estimation to analyze the path effect of the Inner Model and conducts a Bootstrapping test to understand whether the model's mediation effect is significant or not, as shown in Table 5:

(1) The T Statistics (O/STERR) of traditional teaching on learning effectiveness is 1.721 <1.96, so it has a positive effect, but not significant.

(2) The T Statistics (O/STERR) of MOOCs on learning effectiveness is 3.479> 1.96, so it has a positive and significant impact effect.

(3) The T Statistics (O/STERR) of Flipped Teaching on learning effectiveness is 3.823> 1.96, so it has a positive and significant impact effect.

(4) The T Statistics (O/STERR) of learning effectiveness on Topping Practice Course is 2.188> 1.96. so it has a positive and significant impact effect.

(5) The T Statistics (O/STERR) of learning effectiveness on Sandwich Practice Course is 2.266>1.96, so it has a positive and significant impact effect.

(6) The T Statistics (O/STERR) of Topping Practice Course on the employment rate is 3.355> 1.96, so it has a positive and significant impact.

(7) The T Statistics (O/STERR) of Sandwich Practice Course on the employment rate is 2.071> 1.96, so it has a positive and significant impact.

(8) From mentioned above, it can be seen that the estimated values of the 95% confidence interval by using the Bias-Corrected and Percentile dimensions do not contain zero, which shows that the mediating effect of the variables (ME_1, ME_2, ME_3) in this study are all present.

V. CONCLUSIONS AND RECOMMENDATIONS

This chapter will draw conclusions based on the above analysis and results, and briefly describe the contribution of this research, and finally put forward the limitations of the research process and suggestions for follow-up research.

5.1 Conclusions

Looking at the foregoing, this research uses senior students from two universities in Taiwan as the subjects of questionnaires, and usesPLS-SEM as the research toolto explore and understand how the Inner Model and Outer Model fit in this research. The research findings show that senior students from two certain universities of Science and Technology in Taiwan:

(1) Traditional Teaching has a positive impact on LearningAchievement, but it is not significant.

(2) MOOCs have a positive and significant impact on LearningAchievement.

(3) Flipped Teaching has a positive and significant impact on learning effectiveness.

(4) LearningAchievement has a positive and significant impact on Topping Practice Course.

(5) LearningAchievement has a positive and significant impact on Sandwich Practice Course.

(6) Topping Practice Course has a positive and significant impact on the Employment Rate.

(7) Sandwich Practice Course has a positive and significant impact on the Employment Rate.

(8) Topping Practice Course, Sandwich Practice Course & Learning Achievement of three implicit variables are all mediating factors.

The educational policies extended from the results of (1) to (8) above are detailed as the recommendations of this research. In addition, the results of this study can be used as a reference for decision makers of universities / colleges, and employers in relevant corporations. Besides, it can also be used as a reference for education authorities in formulating education policies in Taiwan,.

Besides, the fit of the Inner Model and the Outer Model in this study has a good fitting effect. This shows that the established model of this study can truly reflect the implication of "Seamless Learning" and "Employment Connection".

5.2 Research Contribution
(1) In practice, the results of this research can not only provide reference for decision makers of domestic colleges and universities and the employers of enterprises, to implement the integration of study and use, so that students can seamlessly study in schools and connect their future employment. It can also be used as a reference for education authorities when formulating education policies.

(2) In terms of theoretical application, this research focuses on the relevance of "multi-constructed" research topics, so Smart PLS is used as the research tool of this study, which should have a great contribution to theoretical applications.

5.3 Research Limitations
(1) With limited resources, this study tries to complete the research work at each stage in a rigorous manner, but there are still the following research limitations: because this study uses Purposive Sampling to sample the population, although the effective sample recovery rate is high, it is likely that the effective sample is not enough to represent the population, and it may cause the phenomenon of bias in the research results.

(2) This study only takes two "paradigm" universities of Science and Technology in Taiwan as the objects, and it may not truly represent all tertiary and technical colleges or universities; because the research population is divided into the students in the first half (the first 27%) and the students in the second half (the last 27%), and compare the results which may be better able to understand the relevance of the various variables of the research theme.

5.4 Recommendations
5.4.1 Comprehensive advice to education authorities, school decision makers, teachers, students and employers:
(1) Continue to practice "emphasis on technology and humanities simultaneously", "academic and industrial integration", and "function-oriented, advanced courses" in order to be close to the "Seamless Learning" during the study period and the "Employment Connection" of the industry needs.

(2) It is recommended that schools must continue to promote "cooperation between industry and university" and establish "inter-school alliances" to assist in the upgrading of local industries, and ultimately hope to achieve resource sharing and co-creation of diversification, and then become paradigm of high-quality science and technology universities / colleges.

(3) The school authorities must respect individual differences and adaptive development of students, and therefore promote diversified teaching and assessment, so that students can fully realize their personal potential.

(4) Students must possess diverse abilities, workplace ethics, and the spirit of volunteer service in order to become elites in society and industry, and modern citizens who enjoy lifelong learning.

(5) Encourage teachers to have "teaching knowledge", "professional academic" and "practical experience", so that they can cultivate the talents of pragmatic and practical industry.

(6) The decision-making authority must promote internships to shorten the gap between learning and use, so as to provide students with zero-distance industrial technology knowledge.

5.4.2 Future Research Development Direction
(1) The research scope can be expanded to divide the research population into students in the first half (the first 27%) and students in the second half (the last 27%), and compare the results to understand the relevance of the main constructs of the research theme whether the effect is the same or not, and adopt stratified random sampling method to sample the population.
(2) Group analysis of SEM can be used to verify whether the relevance of each variable is the same or not.

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