CHAPTER 3

METHODOLOGY

3.1 The Target Group

This study sets out to evaluate meta-cognitive skills training on learners' writing ability and learner autonomy. The target group consisted of 16 first year B.Sc. Software Engineering students, at the College of Art, Media and Technology at Chiang Mai University. Most students had a pre-intermediate proficiency level in English. Learners were purposively selected to participate in this study. The College of Art, Media and Technology created a placement test, testing these non-English major learners' proficiency in reading, writing, speaking and listening. The selection criteria for participants were a writing score of above 60% as well as a total average score of above 60%.

3.2 INSTRUMENTS

3.2.1 Writing Ability

3.2.1.1 Quantitative Research

For the analysis of learners' writing ability, quantitative research is used in this study. Quantitative research refers to the systematic scientific investigation of quantitative properties, phenomena and their relationships. The objective of this quantitative research is to employ mathematical models and theories pertaining to certain phenomena. In this study Ebel's Algorithm (Ebel, 1951) is used to calculate the rater reliability, mean scores and standard deviations between essays rated by two raters/graders. The process of measurement is central to

quantitative research, because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships.

Quantitative research methods, for the purposes of this study, is applied through generation of theories, the development of instruments and new methods for measurement, the collection of empirical data, as well as the analysis of data and the evaluation of results.

Although a distinction is commonly drawn between qualitative and quantitative aspects of scientific investigation, it has been argued that the two go hand in hand. Based on his analysis of the history of science, Kuhn (1961), for example, concludes that 'large amounts of qualitative work have usually been a prerequisite to fruitful quantification in the physical sciences'. Qualitative research is often used to gain a general sense of phenomena and to develop theories that can be tested using further quantitative research. For instance, in the social sciences qualitative research methods are often used to gain a better understanding of such things as intentionality and meaning of why and to what consequence a person or group do something and what it means to them. For the purposes of this study, both qualitative and quantitative methods are used to deal with the analysis of data concerned with learner autonomy, and data concerned with writing ability, respectively.

The quantitative methods or research techniques, that are used to gather quantitative data in this study, deals with the essay scores, which are measurable. Tables and graphs are used to present results, and are therefore to be distinguished from the qualitative methods employed in the following section that deals with learner autonomy.

3.2.1.2 Raters

Appendix 10 show the essay scores for learners' second drafts, awarded to each learner, for each set, after all the data for the study was collected. Two graders/raters were chosen to check each essay, because of practical concerns, the availability of qualified raters and for the improvement of data reliability.

The group of raters consisted of two men and two women, two of which were educated in North America, and two in Asia. Thailand and China, respectively. All have masters degrees, except one participant that is a master's candidate. This diversity among graders is deliberate, so that the process may be as fair as possible.

The mean of the scores awarded by the two graders are shown in *Tables 6,7,8 and 9*, while *Table 5* indicates the average mean ratings for each set. The mean of ratings were used, because in cases where judgments are involved, and there is a panel, a mean score indicate the direction in which most opinions converge. It points a middle way.

Choosing more than two graders rather than more for each writing task/essay, may have increased the inter-reliability scores in each set, but may also have underemphasized the differences in scores awarded by professionals using the same writing rubric (*see Appendix 5*), grading material in which subjects aimed at achieving the same objectives. In order to make it more reliable, the researcher used Ebel's Algorithm, a formula indicating the reliability of graders' scores. Instead of close correlation between scores at all times, graders often differed greatly in their interpretation of essays and possibly in their personal standards and criteria for what constitutes a good essay. Reasons for variations in raters' paradigms, may be attributed to differences in schema resulting from different educational backgrounds, values and heritage.

Because of the subjective nature of essay grading, raters were not allowed to discuss either the rubric or the essays with each other. Instead they were trained to use the rubric.

3.2.1.3 The Inter-rater Reliability is the degree of agreement among raters. There are a number of *statistics* that can be used to determine inter-rater reliability. Different statistics are appropriate for different types of measurement. For the purposes of this study, Ebel's Algorithm (Ebel, 1951) is used to measure the reliability among raters. It is important to note that two raters graded each essay and one pair of raters graded each half of the group.

