CHAPTER 5

Summary, Conclusions, and Recommendations

This study aimed (1) to explore instructional management conditions, knowledge and understanding in instructional management, and needs and necessity in developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students, (2) to construct and identify the quality of the evaluation model for developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students, and (3) to identify the utilization results of the evaluation model for developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students. This research was divided into three major items as follows:

(1) Exploring instructional management conditions, knowledge and understanding in instructional management, and needs and necessity in developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students. The sample group was 741 science teachers teaching in educational institutes delivering in primary education level and junior high school level, located in Phitsanulok and Uttaradit Provinces. The sample group was obtained via multi-stage random sampling separated into groups based on educational service areas. The research tool was Set 1: Questionnaire on conditions of instructional management, knowledge and understanding toward instructional management, and needs and necessity in developing science teachers' instructional management enhancing the abilities in reading, critical thinking, and writing of basic education students. The data were analyzed by means of frequency distribution, percentage, mean, standard deviation, and Modified Priority Need Index.

(2) Constructing and identifying the quality of the evaluation model for developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students. The researcher presented the research operation into three parts which were (1) synthesis of indicators in instructional management which enhanced reading, critical thinking, and writing of basic education students, (2) evaluation model construction, and (3) quality identification of the instructional management model. As for Part 1: Synthesis of indicators in instructional management, the sample group was 294 science teachers teaching in primary schools and junior high schools affiliated with Uttaradit Primary Educational Service Area Office 1. The research tool was Set 2: Questionnaire on the appropriateness of the indicators toward instructional management. The data were analyzed via the Exploratory Factor Analysis. As for Part 2: Evaluation model construction, the constructed evaluation model consisted of five components which were (1) evaluation objectives, (2) objected evaluated, (3) evaluation operation: evaluators, evaluation tools and methods, (4) evaluation result judgement, and (5) evaluation result report and utilization for developing instructional management. And, as for Part 3: Quality examination of the evaluation model, the key informants were 11 experts in testing and evaluation theories, testing and evaluation operation, and instructional management. The tool used to gather the data was Set 3: The quality evaluation form of the evaluation model in terms of propriety, feasibility, clarity, and easiness when being utilized of the model. The data were analyzed by means of descriptive statistics, namely mean and standard deviation.

(3) The utilization results of the evaluation model for developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students. The sample group was 30 science teachers teaching in primary education level and junior high school level affiliated with Uttaradit Primary Educational Service Area Office 1 selected from the science teachers applied in the project. The research tools used to gather the data were the following three sets – Set 4: Evaluation form on instructional management abilities, Set 5: Questionnaire toward instructional management attitudes, and Set 6: Evaluation form used to evaluate the evaluation model for developing instructional management. As for Set 4: Evaluation form on instructional management abilities, the data gained

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were analyzed by identifying frequency, percentage, mean, and Wilcoxon Rank Test. As for Set 5: Questionnaire toward instructional management attitudes, the data were analyzed by identifying mean and standard deviation. And, as for Set 6: Evaluation form used to evaluate the evaluation model for developing instructional management assess by the science teachers who utilized the model, the data were analyzed by identifying mean and standard deviation.

The data in this chapter were presented in three major items which were summary of study results, conclusion of study results, and recommendations. The details were shown as follows:

5.1 Summary of Study Results

The summary of the study results was divided into three major items as follows:

5.1.1 The results of the study of instructional management conditions, knowledge and understanding in instructional management, and needs and necessity in developing science teachers' instructional management, which enhanced the abilities in reading, critical thinking, and writing of basic education students

(1) According to the study results of the instructional management condition, it was found that the sample group of the science teachers operated the instructional management at a moderate level both in an overall picture and in each item classified as teaching preparation, instructional process, and summary records, reports, storage, and learning outcome utilization.

(2) In terms of the study results of knowledge and understanding found among the science teachers, it was found that most of them possessed knowledge and understanding toward instructional management at a moderate level or 64.24 percent.

