



Developing english teacher's competency indicators in the digital age: Testing measurement invariance

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Abstract

The purpose of this study was to develop the performance indicators of English teachers. according to the learning management guidelines in the digital age Verify the conformity of the performance measurement model and test for the invariance of the measurement model. data analysis Descriptive statistics and reference statistics were used. One-way analysis of variance was used. The second order confirmatory component analysis was performed using the SPSS package. and analysis of multiple group structural equation model using MPLUS program. The results showed that English teacher competency according to the learning management approach in the digital age consisted of 3 components and 12 indicators. There are $\chi^2 = 17.556$, $df = 25$, $p = 0.863$, $GFI = 0.994$, $AGFI = 0.996$ and $RMR = 0.003$.

Keywords: Indicators, English teacher's competency, digital age, measurement invariance

Introduction

Technology plays a huge role in education in the digital age. This is an education management in the Technology Based Paradigm that uses technology to prepare for learning skills that have the characteristics of integrated learning to enhance the efficiency of the body. knowledge, skills, expertise and competencies for learners to have a love for lifelong learning Educational institutions both in Thailand and abroad have begun to develop their own learning platforms or courses or share corporate information. Self-knowledge through online channels on various platforms, more learning platforms called MOOCs that are open to the general public, can learn from any source in the world. In addition, there are many social media and learning materials available to study and research according to their interests. An application that helps teachers organize their teaching and learning system. Applications that offer knowledge in various fields. Applications that use AR technology to help promote learning.

The competency of teachers is an important variable (Sukanya Rassamichot, 2005) that can predict or predict the quality of learners, education reform therefore gives priority to teacher reform (Committee of Basic Education, 2005) from the SEAMEO Congress 2021 organized by the Education Minister's Organization. of Southeast Asia (SEAMEO) in collaboration with the Ministry of Education of SEAMEO member countries. Including the Thai Ministry of Education on April 28-29, 2021, education issues were discussed. One of the key issues is "Teacher Development Reform" to raise the level of ASEAN education This led to an ongoing discussion in the workshop for synthesizing guidelines for driving policy modeling for teacher development. "Teacher development" is an issue that needs to be solved urgently. Especially in the "COVID-19" situation, children learn more online. Teachers need to develop children to learn to their full potential. Because the survey found that only 50% of Thai children have access to educational technology. Thailand has problems with teaching and learning in almost every group of schools. Except for the special school group The main reason is from learning from the elementary level. Thai children have reading problems. and English In addition, the subject

density is higher than that of other countries. According to the SEAMEO Congress 2021, there is a policy design process. In order to solve structural problems in ASEAN education, the process that the Center has accelerated is the Teacher Development model, which covers the entire system of development, namely Collaborating with teacher education institutes and experienced teacher networks to prepare personnel to enter the teaching profession Therefore, performance indicators are indicators of teachers' success and ability to lead to success (Nonglak Wiratchai, 2008) [6] in developing the quality of learners according to the established standards. Therefore, it is necessary to have tools or criteria that will be used to measure the results of the study. to indicate a condition or reflect a method competency and performance in any manner which will lead to learning management information of quality teachers. Indicator development is a method. In order to obtain quality indicators that can be used as indicators of success in the most realistic situations. This is especially important in empirical studies. Indicators should be developed for all dimensions of the characteristics to be studied and there should be a development process that is straightforward and accurate. Quality indicators are therefore monitored and Evaluate the performance clearly (Nongluck Wiratchai and Suwimon Wongvanich) are concrete and can identify or indicate the performance of the performance of English teachers well and effectively.

