Enhancing Creative Thinking in Business Research Classes: Classroom Action Research

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The purpose of this paper is to answer research questions on how best to enhance creative thinking in business research classes through encouraging students' intellectual capability, motivation, and collaborative learning. This study is based on classroom action research. Participants were MBA (Master of Business Administration) and MSMIS (Master of Science in Management Information Systems) graduate students studying business research methods. The findings suggest that the main teaching processes should be as follows: Instructors should encourage students to use their logical reasoning during the conceptual framework development. Workshops on students' research projects should be conducted so students can practice doing research. Students should make oral presentations of their projects and experts invited to comment on them. Collaborative technologies need to be introduced so that instructors and students can communicate with each other on assignments. Apart from collaborative tools, instructors can set up additional sessions after hours to allow students to discuss problems they are facing. Research classes should incorporate in the coursework three student presentations: problem statement, research proposal, and completed research report. Finally, instructors should form students into groups and establish roles for the members.

INTRODUCTION

In general, higher education institutions use lectures and assignments to teach how to conduct research. However, the above-mentioned methods often allow students to learn and understand research methodologies at only an average level. These methods do not provide students with appropriate understanding of the subject, and therefore, students may not achieve the learning objectives. The instructor's assessments of students' research conceptual models show that many students lack logical thinking and analysis skills, and ability to synthesize information from prior research. Many students consider that the research subject is hard to study and understand. Some eventually will not want to do research any longer, even though this subject teaches them to develop creative thinking, to work systematically, and to think logically.

Teaching students to possess logical and creative thinking conforms to academic reformations adopted in Thailand, which intend to teach students to think critically. In addition, this teaching complies

with the 11th National Economic and Social Development Act. This act aims to improve the educational achievement of Thai people, not only regarding quantitative aspects, but also by initiating a new body of knowledge to increase competency needed to compete with other countries. However, this new body of knowledge needs academic discipline and scholarly instruction in the subject of research (Office of the National Economic and Social Development Board, 2015). Moreover, effectively and efficiently analyzing and synthesizing existing knowledge requires logical and critical thinking skills. These skills are incorporated in successful research processes. This statement agrees with Zhao (2009), who states that teachers could train MBA students to analyze effectively and efficiently by using logical thinking.

To help solve these problems, instructors can incorporate logical thinking into the research subject (Laney, 2001). Although logical thinking results from cumulative personal experiences gradually collected over a long time, teachers can choose instructional methods that accelerate the learning process to develop this principle more rapidly (Rimanoczy, 2007; Zhao, 2009). Therefore, the purpose of this research is to examine the nature of logical thinking and how it can develop and enhance students' creative thinking. Specifically, this research attempts to answer the question of how to enhance creative thinking in business research classes by encouraging students' intellectual capability, motivation, and collaborative learning.

THEORETICAL BACKGROUND

To improve students' creative thinking, instructors should understand what the underlying problems are. The problems may be based on the attributes of instructors and/or the attributes of learners. However, this research emphasizes problems based on the attributes of students – intellectual capability, motivation to learn, response to collaborative learning, and compatibility with teaching methods.

Intellectual capability

Students possessing creative thinking ability demonstrate this in the form of inferences, interpretations, and assumptions; as well as the determination of concepts, theories, principles, definitions, and frames of reference (Pual and Elder, 2011). The ability to form inferences originates from logical thinking. Logical thinking comes from learning from other people's mistakes and actions. These experiences and actions, if reasonably thought through, help students to cope with difficult situations successfully (Rimanoczy, 2007; Zhao, 2009). Normally, people use logical thinking to make decisions by simplifying complex situations to simple solutions (Morgan and Thiangarajan, 2009).

Creative thinking and critical thinking are often inseparable. Critical thinking is the ability to think clearly and rationally about what to do or what to believe. Critical thinking is an essential part of creative thinking, because people need critical thinking to evaluate and improve their creative ideas (Lau and Chan, 2004; Nimalathasan and Valeriu, 2010). New ideas generated from creative thinking must be useful and relevant to the problems if they are to be fixed. Critical thinking plays a crucial role in evaluating new ideas, in selecting the best ones and in modifying those ideas as necessary (Lau and Chan, 2004; Pual and Elder, 2011).

Apart from intellectual capability, students should also possess learning skills. Four key learning skills - listening, thinking, reading and writing - also enhance education efficacy. These skills provide students with competency, which in turn develop creative thinking (Palaniappan, 2014).

Motivation in education

One of the important components in the study of research is motivation. Students' motivation plays a crucial role in learning the conceptual process, critical thinking process, and information processing skill (Cavas, 2011). The instructor's level of motivation is an important factor that relates to students' creative thinking (Horng et al., 2005; Davis et al., 2014; Palaniappan, 2014). Motivation is an important educational variable that can promote new learning, strategies and behaviors, and skills. If students perceive the value of learning tasks, they will actively participate in those tasks to construct a meaningful understanding of a new concept based on their existing knowledge (Cavas, 2011).

