

## PalArch's Journal of Archaeology of Egypt / Egyptology

### AN INSTRUCTOR NEEDS DEVELOPMENT ANALYSIS OF A THAI COMPUTER STUDENT'S ADVANCED WORD PROCESSING (AWP) PROGRAM DIGITAL LITERACY SKILLS, COMPETENCY, TECHNOLOGY, AND PROGRAM COMPREHENSION

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**Surat Sukman, Paitoon Pimdee, Aukkapong Sukkamart. An Instructor Needs Development Analysis Of A Thai Computer Student's Advanced Word Processing (Awp) Program Digital Literacy Skills, Competency, Technology, And Program Comprehension-- Palarch's Journal Of Archaeology Of Egypt/Egyptology 18(3), 539-554. ISSN 1567-214x**

**Keywords: Advanced Word Processing Program, Competency, Computer Education, Computer Instructor, Digital Literacy, ICDL, Needs Analysis, Thailand.**

#### **ABSTRACT**

The purpose of this research was to study the digital literacy development needs of Thai higher education computer students' enrolled in an Advanced Word Processing (AWP) program and their related digital literacy (DL) skills. The sample made use of simple random sampling to select 46 computer education instructors teaching at one of Thailand's Rajabhat teacher training universities across Northeastern Thailand. The research instrument was a questionnaire in which item reliability was judged to be 0.95. Data were analyzed using descriptive statistics, including the mean ( $\bar{x}$ ), standard deviation (S.D.), as well a modified priority needs index (PNI<sub>Modified</sub>) analysis. The results of this research showed that the instructors thought that the competency of students in the AWP program, both in each aspect and in the overall level, was high. Results also revealed that AWP program student instructors perceived the greatest importance be placed on Formatting of the five aspects examined. This was followed by Preparing Outputs and Collaborative Editing. Interestingly, both Referencing and Enhancing Productivity were ranked equally last. However, the study's results from the same five aspects were slightly different when the order of essential needs (OEN) was analyzed. In this case, we see that Formatting was number 1, followed by Preparing Outputs, Enhancing Productivity, Collaborative Editing, and finally, Referencing. Finally, from the analysis of the instructor's opinions, it was determined that student need development was foremost necessary in referencing, collaborative editing, and then formatting, respectively.

## INTRODUCTION

Numerous global studies and reports have discussed and highlighted the importance of skills necessary in the 21st century, as 21st century skills are highly sought after by practitioners in a rapidly changing and highly challenging century (NCREL, 2003; Pheeraphan, 2013). Moreover, the European Union (2015) has stated the importance for relevant and high-quality knowledge, skills, and competences developed throughout lifelong learning. These aspects are therefore critical for an individual's employment, their innovative capabilities, critical thinking skills, an active citizenship, and their overall well-being (Thammasaeng et al., 2016; UNESCO, 2014). Digital abilities are also skills that the United Kingdom (UK) has identified as crucial for employment across all sectors of the economy (Lill, 2015), with Coldwell-Neilson (2017) in Australia and the House of Lords (2015a) in the UK adding that digital literacy (DL) should be a core educational requirement on the same level of importance as reading and math. In the UK, it was also stated that the digital revolution has changed the very foundation of the country's labor market whose technology has become an integral part of everyday life (House of Lords, 2015b).

In the United States, Hughes et al. (2016) over seven years studied laptop teacher preparatory programs and reported on their faculty's use of technological activities in coursework. Evaluation included coursework on presentations, word processing, email, learning management systems, and digital video activities. Overall, results indicated that students had divergent technological experiences from which to base their future teaching. Therefore, there is a need to standardize the course curriculum and the assessment process afterwards.

In Australia, Coldwell-Neilson (2017) noted the workplace impact of disruptive technologies, which is leading to employers demanding a broader range of skills that go beyond the capabilities that graduates have developed through their higher education studies. However, from the 13 Australian universities studied, it was determined that there is minimal information being provided to new students, which is further complicated by a significant problem in the shared understanding of what DL entails. There is also a problem between instructors and students, as expectations and understanding of digital skills are not aligned.

