DEVELOPMENT OF AN EMPLOYABILITY MEASUREMENT SCALE FOR COOPERATIVE EDUCATION STUDENTS: EXPLORATORY FACTOR ANALYSIS*

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ABSTRACT

This study aimed 1) to developed and validated the Employability Measure Scale for Thai Undergraduates (EMS-TU), and 2) to identify the factors that influence co-op student employability. The sample consisted of 96 undergraduate students from public autonomous universities in Thailand selected through stratified random sampling technique. The research instrument used in this study was survey questionnaire. The statistics used for data analysis included 1) the Index of Item-Objective Congruence (IOC) to examine content validity of the scale, 2) Cronbach's alpha was used to measure internal consistency reliability, and 3) Exploratory factor analysis (EFA) was employed to investigate the potential underlying factor structure of observed variables.

The results of this study were as followings: 1) IOC scores indicated strong content validity with the values ranging between 0.80 and 1.00, Cronbach's alpha value 0.889 confirmed high reliability, EFA result demonstrated a five-factor version of 23 items with a range of factor loadings from 0.699 to 0.930. 2) The EMS-TU comprises five constructs: English language proficiency, career decision self-efficacy, university commitment, university support, and internship quality. The scale demonstrated strong construct validity and internal consistency, can be used to assess and monitor their students' employability skills for students in higher education institutions in Thailand. The finding of this study informs curriculum development, guide skill enhancement initiatives, and ultimately support the alignment of graduate outcomes with labor market expectations.

Keywords : Employability; Cooperative education (Co-op); Exploratory factor analysis (EFA); Development; Thai graduates

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1. Background and Problem Statement

In today' s competitive job market, employers interested in employing candidates who possessed relevant knowledge, skills, and competencies, which are applicable in the workplace (Al-Shehab et al., 2021). Therefore, graduates urgently need to have these assets to success in the labor market (Qazi et al., 2024). The study by Bamrungsin and Meinhold (2023) noted essential employability as global life skills, self-awareness, digital literacy, English language proficiency, multicultural understanding and collaboration, life and career preparation, mental cultivation, and career decision self-efficacy as achievement skills. These skills can enhance graduates' employment opportunities and meet with the employer demands. In order to meet these demands, higher education institutions collaborated with employers to support the design of learning and work processes (Ferns et al., 2025).

However, between 2016 and 2023, graduates have faced high unemployment rates and a 37% mismatch between graduate output and workplace needs (MHESI, 2023). Students need to be well prepared to meet workplace demands and develop the essential skills required in the 21st century (Bamrungsin, 2017; Khampirat et al., 2025). Therefore, co-op has been intensively recognized as a strategy to enhance students' skills, competencies and employability globally (Emperador-Garnace, 2025). Since 2019, Thailand has been promoting the applying co-op to HEIs to support students in developing professional competencies, knowledge, and skills that align with labor market demands (MHESRI, 2020, 2022).

Employability is defined as the capacity to secure and maintain employment, as well as the ability to identify new job opportunities (Chamorro-Premuzic et al., 2013). It represents a valuable individual resource that can be developed and strengthened to enable individuals to navigate a constantly evolving labor market marked by uncertainty and instability (Di Fabio, 2017). It encompasses a range of accomplishments, skills, and personal attributes that facilitate job acquisition for graduates, thereby benefiting employers, the community, and the national economy (Al-Shehab et al., 2021). In response to recent labor market developments, educational institutions are striving to ensure that graduates are adequately prepared for the workforce (Khampirat et al., 2025).

English language proficiency (ENG) is increasingly recognized as the lingua franca in today's diverse international workplace (Abbas et al., 2021). Graduates who are fluent in English are more likely to secure employment and communicate effectively within the workforce (Roshid & Kankaanranta, 2025) such as confident English communication, speak clearly, listen and understand instructions English for

documents work such as letters, directions, reports, graphs, and flow charts (Clement & Murugavel, 2018). Consequently, English language proficiency is essential for increasing employability of graduates (Abbas et al., 2021).