Cavas (2011) concludes that there are six categories of motives: self-efficacy, active learning value, active learning strategies, performance goal, achievement goal, and learning environment stimulation. Self-efficacy is students' beliefs about their own ability to perform well in learning tasks. The active learning value consists of acquiring problem-solving competency, stimulating their own thinking, and finding the relevance of learning. Active learning strategies are a variety of strategies to construct new knowledge based on previous understanding. The performance goal is students' competition with other students in the classroom to get recognition from the teacher. The achievement goal is students' satisfaction as they increase their competence and achievement during learning. Finally, the learning environment stimulation is comprised of learning environment factors such as curriculum, teaching style, and learner collaboration.

Collaborative learning

Collaborative learning is a joint effort by all participants within a group of students, where they work together to search for understanding, meaning, or solutions to accomplish a task (Hong, 2011). Collaborative learning requires individuals to take responsibility for a specific section and then coordinate their respective parts together (Kyndt et al., 2013). Knowledge can be created within members in a group where members actively interact by sharing experiences and take on asymmetric roles (Mitnik et al., 2009). Collaboration can be structured in the form of group-based collaboration or idea-centered collaboration (Hong, 2011). Group-based collaboration is the method where each student within a group is assigned to complete a subtask and then the subtasks are merged together like a jigsaw puzzle. Idea-centered collaboration is the method where students work together without forming a group or having a general plan.

Collaborative learning is very important in achieving critical thinking ability (Gokhale, 1995). Individuals are able to learn effectively and efficiently and retain more information when they work together in a group rather than individually (Gokhale, 1995; Hong, 2011). Technology has become an important factor in collaborative learning. The internet allows individuals to share personal knowledge and ideas. In addition, collaborative learning which uses technology in a learning environment supports group interactions, which in turn mediates the acquisition of new knowledge (Mitnik et al., 2009).

Compatibility with teaching methods

Numerous teaching methods are available for instructors to use in the classroom (e.g., Laney, 2001; Taylor, 2013). As this research puts an emphasis on teaching techniques that enhance students' creative thinking, the most commonly used teaching methods will be reviewed. These teaching methods include: concept-based instruction, role-playing, and case-study approach. The choice of teaching methods depends largely on the subjects that are being taught; the choice may also be influenced by the enthusiasm of the students (Taylor, 2013). Concept-based instruction is the process involved with teaching the general concept definition. This method tends to be more appropriate when teachers want to instruct students with precise definitions and concepts. Role-playing is an experience-based instruction. Role-playing activities are often employed within the format of a simulation. Simulations replicate the essential characteristics of the real world. A case study is normally based on a real life situation. A case-study approach can be used within units or subjects to help students analyze puzzling or unexpected events through subject reasoning.

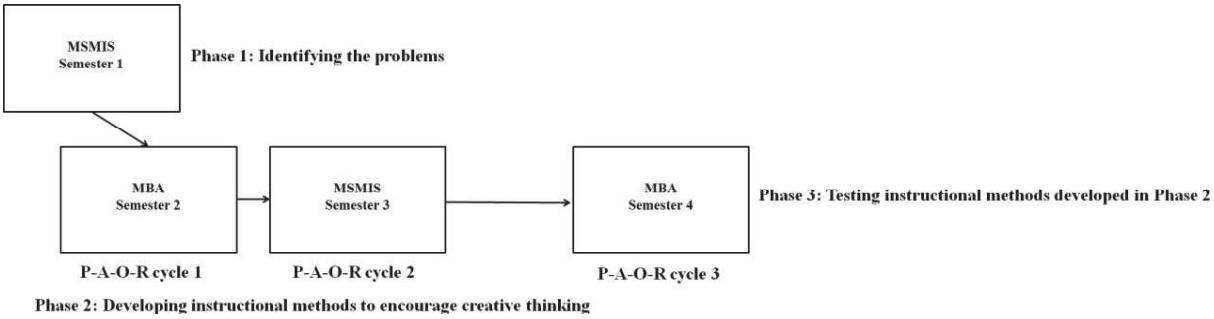
RESEARCH METHODOLOGY

Teaching process

This research was conducted with MBA (Master of Business Administration) and MSMIS (Master of Science in Management Information Systems) graduate students studying business research methodology at a government-sponsored university in Thailand. The total participant count was 184 students in four semesters over two years (including 48 MSMIS students in semester 1, 36 MBA students in semester 2, 64 MSMIS students in semester 3, and 36 MBA students in semester 4).

Research can be classified as quantitative or qualitative; this paper focuses on methods to teach quantitative research. Students in each semester were divided into groups to complete assigned research projects. Each group selected their own research topic. Each semester was divided into fifteen sessions of three hours in each session. Six sessions were used to teach research concepts and processes, emphasizing quantitative research. Two sessions were used to teach qualitative research, while five sessions focused on statistics. The last two sessions were used for research presentations by each group. These sessions allowed students in each group to present their conceptual models to the other groups in order to be evaluated for originality and uniqueness (Palaniappan, 2014). Figure 1 outlines the chronological sequence of this study. The process included three phases: identifying the problems, developing instructional methods to encourage creative thinking, and testing those instructional methods.