Although still a developing country, Thailand has soared into the digital age with the Internet, smartphones, and social media playing an ever increasing role in the Kingdom's development and education. Moreover Thailand's Basic Education Core Curriculum details the importance of ICT literacy, its appropriate use, and related media literacy (Thammasaeng et al., 2016). Also, in Thailand, Phuapan et al. (2016) highlighted the importance of DL in higher education, and concluded that *evaluation skills* were the most important skill indicator in the development of DL.

It is therefore essential that the skills, understanding, and use of this ever-changing technology become the focus of all practitioners (Perera et al., 2016; Temdee, 2019), which will also has the possibility of helping humans achieve a better quality of life. Therefore, DL skills have moved to the forefront in importance in education at all levels across all sectors of the global economy. Additionally, ICT is a significant force of change in organizational culture (Thammasaeng et al., 2016), with DL employee characteristics, skills and abilities used as essential indicators for management evaluation. Finally, the development and execution of technological needs assessment is often times the most critical and time-consuming step in the process of setting related goals for a specific educational programs (Szuba et al. 2005).

For this reason, before students graduate, it is imperative to explore DL and comprehension skills in advanced word processing, as it is a fundamental program that is required in every workplace. It is also essential that consistency and standardization be instilled in the education and evaluation process.

### ***Objectives***

1.1.1 To study AWP instructor opinions concerning their student's actual performance and participation in each Rajabhat teacher training university's AWP program.

1.1.2 To study and prioritize the required needs in the development of student competency in in each Rajabhat teacher training university's AWP program.

## **LITERATURE REVIEW**

### ***Competency***

Early on, Boyatzis (1982) defined *competency* as the knowledge, skills, abilities, traits and behaviors which allows an individual to perform a task within a specific function or job. These attributes are identical to those identified by Thailand's Office of the Civil Service Commission (2009), which also added that competency allows a worker to produce outstanding results within an organization. However, as Boyatzis (1982) pointed out, effective job performance requires the ability of an employer to understand and measure a number of factors at the same time.

McClelland (1973) also suggested that better competency measurement could be achieved by the successful analysis of life outcomes and the competencies involved in them, criterion sampling, and assessment of communication skills. Raisova (2012) used the Competency Based Interview (CBI) to assess Czech workers' professional competences. Assessment was conducted on a combination of knowledge, skills, personal characteristics and values, with professional competence stated as measured in most situations by a worker's performance in a specific work situation.

Therefore, competence is important and useful with Jia and Fan (2008) observing that 75% of human resource development today based on competency knowledge and capability in individuals, teams and organizations. Moreover, worker competency is the most essential resource an organization can possess.

***Established DL assessment standards in AWP programs***

UNESCO (2018) undertook a Digital Literacy Global Framework (DLGF) study and stated that the various frameworks can be used for various purposes. These included training guides, employment staff selection, and entrepreneurial innovation engagement. Furthermore, from the study, UNESCO researchers developed a list of proposed DL competence areas and individual competencies. This is detailed in Figure 1.

**Figure 1:** UNESCO’s proposed digital literacy competence areas and individual competencies.

Competence area	Competences
0. Fundamentals of hardware and software	0.1 Basic knowledge of hardware such as turning on/off and charging, locking devices 0.2 Basic knowledge of software such as user account and password management, login, and how to do privacy settings, etc.
1. Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3 Managing data, information and digital content
2. Communication and collaboration	2.1 Interacting through digital technologies 2.2 Sharing through digital technologies 2.3 Engaging in citizenship through digital technologies 2.4 Collaborating through digital technologies 2.5 Netiquette 2.6 Managing digital identity
3. Digital content creation	3.1 Developing digital content 3.2 Integrating and re-elaborating digital content 3.3 Copyright and licenses 3.4 Programming
4. Safety	4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment
5. Problem solving	5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Creatively using digital technologies 5.4 Identifying digital competence gaps
6. Career-related competences	6. Career-related competences refers to the knowledge and skills required to operate specialized hardware/software for a particular field, such as engineering design software and hardware tools, or the use of learning management systems to deliver fully online or blended courses.

Furthermore, in the UNESCO study, the rebranded DL framework now known as ICDL was frequently discussed. As ICDL’s DL framework and word processing (document) assessment module was used for this study, some historical background is useful.

