

# CONTENTS

|                                                                                                                                                             | <b>Page</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| ACKNOWLEDGEMENT                                                                                                                                             | c           |
| ABSTRACT IN THAI                                                                                                                                            | d           |
| ABSTRACT IN ENGLISH                                                                                                                                         | e           |
| LIST OF TABLES                                                                                                                                              | k           |
| LIST OF FIGURE                                                                                                                                              | n           |
| LIST OF ABBREVIATION/SYMBOL/GLOSSARY                                                                                                                        | o           |
| STATEMENT OF ORIGINALITY IN ENGLISH                                                                                                                         | w           |
| CHAPTER 1 INTRODUCTION                                                                                                                                      | 1           |
| 1.1 Background and the Importance of the Problem                                                                                                            | 1           |
| 1.2 Research Questions                                                                                                                                      | 8           |
| 1.3 Objectives of the Research                                                                                                                              | 8           |
| 1.4 Scopes of the Research                                                                                                                                  | 8           |
| 1.5 Definition                                                                                                                                              | 9           |
| 1.6 Benefits of the Research                                                                                                                                | 10          |
| CHAPTER 2 REVIEW OF LITERATURE                                                                                                                              | 11          |
| 2.1 Educational Quality Assurance                                                                                                                           | 12          |
| 2.2 Research and Development of Assessment Model                                                                                                            | 60          |
| 2.3 Bilingual School                                                                                                                                        | 73          |
| CHAPTER 3 METHODOLOGY                                                                                                                                       | 82          |
| 3.1 Phase 1 The synthesis and quality checking of standards and indicator<br>on education quality in Bilingual School on Early Childhood<br>Education Level | 83          |
| Sample Group                                                                                                                                                | 91          |
| Tools used in research                                                                                                                                      | 95          |
| Data Collection                                                                                                                                             | 97          |
| Data Analysis                                                                                                                                               | 98          |

## CONTENTS (CONTINUED)

|                                                                                                                                                                  | <b>Page</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 3.2 Phase 2 The construction and development of Internal Assurance model in Bilingual school on Early Childhood Education Level                                  | 101         |
| Sample Group                                                                                                                                                     | 104         |
| Tools used in research                                                                                                                                           | 104         |
| Data Collection                                                                                                                                                  | 105         |
| Data Analysis                                                                                                                                                    | 105         |
| 3.3 Phase 3 The study of the implication of the trial-use of Internal Assurance model in Bilingual School on Early Childhood Education Level                     | 108         |
| Sample Group                                                                                                                                                     | 112         |
| Tools used in research                                                                                                                                           | 112         |
| Data Collection                                                                                                                                                  | 112         |
| Data Analysis                                                                                                                                                    | 112         |
| <b>CHAPTER 4 RESULT OF DATA ANALYSIS</b>                                                                                                                         | <b>115</b>  |
| 4.1 Part 1 Synthesis of the result of standards and indicators of Internal Educational quality assurance for Bilingual School in Early Childhood Education Level | 116         |
| 4.2 Part 2 The result of model construction and development of Internal Educational Quality Assurance for Bilingual School in Early Childhood Education Level    | 130         |
| 4.3 Part 3 The study of result of the trial of the model on Internal Educational Quality Assurance for Bilingual School in Early Childhood Education Level       | 137         |
| <b>CHAPTER 5 SUMMARY, DISCUSSION AND SUGGESTION</b>                                                                                                              | <b>147</b>  |
| 5.1 Summary of Research                                                                                                                                          | 147         |
| 5.2 Discussion of Research                                                                                                                                       | 147         |
| 5.3 Suggestion                                                                                                                                                   | 153         |