FIGURE 1
CHRONOLOGICAL SEQUENCE OF THIS STUDY



The explanation of each phase is as follows:

Phase 1 is identifying the problems. During this phase, students (MSMIS in semester 1) post problems or difficulties encountered while conducting their research on an open-source webboard, a collaborative technology. Each group uses the webboard to collect and share problems. These problems, together with frequent problems encountered by previous students, are then analyzed to create case studies for each research process. These case studies are used in Phase 2.

In Phase 2, instructional methods to encourage creative thinking are developed. In this phase, instructors adopt Classroom Action Research (CAR) adapted from Kurt Lewin (Lewin, 1946). The cycles in CAR are Plan (P), Act (A), Observe (O), and Reflect (R). Initial processes of P-A-O-R are as follows:

- Before lecturing in each course session, instructors ask students in each group to finish a case study within 30 minutes. After this assignment is completed, the instructor provides a possible answer for the case study and explains research concepts supporting this answer. In addition, instructors encourage students to use their logical thinking to solve case-study questions. Examples of case-study questions are "is this case study topic relevant for business?" or "does the relationship among factors in the conceptual model make sense?" Instructors use three case studies to teach research concepts. One for defining research problems, another for building a conceptual model (or theory building), and the last for designing questionnaires. At the same time, other instructors teach statistical concepts and then ask students to finish three statistics case

studies, including selecting appropriate statistical measures, analyzing research results, and summarizing results.

- Apart from working on case studies, each group is required to complete and make two presentations on their own research project. The first presentation is the research proposal. After this first presentation, instructors ask a representative from each group to participate in a focus group. The objectives of the focus group are to extract (1) any significant information that may hinder students' creative thinking to develop a conceptual model and (2) any problems that have not been posted or discussed yet on the collaborative webboard. Each focus group takes three hours. The second presentation is the completed research report.
- Instructors answer questions asked by the students, while at the same time encouraging them to develop their research, especially the conceptual model, by using logical analysis. In addition, students in each group receive comments related to their research project. These comments come from an instructor who is an expert in the students' research topic, and two instructors of research methodology. Students from other groups may comment as well. The course instructors review the comments and make suggestions on how to improve the research, and then distribute to all students.
- Instructors assess students' creative thinking ability by analyzing their research papers, together with reviewing discussions on the collaborative webboard. The primary focus is on the conceptual model because this part of the research project indicates whether or not students apply logical thinking, and in turn, creative thinking on their research projects.
- Lessons learned from this process are applied in future research methodology courses.

The above process is repeated in subsequent semesters, using the same P-A-O-R cycle.

Phase 3 is testing instructional methods developed in Phase 2. This step is done in the same manner as in Phase 2. The finalized teaching methods used for students in semester 3 are tested using MBA students in semester 4. Teaching processes may be adjusted at any time during the cycle.

Research instrument development

The materials and instruments used in this research consist of comprehensive notes for teaching research processes, six assignments (in the form of case studies) and collaborative technologies (e.g., webboard). Case studies are developed from students' research papers in previous semesters. Three case studies – for defining research problems, building a conceptual model (or theory building), and designing a questionnaire – are used to emphasize the use of logical thinking. The other three statistics case studies – for selecting statistical measures, analyzing research results, and summarizing results – are used to help students understand the foundations of statistical knowledge. Apart from the free collaborative technologies (including the open-source webboard, Facebook, and Line), a proprietary webboard called ResYouAsk webboard (incorporating chats and discussion forums) are utilized. Students use these forums to post their problems when doing research projects and get feedback from instructors, normally within one day. For chats, students and instructors discuss students' research projects at an assigned specific time.

ANALYZING THE RESULTS

Identifying the problems

Focus group results, students' research reports, and observations of students by instructors are used to analyze students' creative thinking. This data is analyzed in terms of conceptual model development and statistical analysis. Conceptual model development analysis consists of analyzing the ability of students to identify problems, define research objectives and research questions, develop hypotheses, design tests for the hypotheses, and write research reports. Statistical analysis is comprised of analyzing the ability of students in gathering, processing, and analyzing data; interpretation of findings; and writing statistical

results. This research analyzes students' creative thinking based on the attributes of their intellectual capability, motivation to learn, response to collaborative learning, and compatibility with teaching methods.

Formulating problems for conceptual model development

The results of analyzing relevant data of MSMIS graduate students in semester 1 are as follows: First, regarding students' intellectual capability, most students do not know how to clearly define a research problem. Many students' research reports do not state the underlying research problems adequately to support doing the research. Students often are unable to develop interesting research questions and topics. Students' review of relevant literature may not be properly done. For example, students usually cite previous research papers gleaned from Google and most of this research is written in the Thai language; research papers in languages other than Thai often are not cited. Some citations are not properly done. These prior literature issues may affect the appropriateness of students' conceptual models. In addition, this research evaluates students' learning skills by analyzing the writing in their research projects. The results indicate that most students' research projects are not logically written. Second, for students' motivation to learn, instructors normally use scores to motivate students. However, analysis indicates that students even with scoring often lack motivation to search for relevant literature. This may be because the scores don't count enough in the final course grade to adequately motivate students. Third, due to the high number of participants (approximately 35 students per class), instructors break students into small groups. Each group has five to seven members. Students in each group work in teams to select their research topic and complete the research assignment. Students are free to form their own groups. Generally, members in a group have different backgrounds, e.g., accountant, engineer, marketing specialist, programmer, and computer engineer. As members in a group have different expertise, their chosen research topics may not interest all members. Therefore, some members may be disinterested in doing the research. Furthermore, students comment on the collaborative webboards that it is difficult for them to explain the conceptual model clearly in text. They prefer to draw illustrations, such as diagrams and flowcharts, of the conceptual model. The webboards used as communication do not facilitate posting illustrations when chatting. In addition, students want instructors to collect all common problems together and answer them as a group. Finally, for compatibility with teaching methods, instructors adopt concept-based instruction or classroom lectures. The following quotes from focus group participants support the above analysis.

