

Critiques on Thai Educational Research Methodology

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Abstract

This critique aimed to; 1) synthesize a body of knowledge of educational research methodology, 2) analyze and compare educational research methodology in Thai and international research articles, and 3) critique problems, strengths and weaknesses and put forward suggestions for standardizing Thai educational research methodology. Data were obtained from eight international textbooks, 95 articles and four Thai educational research methodology experts. Results revealed that the principles and international standards of educational research methodology included eight methodological categories which covered 34 characteristics. Findings from a comparison of Thai and international research articles indicated that Thai and international research articles were similar in 15 characteristics and different in five characteristics. Thai research articles had six problems relating to educational research methodology: information searching and English skills, educational research instruction, lack of experts in educational research methodology, research finding distribution, educational researcher development, and research article format.

Keywords: educational research methodology, research principles and international standards

1. Introduction

Educational research is the systematic process for discovering knowledge and facts and addressing problems of interest in educational settings through the scientific method with a view to gaining new knowledge that can be applied to develop rules, theories, or practices for the ultimate goals of inferring, describing, explaining, and controlling educational phenomena of interest (Kajornsinsin, 2000; Ary, Jacobs, Razavieh, & Sorensen, 2006; Donald, 2002). In this regard, educational research serves as the essential tool for advancing educational sciences and enhancing researcher capacity, people quality, and educational quality. All these necessarily pave the way for the development of the country's economic, politic, social, and cultural systems.

To what extent educational research findings will be of trustworthiness and usefulness depends essentially on the amount of knowledge gained from research and the soundness of research methods employed by researchers. Samiee and Athanassiou (1998) points out that as researchers published more and more research findings in academic scientific journals; this implied that a lot of new knowledge and research methods have already emerged as a result.

In addition, Wiratchai (1995) describes the relationship between a body of knowledge from research and from methodology. Wiratchai points out that research methodology and disciplinary contents are fundamental facets that inform and improve each other. That is, the more disciplinary contents are accumulated, the more research methodology is advanced and vice versa. As such, enhancing educational researchers' knowledge of research methodology to enable them to conduct research in real life is an important step that will bring about high-quality educational researchers and studies.

We conducted the literature review related to a synthesis of a body of knowledge as well as research methodology and found that a number of researchers attempted to synthesize a body of knowledge pertaining to educational research methodology (e.g., Wiratchai & Wongwanich, 1998; Siribanpitak et al., 2004; Wiratchai et al., 2009; Polsaram, 2006; Narot et al., 2004). Findings from these studies indeed informed the trend and direction of future educational research methodology. With regard to a synthesis of educational research methodology, while several studies (e.g., Wiratchai, 1995; Kanjanawasee, 1995; Chansakul, 2004; Koro-Ljungberg & Douglas, 2008; Goba, Balfour, & Nkambule, 2011; Burn, 2012; Samkange, 2012) were

carried out to synthesize a body of knowledge relevant to educational research methodology, the focus of them were placed primarily upon certain issues related to educational research methodology. Moreover, Thai researchers had several misconceptions about educational research methodology (KeawFong, 2006; Wiratchai & Wongwanich, 2012).

In particular, it was found from the literature review that there were seven research methodological characteristics commonly employed in previous research, including research questions (Koro-Ljungberg & Douglas, 2008) the literature review (Burn, 2012) research design (Goba, Balfour, & Nkambule, 2011; Koro-Ljungberg & Douglas, 2008; Samkange, 2012) sample identification (Burn, 2012; Goba, Balfour, & Nkambule, 2011) instrument development and validation (Goba, Balfour, & Nkambule, 2011) data collection (Burn, 2012; Koro-Ljungberg & Douglas, 2008; Samkange, 2012) data analysis and interpretation (Burn, 2012; Goba, Balfour, & Nkambule, 2011; Koro-Ljungberg & Douglas, 2008; Chansakul, 2004). However, these methodological components do not cover all key aspects of research methodology.

In the light of what discussed above, we aimed to synthesize a body of knowledge of research methodology based on the research principles and international standards as commonly proposed in the literature and international textbooks on educational research methodology. We also intended to critique the problems, strengths, and weaknesses of educational research methodology in both Thai and international research articles and put forth the recommendations for standardizing educational research methodology in Thailand. In this study, the methodological characteristics of educational research consisted of eight common characteristics in accordance with the research principles and international standards: (1) research problem identification, (2) related literature review, (3) research conceptual framework (RCF) development and variable identification, (4) research hypothesis formulation, (5) population specification and sample selection, (6) research instrument development, (7) data collection, and (8) data analysis and interpretation.

It is thus hoped that findings from this study would be of great help to university students, researchers, and those interested in conducting educational research that meets the research principles and international standards.

2. Literature Review

2.1 Definition of Research Methodology

Based on a synthesized definition of research methodology from the literature, it can be concluded that research methodology refers to the concept, paradigm, philosophy, and the scientific method researchers embrace to make plans for finding answers to research questions through proper and sound description, explanation, prediction, and control of phenomena of interest, thereby binging about eight interrelated components of educational research methodology: (1) research question formulation, (2) related literature review, (3) RCF development and variable identification, (4) research hypothesis formulation, (5) population identification and sample selection, (6) research instrument construction, (7) data collection, and (8) data analysis and interpretation (Wiratchai, 1995; Pitiyanuwat, 2001; Kumar, 2008; Rajasekar, Philominathan, & Chinathambi, 2013; Samiee & Athanassiou, 1998).

2.2 Principal Components of Research Methodology

Based on the literature review related to research methodology characteristics, it can be summarized that the main components underlying research methodology included research question formulation (Koro-Ljungberg & Douglas, 2008), related literature review (Burn, 2012), research design (Goba, Balfour, & Nkambule, 2011; Koro-Ljungberg & Douglas, 2008; Samkange, 2012), sample identification (Burn, 2012; Goba, Balfour, & Nkambule, 2011), instrument development and validation (Goba, Balfour, & Nkambule, 2011), data collection (Burn, 2012; Koro-Ljungberg & Douglas, 2008; Samkange, 2012), and data analysis and interpretation (Burn, 2012; Goba, Balfour & Nkambule, 2011; Koro-Ljungberg & Douglas, 2008; Chansakul, 2004). Drawing upon the literature review, the present study, therefore, incorporated eight fundamental characteristics as integral components of educational research methodology. These methodological characteristics include: (1) research question formulation, (2) related literature review, (3) RCF development and variable identification, (4) research hypothesis formulation, (5) population definition and sample selection, (6) research instrument construction, (7) data collection, and (8) data analysis and interpretation presented in Figure 1.

