

# Synthesis and Evaluation of the Research Competencies

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**Abstract** - This research studied the research processes then lead to the research competencies of professors in higher education institutions. Firstly, survey from relevant documents and previous researches. Next, synthesise the research competencies. Finally, evaluate the research competencies by experts. The evaluation of the research competencies by the experts in overall is at a highly appropriated.

**Keywords** - Synthesis, Evaluation, Research Competency

## I. INTRODUCTION

Research and development (R&D) is a critical factor to drive the national economic and social by the creation and improvement of various technologies and innovations. Then used as a guideline for solving problems, to improve the process for more efficient and effective. Also, building new knowledge. The success of doing research, novice researchers who are teachers in educational institutions, is not an easy task, to create new ideas or processes and takes time. From the study, most researches in Thailand have studied the research processes and the factors that affected to successful in doing research. Particularly for classroom research of secondary school teachers, undergraduate projects, and graduate researches.

This research studied the research processes that lead to the research competencies of researchers and professors in higher education institutions. Firstly, survey from relevant

documents and previous researches. Next, synthesise the research competencies for professors in higher education institutions. Finally, evaluate for certified by experts.

## II. LITERATURE REVIEWS

Research processes start with selecting research problems. Which may choose from reasons, motivation, results in economic or social. Besides, the possibility to be successful research. Secondly, searching for relevant researches and literature reviews to obtain a summary of different methodologies, advantages, limitations, and the best methodology of previous researches. Thirdly, determine the research topic. Next, analyse the problems, to obtain the reason which the former methods cannot solve the problems. A new concept in solving problems to be exhausted or performing better than ever. Then define the objectives, conditions, or scope of research. To finding the methodology, algorithm that can solve the problems. Proved and evaluated the proposed method. Once the results have been proven and evaluated, do analyse the results in finding the causes and guidelines to prevent potential errors. Finally, summarize the research results, then compiled into a research report [1].

Piyawan, B., et al. [2] conducted the research to find research competencies and factors that lead to successful research. Besides, finding conditions and processes that lead to successful research in the context of Thai society. The sample group were professors who work for nine national research universities. The

selection criteria were the person who has done researches, and their researches were published in the national or international journal, chosen by the selective sampling. Data collection by an in-depth interview. The information then categorized and did the reliability check. Lastly, analyse the content systematically. To do research successfully, the researcher should have the research competencies as a basis. Research competencies can be divided into four aspects, as follows: 1) Knowledge, 2) Skill, 3) Personal attribute, and 4) Behaviour desirable.

Chimphli, I., et al. [3] conducted a study of the research conditions of the teachers in the schools in Pattaya city. Besides, developed a model for enhanced the research competencies by collaborative operation research, of the teachers of the schools in Pattaya city. By surveying opinions from a sample group of 231 school teachers in Pattaya city with stratified sampling. The obtained information then use to create a model. Besides, study the principles of creating a model user's manual. To develop the model by checking critique the appropriateness and possibility of the proposed model, and model user's manual with a group discussion by the target group of 14 people. Then evaluate the model by its benefits, appropriateness, possibility, and accuracy by 17 experts. Then obtained the proposed model with four components as follows: 1) Plan, 2) Action and observe, 3) Reflect, and 4) Input.

Udompong, L., et al. [4] study the causal model of research competency by using scientific literacy of teachers and students. The study is divided into two parts as follows:

*Part One:* Study of research documents on research competency by using scientific literacy, including theoretical thinking about research competency; research competency; measurement of research competency; the development process for enhanced research competency; and principles of scientific literacy. They are then defined and categorized scientific literacy. Besides, finding factors affecting scientific literacy. The results obtained theoretical models of research

competency by using scientific literacy. Then there were six experts evaluated it. The criteria for selection of experts as follows: 1) At least 5 years of experience in curriculum or science teaching and 2) At least 5 years of experience in research or classroom activity research.