## CONTENTS (CONTINUED)

|                                                                                                                                                                                                              | <b>Page</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| REFERENCES                                                                                                                                                                                                   | 155         |
| BIBLIOGRAPHY                                                                                                                                                                                                 | 166         |
| APPENDICES                                                                                                                                                                                                   | 167         |
| APPENDIX A Expert Directory                                                                                                                                                                                  | 168         |
| APPENDIX B Tools used in research                                                                                                                                                                            | 174         |
| APPENDIX C The result of quality analysis of research tools                                                                                                                                                  | 191         |
| APPENDIX D Result of research analysis                                                                                                                                                                       | 197         |
| APPENDIX E Synthesized result, development of standards and indicators<br>in Internal Quality Assurance for Bilingual School in Early<br>Childhood Education Level                                           | 212         |
| APPENDIX F Model handbook of Internal Educational Quality Assurance<br>for Bilingual School in Early Childhood Education Level                                                                               | 189         |
| APPENDIX G Internal Evaluation Result by Internal Educational Quality<br>Assurance Model for Bilingual School in Early Childhood<br>Education Level with the original affiliation of sample<br>schools group | 204         |
| CURRICULUM VITAE                                                                                                                                                                                             | 231         |

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved

## LIST OF TABLES

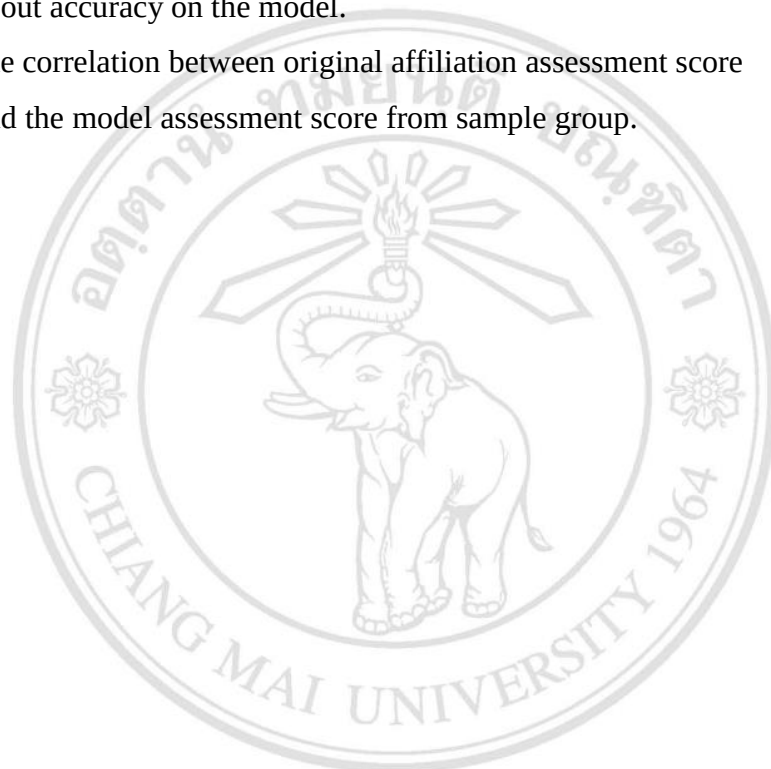
|                                                                                                                                                                    | <b>Page</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Table 2.1 The results from the synthesis of the inside quality insurance pattern                                                                                   | 29          |
| Table 2.2 The results of the problems analysis of the inside educational quality insurance researches                                                              | 32          |
| Table 2.3 Synthesis of the result of standards of internal educational quality assurance for Bilingual Schools in Early Childhood Education Level (1)              | 53          |
| Table 2.4 Synthesis of the result of standards of internal educational quality assurance for Bilingual Schools in Early Childhood Education Level (2)              | 54          |
| Table 2.5 Synthesis of the result of indicators of internal educational quality assurance for Bilingual Schools in Early Childhood Education Level                 | 28          |
| Table 3.6 Value of KMO and Bartlett's Test <sup>1</sup>                                                                                                            | 85          |
| Table 3.7 The coefficient of correlation of variables in factors on educational management.                                                                        | 87          |
| Table 3.8 The coefficient of correlation of variables in factors on physical and intellectual development of student.                                              | 88          |
| Table 3.9 The coefficient of correlation of variables in factors on general Management <sup>1</sup>                                                                | 89          |
| Table 3.10 The coefficient of correlation of variables in factors on efficient and effective performance of teachers.                                              | 89          |
| Table 3.11 The coefficient of correlation of variables in factors on efficient and effective performance of administrator.                                         | 90          |
| Table 3.12 The coefficient of correlation of variables collaborating major factors on self-care and social interactions in multicultural social group of students. | 90          |
| Table 3.13 The coefficient of correlation of variables in factors on emotion and mindset of student.                                                               | 91          |
| Table 3.14 The coefficient of correlation of variables in factors on quality in teaching and promotion.                                                            | 91          |