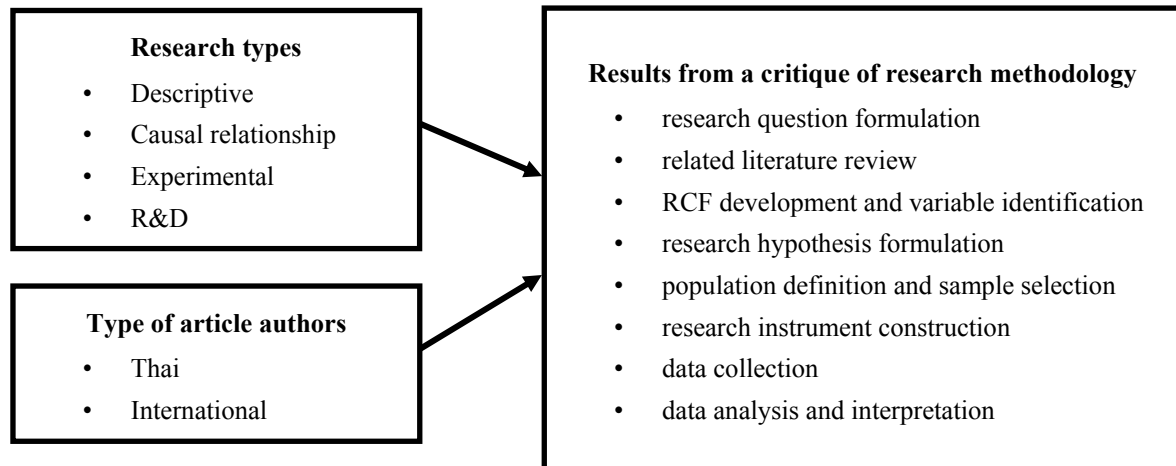


Figure 1. Research conceptual framework of the present study

3. Objectives

The three objectives are to: 1) synthesize a body of knowledge of educational research methodology on the basis of the research principles and international standards, 2) analyze and compare educational research methodology between Thai and international research articles, and 3) critique problems, weaknesses, and strengths of educational research methodology in Thailand and put forward the recommendations for enhancing the quality of educational research methodology in Thailand.

4. Method

4.1 Data Sources

The data were obtained from eight international textbooks related to educational research, 95 research articles published in both Thai and international journals, and an interview with four Thai experts in the field.

4.2 Procedures

4.2.1 A Synthesis of the Existing Body of Knowledge of Educational Research Methodology

A synthesis was based on the following steps:

1. Eight international textbooks related to educational research in university libraries and educational research articles published between 2007 and 2012 were located. The Eight international textbooks and the standards for reporting on empirical social science research in AERA publications were synthesis to develop the eight research principles and international standards.
2. Four types of research, including descriptive, causal relationship, experimental, and R&D research, were coded using a coding sheet containing eight principal characteristics of research methodology.
3. Coded data were synthesized to form a body of educational research methodology knowledge based on the research principles and international standards in order to serve as the guiding framework for comparing educational research methodology between Thai and international research articles.

4.2.2 A Comparison of Educational Research Methodology between Thai and International Research Articles

A comparison followed the following steps:

1. Both Thai and international educational research articles published during 2007-2012 were located. Fifty research articles from 18 Thai journals were published in the Thai-Journal Citation Index Center database and 45 research articles from 24 international journals were published in the Social Science Citation Index (SSCI) database. All research articles were categorized into four types of research: descriptive, causal relationship, experimental, and R&D research, and were grouped into six educational domains: instruction, curriculum, educational measurement and evaluation, educational technology and innovation, educational administration and supervision, and teacher professional and educational personnel development.
2. Each type of Thai and international research articles were coded according to eight principal characteristics of research methodology.

3. Coded data were synthesized for the purpose of comparing educational research methodology between Thai and international research articles.

4.2.3 A Coding of Research Methodology on the Basis of the Research Principles and International Standards

A coding of research methodology was based on the following procedures:

1. Research articles were coded in accordance with eight core characteristics of research methodology in a checklist.
2. Coded data were synthesized in order to compare research characteristics of Thai and international articles based on eight principal characteristics of research methodology in a checklist.

4.2.4 A Critique of the Problems, Strengths, and Weaknesses of Educational Research Methodology in Thai Articles and Suggestions for Improving Educational Research Methodology in Thailand

Critiques were carried out based on the following steps:

1. The problems, strengths and weaknesses gained from a synthesis and comparison of educational research methodology between Thai and international articles were identified on the basis of research methodology knowledge.
2. An interview was conducted with four Thai leading experts in educational research methodology to elicit information on the problems, strengths, and weaknesses of educational research methodology in Thailand.
3. An interview was conducted with four Thai leading experts in educational research in order to gain formation on the suggestions for enhance the quality of educational research methodology in Thailand in respect of curriculum development, university lecturers responsible for producing researchers, and institutions responsible for research funding.

Before synthesizing process, the information from the interviews was used to discuss with the interviewees again to verify accurate interpretation until the accordance conclusion were achieved. Consequently, the researchers interviewed twice times per expert.

4. The information related to the problems, strengths, and weaknesses of educational research methodology and an interview with the experts was synthesized to formulate the recommendations for standardizing educational research methodology in Thailand.