On May 10<sup>th</sup> 2019 in Brussels, Belgium an internationally recognized brand for computer literacy certification was launched (“ICDL for Europe”, 2019). Previously similar certification was referred to as the European Computer Driving Licence (ECDL), or International Computer Driving Licence (ICDL). Then as now, ICDL is designed for European information communication and technology (ICT) students, workers, and professionals.

Formerly referred to as the ‘word processing’ module, the relabeled ICDL module is now referred to as the ‘documents’ module. Beyond the basics of creating, formatting, and finishing letters and other everyday documents, there is an added focus of creating complex documents that are attractive to read. This is consistent with Alkali and Amichai-Hamburger (2004), which noted that DL also includes a large variety of complex skills. These include cognitive, motoric, sociological, and emotional that users need to have in order to use digital environments effectively. Shopova (2014) also noted the problems in ICT education and digital literacy instruction as they applied in the integration process within the European Higher Education Area (EHEA). Therefore, as an essential ICT employment skill, workers need to demonstrate their ability to use word processing applications to produce workplace documents effectively.

Today, according to ICDL Thailand, more than 16 million individuals across 100 countries have had their ICT skills evaluated by one of the ICDL course and testing modules. Moreover, as the world moves into the fourth industrial revolution (Industry 4.0), worker DL knowledge and assessment are playing even more essential roles.

### *Assessing needs*

According to UNESCO education is undergoing a quickening period of intensive change and reorientation, with a multiplicity of educational systems being developed to cope with rapid technological advances and the changing needs of the world’s labor market. Earlier Drucker (2007) noted that as society’s needs change, the educational process must change with it, primarily due to the rapid and constant technological change. Kaufman et al. (1993) viewed assessing needs as a process used to identify needs by prioritizing essential needs, or gaps, between what exist now and what is desired or wants. Additionally, in a study for the World Bank, Watkins et al. (2012) and Wongwanich (2015) also noted the importance in the preparation of a pre-assessment, while also highlighting the essential nature of data collection and analysis, as well as the prioritization of essential needs. O’Reilly (2016) also reported that assessing needs should be a preliminary step in setting programmatic goals or developing strategic plans.

Within an organization, Szuba et al. (2005) stated that a technology needs assessment is the process of evaluating the current environment as opposed to the preferred environment. Moreover, the authors state the added critical nature

of an organization's technology plan prior to assessing an organization's needs. This plan details what is in place and what is planned for the future.

## **RESEARCH METHODS**

### ***Population and sample***

The population for the study consisted of 120 computer education instructors who were teaching at one of Thailand's Rajabhat teacher training universities across Northeastern Thailand for the 2020 academic year. Simple random sampling was used for the 46 instructors who eventually participated in the survey. The sample size was determined by use a formula which assured a 95% confidence level, with no more than a 5% error rate (Singh & Masuku, 2014; Yamane, 1973).

$$n = N / [1 + N (e)^2] \text{ - Where } n \text{ is the sample size, } N \text{ is the population size,}$$
$$(1)$$

and e is the level of precision.

### ***Research tools***

The research tool was a questionnaire synthesized from the Advanced Word Processing course as outlined by the European Computer Driving License (ECDL) Foundation (Lubbe, 2015). From this course outline, a questionnaire was developed in which six areas of items related to each instructor's personal characteristics and the AWP program outline. These included 23 total items divided into Part 2's *Formatting*, Part 3's *Referencing*, Part 4's *Enhancing productivity*, Part 5's *Collaborative editing*, and finally, Part 6's *Preparing outputs*.

Moreover, the survey items on each instructor's opinions were designed using a 5-level Likert type agreement scale (Likert, 1967).

However, prior to the survey's deployment, five experts assessed the questionnaire's content validity and consistency. Measurement was enabled by use of the indexes of item-objective congruence (IOC) (Turner & Carlson, 2003). The reliability/confidence value of 0.95 was ascertained from the use of Cronbach's alpha  $\alpha$  (Cronbach, 1990). The questionnaire scale for the five levels were ranked from 1- 5, whose interpretation has been suggested as 1 = Very low (1.00-1.49), 2 = Low (1.50-2.49), 3 = Medium (2.50-3.49), 4 = High (3.50-4.49), and 5 = Very high (4.50 – 5.00).