> "We do not know what 'research problems' mean."
>
> "We always try to find related research articles with our research topic published in Thai. In case we cannot find Thai articles, we search for English articles. However, English articles are difficult to understand."
>
> "During consulting with instructors about our research project, we want to post illustrations of our conceptual model on the webboard but we cannot. Therefore, we have to explain our conceptual model in the form of text. Explaining a conceptual model by text is quite difficult."

Formulating problems for statistical analysis

The results of analyzing relevant data of MSMIS graduate students in semester 1 are as follows: First, regarding intellectual capability, students do not know which types of statistics (e.g., factor analysis, regressions, analysis of variances (ANOVA)) should be used to analyze research results. In addition, students are not sure whether the statistical procedures used to examine data are accurate. Most students cannot interpret the results from statistical output. Second, for motivation to learn, instructors also use scores to motivate students. Third, regarding response to collaborative learning, students in each group normally divided statistical analysis of their research project into small tasks and then assigned these tasks to two or three members in their group. Finally, for compatibility with teaching methods, instructors adopted concept-based instruction. The following quotes from focus group participants support the above analysis.

"We do not know which types of statistics should be used to analyze data. Therefore, we try to use all types of statistics taught in class to analyze research data."
"Are there any criteria when to do factor analysis? We found that the criteria are flexible depending on the data to be analyzed."

Devising the teaching plan

Based on the above problems noted in semester 1, the teaching plan was revised for the following semester. First, regarding students' intellectual capability, instructors were required to explain the meaning and provide examples of research problem statements. Instructors set up workshops by asking students to finish case studies (both conceptual model development and statistical analysis) at the beginning of teaching each research process. The case studies were developed from students' research reports from the previous semester. The case studies incorporated a problem statement, theory building, questionnaire designing, statistics selection, statistical analysis (e.g. factor analysis and regressions), and statistics summary. During the course, instructors encouraged students continuously to use their logical thinking in setting up factors and relationships among the factors to build a conceptual model. Instructors assumed that students possess some degree of logical thinking, because the students had to pass a logic test at the acceptance level before attending the university. Therefore, students possess logic skills but they do not seem to apply these skills when doing their research projects. Second, for motivation to learn and response to collaborative learning, no change was required in the teaching process. Scoring and forming students into groups was continued. However, instructors motivated students in each group by increasing scores with groups that have more literature reviews than the minimum required. The minimum number of required previous research citations was set up to be three times the number of members in a group. The communication technology used to exchange information between instructors and students changed from the open-source webboard to Facebook to facilitate the ability to post illustrations - which Facebook can do, while the open-source webboard cannot. Finally, concept-based instruction was employed for teaching conceptual model development and statistical analysis. As this business research class lasts 15 weeks (one semester), instructors arranged each group to submit parts of the research paper as follows: problem statement (third week), research proposal (eighth week), and research report (fifteenth week). Instructors provided feedback for each assignment to students before they moved to the next assignment.

First action research cycle

Problem formulation and lesson planning for MSMIS graduate students in semester 1 was delivered as the Plan in the P-A-O-R cycle for MBA students in semester 2. The next steps in the cycle are to Act (delivering the teaching), Observe (collecting data), and Reflect (evaluating the results).

Delivering the teaching

At the beginning of the research course, instructors reviewed the course outline together with setting up requirements for the semester. First, instructors announced the minimum number of prior research that students must cite. The minimum number is three times the number of members in a group. For example, if a group has five members, the previous research cited should be at least fifteen papers. Students will earn higher scores on their literature review if they cite more than fifteen sources, and if they are from a well-regarded English journal. Second, to improve students' learning skills, instructors adjusted the course outline by adding group presentations. Three research presentations (problem statement, research proposal, and research report) are required. Third, students must work in a group to finish six case studies within the defined time frame. These case studies are about research processes, such as defining a problem statement, theory building, and questionnaire development. The six case studies are worth 20 percent of the total score. Fourth, communication technology was changed from the open-source webboard to Facebook. Instructors set up a research groups on Facebook equal to the number of groups in the course. Since each student usually is already on Facebook, the instructors asked him/her to friend his/her research group. Each group can post questions via the appropriate Facebook group at any time.

The instructors answer questions based on a set schedule provided to students at the beginning of the semester. Finally, instructors encouraged students to use their logical thinking while doing their research projects.