Based on such importance, the researcher is interested in studying and developing indicators of English teacher competency according to learning management approaches in the digital age. There was a confirmatory component analysis (Suntrorapot Damrongpanit, 2020) [9] and an analysis of invariance (Measurement Invariance) of the English teacher competency measurement model according to the learning management approach in the digital age. with different backgrounds to synthesize indicators of English teacher competency in the digital age (Ritinan Samutthai, 2017) [11] to see if there are any indicators that will be indicators of knowledge, skills and characteristics of English teachers in the digital age that will be used to develop and validate the competency model of English teachers in the digital age. digital The results of this study

provide an indicator of English teacher competency in the digital age. This can be used as a framework for planning educational personnel development and assessing the competency of English teachers in teaching and learning to truly be effective for learners according to the learning management approach in the digital age.

Methods

The researcher designed the research in two phases. Phase 1 was the development of indicators and conceptual frameworks for English teachers' competency. According to the learning management guidelines in the digital age A qualitative research method with cognitive interviews. Phase 2 was used to examine the consistency of the competency measurement model of English teachers according to the learning management approach in the digital age. And to test the invariance of the competency measurement model of English teachers according to the learning management approach in the digital age. With different backgrounds with a quantitative research method with details of the research process sample data collection and data analysis in each of the following phases.

Phase 1: Qualitative Data Collection

Case study

The case study in this research is a teacher under the Office of the Basic Education Commission. under the Department of Local Administration Promotion Under the Office of the Private Education Commission Under the Office of Non-Formal Education, 36 people with different sex and affiliation. Because the researcher aims to test the invariance of the competency measurement model of English teachers according to the learning management approach in the digital age. between teachers with different backgrounds In terms of sex and affiliation, it consisted of 4 affiliations: 1) SPT. 2) OPT. 3) CCH. 4) KSN. Then choose schools in each undertaking, 3 schools each consisting of elementary schools. Opportunity Extension School and secondary school The researcher asked for cooperation from the school to select 3 interviewee teachers from each school, consisting of males and females.

Qualitative results from the use of cognitive interviewing techniques

Qualitative results from the use of cognitive interviewing techniques. To collect insights from the case study teachers. About indicators of English teacher competency in the digital age In order to use the information obtained to develop the conceptual framework for this research. The sample case studies consisted of teachers from different backgrounds. Covering both under the 1) SPT. 2) OPT. 3) CCH. 4) KSN. 9 people per affiliation, totaling 36 people, mostly 20 females (55.56%) and 16 males (44.44%). Most of the samples in each affiliation were female. Older than 50 years, the largest number 15 (41.67%), followed by 9 people between 41-50 years old (25%) and less than 30 years old, the smallest number of 2 people (5.55%) in all sectors. Most of them are over 50 years old as well.

Phase 2 Quantitative study

Quantitative study The purpose of this study was to compare the performance indicators of digital English teachers between teachers from different backgrounds. Examine the consistency of the competency measurement model of

English teachers based on learning management approaches in the digital age with empirical data. And to test the invariance of the competency measurement model of English teachers according to the learning management approach in the digital age. with different backgrounds There are details of how to proceed as follows.

The population is teachers under the Office of the Basic Education Commission. under the Department of Local Administration Promotion Under the Office of the Private Education Commission Under the Office of Non-formal Education, 452,141 people.

The sample group was teachers under the Office of the Basic Education Commission. under the Department of Local Administration Promotion Under the Office of the Private Education Commission under the Office of Non-formal Education 1,000 people, the sample size was determined by using the concept of Hair *et al.* (1998 cited in Nonglak Wiratchai, 1999). Since this research is an analysis using the Mplus program which requires a sample size of 20 people per 1 value, this research consists of 12 observed variables and 31 parameters to be estimated. Therefore, the appropriate sample should be at least 620 people and the invariance test of the model according to the teacher's background. Therefore, random sampling by affiliation was used. By type of school by grade level offered In order to have a representative population of 200 people in each affiliation, and this research was sent online questionnaires. There fore for the response rate By increasing the sample size to 1,000 people for sampling, the researcher used multi-stage random sampling as follows.