Career decision self-efficacy (CDS) is recognized as a significant determinant of employability, influencing individuals' ability to assess their skills, make career choices, set goals, and align their personal values with work and life decisions (Hamzah et al., 2021; Neneh, 2020), as it relates to students' ability to make informed decisions regarding their professional aspirations and to take proactive steps toward achieving them (Wu et al., 2020). The concept of career decision self-efficacy was initially introduced by Bandura (1977) within the framework of his social cognitive theory, where it is defined as an individual's belief in their capacity to successfully execute tasks related to career decision-making. It serves as a strong predictor of various career-related attitudes and behaviors (Wang et al., 2023).

University commitment (UNC) refers to the belief that students develop when they recognize their potential for growth within the institution and feel they have become an integral part of it (Chen, 2017). Students who demonstrate a strong commitment to their university are more likely to participate in co-curricular activities, utilize institutional resources, and cultivate competencies that are highly valued in the labor market, thereby improving their overall employability (Chowdhury, 2021).

University support (UNS) refers to the contributions made by institutions to enhance the skills and productivity of their graduates (Baird & Parayitam, 2019). At the university level, learning support can be facilitated by academic supervisors (Luk & Chan, 2020). Research indicates that university support significantly impacts students' employability (Caballero et al., 2020). This influence arises because student employment affects participation in embedded work experiences and employability-building initiatives provided by academic institutions (Jackson, 2024).

The co-op quality (COQ) is crucial, as it provides students with meaningful hands-on experience and helps them develop the skills and knowledge necessary for the job market (MHESRI, 2020). High-quality co-op offer productive and significant experiences that enable co-op students to become aware of and proficient in their future careers (Creswell & Coll, 2011). Consequently, the quality of co-op plays a vital role in effective preparing students working such as Work planning and organizing ability, sharpened analytic skills, solve problems, work as a team as well as enhancing

students' readiness for employment and in building their confidence to transition effectively into the workforce (Bamrungsin & Khampirat, 2022).

2. Research Objectives

2.1 To initiate the development of a scale to measure student employability for Thai co-op students.

2.2 To identify the factors that influence co-op student employability.

3. Research Benefits

3.1 To explore measurement scale for developing student employability in Thai higher education context.

3.2 To be the guideline for enhancing co-op student abilities.

4. Research Methodology

This research employed quantitative approach. A sample of 96 Thai undergraduate students from public autonomous universities in Thailand selected through stratified random sampling technique. Data were collected using self-administered survey questionnaires between January to March 2025. The researchers conducted the research as follows:

4.1 Participant

This study involved with 96 participants. Among the 96 co-op students, 56 (58.3%) were female and 40 (41.7%) were male. Participants represented a range of academic disciplines, with the majority (n = 51, 53.1%) majoring in engineering, followed by 27.1% (n = 26) in other unspecified fields, 12.5% (n = 12) in science and technology, 4.2% (n = 4) in medical programs, 2.1% (n = 2) in liberal arts, and 1.0% (n = 1) in social sciences. In terms of co-op duration, 55.2% (n = 53) of students reported placements lasting 3 to 4 months, while 44.8% (n = 43) had co-op longer than 4 months. Regarding English language proficiency testing, 35.4% (n = 34) of students indicated they had taken a formal English exam (e.g., TOEIC, IELTS, or TOEFL), while the remaining 64.6% (n = 62) had not undertaken any standardized English proficiency assessment.

4.2 Instrument

The self-assessment questionnaire was an instrument to collect the data of the EMSTC. All items were rated on a 5-point Likert scale, ranging from (1) strongly disagree to (5) strongly agree (Bowling, 1997). Content validity was examined using the Index of Item-Objective Congruence (IOC), with item scores ranging between 0.80 and

1.00, indicating strong content validity. The internal consistency reliability of the scale, as measured by Cronbach's alpha, was 0.889, demonstrating high reliability (Nunnally, 1978).