4.3 Instruments

The data were collected using four coding sheets and one checklist. Four coding sheets included a coding sheet of the existing body of knowledge of educational research methodology based on the research principles and international standards, a coding sheet of educational research methodology in Thai and international research articles, a coding sheet of a comparison of educational research methodology in Thai and international research articles, a coding sheet of the problems, strengths, and weaknesses of educational research methodology in Thai studies. Another instrument was a checklist of the main sections of research articles based on the international standards. An interview was also conducted with Thai leading experts in the field of educational research methodology.

We checked the quality of all the instruments using content validity, which was based on an evaluation of three leading experts. We also investigated inter-coder reliability coefficients of two coding sheets. The percentage of inter-coder agreement based on our judgment was over 80 percent for the two coding sheets. We also further discussed and exchanged the ideas and details of coding disagreement until the final agreement was reached.

4.4 Data Analysis

1. Content analysis was used to synthesize the existing body of knowledge of educational research methodology based on the research principles and international standards.
2. Chi-square test and content analysis were used to analyze and compare educational research methodology between Thai and international research articles. For Chi-square analysis, we used the frequency of Thai and international research articles categorized by research type and the research principles and international standards. If the Chi-square were statistically significant at .05 that means Thai and international research articles were different.
3. Content analysis was employed to identify the problems, strengths and weaknesses of educational research methodology in Thai research articles and propose practical suggestions for developing educational research methodology in Thailand.

5. Results

5.1 *A Synthesized Body of Knowledge of Educational Research Methodology*

Results from a synthesized body of knowledge of educational research methodology based on the research principles and international standards were presented in relation to eight fundamental components of educational research methodology. These core components were commonly found in educational research. Details were presented as follows.

5.1.1 Research Problem Identification

Results from the synthesis revealed that research problems were consistent with titles, theories, and the related literature and also dictated the direction that current research could expand on the existing body of knowledge in the literature. Moreover, research problems were stated in a short, concise, and clear manner and were specific to the objectives, scopes, contexts, and educational methodology of the studies. Furthermore, research problems were formulated in the form of open-ended questions, such as why- and how-questions.

5.1.2 Review of the Related Literature

Results from the synthesis informed that literature review reflected what previous studies had found and what theories had been used pertaining to the research topics of interest, thereby directing the way in which research would be undertaken. The related literature review also indicated the connection and potential contribution that research findings would make to the existing body of knowledge or indicated new findings that have never been discovered or showed conclusive findings to unsettled issues from earlier studies. Besides, the related literature review also reflected a well sequent and sound synthesis of previous studies rather than presenting excerpts from other documents and was based on reliable and latest academic sources as well as research articles.

5.1.3 Research Conceptual Framework Development and Variable Identification

Research results based on the synthesis showed that RCF development and variable identification must be clearly and thoroughly associated with the review of the related literature and indicate the relationship between or among variables in question. It is important to note, however, that the RCF representing the relationship of variables in question is not necessary in descriptive research.

5.1.4 Research Hypothesis Formulation

Based on the synthesis, it was found that research hypotheses should be based on relevant theories and sound and recent studies and should indicate an accurate and clearly-defined relationship between or among variables under study. Research hypotheses should also correspond to research objectives and can be tested using research process. However, descriptive and R&D studies may or may not have research hypotheses.

5.1.5 Population Definition and Sample Selection

According the synthesis, it is essential to describe in detail the demographic information or characteristics of the target population or other units of analysis (e.g., organization, settings, or documents) and a sampling method that is used to obtain the sample from the corresponding population. It is also important to specify the sample size or, if possible, the target population size on the basis of the research principles and report the distribution of the sample data based on general characteristics or certain variables of interest.

5.1.6 Research Instrument Development

To develop research instruments, it is of necessity that the definition of a variable in question be operationalized based the related literature review. Research instruments should be designed to best capture the information regarding a variable of interest and best suit the samples or respondents under study. Details of research instruments should also be presented including, for example, the item format, the number of items, and the scoring method. Furthermore, the presentation of instrument development procedures should cover the development process and/or validation process of research instruments. In addition, the validation approach should be appropriate for research instrument formats and the quality indices of the instruments adopted from previous studies should be reported. The intervention process, especially in experimental and R&D research, should be thoroughly described so that other studies can replicate. However, descriptive and causal relationship studies do not have to describe the intervention or innovation.

5.1.7 Data Collection

Research indicated that data collection strategies should be appropriate for capturing the information related to a variable in question, participants of interest, and instrument formats used. It is also important to describe in detail the roles of researchers in data collection procedures, the period of data collection, and the step-by-step

description of data collection process so that other researchers can follow.

5.1.8 Data Analysis and Interpretation

It is necessary to investigate the assumptions of statistical techniques and choose a statistical technique that is suitable for the data characteristics, research problems and research objectives. The data should also be accurately interpreted and summarized in accord with the analysis results and without researchers' personal judgment and the research results should be presented in a way that provides thorough answers to research questions and hypotheses. Moreover, to facilitate the interpretation of the data, charts, tables and figures should be used to present the data, making easier for readers to interpret the data. When possible, it is also useful to use a quote to elaborate the information.

5.2 Comparison of Educational Research Methodology

Table 1 shows a comparison of research methodology between Thai and international research articles as categorized by research type. Thai and international research articles had similar and different procedures of educational research methodology as follows.

Table 1. A comparison of research methodology between Thai and international research articles as categorized by research type