## LIST OF TABLES (CONTINUED)

|                                                                                                                                                                                   | <b>Page</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Table 3.15 The number of population and sample group in the research                                                                                                              | 92          |
| Table 3.16 Number and percent of basic data in sample group for Exploratory factor analysis.                                                                                      | 93          |
| Table 3.17 Number and percentage of basic data in sample group for Second-order Confirmatory Analysis.                                                                            | 94          |
| Table 3.18 Implementation Plan for the trial use of the Internal Assurance Model in Bilingual School on Early Childhood Education level in Internal Quality Assessment Part.      | 109         |
| Table 4.19 The revision result of standards and indicators based on suggestion from experts.                                                                                      | 117         |
| Table 4.20 Eigen Value, Percentage of Variance and cumulative percent of Variance in each factor                                                                                  | 119         |
| Table 4.21 The result from 2 <sup>nd</sup> . Order CFA of Internal Educational Quality Assurance Model for Bilingual school in Early Childhood Education Level (The First level). | 120         |
| Table 4.22 Mean, Standard deviation and the level of expert's opinion upon utility of the model.                                                                                  | 133         |
| Table 4.23 Mean, Standard deviation and the level of expert's opinion upon feasibility of the model.                                                                              | 134         |
| Table 4.24 Mean, Standard deviation and the level of expert's opinion upon propriety of the model.                                                                                | 135         |
| Table 4.25 Mean, Standard deviation and the level of expert's opinion upon accuracy of the model.                                                                                 | 136         |
| Table 4.26 Mean, Standard deviation and the level of sample group opinion about utility on the model.                                                                             | 139         |
| Table 4.27 Mean, Standard deviation and the level of sample group opinion about feasibility on the model.                                                                         | 141         |

## LIST OF TABLES (CONTINUED)

|                                                                                                                            | Page |
|----------------------------------------------------------------------------------------------------------------------------|------|
| Table 4.28 Mean, Standard deviation and the level of sample group opinion about propriety on the model.                    | 142  |
| Table 4.29 Mean, Standard deviation and the level of sample group opinion about accuracy on the model.                     | 144  |
| Table 4.30 The correlation between original affiliation assessment score and the model assessment score from sample group. | 146  |



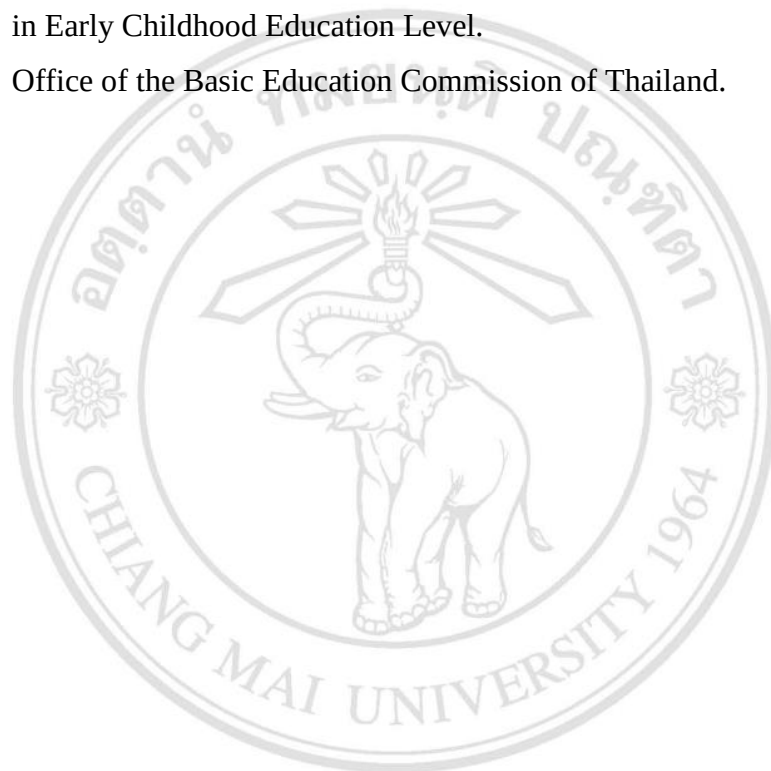
ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved

## LIST OF FIGURES

|                                                                                                                                                                                                           | <b>Page</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Figure 2.1 Process of operation continuously according “PDCA” cycle.                                                                                                                                      | 20          |
| Figure 2.2 Relationship of the Educational Quality Assurance processes.                                                                                                                                   | 23          |
| Figure 2.3 Example of the process of the operation from PDCA cycle<br>that are working at the same time.                                                                                                  | 25          |
| Figure 2.4 Balance Scorecard Concept.                                                                                                                                                                     | 26          |
| Figure 2.5 The connections between the inside quality insurance and<br>the outside quality assessment.                                                                                                    | 28          |
| Figure 2.6 The inside relations between 3 variables with the aime-study attributes                                                                                                                        | 43          |
| Figure 2.7 Steps of Research and Development                                                                                                                                                              | 61          |
| Figure 2.8 The cycle of research and development (R&D Cycle of Borg)                                                                                                                                      | 63          |
| Figure 2.9 The cycle of research and development of innovation<br>(R&D cycle by Rungrid Kaewurai                                                                                                          | 65          |
| Figure 2.10 The step of classroom research by Research and development concept                                                                                                                            | 66          |
| Figure 2.11 The step to construct the model                                                                                                                                                               | 68          |
| Figure 2.12 The concept diagram of research                                                                                                                                                               | 73          |
| Figure 3.1 Synthesis Chart of standards and indicators of Internal Educational<br>Quality Assurance for Bilingual school in Early Childhood<br>Education Level.                                           | 100         |
| Figure 3.2 The construction and development of Internal Assurance Model in<br>Bilingual school in Early Childhood Education Level.                                                                        | 107         |
| Figure 3.3 Study of the implication of the trial-use of Internal Assurance<br>Model in Bilingual school on Early childhood Education level.                                                               | 114         |
| Figure 4.15 The Second-Order Confirmatory Factor Analysis (2nd. Order CFA)<br>result of standards and indicators of Internal Assurance model in<br>Bilingual Schools on Early Childhood Education Level . | 129         |
| Figure 4.16 Internal Educational Quality Assurance model for Bilingual<br>Schools in Early Childhood Education Level.                                                                                     | 131         |

## LIST OF ABBREVIATION

|         |                                                                                                              |
|---------|--------------------------------------------------------------------------------------------------------------|
| ONESQA. | Office for National Education Standards and Quality Assessment.                                              |
| S.      | Standard.                                                                                                    |
| IND.    | Indicator.                                                                                                   |
| Model   | The Internal Educational Quality Assurance Model for Bilingual School<br>in Early Childhood Education Level. |
| OBEC    | Office of the Basic Education Commission of Thailand.                                                        |