4.3 Data collection

Prior to data collection, ethical approval for this study was obtained from the Ethics Committee at Suranaree University of Technology, Thailand (EC-67-40). Data were collected from 96 cooperative education (co-op) students enrolled in five Thai public autonomous universities during the 2023/2024 academic year, prior to the final semester break. A stratified random sampling technique was employed to ensure representative participation. Participants were invited to take part in the study via written invitations distributed through designated university contact persons. The invitations assured students of the anonymity and confidentiality of their responses and emphasized that the data would be used solely for research purposes.

4.4 Data Analysis

The data collected in the study were analyzed using SPSS version 26.0. To characterize the level of variability in the data, this study used descriptive statistics such as mean (M), standard variation (SD), maximum and minimum of each item. Cronbach's alpha coefficient (α) was used to evaluate the questionnaire's internal consistency and reliability among raters. EFA was used to investigate the potential underlying factor structure of a group of observed variables. The study used extraction method as Principal Component Analysis as extraction method and Varimax with Kaiser Normalization, as rotation method.

5. Research Results

5.1 The descriptive statistics for the EMSTC result show that the overall mean score of the scale was (M=3.93, SD = 0.70), indicating a generally high level of perceived employability among students (Table 1). Among the subscales, co-op quality (M = 4.44, SD = 0.53) received the highest mean score, suggesting that students perceived their co-op as highly beneficial in developing skills such as teamwork (COQ4, M = 4.55) and problem-solving (COQ3, M = 4.44).

Table 1 Descriptive statistics of EMSTC including means (M), and standard deviations (SD)

Code	Item	M	SD
English Language Proficiency (ENG) (M=2.97, SD=.94)			
ENG1	Use English for communication confidently.	3.03	1.04
ENG2	Able to speak clearly with others.	2.86	1.02
ENG3	Able to listen, understand and ask questions.	3.07	1.02
ENG4	Able to create English official documents.	2.94	1.07
Career Decision Self-Efficacy (CDS) (M=4.00, SD=0.65)			
CDS1	Able to assess my abilities accurately.	3.87	.83
CDS2	Able to determine personal job idea.	4.06	.75
CDS3	Able to decide my most value occupation.	3.94	.86
CDS4	Able to provide career goals and achievement.	4.04	.83
CDS5	Can define lifestyle I would like to live.	4.09	.78
University Commitment (UNC) (M=4.03, SD=0.69)			
UNC1	I really care about my university and its future.	3.94	.85
UNC2	Being at this university really inspires me.	3.94	.83
UNC3	I am proud to tell others about my university.	4.08	.84
UNC4	I am extremely glad I chose this university.	4.20	.83
UNC5	I advocate my university to my friends.	4.10	.78
UNC6	I find my university values similar to mine.	3.93	.86
University Support (UNS) (M=4.16, SD=0.69)			
UNS1	My department was very helpful in preparing me to look for a co-op.	4.00	.90
UNS2	My academic supervisor (i.e., university training manager) is extremely supportive.	4.27	.68
UNS3	My academic supervisor helped me speak to the company when problem arises.	4.21	.78
Co-op Quality (COQ) (M=4.44, SD=0.53)			
COQ1	The co-op has helped to develop my ability to plan and organize my day-to- day work.	4.34	.72
COQ2	The co-op has sharpened my analytic skills.	4.41	.64
COQ3	The co-op has developed my ability to solve problems.	4.44	.63
COQ4	The co-op has developed my ability to work as a team member.	4.55	.57
COQ 5	As a result of the co-op, I feel confident about tackling unfamiliar work-based problems.	4.47	.68