Research characteristics	Desc	Caus	Exp	R&D
	χ^2	χ^2	χ^2	χ^2
1. Research problem formulation				
1.1 Research problems are related to titles.	0.00	0.00	0.00	0.00
1.2 Research problems are related to related literature review.	12.47*	1.05	8.03*	4.80
1.3 Research problems reflect the contribution that research would expand on the existing body of knowledge.	30.00*	16.36*	17.06*	16.00*
1.4 Research problems are short, concise, clear, and specific to objectives, scopes, contexts, and study methods.	3.81	0.00	1.71	1.14
1.5 Research problems are in the form of open-ended questions such as why and how questions.	5.00	1.05	4.89	1.14
2. Review of the related literature				
2.1 Literature review reflects the connection between a priori and issues under study and guide research procedures.	19.85*	5.00	8.03*	6.77*
2.2 Literature review reflects the expansion and connection of prior findings or the conclusive findings to controversial issues or new findings never before discovered.	30.00*	16.36*	17.06*	19.43*
2.3 Literature review is based on a sequential and sound synthesis of the related literature without using excerption.	26.22*	12.80*	21.00*	19.43*
2.4 Literature review is based on latest academic sources and research findings.	26.22*	10.77*	13.65*	13.33*
3. Research conceptual framework and variable identification				
3.1 Research conceptual framework and variable identification is based on a thorough review of relevant literature.	11.81*	6.67*	10.66*	11.20*
3.2 Variable identification shows the relationship of variables under study.	9.02*	6.67*	10.66*	4.80
4. Research hypothesis formulation				
4.1 Research hypothesis formulation draws on reliable, up-to-date, and sound literature review.	10.71*	0.83	5.17	0.00
4.2 Research hypothesis formulation reflects a clear and accurate relationship of variables and corresponds to research objectives.	1.07	0.00	2.52	0.00
4.3 Research hypotheses can be tested through research process.	1.07	0.27	2.52	0.00

Research characteristics	Desc	Caus	Exp	R&D
	χ^2	χ^2	χ^2	χ^2
5. Population identification and sample selection				
5.1 Characteristics of population or target cases, either humans or documents, are properly described.	0.54	2.22	2.25	0.00
5.2 The procedure and criteria for obtaining target samples are consistent with research objectives.	3.28	0.27	5.69	1.00
5.3 The number or size of samples is based on research principles.	1.10	2.22	1.92	3.29
5.4 The distribution of sample data related general or background variables is reported.	13.13*	8.57*	17.06*	5.47
6. Research instrument development				
6.1 The operational definition of variables is based on related literature review.	10.50*	10.77*	10.10*	2.06
6.2 Instrument characteristics are consistent and appropriate for variables and sample under study.	0.91	1.05	1.92	0.73
6.3 Instrument characteristics such as formats, item numbers, and scoring methods are properly described.	0.95	4.00	5.35	0.89
6.4 The procedures for developing research instruments cover the development process and/or the validation process with the target sample under study.	5.81	9.33*	10.75*	6.55*
6.5 The approaches for evaluating instrument quality are appropriate for instrument types and the quality indices of the adopted instruments are also reported.	1.26	5.07	5.35	0.00
6.6 The intervention and innovation, particularly in experimental and R&D research, is described in detail so that readers can replicate.	0.00	0.00	5.35	2.67
7. Data collection				
7.1 Data collection procedure is consistent with variables in question, respondents, and research instruments.	7.40*	3.06	1.71	0.73
7.2 The roles of researchers or data collectors in data collection procedure are properly explained.	5.47	2.40	5.69	0.89
7.3 The time or period of data collection procedure is identified.	8.15*	2.36	5.10	4.00
7.4 Data collection procedure is described step by step so that readers can replicate.	8.74*	1.51	8.03*	0.50
8. Data analysis and interpretation				
8.1 Statistical assumptions of inferential statistics are investigated.	5.64	2.40	5.10	4.24
8.2 Analytical techniques are appropriate for research problems and objectives.	3.81	0.00	1.71	0.00
8.3 Analytical techniques are appropriate for data characteristics	3.81	0.00	1.71	0.00
8.4 Interpretation and summarization of research results are accurate and consistent with analytical results without researchers' opinion involvement.	5.27	1.05	1.71	2.11
8.5 The presentation of research results are thorough for answering research questions/problems or research hypotheses.	0.00	1.05	0.00	0.73
8.6 The presentation of tables, charts, or figures provides sufficient and comprehensible information or evidence related to verbal data.	17.14*	3.53	8.03*	6.44*

Note. * $p < .05$ (χ^2 -test is greater than the critical value of 5.991) Desc means descriptive research. Caus mean causal relationship research. Exp means experimental research.

5.2.1 Similar Characteristics

Thai and international research articles had 15 similar characteristics related to research problem identification,

population definition and sample selection, research instrument development, data collection, and data analysis and interpretation.

5.2.1.1 Research Problem Identification

There were three similar characteristics; 1) research questions were associated with research titles; 2) research questions were short, concise, clear, and specific to research purposes, scopes, and methods; and 3) research questions took the form of open-ended questions, such as why and how questions.

5.2.1.2 Population Definition and Sample Selection

There were similar in three aspects; 1) demographic characteristics of target population or cases of interest were described; 2) sampling procedures and criteria for obtaining samples were appropriate for research objectives; and 3) descriptions and numbers or sizes of samples were consistent with research types used.

5.2.1.3 Research Instrument Development

There were similar in three aspects; 1) research instruments were appropriate for measurement of variables in question and characteristics of participants or respondents; 2) details of instrument characteristics, such as formats, number of items, and scoring methods, were described; and 3) methods for investigating the quality of instruments were appropriate for instrument formats and quality indices of adopted instruments were also reported. As for data collection, Thai and international research articles were similar in that the roles of researchers or other data collectors in data collection procedures were explained.

5.2.1.4 Data analysis and Interpretation

There were similar in five characteristics; 1) investigation of statistical assumptions was not reported; 2) analytical techniques were correspondent with research problems and research objectives; 3) analytical techniques were suitable for data characteristics; 4) the interpretation and summary of research results are accurate and consistent with analytical techniques and no researcher opinion was involved in the interpretation; 5) the presentation of research results covered all information needed to answer researcher questions and hypotheses.

5.2.2 Different Characteristics

In terms of different characteristics, they differed in five characteristics; 1) research problem formulation, 2) related literature review, and 3) research conceptual framework development.

5.2.2.1 Research Problem Formulation

International research articles formulated research problems that reflected and dictated the potential outcomes that current research could add to the existing body of knowledge in the literature, Thai research articles did not state research problems that mirrored the potential findings that current research could expand on the existing body of knowledge.