### ***Data collection***

The researchers collected data from 46 computer education instructors who were teaching at one of Thailand's Rajabhat teacher training universities across Northeastern Thailand for the 2020 academic year. The data was collected from April to May 2020 with online questionnaires along with a phone call

asking for help in providing information from the instructors, resulting in complete questionnaires from 46 instructors.

### *Data analysis*

Descriptive statistics were used for the analysis, which include both the mean ( $\bar{x}$ ) and standard deviation (S.D.). Furthermore, needs assessment was calculated from use of the modified priority needs index (PNI<sub>Modified</sub>). From the original PNI (Wongwanich, 2005; Wongwanich & Wiratchai, 2005), a more robust was developed which has become known well-known to many Thai educational researchers as the modified priority needs index (PNI<sub>Modified</sub>) (Chainut et al., 2019; Thammasaeng et al., 2016). Therefore, the prioritization and analysis of the needs assessment data was conducted by use of the PNI<sub>Modified</sub> (Silsawang et al., 2014; Wongwanich & Wiratchai, 2005). To get standard scores, the needs were assessed by finding the differential value between desired outcome (I) and actual results (D) (Wongwanich, 2005). The formula for the calculation used for this study was as follows:

$$\text{PNI Modified (PNI}_{\text{Modified}}) = (I - D) / D \quad (2)$$

PNI = priority needs index

I = desired outcome mean ( $\bar{x}$ )

D = actual results mean ( $\bar{x}$ )

#### 3.4.1 Study and prioritization of needs

The study and prioritization of needs for improving the performance of the AWP program students also used a five level for the desired condition (*Expectation*) of the student's ability to use AWP program equal to 5. The reason why the student competency expectation was set at 5 was because they were students directly studying within a computer major.

## **RESULTS**

The study's findings can be summarized as follows:

### *General information of the AWP program instructor respondents*

Table 1 shows the general characteristics of each AWP instructor. From it we note the almost even distribution of men (47.83%) and women (52.17%), which is consistent with Thailand's overall demographic distribution for this region. Secondly, most instructors identified themselves as director of their course (58.70%), with the academic rank of 'instructor' (76.09%). Although only classified as 'lecturers', 53.17% had a master's degree and an astounding 45.65% indicated they had completed their doctoral degrees. Finally, the majority (36.96%) had been teaching between 10-14 years.

**Table 1** AWP program instructor characteristics.

Instructor		
General Information	Number	Percentage
<b>Gender</b>		
Male	22	47.83
Female	24	52.17
<b>Instructor's course position</b>		
President	3	6.52
Instructor	16	34.78
Director	27	58.70
<b>Academic Rank</b>		
Instructor	35	76.09
Assistant Instructor	11	23.91
<b>Highest education</b>		
Bachelor's degree	1	2.17
Master's degree	24	52.17
Doctoral degree	21	45.65
<b>Working experience</b>		
Less than 5 years	3	6.52
5 - 9 years	10	21.74
10 - 14 years	17	36.96
15 - 19 years	5	10.87
20 - 24 years	5	10.87
25 years or more	6	13.04

***Student AWP competency instructor feedbacks***

Table 2 details the results from each instructor's feedback on each student's AWP program competency at one of the five main aspect levels.

**Table 2** the instructors' opinion level of each student's AWP program competency classified by each aspect area.

Skills in each of the 5 main areas	Instructor		
	$\bar{x}$	S.D.	Level
Formatting	4.26	0.76	High
Referencing	3.58	0.95	High
Enhancing Productivity	3.58	0.95	High
Collaborative Editing	3.75	1.00	High
Preparing Outputs	4.13	0.90	High
mean ( $\bar{x}$ )	3.87	0.89	High