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved



## LIST OF SYMBOLS

|           |                                                                                               |
|-----------|-----------------------------------------------------------------------------------------------|
| $\bar{x}$ | means Arithmetic Mean.                                                                        |
| SD.       | means Standard Deviation.                                                                     |
| b         | means Factor loading.                                                                         |
| SE        | means Standard error.                                                                         |
| $R^2$     | means Coefficient of determination.                                                           |
| FS        | means Factor Score Regressions.                                                               |
| df        | means Degrees of freedom.                                                                     |
| P         | means Level of Significant.                                                                   |
| $\chi^2$  | means Chi-Square Value.                                                                       |
| GFI       | means Goodness of Fit Index.                                                                  |
| AGFI      | means Adjust goodness of Fit Index.                                                           |
| RMR       | means Root Mean Squared Residual.                                                             |
| RMSEA     | means Root Mean Squared Error of Approximation.                                               |
| ○         | means Latent Variable.                                                                        |
| □         | means Observable Variable.                                                                    |
| →         | means Causal relationship among latent and observable variable.                               |
| X2        | means standard 1 Physical and intellectual development of Students.                           |
| St1.1     | means Indicator 1.1 Students have standard weight and height.                                 |
| St1.2     | means Indicator 1.2 Students have movement skills according to their ages.                    |
| Sb2.4     | means Indicator 2.4 Students can appropriately control their emotion according to their ages. |
| Ss3.1     | means Indicator 3.1 Students have discipline and responsibility for the assigned task.        |
| Ss3.2     | means Indicator 3.2 Students obey to the instruction of parents and teachers.                 |
| Ss3.3     | means Indicator 3.3 Students are honest.                                                      |

|       |                                                                                                     |
|-------|-----------------------------------------------------------------------------------------------------|
| Ss3.4 | means Indicator 3.4 Students are generous and munificent.                                           |
| Ss3.5 | means Indicator 3.5 Students can play and work with others in unity.                                |
| Sr4.1 | means Indicator 4.1 Students have interest, eager and love learning.                                |
| Sr4.2 | means Indicator 4.2 Students have a concept from learning experience.                               |
| Sr4.3 | means Indicator 4.3 Students have appropriate Thai language skills for their ages.                  |
| Sr4.4 | means Indicator 4.4 Students have appropriate English language skills for their ages.               |
| Sr4.5 | means Indicator 4.5 Students have science and mathematics processing skills.                        |
| Sr4.6 | means Indicator 4.6 Students have imagination and creativity.                                       |
| Sr4.7 | means Indicator 4.7 Students have appropriate problem solving skills                                |
| X6    | means Standard 2 Students have self-care and interaction in cultural society                        |
| St1.3 | means Indicator 1.3 Students have hygiene in their health care                                      |
| St1.4 | means Indicator 1.4 Students avoid conditions that have risks about diseases, accidents, and drugs. |
| St1.5 | means Indicator 1.5 Students have no illness/condition that affects their development.              |
| Ss3.6 | means Indicator 3.6 Students interact with each other with equality.                                |
| Ss3.7 | means Indicator 3.7 Students have respect for cultural differences.                                 |
| Ss3.8 | means Indicator 3.8 Students behave based on Thai cultures and their religions.                     |
| X7    | means Standard 3 Student have emotions and mentality development.                                   |

|       |                                                                                                                                                             |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sb2.1 | means Indicator 2.1 Students are cheerful.                                                                                                                  |
| Sb2.2 | means Indicator 2.2 Students feel good about themselves.                                                                                                    |
| Sb2.3 | means Indicator 2.3 Students are confident and assertive.                                                                                                   |
| Sb2.5 | means Indicator 2.5 Students appreciate art, music, movement,<br>and nature.                                                                                |
| X4    | means Standard 4 Teacher performance have efficient and<br>effective.                                                                                       |
| T5.1  | means Indicator 5.1 Teachers understands the philosophy,<br>principles, and nature of childhood<br>education and can apply their experience in<br>teaching. |
| T5.2  | means Indicator 5.2 Teachers make lesson plans according to<br>the childhood bilingual curriculum.                                                          |
| T5.3  | means Indicator 5.3 Teachers can provide various learning<br>experience corresponding to students<br>differences.                                           |
| T5.4  | means Indicator 5.4 Teachers manage classroom supporting<br>positive discipline.                                                                            |
| T5.5  | means Indicator 5.5 Teachers uses media and technology<br>appropriate to students' development.                                                             |
| T5.6  | means Indicator 5.6 Teachers assess students' development by a<br>variety of measurement and evaluation.                                                    |
| T5.8  | means Indicator 5.8 Teachers provides a learning environment<br>for all time.                                                                               |
| T5.9  | means Indicator 5.9 Teachers have good interaction with students<br>and parents.                                                                            |
| T5.10 | means Indicator 5.10 Teachers are qualified and competent in the<br>field of childhood education.                                                           |
| T5.11 | means Indicator 5.11 Teachers have ethics and responsibility in<br>their duty.                                                                              |
| T5.12 | means Indicator 5.12 Teachers accept cultural differences.                                                                                                  |