5.2.2.2 Review of Related Literature

International research articles had three aspects; 1) the review of the related literature reflected the connection of previous findings, the expansion of existing knowledge, the conclusive findings to unsettled issues, and the new findings never before discovered; 2) the related literature review was presented in a synthesized, sequential, and logical fashion without using excerpts from other documents; 3) the related literature review was substantiated by cutting edge findings. In particular, all of the international research articles presented the literature review indicating the connection and expansion of existing knowledge, the conclusive findings to unsettled issues, and the new findings never before uncovered. Whereas most Thai research articles appeared not to specifically present the literature review as a separate section but rather included it as part of the introduction section. Moreover, the literature review of Thai research articles was not presented in a well sequent and sensible way and did not cite recent and updated research findings.

5.2.2.3 Research Conceptual Framework Development and Variable Identification

All types of international research articles, except for descriptive studies, were able to obviously and thoroughly relate research conceptual framework and variable identification with the relevant literature, while most Thai studies, except for descriptive studies, did not clearly and comprehensively connect research conceptual framework and variable identification with the related literature.

5.3 Problems, Strengths and Weaknesses of Thai Research Articles, and Suggestions for Improving Educational Research Methodology in Thailand

5.3.1 Problems of Educational Research Methodology in Thai Research Articles

5.3.1.1 English Language and Information Searching Skills

Researchers were not good enough at English, in particular reading skills, to be able to have access to essential information in English, keep pace with and synthesize the advancement of knowledge on topics of interest, keep up with the existing body of knowledge, and identify research problems worthy of further study. Moreover, most researchers had difficulty reading and translating research findings in international research articles, thereby misunderstanding the actual concepts and results of research studies. Most researchers also lacked information searching literacy and therefore they did not know relevant online databases, use effective searching strategies, and evaluate and select decent articles on topics of interest.

5.3.1.2 Educational Research Methodology Instruction

Students in different academic fields were taught educational research by teachers who were more specialized in such fields rather than in educational research methodology per se. Additionally, teachers rarely assigned students to read international research articles and rarely taught students how to read international research articles in order to broaden their research horizon and learn from published articles in well-accepted international journals. In the light of this, the new generation of educational researchers, therefore, tended to produce research which was often redundant instead of developing or applying state-of-the-art research methodologies that best suited research problems of interest.

5.3.1.3 Experts in Educational Research Methodology

There was a lack of educational research experts who were well-versed and experienced not only in theoretical and practical research methodology, qualitative research, but also measurement and evaluation. In addition, Thailand lacks high-quality researchers who can serve as the role model and devote to improving the new generation of researchers to produce research that is decent and up to the international standards. Moreover, many educational research methodologists are approaching their retirement age and this indeed interrupts an on-going development of the new researcher generation and a network of researchers. However, if researchers are highly competent and experienced in research methodology, they are able to produce advanced and complicated research which cannot easily be understood and followed by novice researchers in general.

5.3.1.4 Educational Researcher Development

Thai researchers lack the opportunity to enhance their research capacity, for example, the opportunity to do research under the supervision of well-accepted senior researchers. Thai researchers also lack research funds to enhance their research experience abroad and participate in international research conferences.

5.3.1.5 Journal Publishing Format

Thai journal publishers limit article sections and therefore articles sections do not cover main sections as commonly included in international articles. Besides, Thai research articles have a limited number of pages with an average number of 13 pages, thereby making it impossible for researchers to present important details of particular sections and describe important information of research.

5.3.2 Strengths of Education Research Methodology in Thai Studies

As regards the strengths of Thai education research methodology, it was found that there were three strengths found in four types of research. One strength point is concerned with research question formulation in that Thai research included research questions that were related to research titles. Another strength point deals with population definition and sample selection. The description of population demographics or characteristics of other targeted units of analysis such as cases or documents was clear and adequate. The last strength had to do with data analysis and interpretation; that is, the presentation of research results provided thorough responses to research questions and hypotheses.

5.3.3 Weaknesses of Education Research Methodology in Thai Studies

As presented in Table 2, results revealed that Thai educational research had one weaknesses related to research problem formulation, two weaknesses concerning the related literature review, and one weakness regarding data analysis and interpretation. In terms of research problem formulation, research problems did not reflect the potential contribution and expansion of current research to the existing body of knowledge. With regard to the review of the related literature did not demonstrate the connection and expansion of prior findings and issues or

problems that were still debatable or never before investigated. As for data analysis and interpretation, statistical assumptions of inferential statistics used were not investigated in Thai educational research.

Table 2. Results from a comparison of educational research methodology between Thai and international research articles and a critique of overall strengths and weaknesses of educational research methodology in Thailand

Methodology	Similarity	Difference	Strength	Weakness
1) Research problem formulation	<ul style="list-style-type: none"> - Research problems are related to titles. - Research problems are short, concise, clear, and specific to objectives, scopes, contexts, and study methods. - Research problems are in the form of open-ended questions such as why and how questions. 	<ul style="list-style-type: none"> - Research problems reflect the direction that current research would expand on the existing body of knowledge. Research problems in most international research articles indicate the direction that current research would expand on the existing body of knowledge, whereas those in most Thai research articles do not indicate the direction that current research would add to the existing body of knowledge. 	<ul style="list-style-type: none"> - Research problems are related to titles. 	<ul style="list-style-type: none"> - Research problems do not reflect the direction that current research would expand on the existing body of knowledge.
2) Review of related literature	-	<ul style="list-style-type: none"> - The review of the related literature reflects a connection and expansion of the existing body of knowledge from prior findings, or points to conclusive findings to controversial issues, or indicates new findings to issues that have not yet been researched. - The review of related literature is presented based on a sequential and sound synthesis of related literature without excerpts from other documents. - The review of related literature draws on cutting edge academic sources and research studies. In particular, the review of the related literature in all international research articles indicates the connection and 	-	<ul style="list-style-type: none"> - The review of the related literature do not illustrate a connection and expansion of the existing body of knowledge from prior findings, or points to conclusive findings to controversial issues, or indicates new findings to issues that have not yet been researched. - The presentation of the review of the related literature is based on a sequential and