Analysis

1. Analyze basic statistics about the characteristics of the sample using mean, percentage and standard deviation. using the SPSS program
2. Analyze the data to check the quality of the English Teacher Competency Test in the digital age. in terms of accuracy and precision Content validity analysis The IOC index was determined. The reliability was analyzed using internal concordance analysis. Cronbach's alpha coefficient was determined by SPSS program.
3. Analyze the competency level of English teachers in the digital age. By finding the mean (mean), standard deviation (standard deviation), coefficient of variation, skewness (skewness) and kurtosis (kurtosis) with a preset program.

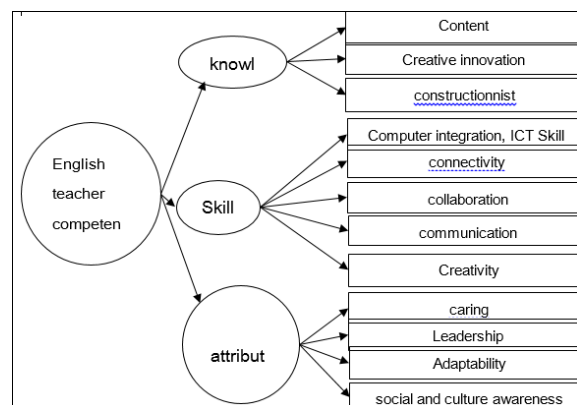


Fig 1: Framework for English Teacher Competency Indicators in the Digital Age

Table 1: The results of testing the invariance of the English teacher competency model in the digital age between genders

Hypothesis	χ^2	df	χ^2/df	p	GFI	NFI	RFI	RMR
1. H _{form}	30.075	55	0.554	0.940	0.995	0.993	0.985	0.003
2. H _{ly}	47.456	64	0.745	0.935	0.991	0.992	0.985	0.004
3. H _{GA}	41.650	58	0.730	0.941	0.993	0.993	0.985	0.004
$\Delta\chi^2_{2-1} = 17.390 * \Delta df_{2-1} = 9$ critical value = 16.915								
$\Delta\chi^2_{2-1} = 10.570 * \Delta df_{2-1} = 3$ critical value = 7.811								

Note. *p < .05

Table 2: Results of testing the invariance of the English teacher competency model in the digital age between different affiliations.

Hypothesis	χ^2	df	χ^2/df	p	GFI	NFI	RFI	RMR
1. H _{form}	126.009	123	0.954	0.540	0.995	0.963	0.989	0.013
2. H _{ly}	191.456	151	1.445	0.035	0.991	0.922	0.965	0.024
3. H _{GA}	156.650	146	1.130	0.141	0.993	0.943	0.976	0.045
$\Delta\chi^2_{2-1} = 67.391 * \Delta df_{2-1} = 25$ critical value = 36.115								
$\Delta\chi^2_{2-1} = 35.579 * \Delta df_{2-1} = 8$ critical value = 15.181								

Note. *p < .05

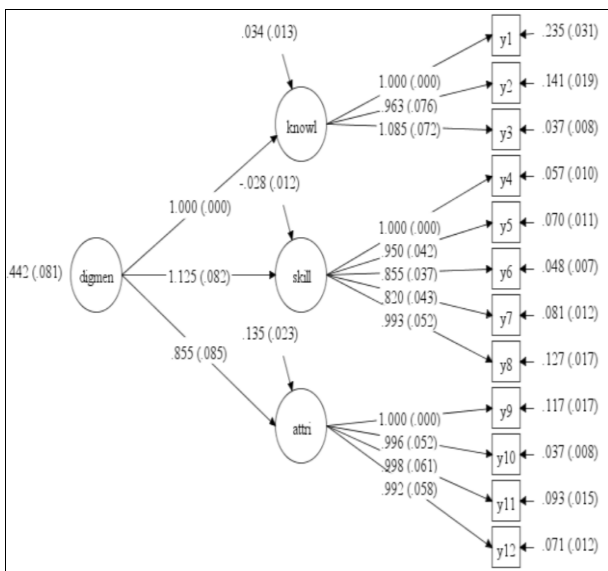


Fig 2: A model for measuring English teacher competency in the digital age of male teachers.