(3) In terms of the study results of the needs and necessity in developing instructional management, it was found that the science teachers needed and were necessary to be developed in the instructional management in every item. The first three items were "Tool production used to evaluate reading, critical thinking, and

writing," "Scope determination of reading, critical thinking, and writing," and "The application of learning outcomes in reading, critical thinking, and writing to plan and develop students constantly," respectively.

5.1.2 The results of the construction and quality identification of the evaluation model for developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students

(1) The results of the model construction

It was found that the evaluation model for developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students constructed by the researcher consisted of five components which were (1) evaluation objectives, (2) objects evaluated, (3) evaluation operation, (4) evaluation result judgement, and (5) result reports and utilization in developing instructional management. Each component contained relating elements as follows:

1.1 Evaluation objectives: to obtain feedback information to develop science teachers' instructional model enhancing the abilities in reading, critical thinking, and writing.

1.2 Objects evaluated: the objects evaluated were 29 indicators of the instructional management abilities.

1.3 Evaluation operation: this consisted of evaluators, evaluation tools, and evaluation methods.

1.4 Evaluation result judgement: this consisted of evaluation criteria and judgement criteria.

1.5 Evaluation result reports and utilization in developing instructional management: they consisted of the evaluation result reports of instructional management abilities and instructional management development.

(2) The Examination Results of the Model Quality

According to the quality evaluation results performed by the experts toward the evaluation model for developing science teachers' instructional management which

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enhanced the abilities in reading, critical thinking, and writing of basic education students, it was found that the model possessed propriety, feasibility, clarity, and easiness when applied at the highest level with an opinion average between 4.55 and 5.00.

5.1.3 The utilization results of the evaluation model for developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students

(1) The utilization results gained from the sample group of the science teachers who authentically used the model

The utilization results of the evaluation model for developing science teachers' instructional management which enhanced the abilities in reading, critical thinking, and writing of basic education students were shown as follows:

1.1 Before the teachers were developed in an overall picture, it was found that, out of a sample group of 30 science teachers, there were 23 science teachers passing the evaluation criteria, seven failing the evaluation criteria in an overall picture, and 15 failing in terms of each aspect. In other words, there were 22 people failing the evaluation criteria. The research operation during this period contained two development methods which were (1) training to give knowledge for those who failed the evaluation and (2) consultation and facilitation to develop every science teacher in the sample group while operating the instructional management. As for the former method, training to give knowledge, the researcher as an empowering evaluator together with aforementioned science teachers in the sample group applied the evaluation results to plan the instructional management development via the training to give knowledge as necessary based on the evaluation results.

The researcher determined the training curriculum in order to give knowledge which were as follows:

(1) Lesson plan preparation,

(2) Evaluation tool preparation,

(3) Instructional methods, and

(4) Learning outcome reports. The training also included theoretical parts and practicum given by guest speakers, namely disciplinary experts. After that, the empowering person gave consultation and facility. As for giving consultation, the empowering person divided into two groups that were as follows:

4.1 A group given consultation by means of coaching. This group consisted of the science teachers who met the evaluation criteria.

4.2 A group given consultation by means of monitoring. This group consisted of the science teacher who did not meet the evaluation criteria. Additionally, giving consultation and facility was occasionally operated simultaneously. This enabled the science teachers gained trust, faith, and confidence while operating in a friendly manner with administrators, science teachers, academic teachers, and other teacher peers in schools. It was achieved by providing media, technologies, and teaching techniques based on the science teachers' needs.

1.2 As for the evaluation results of science teachers' instructional management enhancing the abilities in reading, critical thinking, and writing of basic education students after being developed, it was found that everyone met the evaluation criteria both in an overall picture and in each item entitled teaching preparation, instructional processes, and summary records, reports, storage, and learning outcome utilization.

1.3 As for the findings gained from comparing the abilities in science teachers' instructional management, it was found that the science teachers possessed higher abilities in instructional management after being developed than those before being developed. The difference was statistically significant at 0.01 level.

1.4 The science teachers expressed their attitudes toward the instructional management enhancing the abilities in reading, critical thinking, and writing of basic education students with an overall picture at a high and an extremely high levels.

(2)   The quality evaluation results of the evaluation model as assessed by the sample group of the science teachers

The quality evaluation results of the evaluation model for developing science teachers' instructional management enhancing the abilities in reading, critical thinking, and writing of basic education students were assessed by the science teachers who utilized the evaluation model. It was found that the evaluation model possessed standards in utility, feasibility, ethical propriety, and accuracy in an overall picture at an extremely high level with an opinion average between 4.67 and 4.74.

5.2 Conclusion of the Study Results

The conclusion of the study results was divided into three minor items as follows:

5.2.1 The Study of Instructional Management Conditions, Knowledge and Understanding in Instructional management, and Needs and Necessity in Developing Science Teachers' Instructional Management

The research findings of this item were considered descriptive research expressed the practical conditions and knowledge levels in managing instruction of a sample group of the science teachers. This linked to the research findings of needs and necessity in developing science teachers' instructional management. The researcher discussed as follows:

(1) That a sample group of the science teachers operated the instructional management consisting of teaching preparation, instructional processes, and summary records, reports, storage, and learning outcome utilization at a moderate level was due to the fact that they affiliated with small-sized schools. There were not enough teachers for classes; their educational qualification did not match their subjects taught. There was a lack of appropriate teaching media even though their headquarter solved the problem by providing distant education via satellites from Klai Kang Won School which was ready in terms of teachers possessing educational qualification in line with their subjects and technological media used while instructing. This was cooperated with facilitating for teachers via teaching manual so that they could study. However, according to the research results, teachers still performed their instructional

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management at a moderate level. Chairat Sujirat (2007), Boonchom Srisa-ard (2003), Tisana Khammani (2002), and Sirichai Kanjanawasee (2009) regarded that teaching preparation, instructional processes, and summary records, reports, storage, and learning outcome utilization were the teachers' roles and duties based on the Basic Education Core Curriculum B.E. 2551 and the professional standards. According to the research, it was found that the media the teachers used to teach their students to read, critically think, and write were textbooks at 88.53 percent. The instructional management methods used to teach the students to read were in a format that the teachers read before and the students followed (the Office of the Basic Education Commission: 2015). This was in contrast with the instructional management based on the Basic Education Core Curriculum B.E. 2551 and Bruner's concepts (1963) regarding that the learning enabling children to construct knowledge body by themselves was the learning from authentic practice from concrete to abstract.

(2) That a sample group of science teachers possessed understanding in the concepts and principles in instructional management in terms of teaching preparation, instructional processes, and summary records, reports, storage, learning outcome utilization at a moderate level as the headquarter determined broad instructional guidelines. This determined the educational institutes to hold instructional activities that allowed the students to practice authentically and provide or develop instructional media for students to read, critically think, and write, such as textbooks, articles, tales, and journals. These activities allowed the educational institutes to hold activities along with the instruction of the science content group. The educational institutes determined the indicators required to possess among learners, such as the abilities in defining, interpreting, understanding, and expecting events from reading key concepts, the abilities in grouping, classifying, comparing, and selecting valuable data from reading situation or events, the abilities in writing definition, classification, and brief summary of key concepts, and the abilities in writing linkage summary with supplementary reasons. It could be seen that these indicators required the teachers to measure student behavior in reading, critical thinking, and writing from fundamental thinking to higher thinking levels based on Bloom's concepts (1956). It was necessary that the teachers have to possess these aforementioned topics. However, according to the researcher's study of the attitudes of a sample group of science teachers, it was found that they never

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experienced the instructional management at 53.40 percent. They were also obtained consultation in instructional management at 81.40 percent. This resulted in some teachers lacked reading and writing skills. In terms of scientific content that the teachers used in the instructional management, they had to understand the content as well. This was in line with the research findings of Billy Mcclune and Ruth Jarman (2010) who regarded that the teachers had to possess knowledge in scientific content together with reading and writing skills in order to apply experience to develop students' abilities until the results were achieved as determined in the indicators.

(3) That the teachers needed the development in instructional abilities in terms of constructing evaluation tools for students the most was due to the fact that the tools for evaluating student reading focused on evaluating students from their authentic practice by measuring the abilities in thinking critically. Reading was regarded as a high thinking skill. However, according to the research findings of Phinda Warasunun (2011), it was found that most teachers constructed the tests measuring knowledge and memory which were not in line with constructing evaluation tools toward students' critical thinking skills from reading. When constructing these tools, the teachers had to possess skills in writing situation for students to read and evaluate their reading abilities from analyzing to classifying what they read, from grouping to comparing what they read whether it was appropriate or not. They had to summarize with supplementary reasons from what they read as well. It could be seen that evaluating student reading from situation contained the details expressing the development in thinking critically. According to the research findings of the Institute for the Promotion of Teaching and Science and Technology (2013), it was found that teachers lacked the evaluation skills that expressed the details of the evaluation tools. Therefore, it could be a supporting reason telling that the teachers needed the development in constructing the evaluation tools as well.

However, Tisana Khammani et.al. (2002) identified that the evaluation was a part of the instructional processes, aiming to judge the learning level of the students. The instructional processes enhancing the students to learn via reading, analyzing what they read, and writing reasonably relied much on teachers' methods in teaching them to possess those skills. Klausmeier (1985) believed that human learning was like brain

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operation in that the brain acquired the information from reading and processed it by controlling brain thinking as required. The teachers played an important role in employing teaching techniques to stimulate student thinking until it achieved the required goals.

According to the aforementioned parts, it was extremely necessary that the teachers be developed in their instructional management abilities. Like Krissana Wongkom's research (2004), it was found that teachers were satisfied with the teacher development in learning evaluation aspect via giving consultation and facilitating. Chusri Wongrattana et.al. (2010) conducted the research on the activities mostly used to develop teachers via training consisting of four steps which were (1) an exploration of teacher needs and necessity, (2) teacher training, (3) knowledge application from training to authentic practice of monitoring, giving advice and consultation, and giving feedback, and (4) teacher operational summary and feedback information from teacher peers.

5.2.2 Construction and Quality Identification of the Evaluation Model

The evaluation model constructed in this research was considered an evaluation to acquire the information from the evaluation results in order to develop teacher instructional management and be the teacher guidelines based on the instructional management indicators determined. The researcher discussed this as follows:

(1) The evaluation model aimed to gain the information from the evaluation results, namely the abilities in managing instruction of the teachers. Therefore, the evaluation results were applied to develop teacher instructional management until it achieved as determined in the indicators. This was in accordance with Sirichai Kanchanawasee (2009) who mentioned that the evaluation had to possess evaluation objectives and objected evaluated in order to apply the evaluation results to develop the value of the objects evaluated until it achieved the objectives.

(2) This evaluation model consisted of the evaluators from various parties relevant, namely teachers, administrators or academic teachers, and empowering people

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so that the feedback was gained from various evaluators (Phitsanu Fongsri: 2007). This operation contributed to the reliability of the information.

(3) This evaluation model employed the evaluation criteria that consisted of scoring scales and scoring criteria identifying clear work differences. The judgement of the evaluation results by considering the overall work in each indicator and qualitative explanation (Somsak Phuvipadawat: 2001) enabled the evaluation results to mostly reflect work quality that was in line with authentic conditions and possess justice toward those evaluated.

(4) The evaluation results acquired from the evaluation model allowed those evaluated to express their opinions toward the evaluation results without violating individual rights (the Joint Committee on Standards for Education: 1994) whether those evaluated accepted them or not.

(5) The quality of this evaluation model was appropriate, feasible, clear, and easy-to-use at the highest level due to the followings:

5.1 This evaluation model was developed based on academic concepts in that there was a study of contexts and the needs and necessity of the science teachers. Then, the information gained was combined with the educational evaluation concepts of Nero (1983), Sirichai Kanchanawasee (2013), and Yaowadee Rangchaikul (2003) and determined as the evaluation framework in terms of why the evaluation was performed, what was evaluated, how to evaluate, which methods used to evaluate, who evaluated, and which criteria used to judge the value. The empowerment evaluation concepts of Fetterman (2005) were also explored. They focused on the evaluation for development which consisted of two types of development which were training to give knowledge and consultation and facilitation. After that, the researcher synthesized, identified the quality of the evaluation model, employed the model, modified the model, and publicized the model.

This research revealed that this evaluation model was acquired from systematic study beginning from the exploration of teacher contexts, reliable educational concepts which were practically feasible in trying out, modification, and dissemination of the model.

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The researcher applied the concepts of the Far West Laboratory for Research and Development (Borg and Gall: 1981) in developing the model which consisted of ten steps as follows. (1) In terms of research and data collection, the researcher explored the instructional management conditions, knowledge and understanding in managing the instruction, and the needs and necessity in developing the instructional management. It was found that the science teachers operated the overall instructional management at the moderate level. When considering each aspect, it was found that the teaching preparation was mostly at the moderate level (the scores between 50.00-70.00 percent). In terms of the needs and necessity of the teachers, it was found that they needed and were necessary in developing the instructional management in every variable at a similar level. This research step collected the data for making decision in developing the model and determining key characteristics of the model. (2) Planning was the determination of objectives in planning the operation, resource utilization, and operational periods in developing the model. (3) Preliminary model development was a preparation of model usage, manual, and evaluation methods based on the details determined in planning periods which were in line with the Basic Education Core Curriculum B.E. 2551. The model quality evaluation performed by the experts was used as preliminary information for developing the model. (4) Preliminary field testing was performed by employing the model with a small sample group. The data were collected via interviewing on the results after trying out the model in order to evaluate the content and language. (5) Main product revision was the revision based on the suggestions of the preliminary field testing. (6) Main field testing was performed by applying the model with a medium-sized sample group. In this step, the qualitative data were collected, especially the content and instruction, via non-structured interview with the sample group in order to identify the data and modify prior to authentic practice. (7) Operational product revision was based on the suggestion from the main field testing. (8) Operational field testing was performed by applying the model modified in authentic practice with a sample group of the science teachers. The data were collected through the evaluation form of the abilities in instructional management, the questionnaire on attitudes toward the instructional management, and the evaluation form on the quality of the evaluation model. (9) Final product revision was based on the suggestions from the operational field testing. In this step, the researcher provided the model utilization

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manual which consisted of three issues, namely (a) administrators or academic teacher heads, (b) science teachers, and (c) empowering people for the sake of the usage convenience. Five sets of the guidelines regarding the guidelines in developing the instructional management were provided for a sample group of the science teachers and the evaluators for further exploration as necessary. (10) Dissemination and implementation was the step of preparing the research report, disseminating, and utilizing for the sake of expanding the research findings.

5.2 This evaluation model offered the information of the evaluation results in order to be employed in developing the instructional management of the teachers via training to give knowledge and consultation while operating. This was in line with the research of Sathida Sakulrattanakulchai (2010) who evaluated the instruction in a format of architecture studio evaluation and applied the evaluation results to develop the instructional management of the teachers. However, these research findings limited only in training to give knowledge, consultation, and facilitation the teachers in learning evaluation. Similarly, Chusri Wongrattana et.al. (2010) explored the guidelines in developing instructional competency of the teachers both domestic and foreign. It was found that the activities mostly used to develop teacher competency were training and knowledge sharing.

5.3 This evaluation model was equipped with the manual of model utilization that those who used the model could study the evaluation details based on instructional management indicators. It contained systematic evaluation steps leading to convenient utilization.

5.2.3 The Utilization Results of the Evaluation Model

These utilization results of the evaluation model were acquired from evaluating a sample group of the science teachers, and they were used to develop the instructional management of the teachers until the goals were fulfilled. The researcher discussed as follows:

(1) The evaluation results revealed that there were 22 science teachers out of a sample group of 30 teachers who failed the evaluation. Those failing the evaluation

acquired training to give knowledge in order to adjust knowledge foundation based on the needs of the evaluation results. This was in line with the systematic training concept of Sane Juito (2011) who mentioned that the goal determination of the training was set as needed by the participants. The training was considered a method to develop the teachers based on this evaluation model. The training methods to give knowledge by the empowering people were coordinated with those of the experts who were knowledgeable and capable in transferring techniques. According to the knowledge transfer of the speakers, it was found that (1) training media were modern, such as video tapes and projectors. (2) Attention was constructed among the participants by giving examples of familiar situation while giving knowledge. (3) The training production was cooperatively reflected in person. Besides, the training atmosphere was comfortable in terms of materials, tools, and media without bothering noises. Therefore, the evaluation results toward the training operation given by the sample group of the science teachers were at the highest level. Another teacher development method was giving consultation to the sample group of 30 science teachers. The researcher as an empowering person was operating during the teacher operation in instructional management at schools. There were two types of giving consultation which were (1) coaching for the science teachers who passed the evaluation criteria by determining the indicators and instructional management guidelines for the teachers. After that, there were the follow up and consultation as needed until they achieved the goals in managing the instruction. (2) The second type was mentoring which dealt with giving the consultation by the empowering person as a mentor of a sample group of the science teachers who failed the evaluation criteria. The empowering person would teach as an example in order to correct their teaching methods and closely give consultation in managing instruction from preparing teaching, instructional processes, summary records, reports, storage, to learning outcome utilization until the teachers could achieve the goals in instructional management. In addition, the empowering person facilitated the science teachers in (1) providing a venue for brain storming, (2) facilitating the data process of the evaluation results, (3) coordinating and constructing understanding with the administrators in supporting materials and tools for teachers, (4) pairing up in order to exchanging and learning together allowing the teachers to operate activities constantly, (5) being flexible during operation, and (6) providing additional documentations as necessary. The

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aforementioned operation in developing the instructional management was considered the evaluation and modification of the operation equipped with monitoring and following up (Levin: 1996). This was in line with the research findings of Krittiya Wongkom (2004) who mentioned that teacher self-evaluation and giving consultation during the operation contributed to teacher confidence in their operation.

(2) The operation based on this evaluation model enabled a sample group of every science teacher to possess the evaluation results that passed the evaluation criteria after being developed in their instructional management. When comparing with the abilities in instructional management before and after being developed, it revealed that the science teachers possessed the abilities in instructional management after being developed higher than those before being developed at a statistically significant level of 0.01.

Due to the fact that the indicators of the instructional management which were considered a part of the evaluation model were obtained from synthesizing documentations and identifying structural validity via higher statistics, they were reliable. When the empowering person applied these indicators to be the goals in developing teachers, it revealed that after being developed the teachers could write instructional plans identifying the activities for the students to practically operate. They could assess the students authentically, employ concrete instructional media, possess teaching techniques for the students to perform, evaluate student work via scoring rubrics, and use interesting media and technology in their teaching. The student work derived from their teaching was obtained from what the students read. The students could apply their reading media to construct new knowledge body, take it to analyze their daily situation, and then write a rational summary. This teaching method was in line with the constructivism concepts and wisdom development of Bruner. In addition, the researcher facilitated a sample group of the science teachers by providing the guideline to teach reading in a metacognitive manner which controlled thinking via reading. There were three steps in doing this which were (1) pre-reading activities which allowed the students to read and organize their thinking systems between former and new knowledge. (2) While-reading activities dealt with allowing the students to write summaries of the new knowledge body and evaluate themselves once again in

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order to examine whether what they read fulfilled the goals or not. The teachers would advised and facilitated student in holding these activities. This told that reading and writing skills and scientific knowledge were an important factor in developing student work in writing and summarized rationally. This was in line with the research findings of Billy Mcclune and Ruth Jarman (2010) who believed that constructing knowledge in reading skills sensibly via reading scientific news relied much on the readers' scientific knowledge, reading skills, and writing skills.

(3) According to employing this evaluation model, a sample group of science teachers possessed positive attitudes toward the instructional management at the highest level as the science teachers and those relevant to this research collaborated in operating the activities in line with the model depending on their different roles and duties. They then had a sense of belonging while having motivation in operating (Supaporn Thamwichaiphan: 2007). This could lead to their positive attitudes in instructional management which were considered a successive result from their work. The effect of employing the evaluation model was in line with that of Sirichai Kanchanawasee (2009) who mentioned that the operational outcomes were considered the destination following the production and the effect.

(4) After employing the model, it was found that a sample group of the science teachers agreed that this evaluation model contained utility, feasibility, propriety, and accuracy standards at the highest level due to the followings.

4.1 Relevant people were identified depending on their roles and duties, namely science teachers, administrators, and empowering people. These relevant people were capable enough to employ the model as there was a manual to study and a meeting to clarify leading to mutual understanding prior to the evaluation. The evaluation scopes, methods, tools, result reports, and evaluation result utilization to develop were clearly determined.

4.2 There was explanation regarding evaluation methods and development in the evaluation manual and guidelines for developing the instructional management which were easy-to-use and not complicated.

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4.3 There was an instruction manual with clear and concrete explanation at the quality level. This allowed those evaluated to either accept or refuse the evaluation results. The evaluation methods and results were based on the concepts.

4.4 Evaluation result reports were based on systematic data collection and analysis with clear explanation and development guidelines that were in line with the evaluation. It was an evaluation for judgement and development based on evaluation concepts in order to revise whether it fulfilled the goals or not.

According to the summary and the conclusion of the study results, the researcher had some observation which could be summarized as the knowledge body as follows:

(1) The model strength lay in the fact that it was an evaluation for applying the evaluation results to develop the instructional management in line with the needs and necessity. There were two development methods which were (1) training and (2) counseling and facilitating. The training aiming at giving knowledge depended on the diagnosis results of the evaluation individually. Therefore, it was considered the development on a key basis of individual differences.

(2) The evaluator role of the instructional management based on the model was important to the evaluation results. If the evaluation results were biased due to the evaluators, it would result in the instructional management development of the science teachers evaluated as the results would not in line with factual information which was the teacher's internal characteristic. Therefore, the evaluators had to possess clear understanding toward the evaluation details of each indicator prior to the evaluation. While evaluating, the behavior of those evaluated had to be assessed only when it was expressed so that the evaluation results were reliable.

(3) This evaluation model was considered a new trend in that the evaluators played a role as being the evaluators and developers simultaneously until the teachers could learn and construct the knowledge body by themselves. Therefore, it was considered a participatory learning society in a team format.

(4) This evaluation model possessed utility standards as there was an identification of those relevant based on their roles and duties, namely science teachers, administrators, and empowering people. Those relevant were capable enough to utilize

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the model as there was a manual for them to study. Moreover, there were meetings in order to mutually understand prior to the evaluation. The ranges of the evaluation, evaluation methods, evaluation tools, result reports, and evaluation result application for development were clearly determined.

(5) This evaluation model possessed feasibility standards as the evaluation methods and development were explained in the evaluation manual. The guidelines of the instructional management development were easy-to-use and not complicated.

(6) Knowledge and practical skills in the instructional management of the teachers related to each other positively and negatively. However, they were inverse to the needs and necessity in developing the instructional management. The less knowledge they possessed, the less practical skills in the instructional management they performed. And, this resulted in higher needs and necessity for development. However, the more knowledge they possessed, the more practical skills in the instructional management they performed. And, this resulted in lower needs and necessity for development.

(7) The roles of science teachers in managing the instruction which was in line with the Basic Education Core Curriculum B.E. 2551 consisted of teaching preparation, instructional processes, and summary records, reports, storage, and learning outcome utilization. The teachers were supposed to operate completely in these three parts. (a) Teaching preparation was determined as instructional goals that learners had to possess. The teaching methods focusing on authentic practice had to be designed as well as instructional media, measurement, and evaluation toward learners' learning results based on authentic conditions. (b) The instructional processes dealt with the utilization of teaching methods designed to motivate and provoke students so that they possessed learning behavior and achieved desired goals. The technological media were utilized in the instructional management in order to attract learners' attention. The atmosphere was constructed during the instruction. The measurement and evaluation of the learners' learning results were performed in order to improve and judge their learning via various methods on a basis of student-centered approach. (c) The summary record, reports, storage, and learning outcome utilization were employed as the summary and

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the learning result reports which reflected to the learners and teachers at which quality level they were.

(8) The instructional management enhancing the abilities in reading, critical thinking, and writing of basic education students would succeed or not, depending on teaching and evaluation methods in authentic conditions which were operated together in order to develop learner quality so that they were capable in reading, critical thinking, and writing in line with the Basic Education Core Curriculum B.E. 2551.

(9) The expert qualification in evaluating and reinforcing the science teachers was supposed to be knowledgeable and experienced. They might be selected from either internal or external staff of organizations. Another qualification was friendliness as there had to be interactions with those developed and relevant periodically in operating the model.

(10) The evaluation and development of the abilities in managing instruction individually was considered the development of authentic abilities of science teachers in that the teachers changed their teaching behavior based on each teacher's potential.

(11) The success factors of the instructional management were the cooperation in working based on their roles and duties as administrators, science teachers, and empowering people. The science teachers had to possess knowledge in content, development of reading and writing skills, and evaluation of reading, critical thinking, and writing. The empowering people possessed the abilities in motivating, provoking, and facilitating. The administrators were interested and supported appropriate resources contributing to motivation in operating for teachers.

5.3 Recommendations

5.3.1 Recommendations on Utilizing the Model

(1) According to this evaluation model, the evaluation steps before developing the instructional management were considered the value judgement of the evaluation results. The evaluators had to possess knowledge and evaluated fairly based on evaluation concepts. Moreover, those evaluated needed to accept the evaluation

results willingly. Therefore, the evaluators were supposed to be supervisors, academic teacher heads, or representatives from relevant departments that those evaluated gave trust and faith to.

(2) This evaluation model employed the empowering evaluation concept to develop the instructional management via providing training to give knowledge as necessary based on the evaluation results gained from self-evaluation and those relevant which were reliable. There was a follow-up on the training results which contributed to qualified training, efficiency, and value. Therefore, the plan was supposed to be cooperating between those failed the evaluation criteria and the empowering evaluator in order to determine the training curriculum to give knowledge.

(3) This evaluation model consisted of giving consultation and facilitating the science teachers. The time period was flexible in order not to affect the instruction with an agreement on operating together as set of desired goals. Therefore, educational institutes and those relevant were supposed to have an agreement in working together in order to share responsibilities.

(4) In terms of employing this evaluation model, there were a material support and team participation in evaluating and following up from the administrators. This was considered the responsibility of the educational institutes and relevant departments in operating in a teamwork system. Therefore, the administrators or those assigned were supposed to be attentive and cooperative in supporting materials and devices used in operating as set in the model.

(5) Those who employed the evaluation model were supposed to possess knowledge and understanding in what they evaluated before instructional management development so that the evaluation results were highly reliable. Also, they were supposed to be friendly with teachers and administrators, were accepted by teachers, were able to cooperate with teachers, and had time to give consultation while working together all the time.

(6) This evaluation model possessed the integration with the instruction of science learning content groups. In order to get rid of repetition, the indicators were

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supposed to be analyzed so that the indicators of reading, critical thinking, and writing based on the Basic Education Core Curriculum B.E. 2551 together with the instructional management were covered simultaneously.

(7) Those who employed this model were supposed to explore and understand the manual of model utilization thoroughly in terms of components, details of each indicator, and evaluation criteria in order to gain accurate information and evaluation results as much as possible.

5.3.2 Recommendation for Further Research

(1) This research aimed at evaluating the instructional management covering both at a class level and an educational institute level in regard to the Basic Education Core Curriculum B.E. 2551. As for school age children, the research conducted at childhood, higher education, preschooler, and adult levels were supposed to be performed.

(2) This research applied the empowering evaluation concept which was a natural evaluation. It was the evaluation performed together with the development via evaluating before and after the instructional management development of the science teachers in order to compare the beginning and the end of development in a time period. The evaluation during the instructional management also performed in order to take the evaluation results to modify and adjust the instructional management. There was a flexibility based on situations until the goals were fulfilled. It was found that the science teachers thought that the model possessed utility, ethical propriety, feasibility, and accuracy at a high level. Therefore, there was supposed to be the research conducted in other dimensions, namely the instructional management at a community level which was considered non-formal education, and at an individual level which was considered informal education.