Table 2 Bivariate Correlation Between the Items of EFA

	ENG1	ENG2	ENG3	ENG4	CDS1	CDS2	CDS3	CDS4	CDS5	UNC1	UNC2	UNC3	UNC4	UNC5	UNC6	UNS1	UNS2	UNS3	COQ1	COQ2	COQ3	COQ4	COQ5
ENG1	1																						
ENG2	.885**	1																					
ENG3	.824**	.821**	1																				
ENG4	.620**	.661**	.714**	1																			
CDS1	.162	.202*	.133	.039	1																		
CDS2	.024	.121	.089	.160	.615**	1																	
CDS3	.049	.028	.004	-.071	.589**	.443**	1																
CDS4	.047	.118	.070	.061	.612**	.619**	.531**	1															
CDS5	.009	.042	.031	.056	.500**	.563**	.444**	.705**	1														
UNC1	-.010	.064	.065	-.049	.272**	.285**	.340**	.196	.229*	1													
UNC2	-.034	.029	.078	-.003	.216*	.239*	.273**	.199	.136	.720**	1												
UNC3	.033	.038	.078	-.030	.194	.158	.252*	.070	.068	.623**	.692**	1											
UNC4	-.032	.009	-.030	-.046	.189	.248*	.220*	.033	.002	.625**	.604**	.636**	1										
UNC5	.009	.096	.055	.031	.196	.220*	.178	.074	.069	.511**	.550**	.637**	.721**	1									
UNC6	.025	.109	.076	.030	.264**	.200	.234*	.106	.024	.566**	.675**	.641**	.659**	.671**	1								
UNS1	.123	.102	.124	.097	.139	.155	.135	.167	.208*	.300**	.430**	.373**	.349**	.457**	.375**	1							
UNS2	-.041	.038	-.013	.019	.187	.354**	.130	.237*	.324**	.240*	.372**	.288**	.397**	.452**	.346**	.540**	1						
UNS3	.043	.129	.071	.113	.170	.334**	.141	.147	.292**	.207*	.338**	.259*	.413**	.457**	.345**	.622**	.787**	1					
COQ1	.125	.121	-.020	-.044	.263**	.212*	.096	.186	.240*	.183	.273**	.177	.300**	.158	.202*	.177	.382**	.312**	1				
COQ2	.028	.071	-.030	-.029	.196	.207*	.077	.282**	.214*	.175	.236*	.130	.151	.142	.122	.162	.337**	.256*	.526**	1			
COQ3	.219*	.242*	.176	.081	.187	.163	.198	.185	.191	.103	.164	.127	.081	.138	.148	.129	.300**	.268**	.490**	.651**	1		
COQ4	-.029	.021	.002	.013	.144	.162	.058	.127	.210*	.081	.147	.078	.130	.104	.153	.100	.441**	.288**	.549**	.677**	.643**	1	
COQ5	.068	.215*	.055	.077	.199	.147	.061	.132	.112	.135	.118	.003	.026	.102	.194	.000	.305**	.216*	.518**	.621**	.624**	.632**	1

5.2 The Pearson bivariate correlations (r) among the 24 items (Table 1) indicate strong and statistically significant correlations among items within the same subscale, supporting the internal consistency of the scale (Table 2). The items measuring English language proficiency (ENG): ENG1 to ENG4 demonstrated high inter-item correlations, ranging from r = .620 to .885, all significant at the 0.01 level.

5.3 The EFA of the EMSTC yielded a Kaiser–Meyer–Olkin (KMO) value of 0.791, indicating adequate sampling adequacy for factor analysis. The EFA results revealed five distinct factors, corresponding to the five theoretical constructs, each demonstrating strong internal consistency (Table 3): 1) English language proficiency (ENG1–ENG4) – Cronbach's alpha: 0.924. 2) Career decision self-efficacy (CDS1–CDS5) Cronbach's alpha: 0.864. 3) University commitment (UNC1–UNC6) – Cronbach's alpha: 0.9133. 4) University support (UNS1–UNS3) – Cronbach's alpha: 0.836, and 5) Cooperative education quality (COQ1–COQ5) – Cronbach's alpha: 0.875. According to Nunnally (1967), a Cronbach's alpha value exceeding 0.70 is considered acceptable for establishing internal consistency. Therefore, all five constructs in the EMSTC demonstrate reliable measurement properties, confirming the scale's suitability for assessing the employability of cooperative education students in the Thai context. The results of the exploratory factor analysis are presented in Figure 1.