|       |                                                                                                                                                                        |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | means Standard 5 Teacher quality promotion.                                                                                                                            |
| T5.7  | means Indicator 5.7 Teachers conducts researches and develops learning management.                                                                                     |
| T5.13 | means Indicator 5.13 The number of Thai and foreign teachers is sufficient to students (The ratio is 1 Thai and 1 foreign teacher: 20 students).                       |
| T5.14 | means Indicator 5.14 Teachers can academically communicate in their native and second languages.                                                                       |
| X5    | means Standard 6 Administrators performance have efficient and effective.                                                                                              |
| M6.1  | means Indicator 6.1 The administrator understands the philosophy and principles of childhood education.                                                                |
| M6.2  | means Indicator 6.2 The administrator has vision, leadership, and initiatives in developing childhood students.                                                        |
| M6.3  | means Indicator 6.3 The administrator uses the principle of participatory management and uses data evaluation or research as the basement of academics and management. |
| M6.4  | means Indicator 6.4 The administrator can manage education to achieve the goals of quality development plan.                                                           |
| M6.5  | means Indicator 6.5 The administrator supports and develops human resources to be effective.                                                                           |
| M6.6  | means Indicator 6.6 The administrator gives academic suggestions and advices, and pays attention to childhood education with full potentials and time.                 |
| M6.7  | means Indicator 6.7 The administrator has leadership in creating an organization of cultures and learning.                                                             |
| X1    | means Standard 7 Educational management.                                                                                                                               |

- E7.1 means Indicator 7.1 The school has a curriculum for childhood education that can lead to efficient practice.
- E7.2 means Indicator 7.2 The school has a system and a mechanism engaging all parties to understand educational management for childhood education.
- E7.3 means Indicator 7.3 The school has an effective management system in giving services.
- E7.4 means Indicator 7.4 The school supports participation and cooperation with parents, society and local.
- A8.1 mean Indicator 8.1 The school sets standards of childhood education.
- A8.2 means Indicator 8.2 The school prepares and proceeds according to educational development plan to meet the standards of education.
- A8.3 means Indicator 8.3 The school prepares an information system and uses it in management.
- A8.4 means Indicator 8.4 The school monitors and evaluates the internal quality assessment results based on standards of education by using participation concept.
- A8.5 means Indicator 8.5 The school successively uses internal and external quality assessment results in improving the quality of education.
- A8.6 means Indicator 8.6 The school prepares annual reports on the internal quality assessment.
- Sc9.1 means Indicator 9.1 The school has a method/procedure to encourage participation in learning management.
- Sc9.2 means Indicator 9.2 The school becomes a place to develop learning of students and personnel.

|           |                                                                                                                                                                       |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sc9.3     | means Indicator 9.3 The school exchanges knowledge within the school, between families, communities, and related organizations.                                       |
| Ob10.1    | means Indicator 10.1 The school sets educational management process                                                                                                   |
| Ob10.2    | means Indicator 10.2 The school organizes projects and activities to achieve the goal, philosophy, and vision of childhood education.                                 |
| Ob10.3    | means Indicator 10.3 The school successfully achieves the goals.                                                                                                      |
| Ec11.1    | means Indicator 11.1 The school sets policy and developmental guideline according to the policy and educational reform guideline based on social context <sup>1</sup> |
| Ec11.2    | means Indicator 11.2 The school organizes projects and activities that support the policy of childhood education.                                                     |
| Ec11.3    | means Indicator 11.3 The school gives an opportunity to related person in setting promoting standards .                                                               |
| Ec11.4    | means Indicator 11.4 The school receives standard certification from the education committee.                                                                         |
| Ec11.5    | means Indicator 11.5 The school successfully achieves the goals.                                                                                                      |
| <b>X3</b> | means Standard 8 General management <sup>1</sup>                                                                                                                      |
| Sv12.1    | means Indicator 12.1 The school has a plan concerning safety of students.                                                                                             |
| Sv12.2    | means Indicator 12.2 The school has a process and management concerning safety and welfare of students.                                                               |
| Sv12.3    | means Indicator 12.3 The school arranges location, tools, equipment and materials based on the safety of students.                                                    |