**Table 3** details each instructor's opinions concerning each student's AWP program competency at the item level.



**Table 3:** Opinion levels of instructors on the actual condition of the students' overall competency in AWP classes.

Aspect / skill	Instructor		
	$\bar{x}$	S.D.	Level
<b>Formatting</b>	4.26	0.76	High
Ability to arrange text together with images in various ways	4.37	0.57	High
Ability to search and replace text	4.57	0.79	Higher
Ability to select paste style from the clipboard	4.43	0.77	High
Ability to set line spacing	4.35	0.76	High
Paragraph formats can be set and canceled with pagination option	4.13	0.80	High
Ability to customize the title sequence automatically	4.26	0.74	High
Ability to use, edit, customize, cancel using character style and paragraph Style.	4.09	0.86	High
Ability to edit, modify, cancel columns using column break command	3.96	0.84	High
Ability to combine cells, separate cells in a table, convert text to tables, convert tables to text.	4.24	0.76	High
<b>Referencing</b>	3.58	0.95	High
Ability to handle footnotes in various formats	3.76	0.87	High
Ability to handle citation in various formats	3.52	1.00	High
Ability to handle indices in various formats	3.41	0.95	High
Ability to handle various types of linked citations	3.65	0.99	High
<b>Enhancing Productivity</b>	3.58	0.95	High
Ability to manage fields in various forms	3.72	0.88	High
Ability to manage filling forms in various forms.	3.89	0.94	High
Ability to handle circular in various ways	3.93	0.97	High
Ability to manage link in various ways	3.98	0.83	High
Ability to handle automatic messages with macro in various ways.	3.50	1.0	High
<b>Collaborative Editing</b>	3.80	0.92	High
Ability to combine, compare and use documents together	3.70	0.96	High
Ability to secure documents	3.80	1.04	High
<b>Preparing Outputs</b>	4.13	0.90	High
Ability to divide the document	4.04	0.94	High
Ability to set different header, footer within the same document	4.15	0.86	High
Ability to check the correct spelling in the document	4.20	0.91	High
mean ( $\bar{x}$ )	3.87	0.89	High

Table 4 details the study's five main aspects' mean, the instructor's expectation level, the results from the PNI<sub>(modified)</sub> analysis, and the order of each aspect's importance as an essential need.

**Table 4** Order of essential needs for developing students' competency in the AWP program in five key areas.

Aspect / skill	Instructor			
	I	E	PNI	OEN
Formatting	4.26	5	0.17	5
Referencing	3.58	5	0.39	1
Enhancing Productivity	3.58	5	0.31	3
Collaborative Editing	3.80	5	0.33	2
Preparing Outputs	4.13	5	0.21	4

**Note:** I = desired outcome mean ( $\bar{x}$ ), E = expectation level, PNI = PNI<sub>(modified)</sub>, OEN = order of essential needs.

Table 5 details all 23 items' mean, the instructor's expectation level, the results from the PNI<sub>(modified)</sub> analysis, and the order of each aspect's importance as an essential need.

**Table 5** Order of essential item needs for developing students' performance in the AWP program.

Aspect / skill	Instructor			
	I	E	PNI	OEN
<b>Formatting</b>	4.26	5	0.17	5
Ability to arrange text together with images in different ways	4.37	5	0.14	7
Ability to search and replace text	4.57	5	0.10	9
Ability to select paste style from the clipboard	4.43	5	0.13	8
Ability to set line spacing	4.35	5	0.15	6
Paragraph formats can be set and canceled with pagination option	4.13	5	0.21	3
Ability to customize the title sequence automatically	4.26	5	0.17	5
Ability to use, edit, customize, cancel using character style and paragraph style.	4.09	5	0.22	2
Ability to edit, modify, cancel columns using column break command	3.96	5	0.26	1
Able to combine cells, separate cells in a table, convert text to tables, convert tables to text.	4.24	5	0.18	4
<b>Referencing</b>	3.58	5	0.39	1
Ability to handle footnotes in various formats	3.76	5	0.33	4

Ability to handle citation in various formats	3.52	5	0.42	2
Ability to handle indices in various formats	3.41	5	0.46	1
Ability to handle different types of linked citations	3.65	5	0.37	3
<b>Enhancing Productivity</b>	3.58	5	0.31	3
Ability to manage fields in various forms	3.72	5	0.35	2
Ability to manage filling forms in various forms.	3.89	5	0.28	3
Ability to handle circular in various ways	3.93	5	0.27	4
Ability to manage link in various ways	3.98	5	0.26	5
Ability to handle automatic messages with macro in different ways.	3.50	5	0.43	1
<b>Collaborative Editing</b>	3.80	5	0.33	2
Ability to combine, compare and use documents together	3.70	5	0.35	1
Ability to secure documents	3.80	5	0.31	2
<b>Preparing Outputs</b>	4.13	5	0.21	4
Ability to divide the document	4.04	5	0.24	1
Ability to set different header, footer within the same document	4.15	5	0.20	2
Ability to check the correct spelling in the document	4.20	5	0.19	3

**Note:** I = desired outcome mean ( $\bar{x}$ ), E = expectation level, PNI = PNI<sub>(modified)</sub>, OEN = order of essential needs.