Collecting data

To analyze whether this teaching process enhanced creative thinking in students, three methods were used to collect data: (1) Focus group. Five to seven students were in the focus group, each one a representative from a different research group. (2) Student research reports at the end of the course, together with collaboration information posted by students on Facebook. (3) Observations by instructors of students' learning.

Evaluating the results

This research measured five components of creative thinking: innovation, feasibility, logic, flexibility, and clarity. These components are adapted from previous research (e.g., Aizawa (2009, 2010); Hazard (2010) and Phillips (2010)). Innovation is the ability to generate new ideas for given problems. Feasibility is the ability to accomplish or bring about possible solutions to problems. Logic is the ability to think, especially in a reasonable manner while using good judgment. Flexibility is the ability to mix various theories in order to form new ideas. Clarity is the ability to elaborate or express an illustration of the argument. Because previous research indicated no weighting of these five components, it was decided to weight the five components equally. Each component is worth five points. Therefore, the total possible score for creative thinking is 25 points. The grading used for creative thinking ranges from 23-25 points for "very, very good", 20-22 points for "very good", 17-19 points for "much better than average", 15-16 points for "better than average but enough room for improvement", 13-14 points for "better than average but just barely", and less than 12 points for "needs lot of work to do".

The overall score of students in this semester (MSMIS semester 1) as determined by two instructors was 13 points. This indicates that they are better than average but just barely. The students do not possess much creative thinking. The quality of students' literature review is unsatisfactory. Students have difficulty to properly conduct statistical analysis in their research projects. The reasons for unsatisfactory students' research papers are explained in more detail in the second action research cycle. In addition, Cohen's Kappa coefficient was used to calculate the consistency evaluation by the two instructors. Cohen's Kappa is 0.66, which is higher than 0.65 (Cohen, 1960). This result indicates the same direction of assessments.

Second action research cycle

The results from MBA students in semester 2 were analyzed and utilized with MSMIS students in semester 3. The next steps are to Plan (identifying the problems and planning the teaching), Act (delivering the teaching), Observe (collecting data), and Reflect (evaluating the results).

Identifying the problem and planning the teaching

The quality of students' literature reviews showed no improvement, with most citations not properly done. Each group of students usually cited previous research written in Thai language only. Some previous research cited is not good quality.

The main reasons for these problems are as follows: First, students cannot efficiently read through the prior research to gain an understanding of the main concepts. This is due to the fact that the students apparently lack sufficient ability in reading English. Second, students did not effectively learn research processes from the case studies developed in the previous semester, which consist of the major problems that the previous students encountered while studying research. Third, students commented that there is a lack of privacy when using Facebook for communication, especially when describing problems. In addition, instant communication (chat) via Facebook is not appropriate because students normally use nicknames for their Facebook accounts. Instructors had difficulty in following the group progress because of the nicknames. Facebook also does not have log files to collect questions and answers which can be

used as guidelines to analyze students' intellectual ability. Instructors can analyze a log file with text analysis statistical software for further data analysis. Fourth, collaboration among members in a group still was not appropriate. Each group normally divided research into separate tasks and then assigns these tasks to group members. Students then tend to work individually instead of as a group. Fifth, regarding statistical analysis, students did not complain as much about the teaching process, except for the three statistics case studies. The students want case studies that better relate to their research project. The following information from focus group participants supports the above analysis.

> "It is difficult to read research papers and understand the main concepts, especially those written in English."
>
> "Case studies at the beginning of each period consume too much time. In addition, the case studies are not relevant to my research topic."
>
> "Sometimes I want to chat with instructors to get an instant answer, but the Facebook chat function does not work properly."
>
> "Instructors should create Frequently Asked Questions (FAQs) so that students can use them as guidelines for their research papers."
>
> "For my group, we created and assigned roles to each member. We divided the research paper into tasks which were assigned to each member. We also appointed one person to collect the completed tasks, and then consolidate them into one paper, while also correcting all errors."

From the problems noted above, the teaching plans were revised as follows. First, instructors still must continually encourage students to apply their logical thinking when developing their conceptual models. Second, to solve the problem of students' unsatisfactory citations of previous research papers, new criteria for students' literature review was established. Two-thirds of previous research cited should be in English, and should come from online databases provided by university libraries. Third, to promote ability to read research papers from journals, instructors prepared notes on how to read them to gain a proper understanding of the contents.

Delivering the teaching

Teaching methods in this cycle are as follows: First, instructors continued to encourage students to use their logical thinking while developing conceptual models. For literature review, instructors explained and handed out notes on how to read research articles from journals. Second, case studies were revised to be less complex, take less time to finish, and better relate to students' research topics. Students still continued to work in groups to finish six case studies in a set schedule. Third, at the beginning of the semester, instructors asked students to form into groups. Roles were created for each member, and a group leader was selected. Each role has responsibility for a specific research task, while the group leader coordinated and consolidated the parts together. Fourth, the communication technology was changed from Facebook to Line. Line has chat and free-calling functionality, allowing instant response to questions posed by students. Fifth, three research presentations still are required because they help students to learn not only about the strengths and weaknesses of their research, but also about other research as well. Sixth, for statistical analysis, instructors taught statistical concepts and then had workshops with three adjusted (for complexity and time to complete) case studies. Instructors gave feedback to students during the workshops.

Collecting data

To analyze whether the teaching process in this semester (semester 3 – MMIS students) enhanced creative thinking in students, the following three methods were used to collect data for this research: (1) focus group, (2) research report at the end of the course, together with information posted by students on Line, the technology used for collaboration and (3) instructors' observations of students' learning.

Evaluating the results

Two instructors evaluated the research reports from each group for creative thinking. The overall score for students this semester was 16 points, which was higher, but not significantly, from last semester's score of 13. The score indicates that this semester's students are still better than average. But, in other words, the students still do not possess much creative thinking. Cohen's Kappa is 0.74 which is higher than 0.65. This result indicates the same direction of assessments by the instructors. The complaints from students regarding case studies and ability to use statistics still need to be resolved. The reasons for unsatisfactory research papers are explained in more detail in the third action research cycle.

Third action research cycle

The results from MSMIS students in semester 3 were analyzed and utilized with MBA students in semester 4. The next steps are to Plan (identifying the problem and planning the teaching), Act (delivering the teaching), Observe (collecting data), and Reflect (evaluating the results).

Identifying the problem and planning the teaching

The major problems encountered during the second action research cycle are as follows: First, using case studies developed from the previous semester to teach students proved that these teaching methods are not appropriate. The way to teach research processes to students needed to be adjusted. The reasons are: (1) Time for students to complete case studies is limited. (2) Students lack motivation to do the case studies because they think they are difficult and time consuming. In addition, the case studies do not relate to their research projects and do not help students to make progress on them. Second, students complain about the comprehensive handouts. The handouts contain too much information regarding research processes which overloaded students' ability to learn. Third, group members have various interests and experiences that caused problems in working together and decision making. Fourth, technology communication still needed to be adjusted. Using Line to communicate still had problems. Line is not suitable if the network is not stable. In addition, Line does not have log files. The following information from focus group participants support the above analysis:

> "The case studies used in the workshops are not relevant to our research topics."
>
> "Though the workshops help us to understand experiences with research from the previous semester, they consume too much time without any benefits for our research topics."
>
> "The comprehensive handouts have too much information on research processes which confuse me."
>
> "When we consult with instructors regarding our research using Line, the network always disconnects, and we are frustrated by this. Meeting instructors face to face may be more appropriate."

From the problems identified above, the teaching plans were revised as follows: First, instructors decided not to keep but to discard case studies from the previous semester. However, instructors retained the objectives of the case studies; i.e., encouraging students to successfully prepare problem statements, research objectives, research questions, conceptual models, and statistical analysis. Instructors designed case studies based on students' research projects assigned to be completed for this course. Students in each group worked on their research topics during classes. This allowed prompt responses from instructors when issues arose. Second, at the beginning of the semester, instructors asked students to form groups and establish roles for each member of the group, especially for the group leader. Third, a new technology communication was established. A proprietary collaborative webboard called ResYouAsk has functionality that allows students to post questions via discussion forums or chatting. In addition, this technology has log files so all questions and answers can be stored for further analysis.

Delivering the teaching

Teaching methods in this cycle are as follows: First, instructors encouraged students to use their logical thinking as noted in the second action research cycle. Instructors decided to provide lecture notes, instead of providing comprehensive handouts. These notes will be distributed to students at the beginning

of each class. The notes incorporate (1) research processes and their relationship to research problems, research objectives, research questions, and research hypotheses (2) how to properly do literature reviews together with how to read previous research articles (3) theory building (4) questionnaire development (5) sampling (6) statistics selection (7) statistical analysis and writing results (8) writing completed research report. Second, instructors continued to form students into groups, along with establishing roles for each member in the group. Third, apart from using the technology communication stated above, students are able to consult with instructors after class. Fourth, instructors summarized FAQs created from the collaborative webboard log files and distributed these to students. Fifth, the six case studies were changed to be based on the students' research projects required for this course.

Collecting data

Three methodologies for data collection – focus groups with students, students' research reports at the end of research course, and information posted by students on the ResYouAsk collaborative webboard – were used to collect data for this classroom action research.

Evaluating the results

Instructors concluded that instructional methods used in the fourth semester with MBA students are suitable for teaching a research methodology course. In addition, the assessment of students' creative thinking from the two instructors showed satisfactory results. The assessment indicates that students in this semester got 19 points – much better than average. The consistency of assessment results of the two instructors calculated using Cohen's Kappa coefficient equals 0.79. In addition, students were motivated to attend class, especially workshops using students' research projects as case studies, because they could finish their research projects during classes. Problems of collaboration were reduced when the groups had group leaders who are responsible to review all work of group members.

CONCLUSIONS

This classroom action research was initiated because instructors in business research methodology determined that most students do not master the most important objective of learning how to do research – to develop new knowledge. From analyzing conceptual models and statistical analyses in students' research reports, instructors observed that students do not apply logical thinking skills. The students do not analyze and synthesize previous research articles properly. Students do not analyze statistics with appropriate procedures. Therefore, this research tries to answer questions on how to enhance creative thinking in business research classes by encouraging students' intellectual capability, motivation, and collaborative learning.