The inter-rater reliability calculator is a program that estimates the reliability of a set of ratings or other scores based on a formula presented by Ebel (1951), as well as provides information such as standard deviations of ratings and the mean rating of each group.

The formula is very flexible in that it requires no assumptions about the number of graders rating each essay, nor which graders rate each essay.

The reliability of ratings in theory ranges between zero and one. The method used to estimate the reliability in this program can potentially result in estimates of the reliability that are negative. This generally means the actual reliability is near zero.

Scores can be interpreted as follows:

< 0 No agreement

0.0 — 0.20 Slight agreement

0.21 — 0.40 Fair agreement

0.41 — 0.60 Moderate agreement

0.61 — 0.80 Substantial agreement

0.81 — 1.00 Almost perfect agreement

Table 3: The reliability for a score based on 4 raters, according to Ebel's algorithm

Sets	Rater Reliability Score
A	0.59 *(moderate agreement)*
B	-0.2.11 (0.00) *(no/moderate agreement)*
C	0.60 *(moderate agreement)*
D	0.67 *(substantial agreement)*

While the reliability of the graders are not under scrutiny in this study, it is worth noting that with the exception of the irregularity caused by the deviations between scores in Set B, the reliability scores in Sets A and C are considered "moderate", and "substantial" in Set D. This indicates an increase in rater reliability, which can be attributed to their increased familiarity with and practice in using the writing rubric. Regardless of the 45% deviation in the scores for learner 1 in Set D, the reliability score for Set D is still the highest. Suggesting that over a period of time and with practice and increased understanding of the criteria, graders can improve their ability to use the writing rubric more effectively and improve the quality of their assessments.

In this study, its purpose is to give a score of how much consensus there is between the scores given by the four graders in each set. It is useful in refining the outcomes of the use of the writing rubric, and to try to establish a greater understanding of the human element in the research, and in the different ways, graders interpret and use the same rubrics. If graders do not agree, either the scale or rubric is defective or the raters/graders need to be re-trained in the use of the rubric. There may be additional factors that play a role in grossly deviating scores awarded by different graders, even if they use the same rubric.

Differences can occur because of cultural standards and perceptions of what grades constitute a pass.

While the pass rate at an American University is 50%, the pass rate at Taiwanese University is 60%. Rates from these two countries may for example have different ideas about class averages, good grades and bad grades. Looking at the situation from this perspective, it is understandable that there will be differences in how people from different academic cultures interpret the writing rubric, and award marks.

In the grading of learners' essays, two graders were responsible for checking any one particular essay. In some cases, there were dramatic differences between the scores awarded, regardless of the fact that both graders were professionals in the field of English language teaching, and used the same rubric.

3.2.1.4 Essay raters are volunteers with professional qualifications and experience in language teaching. They have used the *writing rubrics* as instruments to assess learners' second drafts from each set. Two independent graders graded each essay. The data was recorded and the mean ratings and standard deviations calculated. These scores are analyzed and discussed further in the following chapters.

3.2.1.5 Essays: Learners chose their own topics in set D according to what was relevant, appropriate, interesting, and ideally a topic they were knowledgeable of. Giving learners a choice of themes/topics is part of the learner-centred approach, which encourages learners to take responsibility for their own learning, research and practice. It sets A, B and C, learners were organized in brainstorming teams/groups, and decided on the topics below, which were considered as guidelines, and open to learners' interpretation.

Essay Topics, with some semantic variation, were as follows:

Set A: *The Uses of Computers in our Society*

Set B: *My Plans for Songkran*

Set C: *The Roles I Play in My Life*

Set D: (a choice of topic each individual is knowledgeable of or specifically interested in)

All essays were written in class, and strict time limitations were imposed, not only to make the effort fair, but also to give learners a better idea of how much they can accomplish within a certain period of time. With this knowledge they can better plan, and learn to manage their time better. Typically, learners would be given 40 minutes to plan and write a 200-word essay.

3.2.1.6 The five-paragraph essay: During the study, learners focused on writing five-paragraph essays, which was a formal format of written argument. The format requires an essay to have five paragraphs, namely one introductory paragraph, three body paragraphs with topic sentences, support sentences and development sentences (i.e. reasons or examples), and one concluding paragraph.

3.2.1.7 Writing questionnaires: Learners have reflected on their writing experience every time after writing their second drafts in each set. They were given ten open-ended questions to guide their reflections (*see Appendix 4).*
The data derived from these questionnaires was used to evaluate the extent to which learners have successfully incorporated meta-cognitive strategies. Learners who used the strategies taught successfully, are considered more autonomous. Most of the participants in the study have made steady improvement in their essays, judging by their scores from Set A to Set D.
The data collected was analyzed and discussed under the four main headings of meta-cognition namely, *planning, monitoring, evaluation* and *planning for future improvements,* to learn about the extent or strategy use by learners, and to evaluate the meta-cognitive strategy training on their autonomy as writers.
The data-collection instrument is a questionnaire. Questions are subcategorized under these strategies, each corresponding with one or more of the four meta-cognitive strategies.

During the pilot study with another group of adult learners, learners' ability to understand and answer the questions in the questionnaire were tested. During the study, participants were given the option to answer in Thai if they could not express themselves in English.

The questions were based on Oxford's meta-cognitive strategies (Oxford, 1990), and the instrument was validated by an expert supervisor, and used in a pilot study before minor changes were made. After the questions were checked again and approved, they were used in the study, to evaluate learner autonomy.

3.2.1.8 Peer-editing: Learners were trained in the use of the writing rubric (see Appendix 6) before doing the peer-editing activity. The vocabulary, often new to learners, was discussed and explained, to ensure that learners understood the purpose and function of the rubric, and how to use it effectively. The use of a writing rubric was the first part of the scaffolding process and meta-cognitive strategy training. Learners used the writing rubric for peer-editing in Set A, and later used it for self-editing, as a tool for evaluating and monitoring various aspects of their essays.

3.2.1.9 Criteria for Peer-editing: Learners were asked to be kind, honest and specific in their feedback to their peers. Learners used the writing rubric (see Appendix 6) to edit their peers' first drafts, and give written feedback to justify/clarify the score they awarded their peers. The main themes of the rubric peer graders had to consider are as follows:

- Clarity of content
- Language use
- Sentence control and content organization, and
- Length / number of words

3.2.1.10 Self-editing: Learners were trained in rubric use and given practice during the peer-editing activity in Set A. After the activity, there were a round-table discussions, where learners could relate their experiences using the rubric, and discuss the problems and difficulties they have encountered. This opportunity was used to review the rubric, and clarify uncertainties pertaining to its use.

By the time they used the rubric to edit their own first drafts in Sets C and D, learners were familiar with how it was used and understood its purposes. Learners were encouraged to discuss problems they had using the rubric and make notes on areas that could be improved.

Self-editing plays a key role in the practical application of meta-cognitive strategies, since it directly relates to the four key focal points of the study regarding meta-cognition, namely planning, evaluating, monitoring and planning for future improvement. Self-editing using a rubric has proven to raise learners' awareness of important aspects in essay writing, such as clarity of content, language use, sentence control, content organization and the actual required word limit.

3.2.1.11 Teacher Feedback: The instructor has spent time discussing possible improvements and common errors in learners' writing, which were directly relevant to the requirements of the rubric. During these one-on-one sessions with learners, the instructor used the opportunity to address individual problems learners had in their writing. These problems covered a wide range of issues, such as motivation, difficulties using the vocabulary words they knew meaningfully in context (which prompted a focus on collocations), as well as technical issues such as subject-verb agreement, proper sentence structure and content organization.

3.2.2 Data Collection Instruments

The reflective *writing questionnaire* is examined to:

- Establish if there was a difference in the quality and insights between learners and sets
- Detect evidence of a personalized dimension to learning
- Identify the implications for future learning and practice
- Evaluate learners' use of meta-cognitive strategies, and how it affects their writing ability and autonomy

Answers are categorized under the four main headings, each focusing on a different aspect of meta-cognition, under which they were analyzed set by set.

This data constitutes the on-going evaluation of what learners have been taught. Through action-research the teaching of and use of strategies such as the use of rubrics, mind-maps, paragraphing and content organizational strategies were introduced and the outcomes evaluated. The main purpose of the questionnaire is to evaluate the use and affects of meta-cognitive skills training on learners' writing autonomy.

An optional *interview* opportunity was available between the researcher and participants. In cases where the data collected by the writing questionnaire was insufficient, or when the essay scores of individual learners were contradictory to those of the other learners, the researcher used this opportunity to clarify meaning and find out what the reasons were for changes in the pattern. There was thus no list of questions or questionnaire per se, but rather questions tailored for each individual problem or need.

3.2.3 Learning Strategies

The use of writing rubrics, self-editing and peer-editing skills, are instrumental strategies taught to learners. These strategies enable learners to better identify problems in their own writing and eventually plan for future improvement by using mind-maps. The effect of these strategies on learners' performance, generate data that is qualitatively and quantitatively analysed and interpreted.

3.3 Treatment

3.3.1 Teaching Instruments

These instruments are in the form of lesson-plans (*see Appendices 2 and 3*), of which the content gradually guided learners towards using of specific meta-cognitive strategies. A process of scaffolding is implied, guiding learners toward more autonomous writing practice.

Given the nature of the research, qualitative methods were used to analyze learners' answers for the writing questionnaire, while quantitative methods were used in the analysis learners' essay scores.

The participants of the study consisted of learners following a writing course, who contributed their reflective statements as answers to writing questionnaires and essays graded for analysis.

The purpose of the instruments are to train learners in meta-cognitive strategies, and to develop learners' meta-cognitive skills, which were gauged through the analysis of learners' writing questionnaires and by the scores of their essays, after being graded by ESL professionals.

3.3.2 Lesson-plans

Writing is not only a creative act, but also a process. It requires time and positive feedback to be done well and for learners to improve their writing. During this process, the instructor should move away from being someone who sets students a writing topic and receives the finished product for correction without any intervention in the writing process itself. The entire course, during which the research for this study was done, stretched over 45 hours, which were spread over eight weeks, four days per week, and into 90-minute sessions. Twenty-four hours of class-time (4 weeks) were used to train learners in the use of the relevant meta-cognitive strategies and writing techniques, as well as to collect data.

According to White and Arndt (1991), focusing on language errors 'improves neither grammatical accuracy nor writing fluency', suggesting instead that *paying attention* to what the students say will show an improvement in writing.

During the pilot studies it was found that feedback is more useful between drafts, not when it is done at the end of the task after the students hand in their essays to be marked. Corrections written on essays returned to the student after the process has finished seem to do little to improve student writing, since many learners only looked at their scores, instead of the ways they could improve next time around. Providing feedback based on the criteria from the rubric, and writing a second draft ensured an opportunity for learners to improve (and correct).

The lesson-plans have aimed to follow the process approach to writing, which are broken down into four stages:

1. Pre-writing:

The teacher stimulates learners' creativity, to get them thinking about how to approach a writing topic. In this stage, the most important thing is the flow of ideas, and it is not always necessary that students actually produce much written work, except for producing mind-maps.

2. Focusing ideas:

During this stage (first draft), learners write without much attention to the accuracy of their work or the organization. The most important feature is meaning and content organization. Learners should concentrate on the content of the writing, and make sure it is coherent.

3. Editing:

This stage gives learners the opportunity to look at their essays critically, or have their fellow learners look at their work, using a writing rubric as guideline. For the purposes of this study, editing implies self-editing or teacher feedback.

4. The Final Draft:

Writing the final draft, the essay is adapted to a readership. Learners should focus more on form and on producing a better rounded piece of work. At this stage learners could benefit most from following the criteria set out in the writing rubric, closely.