Methodology	Similarity	Difference	Strength	Weakness
		<p>expansion of the existing body of knowledge, points to conclusive findings to controversial issues, indicates new findings to issues that have not yet been researched, and draws on state-of-the-art academic sources and studies. Moreover, the presentation of the review of related literature in all international research articles illustrates a sequent and sound synthesis of related literature without excerpts from other documents, while that of Thai research articles do not. All Thai research articles do not contain the literature review section but instead researchers write the literature review in the introduction section which is not enough to accommodate important details indicating the connection and extension of the existing body of knowledge from prior findings. Therefore, the literature review in Thai research articles simply provides reasons in support of research problems that interest researchers and is not based on a sequent and logical synthesis of relevant literature as well as relatively outdated academic sources and research studies.</p>		<p>sound synthesis of the related literature without excerpts from other documents.</p>
3) Research conceptual framework development and variable identification	-	- The development of the research conceptual framework is connected to a clear and thorough review of the related literature. Practically all	-	-

Methodology	Similarity	Difference	Strength	Weakness
		types of international research articles, except for descriptive studies, develop research conceptual frameworks and identify variables of interest in a clear and complete way that is associated with the related literature review. Research conceptual frameworks and variables in virtually all types of Thai research, except for descriptive studies, are not clearly and thoroughly identified and are not connected to the review of the related literature.		
4) Research hypothesis formulation	-	-	-	-
5) Population definition and sample selection	<ul style="list-style-type: none"> - The characteristics of the population or other target cases, either people or documents, are properly described. - The procedures and criteria for obtaining samples or cases are properly explained. - The numbers or sizes of samples or cases are identified based on research principles. 	-	<ul style="list-style-type: none"> - The characteristics of the population or other target cases, either people or documents, are properly described. 	-
6) Research instrument development	<ul style="list-style-type: none"> - The types of research instruments are appropriate for variables and samples/respondents under study. - The characteristics of research instruments, such as formats, item numbers, and scoring methods, are described. - The methods for examining research instrument quality are appropriate for 	-	-	-

Methodology	Similarity	Difference	Strength	Weakness
	instrument formats and the quality indices of original instruments are also reported.			
7) Data collection	- The roles of researchers or collectors in data collection procedures are explained.	-	-	-
8) Data analysis and interpretation	- Statistical assumptions of inferential statistics are not investigated. - Analytical methods are consistent with research problems and objectives. - Analytical methods are appropriate for data characteristics. - The interpretation and summarization of research results are proper and consistent with analysis results without researchers' opinion involvement. - The presentation of research results is comprehensive in response to research questions or hypotheses.	-	- The presentation of research results is comprehensive in response to research questions or hypotheses.	- Statistical assumptions of inferential statistics are not investigated.

5.4 Suggestions for Developing Educational Research Methodology

5.4.1 Development of Curriculum and Textbooks

1. Graduate programs in education should require students to take an educational research methodology course and have professors who have a degree related to educational research methodology teach the course so that students will receive proper understanding and knowledge of research methodology.
2. The curriculum should be designed to provide the opportunity for students to conduct educational research and apply what students have learned to enhance knowledge of research methodology.
3. The development of courses in the curriculum should be research-oriented through teaching article reading skills, assigning students to read research articles especially in international journals, having students do actual research, and teach students educational research methodology related to concepts, paradigms and systematic methods so that students are able to make plans for finding proper and sound answers to research questions and use interconnected research steps throughout the whole research process.
4. Graduate programs should include information searching skills as part of necessary capacity that students are expected to be improved and should develop the instruction that allows students to practice searching information as much as possible.

5. Graduate programs should require students to publish their research findings in international journals and present their research finding at both national and international conferences.
6. Teachers at graduate levels should constantly be improved in both research content and methodology through reading new textbooks, subscribe to research journal and find the opportunity, conduct research with international researchers, and consistently attend academic conferences and present research findings.
7. The development of educational research textbooks and materials should focus not only on research methodology but also on issues surrounding notion, paradigm, philosophy, and systematic methods that can help readers or students to make plans for finding proper and sound answers to research questions, employ interrelated steps throughout research process, and design research methodology that are based on textbook suggestions.

5.4.2 Researcher Development and Production

1. The research mentor system should be established to improve the new generation of lecturers to be researchers. Senior lecturers can play a role in supervising and giving advice and provide opportunities for lecturers to participate in research projects.
2. The tracking system of career advancement should be established so that researchers can spot and follow their professional development path in order to become specialized on their topics of expertise or interest.
3. A community of researchers should be established to build up the academic atmosphere and provide the place where researchers can share and exchange ideas and experiences and learn from one another.

5.4.3 Research Funds

1. Educational institutions should provide research funds for new researcher generation to do research on issues related to research methodology development and knowledge body construction.
2. Research funding organizations should help in spreading proper understanding of research methodology by carrying out research and taking advantage of findings to distribute accurate concepts and knowledge of research methodology in order to promote and train personnel and staffs in as many educational organizations in all regions as possible to have proper understanding and knowledge of research methodology.
3. Research funding organizations must appoint well-qualified reviewers to read and evaluate studies that deserve research funds and this is another way to support high-quality research studies.
4. Research funding organizations such as National Research Council of Thailand (NRCT), the Thailand Research Fund (TRF), and Office of the Educational Council (OEC), should cooperate in the consideration for providing research funds for high-quality research based on the criteria and standards for evaluating international research projects or reports.

5.4.4 Journal Quality Development

1. The publishers should establish an article selection process based on the basic principle and standards adopted by international journals, for example, selecting peer reviewers based on areas of expertise and using article evaluation forms based on the criteria used by international journals.
2. Research journals should set the publication format and expand the number of pages that facilitate a thorough presentation of research studies in accord with the requirements of international journals.

6. Discussion

In this section, we presented several points of discussion related to each of the essential characteristics of research methodology.

6.1 *A Body of Knowledge of Research Methodology*

In terms of the research principles and international standards of educational research methodology, the present study set out eight components of educational research methodology, including research problem formulation, related literature review, research conceptual development and variable identification, research hypothesis formulation, population specification and sample selection, research instrument construction, data collection, and data analysis and interpretation. These key components are consistent with Wiratchai (1995) who posited that the definition of educational research methodology encompasses all steps of research process, ranging from research problem formulation, related literature review, research conceptual development and variable identification, research hypothesis formulation, population specification and sample selection, research instrument construction, data collection, and presentation of data analysis and interpretation.

These eight components are also in line with a number of studies on a synthesis of research methodology. For example, Koro-Ljungberg and Douglas (2008) synthesized research studies base on research questions. Burn (2012) synthesized research studies based on the related literature review. Burn (2012) and Goba, Balfour and Nkambule (2011) synthesized research studies based on sample size specification. Goba, Balfour and Nkambule (2011) synthesized research studies based on research instrument development and validation. Burn (2012) Koro-Ljungberg and Douglas (2008) and Samkange (2012) synthesized research studies based on data collection. Burn (2012), Goba, Balfour and Nkambule (2011), Koro-Ljungberg and Douglas (2008), and Chansakul (2004) synthesized research studies based on data analysis and interpretation. However, other studies also synthesized research studies based on the following research procedures: sample specification, research instrument development, data collection, and data analysis. These procedures are considered as part of research design. (Goba, Balfour, & Nkambule, 2011; Koro-Ljungberg & Douglas, 2008; Samkange, 2012).

6.2 Comparison of Educational Research Methodology between Thai and International Research Articles

6.2.1 Research Problem Formulation

With regard to research problem formulation, Thai and international research articles are similar in three aspects: 1) research problems are short, concise, and clear, related to research titles, and specific to research objectives, scopes, contexts and methods. The research questions were also written using open-ended formats, such as why and how questions. This is due to the fact that Thai journals in Thai-Journal Citation Index Center databases and international journals in Social Science Citation Index databases require research questions and titles to be evaluated by experts. In addition, each journal sets out unique principles, criteria, and topics for writing research papers and also limits the length or the number of pages and words of research articles. Therefore, researchers must follow the requirements of the journals.

Thai and international articles differed in that most international articles contained research questions that reflect the direction that research findings would expand on the existing body of knowledge, meanwhile Thai articles did not have research questions that clearly signify the potential contribution that research finding would make to the existing body of knowledge. This is due to the fact that Thai journals do not require the literature review section as another section of the article but include it as part of the introduction section. Therefore, details of the literature review are not presented enough to inform the potential contributions that research findings would make to the exiting body of knowledge. This is consistent with Wiratchai and Wongwanich (2012)'s suggestion that researchers have to justify that prior studies have failed to addressed similar research problems of interest or have never before addressed these problems or current research investigates these problems in a different way from past research.

6.2.2 Review of the Related Literature

Thai and international articles differed in three aspects; 1) the review of the related literature reflected the connection and expansion of knowledge between present and previous studies and highlighted issues or problems that remained debatable and have not yet investigated, 2) the literature review was presented in a synthesized, sequential, and sensible manner without using excerpts from other documents, and 3) the literature review was based on up-to-date scholarly sources and state-of-the-art research findings. In particular, international research articles obviously based the literature review on cutting-edge work and findings, whereas all Thai research articles did not have the literature review section but included it as part of the introduction section which did not suffice to present the information showing the connection and expansion of knowledge between current and earlier research. Moreover, the presentation of information simply involved reasons supporting problems that interested researchers but did not demonstrate a sequential and sensible synthesis of a priori and citations of state-of-the-art academic documents as well as cutting-edge research findings. For these reasons, Thai research articles did not live up to the international standards commonly found in international textbook on research methodology and the principles of research methodology as commonly employed in scholarly articles published in American Educational Research Association (AERA) journals.

6.2.3 Research Conceptual Framework Development and Variable Identification

Thai and international research articles differed on one issue. Almost all international research articles, except for descriptive studies, showed that the RCF development and variable identification were clear, comprehensive and connected to the review of related literature. This was particularly found to be the major problem and weakness of Thai research articles as the review of the related literature is an essential step for RCF development and variable identification. Wongwanich and Wiratchai (2003) also pointed out that the review of the related literature from theories and research findings help organize the presentation and connection of ideas and logics that lead to proper variable identification and sound RCF development. Likewise, Kaemkate (2008) stated that

RCF development should be started from the review of relevant literature, along with an analysis of research problems, related variables, research designs, data sources, and units of analysis. However, a number of researchers do not clearly understand why it is necessary to conduct the review of the related literature and consequently the review of the related literature is not well documented and profound and is even neglected.

6.2.4 Research Hypothesis Formulation

Most of Thai and international research articles did not include research hypotheses. For those having research hypotheses, international research articles tended to have directional research hypotheses, while Thai research articles typically included non-directional research hypotheses. This is due probably to the fact that directional research hypotheses must be based on the comprehensive and sufficient review of the related literature (Findlay, 2006). This clearly indicated that Thai research articles lacked a strong review of relevant literature, thereby making it impossible to obviously specify the direction of research hypotheses.

6.2.5 Population Definition and Sample Selection

Results revealed that no different characteristic was found between Thai and international research articles but both had three similar characteristics as follows; 1) demographic characteristics of population or cases or other units of analysis were sufficiently described, 2) sampling methods were sufficiently described and appropriate for research objectives, and 3) the characteristics and numbers of sizes of samples or cases were based on research principles. This means that with respect to population definition and sample selection, Thai and international research articles were up to the international standards.

6.2.6 Research Instrument Development

Results showed that there was no difference between Thai and international research articles but there was three characteristic that they both shared in common; 1) research instrument were suitable for variables and participants or respondents under study, 2) the features of research instruments were well described, and 3) the methods for investigate the quality of instruments were appropriate for the formats of research instruments and the quality indices of the adopted instruments were also provided. This implied that both Thai and international research articles described the details of the research instrument section in consistence with the international standards. These common practices were also similar to Findley (2006) who suggested that researchers should report a thorough description of research instruments, instrument developers, instrument development time, item numbers, item examples, scoring methods and rubrics, and instrument qualities in terms of reliability and validity.

