Collaborative Training Model (CTM): An Alternative Solution to Overcome Remote Areas Elementary Teacher Gaps on ICT Competencies

Piter Joko Nugroho
University of Palangka Raya, Indonesia
piter@mp.upr.ac.id

Theo Jhoni Hartanto
University of Palangka Raya, Indonesia
theo@fkip.upr.ac.id

Abstract: Until now an innovative training model to improve elementary school teachers' competency in remote areas has not been presented in education management science repertoire. The teacher professional development program through the training currently carried out by the government in reality has not been able to significantly improve teacher competencies, due to mass nature, not based on the real of teachers' needs; so that it has an impact on wasted of time, effort and also budget. This development research adopts the 4D development model which consists of stages of define, design, development and disseminates aims to develop an innovative training model to overcome the problems of elementary school teachers in remote areas. Overall, this research is not finished yet because up to this article writing, a research process is still underway at the CTM trial stages for elementary teachers in remote areas of inland. At least up to this stage, it can be concluded that CTM has the potential as: (1) an alternative solutions to solve remote areas elementary teachers' competency gap problems, especially related to ICT skills; and (2) an alternative solutions to realize meaningful training based on the needs of elementary teachers in the context of remote areas.

Keyowds: collaborative training model, remote areas teacher, ICT competencies

I. INTRODUCTION

The low of teachers quality, limited professional development programs (Gandara et al, 2001), and inability to improve and maintain teachers quality are real problems faced by remote area teachers (Arnold, 2001). The quality of education at the level of schooling education is highly correlated with teachers' quality, especially at primary education level; the basic education quality is strongly influenced by the level of professionalism of the teacher (Bafadal, 2003). The knowledge and competence of teachers has a significant impact on academic performance of their students, so that it can be said that the quality of education itself cannot possibly exceed from the quality of its teachers (Barber and Mourshed, 2007).

The characteristics of remote areas appear with distinctive geographical, socio-cultural and educational characteristics, thus requiring a separate approach in handling their education (Siram, 1992). Glass (in Heslop, 1996) explains that the impact of living in remote settings should not be underestimated because teachers who work in remote areas are the same as moving assignments or serving other parts of the world. The support and seriousness of the government in guarding the teaching profession through various innovative programs will greatly determine the quality of education in region.

The training program is one form of sustainable professional development mandated by Minister of Administrative Reform Regulation - Bureaucratic Reform (MAARR-BR) Number 16 of 2009 which is currently a trend model to improve teacher competency in reality as yet to show results as expected in improving teacher competence. Teacher training is a planned effort to improve mastery of teacher competencies, namely mastery of knowledge, skills and attitudes so that teachers can carry out their duties professionally (Noe, et al., 2010; Hammerness, 2005).

Various empirical evidence shows that the training program carried out by the government has not been able to improve the competence of teachers, especially teachers who work in remote areas. The study conducted by Nugroho (2012) in a remote area in Gunung Mas which is one of district division in Central Kalimantan Province concluded that various forms of professional development of elementary school teachers in remote areas including through training carried out by the Gunung Mas District Education Office had not been able to improve competence teacher.

Geographical conditions that are difficult to reach, inadequate facilities and infrastructure, developers who have not been effective in carrying out their duties, plus a lack of commitment from policy makers in the regions, which is indicated by the establishment of programs that are not well planned, sustainable and integrated are obstacles that hinder professional development elementary school teachers in remote areas.

The ineffectiveness of training programs for remote elementary school teachers carried out so far is partly due to the establishment of programs that are not based on assessing teacher needs about what forms and activities of training that teachers really need in developing their professionalism (Nugroho, 2013). Several other studies also revealed the same thing that the failure of various teacher training programs was partly due to the implementation of project-oriented, budget-based, mass programs (Jalmo and Rustaman, 2010), not paying attention to the shortcomings of individual teachers (DNE, 2008), still generalized whereas the problems faced by teachers are local and contextual (Sofiraeny, 2011), are top-down where the teacher only follows the existing program (Darwangsa, 2013), meaning that the implementation of the training program is not based on the real needs of the teacher.

"Legality" in the establishment of training programs to improve teacher competency both from the model and its implementation is a real phenomenon that occurs in various regions in Indonesia. A particular training model can be effectively implemented for teachers in certain regions, but it is not necessarily

effective if applied to other regions that have different characteristics and problems; Or it is impossible for the same training model to be given to elementary teachers in urban areas and elementary teachers who work in remote areas while in reality the needs of teachers and their level of competence are very different. Darling-Hammond (2006) states that training programs that are not based on the real needs of the teacher will not have an impact on improving teacher competency and can even reduce teacher motivation waste of time, effort, and budget.

The study conducted Nugroho (2013) recommends the need to develop an effective training model to improve the competence of elementary school teachers in remote areas because so far there has not been a training model that is truly effective applied for elementary teachers in remote areas in education management science. Through an innovative training model that is a training model designed and developed based on the real conditions of the competency gap of elementary school teachers in remote areas are expected to improve teacher competencies which ultimately indirectly lead to improving the quality of education in the region. Based on this fact, this development research seeks to produce an innovative training model aimed at improving elementary school teacher competence in remote areas in Gunung Mas district in Central Kalimantan Province.

II. METHODS

Broadly speaking, this study consists of three stages, namely: *the first stage*: training needs analysis, *the second stage*: the design and development of models and training tools, and *the third stage*: the implementation of models and devices that have been developed. This research is a development research (Research and Development) adapting Four-D Models developed by Thiagarajan, Semmel & Semmel (1974). This development model consists of 4 (four) stages, namely: define, design, develop, and disseminate stages.

In define phase, it is carried out through Training Needs Analysis (TNA). The results of TNA will then be used as a reference in carrying out stages of subsequent development research. Through training needs analysis, accurate information on which competencies and indicators of elementary school teacher competencies will be prioritized for training needs as well as an innovative training model that will be developed to improve the competence of elementary school teachers in remote areas. The define phase is implemented in 21 elementary schools located in sub-district of Damang Batu and Miri Manasa which are parts of remote areas in Gunung Mas by involving 86 teachers as respondents. Data collection was carried out by doing survey, interview, and focus group discussion (FGD) methods.

The instrument used to map the competence of elementary school teachers in remote areas refers to Minister of National Education Regulation (MNER) Number 16 of 2007 about Academic Qualification Standards and Teacher Competence. To analyze training needs, it was used Training Needs Analysis

Tools (TNA-T) which were modified from McCann and Tashima (1994), which were carried out through 3 stages, namely organizational analysis, task / position analysis / operations, and individual analysis.

In design phase, an innovative training model prototype (draft 1) was designed and produced. The format and substance of the design refers to the existing standard references, including the Parker Model (1976) and the Otto and Glaser Model (1970), however the support activities and activities are adapted to the context of primary schools and the environment in Indonesia, especially in remote areas of Gunung Mas District, Central Kalimantan Province. At this stage the preparation of research instruments was carried out and also supporting tools for innovative training models.

In develop phase, an external validation is done by an expert (validator) on the draft 1 model developed. The validator will read draft 1 of the text and comment on the parts needed. Validation is carried out by training model development experts, education management experts, and ICT experts in learning. From the results of this validation the model was later revised. The revised results are in the form of draft 2 training devices. The next step is to carry out limited trials (trial 1) on elementary teachers who are serving in sub-district of Miri Manasa and Damang Batu.

At final stage, the disseminate phase will be carried out. At this stage, dissemination of innovative training models was produced on a broader scale, namely the use of innovative training models for other remote areas. The results of observations and data obtained from the training model trials were analyzed quantitatively in the form of proportions and percentages to determine the response of participants and instructors to the models and training tools that had been developed, the activities of instructors and participants during the training, as well as to find out whether the tools developed significantly helped participants reach ICT skills.

III. RESULT AND DISCUSSION

The results obtained in each development phase with respect to the development process of CTM are outlined below:

A. Research Results on Define Phase

The define phase as the initial phase of development research to produce an innovative training model implemented through training needs analysis (TNA). TNA is a process aimed at identifying competency gaps by comparing current (actual) competencies with desired (ideal) competencies which in this case refer to Minister of National Education Regulation (MNER) Number 16 of 2007 about Academic Qualification Standards and Teacher Competence. TNA will provide an overview of which competencies and indicators of elementary school teacher competency in remote areas experience gaps and whether these gaps can be overcome through training or other than training.

TNA's results show that the fifth indicator of Pedagogic competence, namely "Utilizing Information and Communication Technology for learning interests

is an indicator that experiences the highest inequality and occupies the highest priority that is urgently addressed through training; which is then a reference for researchers in designing and developing innovative training models for elementary teachers in remote areas in the next stages of research (design and develop).

In general, the TNA results can be said to be understandable given the use of ICT for learning interest is not something that is "common" for teachers who work in remote areas. In addition, the lack of activities to improve the quality and competence of teachers to utilize ICT in learning is one of the factors that influence it. However, this condition certainly cannot be used as an excuse, because the mastery of ICT is one of the most important competencies to be mastered by teachers in the 21st century today, besides specifically the Minister of National Education Regulation (MNER) Number 16 of 2007 mandates the use of ICTs for learning interests and self-development as indicators important that must be mastered or owned by a professional teacher, including those who work in remote areas.

Information Technology is basically everything related to the process, use as a tool, manipulation, and management of information; while Communication Technology is all things related to the use of tools to process and transfer data from one device to another. Based on this understanding if it is associated with the learning process, the mastery of ICT in the learning process is the processing of tools used to manage and move learning information through various media used by teachers.

Saputra (2015) states in the primary school context, the benefits of mastering ICT by teachers can be used to support the implementation of the teacher's daily tasks, including: (1) the use of ICTs that can be used in planning teaching, such as making RPPs, preparing syllabi; (2) the use of ICTs that can be used in the implementation of learning, such as using various instructional media (presentation slides) that are interesting, and (3) the use of ICTs that can be used in the evaluation of learning, such as the formative and summative formulation of students, and in preparing report cards. This opinion gives the meaning that the mastery and utilization of ICT for elementary school teachers is something that can be said to be "simple", but if it is associated with the need for the implementation of the task of the teaching profession in remote areas then it becomes something important.

In an effort to identify various training needs related to ICT content for learning interests and carrying out the daily tasks of elementary teachers in remote areas, as well as how the training should be carried out in order to provide meaningful benefits in the optimal acquisition of mastery of teachers' knowledge and skills, then conducted Focus Group Discussion (FGD) activities were carried out. The parties involved in the FGD activities consisted of researchers as designers/developers of innovative training models, the Gunung Mas District Education Office as responsible for education management in Gunung Mas District, and elementary school teachers from remote areas who were involved as research

respondents to past TNA activities. Based on the FGD results obtained two basic conclusions that must be considered by the designer/developer of innovative training models, namely:

1. Regarding the content of ICT training, that teachers are eager to understand and master the skills about the use of "Microsoft Office Software" which can be used to support the implementation of their daily tasks in the context of elementary schools in remote areas. The FGD results about the Microsoft Office Program and the program content that the teachers want to master are presented in Table 1.

2. Regarding the training pattern or model that based on the experience of various training activities that had been attended by teachers so far, in reality there have not been many good benefits for teachers both during the process and after the training ended. One of the reasons is related to the implementation of training programs carried out based on the perspective of the training instructor, both from the training content and the training implementation pattern itself which places the teacher as a training subject who must "submit" to the specified training procedures by the training instructor (pedagogical); or the training program is felt by the teacher only as a process of "content transmission model" only. The existing training programs have also been felt to provide less space for teachers to be able to develop their knowledge and skills optimally because, as is usually the case with existing training programs, they are full of content which in reality is not all teachers need, in addition there is an assumption that training the important thing is to finish quickly. Understanding whether or not the teacher during the process or after training is not the main target that must be achieved.

The FGD results that obtained the two basic conclusions related to what will be trained in the context of the use of ICTs for learning interests, as well as how the training is carried out in order to provide usefulness and meaningful in the sense of obtaining optimal knowledge and skills both during the process and post-training, for then becomes an important reference that must be considered in the design and development of innovative training models that will be developed at the next research stage (Design and Develop).

B. Research Results on Design and Develop Phase
1. Description of Collaborative Training Model (CTM) Design

Two findings obtained from the define phase above, used as a basis for reorientation of the training process for teachers, in this case elementary teachers in remote areas of Central Kalimantan. Views and behaviors that place training activities as a "content transmission model" must be abandoned. The training paradigm must emphasize learning, participant centered, must shift from "instructor and what will be trained" towards "participants and what is needed".

Table 1
The Training Content of ICT Utilizing for Learning Interests of Remote
Areas Elementary Teacher in Gunung Mas District

No	Software Program (Microsoft Office)	Content of Mastery Program
1	Words Processing Software	a. Making a cover b. Numbering pages c. Paper settings d. Making chart with shape used e. Inserting pictures on text f. Drafting automatic table of content
2	Number Processing Software (Excel)	a. Student Scoring data processing b. Making a simple student report cards c. Making of Student Graph Scoring
3	Presentation Processing Software (Powerpoint)	Making an interactive power point slide

Table 2
Step and Activities in Each Stage of CTM

Training Phase	Activity	Activity Description
Phase 1: Collaborative Planning	1. Implementing (TNA and FGD)	• The training developer conducts training needs analysis to determine teacher competency gaps that are a priority to be completed through training • The developer conveys the TNA results to the trainees to further agree on what, why and how the training will be developed by the developer (training objectives, training instructors, training methods and approaches, training materials / materials, training media, training schedules, training assessment tools)
	2. Designing of Collaborative Training Prototype	• The developer of training design a collaborative training prototype based on input from the FGD
	3. Implementing FGD	• The results of the prototype design were then discussed in the FGD with the training participants input from the FGD
Phase 2: Collaborative Organization	1. Division of Task and Responsibilities	• Developers and trainees jointly carry out each stage of training in accordance with their duties and responsibilities
Phase 3: Collaborative Implementation and Authentic Assessment	2. Modeling	• Instructors convey training objectives • Instructors explain step by step training material • Instructors demonstrate skills
	3. Guided Practice	• The instructor conducts guided training for trainees
	4. Feedback	• The instructor asks representatives of the training participants to present the results of their work and asks other participants to respond • Instructors provide comments and input (rectify) the results of the work of participants that are not yet appropriate • The instructor provides reinforcement (reinforcement) to the results of the work of the trainees that are appropriate
	5. Provide individual training and Feedback	• The instructor provides the case that the trainee must complete independently • Participants presenting their work result
	6. Authentic Assessment	• The instructor provides learning outcome assessments in the realm of knowledge, skills and attitudes in each training unit
Phase 4: Collaborative Evaluation	1. Evaluate the achievement of training objectives	• The instructor provides assessment of learning outcomes in the realm of knowledge, skills and attitudes of the overall training content
	2. Reflection	• The instructor presents the learning outcomes obtained by the training participants and reflects the learning with the trainees • The instructor together with the trainees diagnose the learning needs of the trainees that have not been achieved
	3. Remediating	• Collaborative remediation with the peer tutor approach under the guidance of the instructor

The training must create meaningful connections with real life (read: teacher needs in the field). Learning should enable participants to learn in the actual context, namely their daily lives (Hartanto, 2017). Training must provide broad opportunities for participants (read: teacher) to do activities, both hands-on activities and minds-on activities, based on what they need related to ICT. Besides that, it starts from the fact that people learn through selective observation of the behavior of others (examples) that are interesting, so the CTM model also emphasizes the modeling principle of behavioristic theory.

One training approach that is built with the principles above, and concerns about implementation efforts in real life (read: teacher needs) is an adult learning approach or known as the andragogy approach. The andragogy approach is a learning approach that seeks to link content learned with real-world situations (needs) and motivate adults (teachers) to connect the knowledge they have with their daily needs, in the context of teachers' needs for ICT utilization. To realize an approach that has the characteristics as above, the training process must emphasize: making meaningful connections, modeling,

constructivism, creative thinking, collaborative learning, and using authentic assessment, which underlies the CTM model developed. Based on the findings in the define phase and indicators above, designed and developed model and a set of CTM inlude: (1) CTM Model Books, (2) Training Implementation Plans (RPP); (2) Participant Worksheets (LK); and (3) Teaching Modules, and Assessment Sheets (LP). The characteristics of the model according to Arend (2008), include four things, namely: (1) theoretical rationale that is logically arranged by the developer; (2) the rationale for the objectives to be achieved in learning; (3) the form of teaching activities needed that support the effectiveness of the model effectively; and (4) the atmosphere of a learning environment that can support the achievement of learning goals. The four characteristics of the CTM Model are presented in the form of the CTM Model Book. The book contains several main parts, namely: (1) Introduction; (2) Rational CTM Model; (3) Supporting Theories of the CTM Model; (4) Steps of the CTM Model; and (e) The atmosphere of the CTM Model training environment. The explanation of four

sections mentioned above is presented in the CTM Model Book. The CTM model developed aims to improve teachers' knowledge and skills must be designed / developed based on the basic principles of correct training management based on the principles of adult learning (andragogy) with the stages presented in Table 2.

2.   Results of CTM Validation

The CTM validation activity begins with providing a text (CTM Model Book) along with the CTM Model Assessment Sheet to the two validators. The Validator who helped assess this CTM Model is Dr. Sultoni, M.Pd (Faculty of Education, State University of Malang) and Dr. Warih Handayaningrum, M.Pd (Faculty of Language and Literature, State University of Surabaya) as a validator who is expert in the field of education management, especially in developing training models. These experts provide input on the correctness of content and conformity with the theoretical foundations that build training tools. The results of the validator's assessment of the CTM Model are presented as follows.

Table 3
Results of CTM Assessment

No	DESCRIPTION	Validator		Average Score
		I	II	
A	**SUPPORTING THEORIES**			
1	Training Management Theory	5	4	4.25
2	Andragogy Theory	5	4	
3	Constructivism Theory	5	4	
4	Social Learning Theory	5	5	
B	**SYNTAX (PHASE/STEP) MODEL**			
5	Phases are a sequence of logical training activities	4	4	4
C	**SOCIAL SYSTEMS**			
6	Generally, it seems clear the instructor-participant relationship pattern	5	4	4.5
7	Clearly the role of the instructor and the participants in the training	5	5	5
D	**SUPPORTING SYSTEM**			
8	Training activities are clearly indicated in the Training Implementation Plan (RPP)	5	5	5
9	The Teaching Material Sheet supports the achievement of the Training objectives	5	5	5
10	Assessment Sheet (cognitive, performance and attitude) in accordance with the training objectives	5	5	5
11	Worksheets (LK) support the training objectives	5	5	
	Final Score (V)			**4.59**

The results of the analysis shown in Table 3 above can be explained as follows.

a.   The average value of the total validity of the CTM model obtained is V = 4.59. Referring to the CTM Model validity criteria, it can be concluded that this value is included in the category "Very Valid" (V ≥ 4.5). So in terms of all aspects, the CTM Model is stated to meet the validity criteria.

b.   The average value of the validity of the CTM model for aspects of Supporting Theories is $V = 4.25$. Based on the validity criteria of the CTM Model, this value is only included in the "valid" category (3.5 ≤ V ≤ 4.5), so that aspects of the Supporting Theory of the CTM Model are stated to have fulfilled these criteria. In other words,

according to the validator, the theories included in the CTM Model Book have shown their strength as supporting the CTM model.

c.   The average value of the validity of the CTM model for aspects of syntax is $V = 4$. Based on the validity criteria of the KEGS model, the three values fall into the "valid" category (3.5 ≤ V ≤ 4.5).

d.   The average value of the validity of the CTM model for aspects of the social system and supporting systems are 4.5 and 5. Considering the validity criteria of the CTM model, the three values are categorized as "very valid" (V ≥ 4,5). Thus the elements in each aspect are related to one another.

3. Results of CTM Training Tools Validation

Based on the device validity criteria in Table 4 above, it can be concluded that the CTM training tools are included in the "valid" category (3.5 ≤ VP < 4, 5). In general, based on the validator's study, the prominent features of the CTM models and tools that have been developed: assist participants and provide convenience to participants in realizing adult-based training and are participant-centered, emphasizing the application of ICT to the world real (learning and other teacher assignments) based on their needs, developing participants' thinking skills, giving rise to authentic assessments, and supporting the realization of a democratic and interactive learning atmosphere.

Table 4
Summary of Validation Results of CTM Training Tools

Training Tools	Average Score of Two Validators
Training Implementation Plan (RPP)	4.46
Participant Worksheet (LK)	3.68
Teaching Material Sheet (LBA)	4.20
Assessment Sheet (LB)	4.23
Book (Module) Teaching/Training	4.23

Table 5
Assessment Results of CTM Implementation

No	Description of CTM Aspect	Score	
		P1	P2
1	Phases in syntax can be applied	5	4
2	Relationship pattern between the instructor - participants in the training process can be applied	5	5
3	The instructor behavior that applies in the model can be applied	5	5
4	Participant behavior that applies in the model can be applied	5	5
5	Training implementation plans (RPP) can be implemented	5	4
6	Participant activities related to Worksheets (LK) can be applied	4	4
7	Participant activities related to Assessment Sheets (LP) can be applied	4	4
	Average	**4,71**	**4,28**
	Final Score	**4,50**	

4. Results of CTM Implementation

These experts provide input on the correctness of content and conformity with the theoretical foundations that build training tools. The results of the assessment, analysis and revision of the CTM Model are presented as follows (Table 5). The results of the analysis shown in the table above, show that the total average value of the CTM model obtained is V = 4,50. Referring to the existing criteria it can be concluded that this value is included in the category "Very Valid" (V ≥ 4.5). So in terms of all aspects, the CTM Model is stated to meet the practicality criteria from the perspective of the validator (expert).

IV. CONCLUSION AND RECOMMENDATION
A. Conclusion

Referring to Minister of National Education Regulation (MNER) Number 16 of 2007 about Academic Qualification Standards and Teacher Competence and the demands of 21st century skills and various relevant references, one of them is required to have competencies to utilize existing technology, so that it is more optimal in delivering subject matter in schools and help him carry out duties as a teacher. However, in the context of remote areas in Gunung Mas District, Central Kalimantan Province, ICTs are still "far away" for teachers in the region. Let alone to use ICT, to know specifically about matters related to ICT alone.

This statement is supported by the results of the research in the define stage that the competence of elementary school teachers in remote areas in utilizing ICTs for learning interests is an indicator that experiences the highest inequality and occupies the main priority which is urgently to be addressed through training. This finding on the one hand is understandable given the use of ICTs for learning interests is not something that is "common" for those who work in remote areas. In addition, the lack of activities to improve the quality and competence of teachers to utilize ICT in learning is one of the factors that influence it. Even if the training is carried out, usually, it tends to be top-down (pre-determined by the party implementing the training program), not based on the teacher's real needs for the competency gaps they experience.

The findings from the define phase are then used as a reference for researchers to carry out the design and development of a training model named collaborative training model (CTM) at the design stage and develop stage. The CTM model itself is an embodiment of the andragogy approach, which emphasizes the training process on making meaningful connections, modeling, constructivism, creative thinking, collaborative learning, and using authentic assessment.

Based on the review of experts, the CTM models and devices that have been developed have fulfilled valid and practical. However, the conclusion of this study as a whole is still not final, because up to the writing of this article a research process is still underway at the CTM trial stage for elementary teachers in remote areas of inland. At least until at this stage it can be concluded that CTM has the potential as: (1) alternative solutions to solve remote areas elementary teacher competency gap problems, especially related to ICT skills; and (2) alternative solutions to realize meaningful training based on the

needs of elementary school teachers in the context of remote areas.

B. Recommendation

In order for the implementation / trial phase of the CTM model to work properly and effectively as expected, the following are some suggestions that must be considered by the researcher before carrying out these stages, namely: (1) although the CTM module is based on the results of the validator's review "Valid" however, researchers as CTM model developers should pay attention to the sequel of the module content to be compiled. The content demands are that the content that must be presented in the CTM module should be arranged from the easy one to the difficult one. Besides that, because the training target is elementary school teachers serving in remote areas, the content of the CTM module must also be adjusted to the needs and conditions of the training participants; and (2) the schedule of training activities in the implementation guide of the CTM model should include the "Ice Breaking" activity.

This is based on the characteristics of the teacher as an adult learner who will feel comfortable in learning if the learning atmosphere is "enjoyable". Ice Breaking is basically intended to break the ice, boredom and saturation in the atmosphere of learning, so that the learning process is expected to be melted and the atmosphere can return to its original (more conducive) state. If the touch of this activity is applied to the training process for teachers as adult learners, then it is likely that enthusiasm, motivation, and passion in learning will be well maintained throughout the training process.

REFERENCES

[1] Arends, R. I. 2008. *Learning to Teach*. Boston: McGraw-Hill Companies.

[2] Arnold, P. 2001. Review of Contemporary Issues for Rural Schools. *Education in Rural Australia*. 11(1), 30-42.

[3] Bafadal, I. 2003. *Peningkatan Profesionalisme Guru Sekolah Dasar dalam Rangka Manajemen Peningkatan Mutu Berbasis Sekolah*. Jakarta: Bumi Aksara.

[4] Barber, M., and Mourshed, M. 2007. *How the World's Best Performing Schools Come Out on Top*. New York: McKinsey & Company.

[5] Darling-Hammond, L. 2006. Construction 21st Century Teacher Education. *Journal of Teacher Education*, 57, 300-314.

[6] Darwangsa, H. 2013. *Pengembangan Model Diklat Partisipatif-Kolaboratif (Parkol) untuk Meningkatkan Kompetensi Guru Biologi SMA*. Dissertation. Bandung: Universitas Pendidikan Indonesia.

[7] Department of National Education (DNE). 2008. *Laporan Monitoring dan Evaluasi (Monev) Sertifikasi Guru dalam Jabatan Melalui Portofolio Tahun 2006-2007*. Jakarta: Konsorsium Sertifikasi Guru.

[8] Gandara, P. P., Gutierrez, D. D., and O Hara, S. S. 2001. Planning for the Future in Rural and Urban High Schools. *Journal of Education for Students Placed at Risk*, 6(1): 73-94.

[9] Hammerness, K. 2005. *How Teacher Learn and Develop*. In L. Darling-Hammond J. Bransford (Eds).

Preparing Teacher for a Changing World. San Francisco: Jossey-Bass.

[10] Hartanto, T. J. 2016. Pembelajaran IPA (Fisika) Harati Berorientasi pada Pendekatan Ilmiah dan Nilai Moral. *Vidiya Karya*, 31(2).

[11] Heslop, J. 1996. A Model for The Development of Teachers in a Remote Area of Western Australia. *The Australian Journal of Teacher Education*, 21(1). Retrieved Oktober 27th 2017, from http://ro.ecu.edu.au/ajte/vol21/iss1/.

[12] Jalmo, T., and Rustaman, N. Y. 2010. Pengembangan Program Pelatihan Peningkatan Kompetensi Guru IPA SMP. *Forum Pendidikan*, 30(1).

[13] McCann, T. A., and Tashima, J. 1994. *Training Needs Assessment Tool*. Australia: King of Prussia, Pa.

[14] *Minister of Administrative Reform Regulation - Bureaucratic Reform (MARR-BR) Number 16 of 2009 about the Functional Position of Teachers and their Credit Points*. Jakarta: Kemdikbud.

[15] *Minister of National Education Regulation (MNER) Number 16 of 2007 about Academic Qualification Standards and Teacher Competence*. Jakarta: Kemdikbud.

[16] Noe, R. A., Hollenbeck, J. R., Gerhart, B., and Wright, P. M. 2010. *Human Resources Management*. Chicago: McGraw-Hill Companies.

[17] Nugroho, P. J. (2012). Pengembangan Profesionalisme Guru Sekolah Dasar pada Daerah Terpencil Daratan Pedalaman Kabupaten Gunung Mas. *Jurnal Manajemen Pendidikan*, 23(6): 513-531.

[18] Nugroho, P. J. 2013. *Faktor-faktor yang Mempengaruhi Profesionalisme Guru SD Daerah Terpencil Daratan Pedalaman Kabupaten Gunung Mas*. Prosiding Hasil Penelitian dan Pengabdian Kepada Masyarakat 2013. Dies Natalis Universitas Palangka Raya.

[19] Otto, C. P., and Glasser, R. O. 1970. *The Management Training*. Massachussetts: Adliso-Wesley Publishing Company.

[20] Parker, T. C. 1976. *Training and Development Handbook: A Guide to Human Resources Development*. New York: McGraw-Hill Companies.

[21] Saputra, M. P. 2015. *Guru SD Juga Memanfaatkan TIK*. Retrieved April 25th 2018, from http://guraru.org/guru-berbagi/guru-sd-juga-memanfaatkan-tik/.

[22] Siram, R. 1992. *Pelaksanaan Model Sistem Guru Kunjung Suatu Alternatif Pemerataan Pendidikan Sekolah Dasar Daerah Terpencil di Kalimantan Tengah*. Thesis. Malang: IKIP Malang.

[23] Sofiraeny, R. 2011. *Model Pengembangan Profesional Berkelanjutan Guru IPA melalui Lesson Study Berbasis MGMP*. Dissertation. Bandung: Universitas Pendidikan Indonesia.

[24] Thiagarajan, S., Semmel, D. S., and Semmel, M. I. 1974. *Insrtuctional Development for Training Teachers of Exceptional Children*. Minnesota: Indiana University.