3.3.3 General Classroom Activities

The following classroom activities are related to the stages above, and are incorporated into basic writing lesson-plans for writing:

Pre-writing

- Brainstorming

Getting started, students were divided into groups and produce words and ideas related to the topic.

- Planning

Students create mind-maps before they start writing. These plans can be compared and discussed in groups before writing, giving learners the opportunity to share information and communicate with each other in the target language.

- Generating ideas

Discovery tasks, which require learners to write key words about the subject, describe it, compare it, associate it, analyze it, apply it or argue for or against it.

- Questioning

The idea is to work in groups and generate questions about the topic. This helps learners focus on the audience as they consider what the reader needs to know. The answers to these questions may form the basis of their essays.

- Discussion and debate

The teacher assists learners in developing ideas on topics, in a positive, productive way, encouraging them to explore alternative avenues of thought/paradigms relating to the topic.

Focusing ideas

- Group compositions

Working together in groups, learners share ideas and collaboratively write on a specific topic. This involves small groups first creating a mind-map. Each section as well is the content is discussed or negotiated using the target language. It has the added benefit of developing learners' individual talents/roles in groups. Be it as scribe, co-coordinator or speaker/presenter.

- Changing Viewpoints

Useful and fun writing activities are role-plays and storytelling activities. Learners choose different points of view and discuss what a specific character would write in a journal or report.

Learners can also discuss, instead of different viewpoints, different text types, and how the text would be different if it were written as a letter, a newspaper article or journal entry.

Editing:

Learners use the writing rubric to peer-edit, self-edit or receive feedback from the teacher based on the rubric.

3.4 Learner Autonomy

3.4.1 Qualitative research

Qualitative research is a field of inquiry that crosscuts disciplines and subject matter (Denzin, et al, 2005). Qualitative researchers aim to acquire an in-depth understanding of human behaviour and the reasons that govern human behaviour. In this section, evaluating the effects of meta-cognitive strategy training on writing. Qualitative research relies on reasons behind various aspects of behaviour. It investigates the why and how of decision making and conduct, not just what, where, and when.

The study makes use of smaller but more focused samples of data, rather than large random samples, which qualitative research categorizes into patterns as the primary basis for organizing and reporting results.

According to Marshall et al (1998), qualitative researchers typically rely on four methods for gathering information:

- Participation in the setting (meta-cognitive strategy training),
- Direct observation,
- Interviews, and
- Analysis of documents and materials (in this study, the analysis of the questionnaires).

One way of differentiating qualitative research from quantitative research is that largely qualitative research is exploratory, while quantitative research hopes to be conclusive. However it may be argued that each reflects a particular discourse, and neither being definitively more conclusive or 'true' than the other. Quantitative data are of the kind that may lead to measurement or other kinds of analysis involving applied mathematics, while Qualitative data cannot necessarily be put into a context that can be graphed or displayed mathematically.

The graphs in Appendix 8 show the answers given by learners in each set, categorized under the four main headings indicating the purpose of the questions, namely *planning, monitoring, evaluating* and *planning for future improvement.*

Please note that in cases where the same answers or variations of the same answer has been repeated, it has been omitted from these texts. The questions are asked in the first person, the purpose is to emphasize the personal, introspective nature of reflection.

3.5 Procedure of Conducting the Study

The research was conducted in three stages:

- *Planning,*
- *Field, and*
- *Analysis*

3.5.1 The Planning Stage

The research procedure has been carefully planned. Divided into four weeklong sets, the systematic teaching of meta-cognitive strategies in writing has been planned and set out in *Table 4* below.