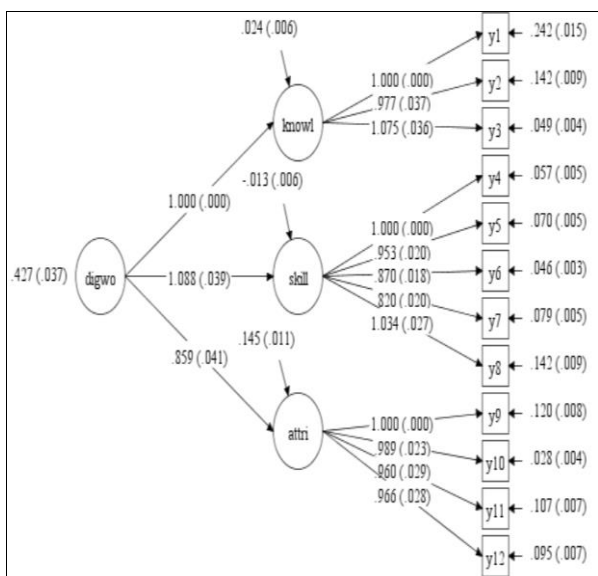


Fig 3: A model for measuring English teacher competency in the digital age of female teachers.

Conclusions and Discussions

- English teacher competency according to the approach to learning management in the digital age consisted of 3 components and 12 indicators, namely component 1, knowledge, with 3 indicators, namely having knowledge of the subject being taught; Have knowledge of innovative media, technology, and understand that learners can create their own knowledge. Component 2: Skills, with 5 indicators, technology skills Ability to connect activities Play a role in activities cooperative learning have communication skills and have the ability to design creative learning activities Component 3: Characteristics with 4 indicators, having compassion for students have leadership know how to adapt and social and cultural awareness.
- A comparative analysis of the differences in English teachers' competency averages according to teachers' learning management approaches in the digital age classified by sex and affiliation.

The level of competency of teachers classified by gender found that the overall knowledge component found that male and female teachers were significantly different at the 0.01 level. When considering the indicator of the knowledge component. It was found that the indicators of knowledge in the subject matter taught and knowledge in media, innovation, and technology were significantly different among female teachers at the 0.01 level. Male, when considering the indicators of the skill components, it was found that the indicators for having technology skills, ICT SKILL, and having the ability to connect activities. Male and female teachers were significantly different at the 0.01 level. Female teachers were on average higher than male teachers. The side indicators played a role in organizing activities. cooperative learning Have communication skills and have the ability to design and create learning activities. The mean values of male and female teachers were not statistically different.

The level of competency of teachers classified by affiliation found that the knowledge component skill component And the characteristics component of teachers from all 4 sub-districts were at high level. When analyzing the differences of the means of measuring English teachers' competency according to the learning management approach in the digital age of teachers classified by sex and affiliation. It was found that knowledge component skill component.

- The results of checking the validity of the English teacher competency measurement model according to the learning management approach in the digital age. The second order confirmatory component analysis found that the model was consistent with the empirical data, with $\chi^2 = 17.556$, $df = 25$, $p = 0.863$, $GFI = 0.996$, $AGFI = 0.996$ and $RMR = 0.003$.

Author Contributions

Received the gold medal "1st place" in the elementary research category. Received the Leader of Achievement Award from ASEAN to International in the Leader of Achievement category in terms of providing outstanding examples of educational media (National level, country level), Received the award Yannasangvara, a good person in Sriland, in the branch of outstanding educational promotion

and development (National level, country level), Received the role model of the year award in the category of outstanding contributions to society (National level, country level), Receiving the honorable person of the country award in the academic category (National level, country level)

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Data Availability statement

The data presented in this study are available on request from the corresponding author.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

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