Nevertheless, it was found that an investigation of research instrument quality in Thai research articles is based primarily on content validity using the item objective congruence (IOC) method and reliability using the alpha internal consistency method without regard to variable and instrument characteristics. This does not correspond to McIntire, Miller, and Lovler (2013)'s recommendation that an investigation of research instrument quality is concerned with the process of gathering as much evidence as possible that reflects the quality of research instruments and relates to variables under measure. Content validity investigation is regarded as necessary evidence for variable measurement in academic achievement tests, whereas construct validity investigation serves as essential evidence for variable measurement in psychological tests. In addition, based on international standards, there are different content validity indices other than IOC, such as Content Validity Ratio (CVR) (Lawshe, 1975 as cited in McIntire, Miller, & Lovler, 2013).

6.2.7 Data Collection

With regard to data collection, no different characteristics were found between Thai and international research articles. Yet there was one similar feature found; that is, in most Thai and international research articles, researchers collected primary data on their own. This is considered as a strength point since researchers obtained data from direct and complete sources which are related to research problems and variables under study. Moreover, the data obtained from primary sources are up-to-date (Hox & Boeije, 2005).

6.2.8 Data Analysis and Interpretation

In terms of data analysis and interpretation, no different characteristics were found between Thai and international research articles. However, Thai and international research articles had five characteristics in common; 1) the information on statistical assumption investigation was not presented, 2) analytical techniques were consistent with research problems and objectives, 3) analytical techniques were appropriate for data characteristics, 4) data interpretation and summarization were accurate, consistent with data analysis, and were not distorted by researchers' opinion, and 5) the presentation of research results covered research problems, questions and hypotheses. It could be concluded that both Thai and international research articles had one pitfall

that does not meet the international standard of research methodology; that is, the presentation of statistical analysis lacked the information regarding statistical assumption investigation which is a requirement for inferential statistics (Hair et al., 2010).

In terms of similarity, Thai and international research articles had four similar characteristics related to data analysis and interpretation. These characteristics are in line with the international standards. These four characteristics are in line with Hair et al., (2010) and Kaemkate (2008)'s suggestions that researchers have to choose statistical techniques that are appropriate for research questions, variables, research objectives, and data characteristics. In addition, in terms of the presentation of research findings in Thai articles, most articles used texts to describe findings and some provided only information on statistical significance without statistical values and graphical presentation. This does not correspond to the principles of research result report suggesting that numerical or statistical values should be presented in the table (Johnson & Christensen, 2012).

6.3 Strengths and Weaknesses of Educational Research Methodology in Thai Research Articles

6.3.1 Strengths of Educational Research Methodology in Thai Research Articles

Results demonstrated that Thai research studies had three main strengths: 1) research problem formulation, 2) population definition and sample selection, and 3) data analysis and interpretation. Concerning research problem formulation, Thai researchers were able to formulate research problems that were related to research titles. In regard to population definition and sample selection, the description of demographics or characteristics of participants, cases or documents under study was clear and sufficient. Regarding data analysis and interpretation, the presentation of research results was comprehensive and covered responses to all research questions and hypotheses. This is due to the fact that these strength points are required for research articles published in journals in the Thai-Journal Citation Index Center database. In addition, these research articles were also reviewed by experts and based on the criteria set by the journals which include section titles, writing principles in each section, and the criteria for screening articles.

6.3.2 Educational Research Methodology Weaknesses in Thai Research Articles

Results indicated that there were four weaknesses found in four types of research. One weakness was related to research problem formulation; that is, Thai research articles tended to formulate research problems that did not reflect the expansion of the existing body of knowledge. Two weaknesses were found pertaining to the related literature review. Thai research articles did not present the literature review that reflected a connection and expansion of knowledge between present and previous research or did not highlight the problems or issues of interest were still debatable and remained unsolved. Moreover, the literature review was not well synthesized in a sequential and sensible manner. The final weakness was related to data analysis and interpretation. In Thai research articles, information on statistical assumption investigation was not presented.

Based on weaknesses related to research problem formulation and related literature review, it can be concluded that these weaknesses were resulted from common causes and were interrelated. These weaknesses existed due to the fact that all Thai research articles did not have a section for writing the literature review but rather included it as part of the introduction section which was not enough to cover information on the literature review and reflect the contribution that current research would make on the existing body of knowledge. Furthermore, the literature review in Thai articles simply provided reasons in support of research problems that researcher wish to investigate and therefore lacked a sequential and sound synthesis of the relevant literature and often used excerpts from other sources. The literature review is, therefore, regarded as the most important step of research methodology as it will affect other steps of research methodology.

One weakness was found with regard to data analysis and interpretation. The investigation of statistical assumption was not presented in all Thai research articles. This is due to the fact that researchers attached more importance to selecting statistical techniques that were appropriate for research problems and objectives without taking into consideration an investigation of statistical assumption. This is not in line with Hair et al. (2010) suggestion that an investigation of statistical assumption is a prerequisite for testing inferential statistics.

7. Conclusion

Results of the critiques on Thai educational research methodology revealed that the principles and international standards of educational research methodology included eight methodological categories which covered 34 characteristics. Findings from a comparison of Thai and international research articles indicated that Thai and international research articles were similar in 15 characteristics and different in five characteristics. Thai research articles had six problems relating to educational research methodology: information searching and English skills, educational research instruction, lack of experts in educational research methodology, research finding

distribution, educational researcher development, and research article format. Important implications from this study were 1) Thai researchers should, first and foremost, improve their skills in English reading, 2) teachers at higher-educational level and scholars should take advantage of research outcomes to inform instruction and production of textbooks on research methodology with a view to promoting proper understanding of research methodology based on the international standards, and 3) Thai journal publishers should establish more criteria for publication by adding more article sections or components that cover key parts as commonly appeared in international research articles. Further research should be conducted to compare research methodology characteristics of Thai research articles based on time sequence in order to explore changes and developments of educational research methodology in Thailand.

8. Limitations of the Study

The research article in this study only consisted of four research types such as descriptive research, causal relationship research, experimental research, and research and development which was not cover all research type especially qualitative research. In addition, there was rare of research article emphasis on methodological research.

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