Table 4: Procedure of the Study

Sets	***Strategy training (Input)***	***First Draft (D1)***	***Activity***	***Second Draft (D2)***	***Writing Questionnaire***	***Optional Interviews***	***Grading***
Set A, Week 1	Training in rubric use and in filling out the Writing Questionnaire (lesson-plan 1)	D1	Review rubric use and do Peer-Editing	D2	Learners will fill out the writing questionnaire which will determine strategies used in writing D2	Learners will be interviewed should data in the writing questionnaire be insufficient	Graders will use the rubric to mark learners' essays to determine grade competence
Set B, Week 2	Teach the use of mind-maps and brainstorming (lesson-plan 2)	D1	Teacher Feedback	D2	Learners will fill out the writing questionnaire which will determine strategies used in writing D2	Learners will be interviewed should data in the writing questionnaire be insufficient	Graders will use the rubric to mark learners' essays to determine grade competence
Set C, Week 3	Teach paragraphing (lesson-plan 3)	D1	Self-Editing	D2	Learners will fill out the writing questionnaire which will determine strategies used in writing D2	Learners will be interviewed should data in the writing questionnaire be insufficient	Graders will use the rubric to mark learners' essays to determine grade competence
Set D, Week 4	Teach content organization using the *five-paragraph essay*-format (lesson-plan 4)	D1	Self-Editing	D2	Learners will fill out the writing questionnaire which will determine strategies used in writing D2	Learners will be interviewed should data in the writing questionnaire be insufficient	Graders will use the rubric to mark learners' essays to determine grade competence

Description of the procedure of the study:

The study plan, which constitutes the time in which the meta-cognitive strategy training took place and data was collected, is divided into four *sets* or weeks. Each week consisted of four 90-minute sessions. The training and data collection for this study was done over a period of four weeks and twenty-four class hours, which were allocated to the Writing Module of a 45-hour ESL course for university freshmen.

Each week is divided into seven steps, namely:

1. A strategy training session
2. Writing a first draft
3. An evaluation activity
4. Writing a second draft
5. Filling out reflective writing questionnaires
6. Optional interviews with participants in the study
7. The grading of learners' essays by independent graders/*raters*

Strategy training sessions were set out as follows:

Week 1: Training in *rubric use* and in filling out the *writing questionnaire*

Week 2: Teaching the use of *mind-maps* and *brainstorming*

Week 3: Teaching *paragraphing*

Week 4: Teaching *content organization* using the *five-paragraph essay*-format

Evaluation activities included:

Week 1: Peer-Editing

Week 2: Teacher feedback

Week 3: Self-editing

Week 4: Self-editing

3.5.2 The Field Stage

Learners have received meta-cognitive strategy training before writing a first draft, on a topic decided upon by common consent of the class.

After activities using the writing rubric (*see Appendix 6*), such as peer editing, teacher feedback and self-editing, learners wrote a second draft, after which they answered the questionnaire (*see Appendix 4*). The graders marked learners' second drafts, before the scores were analyzed.

3.5.3 The Analysis

Data was collected in four sets, each consisting of two essays per participant. Including a first and second draft, plus evidence of an interim activity such as peer editing (Set A), a teacher-feedback session (Set B), and self-editing (Sets C and D). The rest of the data consists of learners' answers to the writing questionnaire. Professional English Instructors teaching at college and university level graded the second drafts.

The essay scores received from the graders and the answers on the reflective writing questionnaires were analyzed to establish how and to what extent the strategies taught were incorporated into the planning, execution and evaluation of learners' writing.

A comparison was also drawn between strategies used by learners in the first and second drafts of their essays, to establish the degree of *planning for future improvement.* If learners had established their weak-points and strong points by *evaluation*, and made changes in their second drafts, it may signify that the *planning for future improvement* was successful. If there were no changes made between the first and second drafts, it can be suggested that learners have not planned for future improvement.

3.6 Data Analysis Instruments

Writing Rubric: The rubric used throughout the study, has been tested during the pilot study for this investigation, and published by other researchers. It is adapted from Walker (1996), and was used as a standard and guideline by learners, the researcher and by the graders.

The *writing rubric* was taught to learners and used by them in peer-editing and self-editing activities, and by the graders checking learners' essays. It mainly concentrates on the evaluation of the "clarity of content", "language use", "sentence control and content organization" and "length/number of words". These

criterions are appropriate to the needs and level of the subjects who took part in the research.