## DISCUSSION

Overall, there was wide agreement from each of the Rajabhat teacher training university computer education instructors concerning the competency level of their students enrolled in each school's AWP program. Moreover, student competency was judged at a 'high' level, which the authors suggest was due exhibited excellent skills in producing documents, reports or projects as assigned by instructors. Of course, as one might expect, these are computer education students and the expectation for their performance was expected to be a high level.

Furthermore, in 2020 the amount, quality, and usefulness of Internet archived information are significant, which most students today can easily access from a variety of platforms including their own smartphones. This is consistent with the findings of Okan (2016) in Turkey in which it was stated that in today's world, education and technology are inseparable. Also, technological capability and use is considered by many as a sign of quality education and an underlying reason for a student's potential success.

As was suggested, ICDL is considered as a leader in ICT digital literacy (UNESCO, 2018). As such, the researchers adopted this study's five main aspects for the evaluation of a Thai AWP program from ICDL's AWP/document module (ICDL, n/d). When we examine the study's results we

note that Formatting had the highest mean (4.26) of the five aspects examined. This was followed by Preparing Outputs (4.13) and Collaborative Editing (3.80). Interestingly, both Referencing and Enhancing Productivity were ranked equally (3.58).

However, when we study the results from the same five aspects, we see a slight difference in importance when we are looking at each aspect's order of essential needs (OEN). In this case, we see that Formatting is on top again, followed by Preparing Outputs, Enhancing Productivity, Collaborative Editing, and finally, Referencing.

When we examine each of the 23 items evaluated, we find that 'ability to search and replace text' is ranked most important. This is closely followed by several other items, all within the Formatting main category. However, at the bottom in importance is a student's 'ability to handle automatic messages with macro in different ways'. Therefore, computer education instructors in both the commercial sector and academia should view these results as useful tools in developing their own curriculums and maximizing their role and classroom time. This is consistent with Barker and Harris (2017) saying that current curriculum development approaches must aim to develop students in computer and digital literacy skills. Zorba (2011) added that undergraduate students should develop their knowledge and skills in using computers. Furthermore, digital literacy skills in undergraduate learning processes can help to develop cognitive skills in thinking, learning, and problem solving. Moreover, according to Leekitch watana and Pimdee (2017), educational policies should focus on emphasizing teacher competency development. This includes their knowledge and skills by use of training and seminars with professional instructors.

Although age is not a factor in this study, as all the students were approximately the same age from the same socio/economic background, other studies have suggested that age can play a role in digital literacy. One example is results from Alkali and Amichai-Hamburger (2004) in which it was stated that results clearly showed that younger individuals performed better than the older ones in photo-visual and branching literacy tasks. However, age was an advantage when reproduction and information literacy tasks were required.

Finally, the authors suggests that the results of the study are useful to researchers or instructors involved in teaching and learning, or instructors involved in curriculum development in understanding and the use of digital literacy technology skills. Furthermore, digital literacy can be used to improve the curriculum and provide teaching and learning, while focusing on areas that students are substandard in.

## **CONCLUSION**

The study set out to evaluate five main aspects of computer education instructor led Advanced Word Processing (AWP) programs across Northeast

Thailand's in 11 Rajabhat teacher training universities. Adopting an international framework championed by a UNESCO recognized digital literacy organization; the researchers subsequently were able to report on the five main digital literacy skills which contained 23 sub-elements. Results revealed that AWP program student instructors perceived the greatest importance be placed on Formatting of the five aspects examined. This was followed by Preparing Outputs and Collaborative Editing. Interestingly, both Referencing and Enhancing Productivity were ranked equally last.

However, the study's results from the same five aspects were slightly different when the order of essential needs (OEN) was analyzed. In this case, we see that Formatting was number 1, followed by Preparing Outputs, Enhancing Productivity, Collaborative Editing, and finally, Referencing.

### ACKNOWLEDGEMENTS

We would like to thank the instructors in computer education program from the 11 Rajabhat Universities in Northeast Thailand for their cooperation in providing useful information in doing this research.

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