*Part Two:* Interview the outstanding science teachers to study concepts and study plans for the development of teachers' scientific literacy. Besides, a study from related documents and researches. Then evaluated by experts in scientific study, and groups of teacher those interviewed. The study found that scientific literacy is a variable that affects the research competency of teachers and students. Teachers should use alternative teaching methods other than by scientific project-based learning, such as context-based learning, discovery-based learning, from a method of learning science; technology; society and environment (STSE) or searching-based learning.

Ismail, R. and Meerah, T. [5] defined the research capacity as the ability to carry out data collection procedures involving planning and selecting of an appropriated instrument by identifying an appropriated method for interpreting and manipulating data besides using appropriated statistical tools to test of significance and understanding. The limitations of analysis techniques, drawing and interpreting appropriated conclusions from an analysis of the results.

Meerah, T., et al. [6] identified the constructs of research skills into 5 factors as follows: 1) Statistical/Quantitative analysis skills, 2) information seeking skills, 3) problem-solving skills, 4) communication skills, and 5) Research methodology skills. While Cheng, W. and Zhang, G. [7] considering the competencies of senior researchers from 10 factors according to 3 aspects as following: 1) Research quality, 2) Research capacity, and 3) Management skills.

### III. RESEARCH METHODOLOGY

The research instrument is a questionnaire. The scope of the proposed study are as

follows:

1) The population are researchers who experienced in information and communication technology, besides education.

2) The sample group is selected sampling from five researchers who experienced in information and communication technology, besides education.

The research is divided into two phases according to the objectives of the proposed study as follows.

*Phase One:* Synthesis of the research competencies. The processes are as follows:

1) Study of related documents and researches in the topics of research processes and research competencies. Then to analyse the information.

2) Create a questionnaire for the evaluation of research competencies.

*Phase Two:* Evaluation of the research competencies by experts. The processes are as follows:

1) The proposed research competencies distributed to five experts by a selected sampling.

2) Bring suggestions from experts to the improvement of the research competencies.

3) Analyse the results of the evaluation of the research competencies, by using the mean and standard deviation.

#### **IV. RESULTS OF THE STUDY**

*Phase One:* Synthesis of the research competencies.

Details of the research competencies in 3 aspects as follows:

##### *1) Writing of the Research Proposal*

Research processes start with selecting research problems. Which may choose from reasons, motivation, results in economic or

social. Besides, the possibility to be successful research. Secondly, searching for relevant researches and literature reviews to obtain a summary of different methodologies, advantages, limitations, and the best methodology of previous researches. Thirdly, determine the research topic. Next, analyse the problems, to obtain the reason which the former methods cannot solve the problems. A new concept in solving problems to be exhausted or performing better than ever. Then define the objectives, conditions, or scope of research. To finding the methodology, algorithm that can solve the problems.

When the proposed of the research proposal has approved. Therefore assessment of the research competencies as follows: (1) Define research problems, (2) Problem analysis, (3) Proposed ideas for solving problems, (4) Reviews of related literature, (5) Setting objectives of the research study, (6) Setting scope of the research study, (7) Writing benefits of the research study, (8) Writing research procedures, (9) Writing the citation and bibliography, and (10) Writing the keywords / phrases.

##### *2) Writing of the Research Study Results*

After the research proposal has approved. Next, prove and evaluate the proposed method. The model may use to prove the feasibility and evaluate its efficiency. In contrast, the use of experiment to finding the accuracy rate of the proposed method when the results have been proven and evaluated.

Once the research results have been obtained Therefore assessment of the research competencies as follows: (1) Design the model, method and algorithm, (2) Assumption research hypothesis, and (3) Proofing and evaluation.

##### *3) Writing of the Research Summary and Report*

Once the results have been proven and evaluated, do analyse the results in finding the causes and guidelines to prevent potential errors. Finally, summarize the research results, then compiled into a research report.

When writing a research report has finished. Furthermore, assessment of the research competencies as follows: (1) Analysis and discussions, (2) Writing a research summary and report, (3) Writing the bibliography, and (4) Writing an abstract of the research study.

*Phase Two:* Evaluation of the research competencies by experts.