Table 3 EFA of the employability measurement scale for Thai co-op students

Code	Item	ENG	CDS	UNC	UNS	COQ
English Language Proficiency (ENG) (Cronbach's alpha = .924)						
ENG1	Use English for communication confidently.	.925				
ENG2	Able to speak clearly with others.	.929				
ENG3	Able to listen, understand and ask questions.	.930				
ENG4	Able to create English official documents.	.813				
Career Decision Self-Efficacy (CDS) (Cronbach's alpha = .864)						
CDS1	Able to assess my abilities accurately.		.789			
CDS2	Able to determine personal job idea.		.761			
CDS3	Able to decide my most value occupation.		.725			
CDS4	Able to provide career goals and achievement.		.866			
CDS5	Can define lifestyle I would like to live.		.793			
University Commitment (UNC) (Cronbach's alpha = .913)						
UNC1	I really care about my university and its future.			.796		
UNC2	Being at this university really inspires me.			.815		
UNC3	I am proud to tell others about my university.			.847		
UNC4	I am extremely glad I chose this university.			.818		
UNC5	I advocate my university to my friends.			.754		
UNC6	I find my university values similar to mine.			.820		
University Support (UNS) (Cronbach's alpha = .836) (M=4.16, SD=0.69)						
UNS1	My department was very helpful in preparing me to look for a co-op.				.717	
UNS2	My academic supervisor (i.e., university training manager) is extremely supportive.				.797	
UNS3	My academic supervisor helped me speak to the company when problem arises.				.856	

Code	Item	ENG	CDS	UNC	UNS	COQ
Co-op Quality (COQ) (Cronbach's alpha = .875)						
COQ1	The co-op has helped to develop my ability to plan and organize my day-to- day work.					.699
COQ2	The co-op has sharpened my analytic skills.					.828
COQ3	The co-op has developed my ability to solve problems.					.811
COQ4	The co-op has developed my ability to work as a team member.					.846
COQ 5	As a result of the co-op, I feel confident about tackling unfamiliar work-based problems.					.841