The research results indicate that best-in-practice teaching procedures for the research subject are as follows: First, instructors should encourage students to use logical reasoning during conceptual framework development and data collection. Instructors should exchange problem-solving experiences with students. Second, instructors should provide handouts for further reading, such as how to read prior research and utilize suitable statistics. Third, apart from lectures, workshops during classes should be conducted so students can practice doing research. This enables students to discuss issues with instructors face to face and immediately. Fourth, additional sessions after class should be set up to allow students to discuss problems that they encounter with their research projects. Fifth, students have to finish a research project by the end of the semester. Sixth, students should make oral presentations on their projects and experts invited to comment on them. Seventh, teaching tools, such as collaborative technologies (e.g., ResYouAsk webboard), need to be introduced so that instructors and students can communicate with each other while not in class. Furthermore, these tools should have functionalities which suit students' and instructors' requirements, such as being able to post illustrations in any form (e.g., flow charts, diagrams), create log files and incorporate both chat and discussion forums.

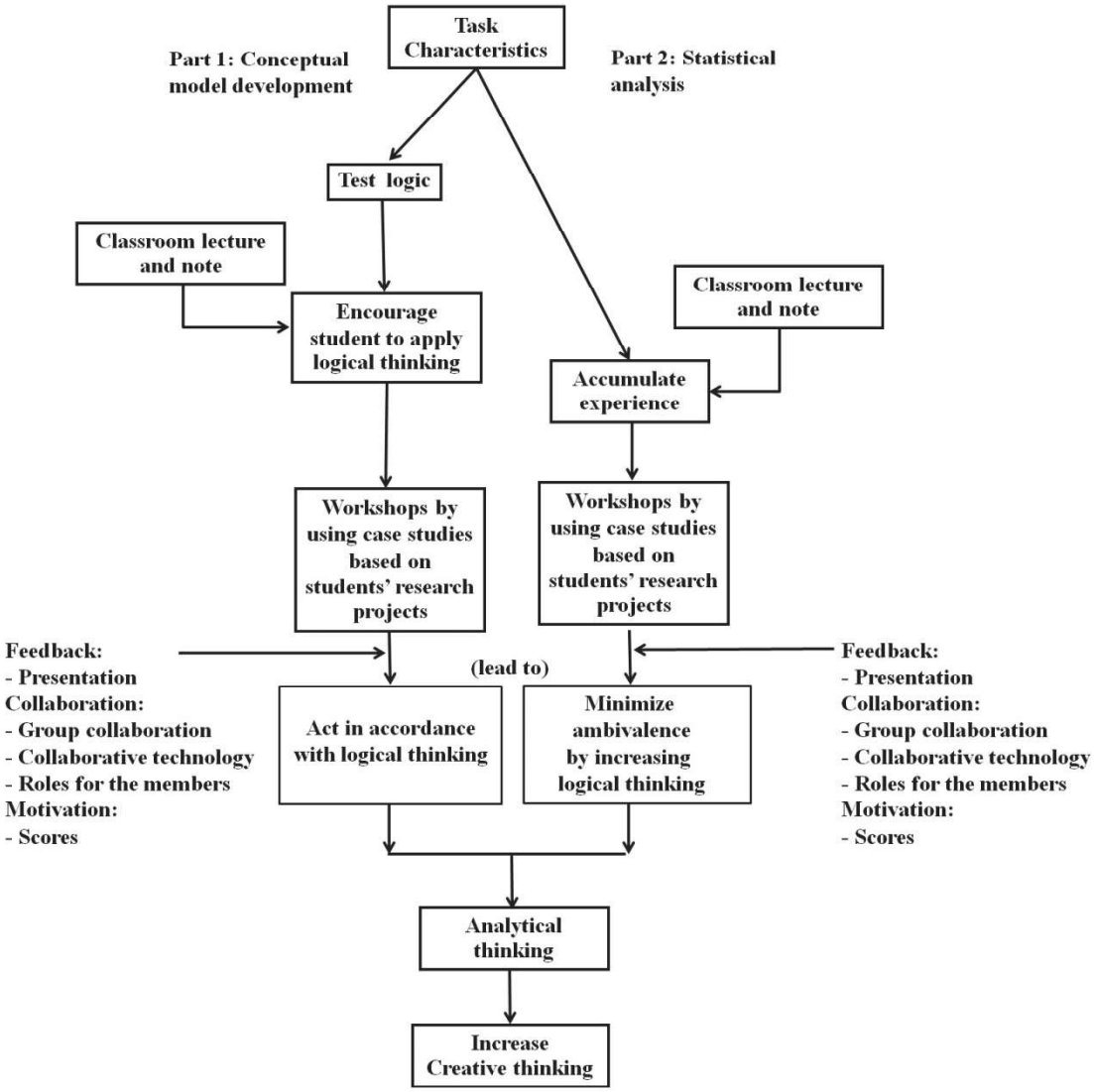
Research contributions

Both theoretical and practical contributions were developed from this research: (1) For theoretical contributions, the initial research results indicate that logical thinking affects the analytical skill. This skill, in turn, affects students' creative thinking. However, three additional factors (feedback, motivation, and collaboration) need to be considered in teaching research methodology. (2) For practical contributions, instructors should conduct class lectures together with workshops, for discussing and exchanging thoughts regarding students' research. Collaborative tools between instructors and students should be utilized to conveniently provide feedback. In addition, these tools can be used to monitor the progress of students.

Figure 2 summarizes the teaching processes used to enhance creative thinking of students. This process model posits that logical thinking affects analytical skills, which in turn affect students' creative thinking. In summary, when the theory of compliance between tasks and instruments is applied in choosing teaching methods for enhancing creative thinking of students, a variety of teaching methods should be used. Instructors should adopt three teaching methods: classroom lectures, case studies, and role playing. A logic test should be conducted with students at the beginning of the semester, to determine how developed their logic skills are.

Instructors should follow these procedures: First, instructors must divide teaching the research subject into two parts. Part one is conceptual model development. Part two is statistical analysis. For conceptual model development, instructors should encourage students to apply logical thinking, along with analytical thinking. In addition, instructors should set up a minimum number of previous research articles that are required to be cited in the literature review. The articles should come from well-regarded journals, especially those in English. To incentivize students to properly do the literature review, instructors can use scoring. The instructors should also distribute information to students on how to read research papers. In addition, the concepts of statistics should be introduced followed by examples on how to analyze the results. However, instructors should let students analyze their own data, while providing feedback on how to solve problems the students are facing. Second, workshops should be set up using case studies based on students' research projects assigned to be completed for the course. During workshops, instructors must work as advisors providing feedback on problems and obstacles the students encounter. Furthermore, collaborative technology with chat and discussion functions, together with the ability to collect questions and answers in log files, should be used. Third, instructors should also distribute lecture notes concerning (1) developing conceptual models, such as research processes and the relationship to research problems, research objectives, research questions, and research hypotheses; (2) doing literature review, together with how to read research articles; (3) developing theories; (4) analyzing data; and (5) writing the research report. In addition, instructors should also distribute FAQs on preparing research papers to students. Fourth, students should divide into small groups and establish roles for the members, as well as selecting a group leader. Fifth, the research subject should have presentation sessions. The sessions should incorporate problem statements, research proposals, and research reports to provide feedback on the students' work as soon as possible.

FIGURE 2
TEACHING PROCESSES USED TO ENHANCE CREATIVE THINKING IN BUSINESS RESEARCH CLASSES



Research validity

The potential threats to research validity identified by Baskerville and Wood-Harper (1998) were used to assess the limitations of this research. The research validity is as follows:

First, this action research was set in a multivariate social situation. The research was conducted with four groups of students in four semesters over two years.

Second, the observations were collected and analyzed within an interpretive framework. Apart from questions from the webboards, focus groups with approximately seven representatives from each research class were established. Information regarding problems that students encountered during their research projects and how students handled the problems were recorded. This was done to increase the reliability of subsequent analysis.

Third, all instructors who participated in this research worked actively and directly with students. Two instructors conducted each research class and one researcher provided teaching assistance.

Fourth, interviews via focus groups, and observations via research classes and webboards, were used. All instructors committed substantial amounts of time with students during the semester, providing a good opportunity for real-time observations.

Fifth, according to evaluations made by students participating in this research, they believed that their understanding of research methodology improved as a result of the class. Additionally, questions raised while conducting research were resolved. The second action research cycle fulfills the requirement of adjusting the theory to practice. Furthermore, the theoretical framework was extended to cover continuous learning.

Sixth, this classroom action research is linked to the theoretical framework that explains how the actions led to a favorable outcome. This framework explained how students' intellectual capability, motivation to learn, response to collaborative learning, and compatibility with teaching methods leads to creative thinking. The second research cycle aimed to further improve the issues perceived to hinder creative thinking. The actions within the second research cycle were also derived from a theoretical framework.

Seventh, and finally, one of the objectives of teaching this research class is to build new knowledge. Instructors noted that theses prepared by students after completing this research class indicated that new knowledge was created, so this objective was achieved.

Future Research

The research results indicate future research should be as follows: First, though this research incentivizes students by using scoring, this extrinsic motivation does not much impact the amount of effort students put into the research class. Students also have assignments from other classes that must be worked on, so workload balance is required. Therefore, this research results encourage further study to examine both intrinsic and extrinsic motivation, as suggested by Ryan and Deci (2000). Second, 45 hours per semester for a research class may not be enough for students to adequately understand the subject, especially for analyzing and synthesizing prior literature. Therefore, future research should be designed to consider extending classroom time beyond 45 hours. This may lead students to commit more time to do learn research methods. Third, due to the limitation of time, instructors have to assign students to work on research assignments in groups. Some students within groups may not dedicate sufficient time to do their group assignments. Therefore, instructors should encourage collaboration among members within groups, which may affect knowledge building (Hong, 2011). Finally, as the third-cycle students' creative thinking scores indicate much better than average, the reason may be that this research emphasizes only the attributes of students. The attributes of instructors may affect methods to increase students' creative thinking (Palaniappan, 2014). Therefore, future research may need to investigate attributes of instructors in more detail.

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