**TABLE I**  
**EVALUATION OF THE RESEARCH COMPETENCIES BY THE EXPERTS**

Evaluated Items	$\bar{x}$	S.D.	Appropriateness
<b>1. Writing of the Research Proposal</b>	<b>4.00</b>	<b>0.68</b>	<b>High</b>
1.1 Define research problems	4.57	0.53	Highest
1.2 Problem analysis	4.43	0.53	High
1.3 Proposed ideas for solving problems	4.14	0.90	High
1.4 Reviews of related literature	4.43	0.79	High
1.5 Setting objectives of the research study	4.57	0.79	Highest
1.6 Setting scope of the research study	4.29	0.95	High
1.7 Writing benefits of the research study	4.29	0.76	High
1.8 Writing research procedures	4.57	0.53	Highest
1.9 Writing the citation and bibliography	4.71	0.49	Highest
1.10 Writing the keywords / phrases	4.57	0.53	Highest
<b>2. Writing of the Research Study Results</b>	<b>4.53</b>	<b>0.59</b>	<b>Highest</b>
2.1 Design the model, method and algorithm	4.71	0.49	Highest
2.2 Assumption research hypothesis	4.29	0.76	High
2.3 Proofing and evaluation	4.57	0.53	Highest
<b>3. Writing of the Research Summary and Report</b>	<b>4.43</b>	<b>0.57</b>	<b>High</b>
3.1 Analysis and discussions	4.57	0.53	Highest
3.2 Writing a research summary and report	4.14	0.69	High
3.3 Writing the bibliography	4.43	0.54	High
3.4 Writing an abstract of the research study	4.57	0.53	Highest
<b>Overall</b>	<b>4.43</b>	<b>0.61</b>	<b>High</b>

Table I, has shown the evaluation of the research competencies by the experts. The score in overall is appropriated at a high level, with an average of 4.43, S.D. = .61. When considering each aspect found that writing of the research proposal is appropriated at a high level, with an average of 4.00, S.D. = .68. Writing of the research study results is appropriated at the highest level, with an average of 4.53, S.D. = .59. Writing of the research summary and report is appropriated at a high level, with an average of 4.43, S.D. = .57.

**V. DISCUSSION AND CONCLUSION**

The evaluation of the research competencies by the experts in overall is at a highly appropriated. When considering each aspect found that writing of the research proposal, and writing of

the research summary and report are highly appropriated. Writing of the research study results is at the highest appropriated.

For further study, will be experiment with the sample groups of professors and researchers. Study the evaluation of the research competencies for each aspect by a self-assessment check-list using a 4-level scale (0-3) should be concerned. Also, conduct a study of the publication competencies.

**REFERENCES**

**(Arranged in the order of citation in the same fashion as the case of Footnotes.)**

[1] Chamnong, K. (2016). “Research and writing research articles in engineering, technology and science”. Chulalongkorn

- University Press: Bangkok, pp. 115-118.
- [2] Boonphen, P. and et al. (2018). "Research competencies and variables related to successful research: case studies of researchers in national research universities". *Kasem Bundit Journal*, Vol. 1, pp. 73-78.
- [3] Chimphi, I. and et al. (2017). "Development of a model for promotion of teacher personnel potential Schools in Pattaya Research with participatory action research". *Graduate Research Journal*, Vol. 2, pp. 15-35.
- [4] Cheng, W. and Zhang, G. (2012). "Empirical Research on the Competency Model of Senior Researchers". *Proceedings of 2012 Second International Conference on Business Computing and Global Informatization*, pp. 832-835.
- [5] Udompong, L. and et al. (2014). "Causal Model of Research Competency via Scientific Literacy of Teacher and Student". *Procedia - Social and Behavioral Sciences*, pp. 1581-1586.
- [6] Ismail, R. and Meerah, T. (2011). "Evaluating the Research Competencies of Doctoral Students". *Procedia - Social and Behavioral Sciences*, Vol. 59, pp. 244-247.
- [7] Meerah, T. and et al. (2012). "Developing an Instrument to Measure Research Skills". *Procedia - Social and Behavioral Sciences*, Vol. 60, pp. 630-636.