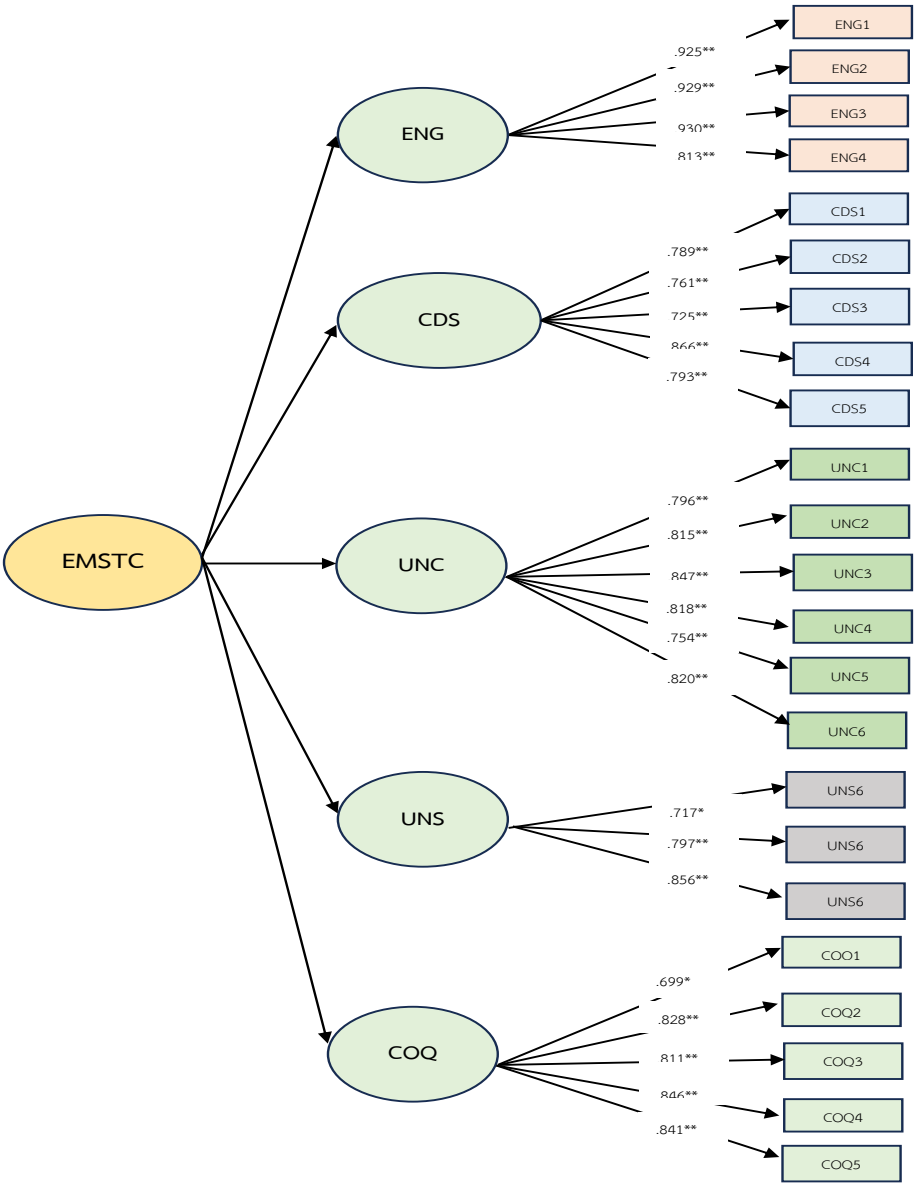

Figure 1 EFA model of the employability measurement scale for Thai co-op students

6. Research Discussion

The research results show that the Employability Measure Scale for Thai Undergraduates (EMS-TU) is both valid and reliable. The researchers identified several key findings and points of interest for discussion as follow:

6.1 The EFA result confirmed the EMS-TU comprising 23 items loading onto five-factors; ENG, CDS, UNC, UNS, and COQ. The factor loading values offer insights into the strength of the relationship between each indicator and the underlying latent factor. In particular, the indicators with the highest factor loading values for all factors (ENG3, CDS1, UNC3, UNS3, and COQ4) reflect their importance in measuring their corresponding factors. In addition, the finding that English language proficiency emerged as the most important factor for measuring graduates' employability, consistence with linguistic capital theory introduced by Zainuddin et al. (2019). The theory highlighted proficiency in language as a valued asset providing social and employment opportunities. Indeed, this finding from this study has underscored the critical role of English language proficiency in fostering graduates' employability and career success (Durga, 2018).

6.2 Cronbach's alpha values ranging from 0.836 to 0.924, exceed the recommended threshold of 0.70 (Nunnally, 1967), demonstrating strong internal consistency (Na-Nan & Saribut, 2020). This consistent with established criteria for instrument validation (Chan & Luk, 2021). These findings confirm that the scale reliably captures distinct dimensions of employability relevant to co-op students in the Thai higher education context. This aligns with the research of Khampirat et al. (2025), who developed and validated of a questionnaire to measure social competencies for Thai co-op students using EFA and confirmatory factor analysis (CFA). In addition, this research also aligns with the study by Na-Nan and Saribut (2020), who validated employees' self-leadership using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to support the development of self-directed work skills in students.

6.3 All employability factors have a positive effect on Thai students' employability. These factors, such as English language proficiency, career decision self-efficacy, university commitment, university support, and internship quality, plays essential role in enhancing gradates' employment potential. The identified factors align with previous research on employability (Zainuddin et al., 2019), which revealed similar factors of employability relevant to students' career success. This consistency suggest that the EMS-TU captured essential aspects of employability identified in previous studies and is consistence with theory related to the measurement of employability,

namely human capital theory (Becker, 1993) and social cognitive learning theory (Tadayon Nabavi & Bijandi, 2012).

7. New Knowledge Gained

This study introduces a new knowledge base by developing an EFA model to initiate the EMS-TC scale, comprised with five factors, which serves as a significant step in understanding employability among students in Thailand. The findings present several future benefits and practical applications of the EMS-TC. Firstly, the EMSTC scale offers a reliable and valid self-assessment instrument for measuring students' employability, providing a valuable tool for both educational institutions and employers to assess and enhance students' career readiness. Secondly, the study provides insights for policymakers in higher education and the labor market by identifying the key factors that influence students' perceptions of their own employability. Thirdly, the research contributes to the existing body of literature by offering a context-specific understanding of employability in the Thai higher education context. Finally, the EMS-TC can be practically applied by institutions (See in Figure 2).

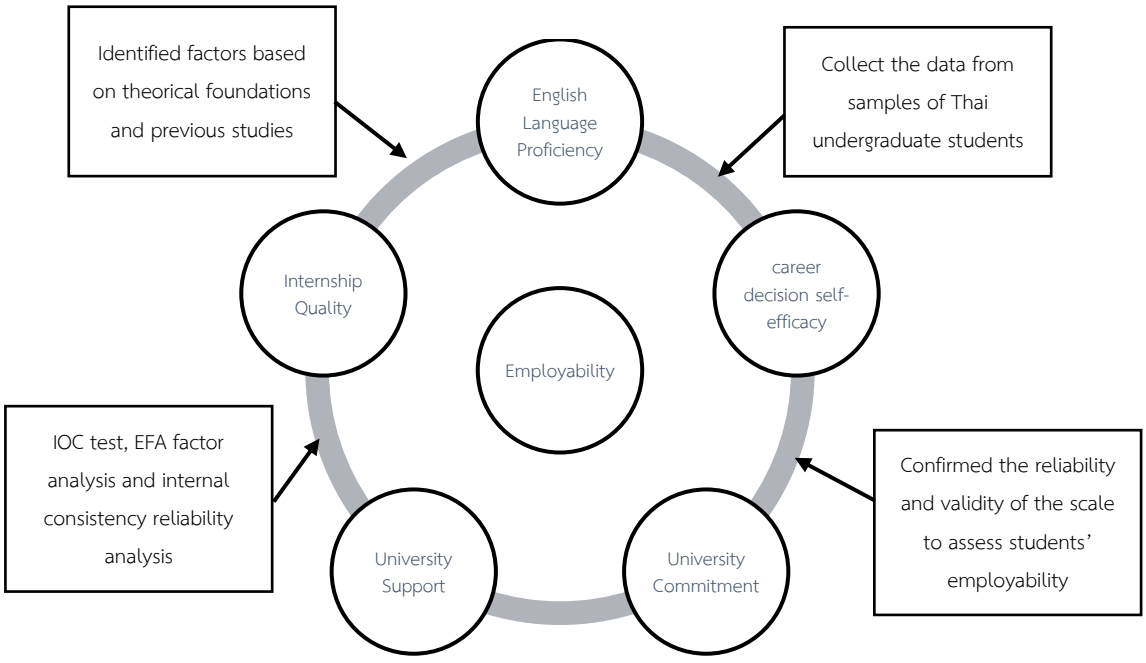

Figure 2 New knowledge gained from research

8. Research Recommendations

8.1 Policy Recommendations

8.1.1 The development and implementation of the EMS-TC provide a valuable instrument for higher education institutions in Thailand to assess graduates' employability. By understanding and identifying students' competencies and skills, policy makers can make inform decisions in designing the curriculum that are capable of enhancing student's employability.

8.1.2 Employers can also use the finding of this study to design the internship and WIL placement programs aimed at enhancing students' employability. In this way, they can, implement effective training programs, which foster skills essential in the workplace.

8.2 Implementation Suggestions

8.2.1 Higher education Institutions can integrate this instrument into their curriculum to ensure that graduates acquire employability skills that are essential for receiving employment opportunities.

8.2.2 Graduates can also use the instrument as a self-assessment tool to assess and identify their areas for improvement in employability. In this way, they can improve self-awareness and foster competencies essential for future employment.

8.3 Suggestions for Further Research

8.3.1 Further research is required to advance the analysis by conducting CFA to validate the EFA model, and by applying Partial Least Squares Structural Equation Modeling (PLS-SEM) which is suitable for small sample sizes to establish a robust and reliable model.

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