- Sv12.4 means Indicator 12.4 School staffs have knowledge and skills to provide health services and security to students.
- Sv12.5 means Indicator 12.5 Students are safe and/or students receive health services and security.
- Ma13.1 means Indicator 13.1 The school arranges facilities for student development.
- Ma13.2 means Indicator 13.2 The school arranges the environment supporting the potential of self-discovery and learning through playing.
- Ma13.3 means Indicator 13.3 The school prepares activity and food that support the integrity of the body.
- Ma13.4 means Indicator 13.4 The school arranges the premises suitable for giving services.

## STATEMENT OF ORIGINALITY

The Bilingual school system on Early childhood Education level was an outstanding educational innovation of Thailand founded in 1994 by Office of the Private Education Commission (OPEC). Nowadays, however modern Bilingual schools do not have specific standards, indicators and internal educational assurance model for Quality Control, Quality Audit and Quality Assessment which is crucial and suitable for the contexts of these schools. Due to the issue this research was initiated in order to study and experiment upon the standards, indicators and internal educational assurance model for Quality Control, Quality Audit and Quality Assessment. The research's purpose was to construct and sustain a suitable and efficient Model for the Quality Assurance. In addition, this research leads to a profound development of Bilingual system in Thailand.

Researcher certifies that the content in the research consist of essential studies which are solely done by the researcher and with supervision of the researcher's adviser. The founding of this research originated from reliable data. The researcher certifies that the objective thesis is not aiming to achieve degree in other university apart from CMU.

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved



## ข้อความแห่งการริเริ่ม

การจัดการศึกษาแบบสองภาษาในระดับปฐมวัย เป็นนวัตกรรมทางการศึกษาของประเทศไทย ซึ่งได้เริ่มดำเนินการตั้งแต่ปีพุทธศักราช 2537 โดยสำนักงานคณะกรรมการการส่งเสริมการศึกษาภาคเอกชน กระทรวงศึกษาธิการ (ศธ.) ปัจจุบันการจัดการศึกษาแบบสองภาษายังไม่มีมาตรฐานและตัวบ่งชี้ ตลอดจนรูปแบบการประกันคุณภาพการศึกษาภายในที่มีความเฉพาะ เพื่อใช้ในการควบคุม ติดตาม ตรวจสอบและประเมินผลการจัดการศึกษาใน การวิจัยครั้งนี้จึงมุ่งศึกษามาตรฐานและตัวบ่งชี้คุณภาพการจัดการศึกษาแบบสองภาษา และพัฒนารูปแบบการประกันคุณภาพการศึกษาภายใน สำหรับโรงเรียนสองภาษา ในระดับการศึกษาปฐมวัย ซึ่งเป็นรูปแบบที่มีคุณภาพทั้งในเชิงทฤษฎีและเชิงการนำไปปฏิบัติ อันจะนำไปสู่การพัฒนาการจัดการศึกษาแบบสองภาษาภายใต้ระบบการศึกษาของประเทศไทย

ผู้วิจัยขอรับรองว่าเนื้อหาในวิทยานิพนธ์ฉบับนี้ เกิดจากการศึกษาค้นคว้าของผู้วิจัยโดยได้รับคำแนะนำจากอาจารย์ที่ปรึกษา ซึ่งผลการวิจัยได้มาจากแหล่งข้อมูลที่มีความน่าเชื่อถือและได้รับการยอมรับและขอรับรองว่าวิทยานิพนธ์ หรือส่วนหนึ่งส่วนใดของวิทยานิพนธ์ฉบับนี้ไม่ได้ถูกเสนอขอรับปริญญาในสถาบันการศึกษาอื่น หรือเพื่อวัตถุประสงค์อื่น

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved