Pedagogical competence-based Training Needs Analysis for Natural Science Teachers

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Abstrak

Penelitian ini menawarkan pendekatan yang efektif dalam penetapan kebutuhan pelatihan guru dengan menggunakan metode Training Needs Assessment (TNA). Tujuannya memetakan kompetensi pedagogik aktual guru IPA SMP, menetapkan kebutuhan dan prioritas pelatihan, serta rekomendasi metode pelatihan efektif. Survei, wawancara, dan FGD dilakukan untuk memperoleh data primer yang selanjutnya dianalisis menggunakan analisis deskriptif. Metode TNA dilakukan secara lengkap melalui analisis organisasi, tugas, dan individu. Analisis individu dilakukan terhadap 165 guru IPA SMP Negeri Kota Pekanbaru menggunakan kuesioner dengan teknik evaluasi diri. Hasil penelitian menunjukkan bahwa tingkat kompetensi pedagogik aktual guru IPA SMP berada di bawah standar kompetensi ideal. Lima prioritas program pelatihan adalah pelatihan TIK/ICT, penelitian tindakan kelas (PTK), teori dan prinsip pembelajaran IPA terpadu, pengembangan kurikulum IPA terpadu, dan penguasaan karakteristik peserta didik. In House Training (IHT), pelatihan khusus, dan kursus singkat direkomendasikan sebagai metode pelatihan yang efektif untuk meningkatkan kompetensi pedagogik guru IPA SMP.

Kata kunci*: kompetensi pedagogik, analisis kebutuhan pelatihan, guru*

Abstract

This study offers an effective approach in determining the needs of training of the teachers using the Training Needs Analysis (TNA). The objectives of the study were to obtain evidence an actual pedagogic competence of the natural sciences teachers, to obtain needs and training priorities, and proposing recommendations on the effectiveness of training method. Surveys, interviews, and FGD were conducted to get primary data. Survey was carried on 165 natural science teachers of SMP Negeri Pekanbaru using self-evaluation questionnaire. Results showed that actual pedagogic competence of the teachers was below the ideal competence. There were five priorities of training program, namely: training of ICT, classroom action research, theory and principles of learning on integrated natural science, curriculum development, and understanding of pupils' characteristics. It is suggested that In House Training, specific training, and short courses are worth applied as effective training methods to improve pedagogical competence of the teachers.

Keywords*: pedagogical competence, training needs analysis, teachers*

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Introduction

People believe that teachers have in-depth knowledge and skills in a particular field of science. However, the knowledge and skills are not enough to make them able to teach well (Turnuklu & Yesildere, 2007). They also need to have teaching skill or pedagogical competence (Hotaman, 2010). Indonesian Government Regulation No. 74, 2008 on Teachers defines that teachers' pedagogical competence is the ability of teachers in learning management of the learners. Pedagogical competence is a specific competence that distinguishes teachers from other professions (Jahiriansyah *et al.*, 2013; Retnowati, 2013) which demonstrates the ability of teachers to organize learning material so it can be easily understood by the learners (Rosnita, 2011).

Recent researches showed that pedagogical competence directly and significantly affected the success of teachers in teaching (Hotaman, 2010) and teachers' commitment and job satisfaction (Sumantri, 2012). Analysis of correlation and regression showed that pedagogical competence directly contributed to teachers' creativity by 68.9% (Retnowati, 2013) and performance by 57.4% (Amin *et.al.* 2013). Therefore, an increase in pedagogical competence will be followed by an increase in commitment, job satisfaction, creativity, and performance of teachers that influence the success of teachers in teaching.

From results of their study, Awang *et.al.* (2013) concluded that teachers must have pedagogical knowledge and skills to develope a correct behavior for students. Recent research proved that pedagogical competence directly and significantly affected 68.3% of learners behavior in terms of motivation to learn (Widoyoko & Rinawati, 2012). Pedagogical competence also affected students' learning outcomes by 39.1% (Pujiastuti *et.al.* 2012), or 42.8% (Yulianti, 2012), or 66.7% (Widiarsa *et.al.* 2013). Thus, an increase in teachers' pedagogical competence will increase student's learning motivation and learning outcomes.

Empirical evidence suggested that pedagogical competence of Indonesian teachers had not reached the required minimum standard. BSNP (2009) reported that out of 33 provinces in Indonesia, there were 42% of teachers who had mastered10pedagogical competences. The initial competency test (UKA) in 2012 showed that the average score of the national level of teacher's competence was low, e.g. 42.25 (BPSDMPK and PMP, 2012). There were 8provinces had reached the score of 42.25 while the rest 25 provinces had even smaller scores. On the other hand, theoretical, juridical, and empirical foundations demonstrate that of teachers are the teachers' basic skill that determines the success rate of students. Therefore, improvement of pedagogical competence of teachers is urgently needed to be implemented in all parts of Indonesia, including in Pekanbaru, Riau Province, where teachers' competence levels are below the national average.

Improvement of teachers' pedagogical competence can be done through training. Indonesian Regulation of the Minister for Administrative and Bureaucratic Reforms No. 16, 2009 defines training as a form of improving the competence of teachers. Training of teachers according to O'Sullivan (Musfah, 2011) should be tailored to the needs of teachers to improve their competence as professional educators. Education Office of Pekanbaru City has done a lot of teacher trainings, but they are not preceded by phase of teachers' needs analysis. A training which is not based on the needs of teachers has no significant impact on improving teacher competence, it may even decrease motivation to learn, a waste of time, energy, and funds (Darling-Hammond, 2006).

Analysis of teacher training needs must be conducted before the training. This study offered an effective approach in determining the training needs of teachers by using Training Needs Analysis (TNA). The goals were to map actual level of pedagogical competence of teachers, define training needs and priorities, and provided recommendations for effective training method. TNA method is able to produce objective, systematic, and sustainable training needs if it is done thoroughly through analysis of organization/institution, task analysis, and analysis of individual (MDF, 2005; Sherazi *et.al.* 2011; Jan and Muthuvelayutham, 2012). Institutional analysis focuses on target group who requires training in an institution. Task analysis focuses on competency profiles that supposed to be mastered. Whereas individual analysis focuses on competency gaps and contributing factors, training needs, and provides recommendations to resolve the problem of competency gap.

Result of institutions analysis in preliminary study conducted in Education Office of Pekanbaru City has set natural science teachers of SMP Negeri Pekanbaru (the state junior high school) as training targets. Task analyses were performed through studying regulations, literature, and consulting experts' opinions. The Decree of the Minister of National EducationNo.16, 2007 on the Standards of Academic Qualifications and Competencies of Teachers (SAQ-CT) was adopted and modified as a description of pedagogical competence that must be owned by the natural science teachers of SMP Negeri Pekanbaru.

Referring to SAQ-CT, the pedagogical competence that must be owned by natural science teachers consists of 10 competencies, namely: (1) mastering the characteristics of learners, (2)

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mastering learning theory and learning principles of integrated natural science, (3) developing curriculum of integrated of natural science learning, (4) conducting educational learning, (5) utilizing information and communication technology (ICT) learning of integrated natural science, (6) facilitating the development of students' potentials, (7) communicating in an effective, empathetic, and polite manner with students, (8) conducting assessment and evaluation of learning processes and outcomes, (9) utilizing the assessment and evaluation results for the sake of the learning, and(10) taking reflective actions to improve the quality of learning (CAR).

Methods

This study was a descriptive research with quantitative and qualitative approaches. Survey, interview and focus group discussion (FGD) methods were used for primary data collection. A total of 165 natural science teachers of SMP Negeri Pekanbaru expressed their willingness to become respondents. The first phase of the study was started with assessments of ideal pedagogic competence (IPC) and actual pedagogic competence (APC) by using questionnaires which had been testedpreviously for their validity and reliability. Assessment of IPC was conducted using IPC questionnaire by the director of junior high school with natural science background, Supervisor and Instructor of natural science of SMP/MTs of Pekanbaru City. Assessment of APC was conducted by using APC questionnaire by natural science teachers with self-evaluation technique. The IPC and APC assessments used a scale with a range of 1-9 which was adopted and modified from Mc. Cann and Tashima (1990).

The gap analysis of pedagogical competence (PCG) was done by comparing the scores of IPC and APC. If the score of the PCG (IPC-APC) more than1, then there is a competency gap. Determination of training needs was done by recording up information's about the cause of competency gaps through interviews. The training priority order (TPO) was based on the score of the PCG and the perception of potential trainees about their training needs in certain competencies (Halim *etal*. 2008).

A Focus Group Discussion (FGD) with 20 participants was conducted to collect deeper information to support quantitative data. The participants (groups of experts and natural science teachers of SMP Negeri Pekanbaru) were selected purposively. The expert group was consisted of representatives from Education Quality Assurance Agency (LPMP) of Riau Province, Head of Section of Training and Development of SMP/MTs of Education Office of Pekanbaru City, and Supervisor of natural science of SMP/MTs. Furthermore, a credibility test of the FGD result was conducted through triangulation technique and reference materials (Sugiyono, 2010).

Results and Discussion

Various research reports indicate that Indonesian teachers' pedagogical competence is still low. There are 42% of Indonesian teachers who mastered the pedagogical competence (BSNP, 2009). Especially for natural science teachers of junior high school, Sudirman & Purnamasari (2009) stated that only 26% of natural science teachers of SMP Negeri Jakarta got good scores for pedagogical competence. From South Kalimantan, Pujiastuti *et.al*. (2012) reported that pedagogical competence of natural science teachers of SMP/MTs in Banjarbaru City was categorized as low. Similar result was obtained in this study (Table 1), which indicated that pedagogical competence mastered by natural science teachers of SMP Negeri Pekanbaru (APC) was below the required pedagogic competence (IPC) standard. Even so, the APC score was below the national standard of competency set by the National Education Standard Agency (BSNP) of the Ministry of National Education with minimum competency score of 7.0. That is, the level of actual pedagogic competence of natural science teachers of SMP Negeri Pekanbaru is below the ideal standard of pedagogic competence.

Table 1. Gap Analysis of pedagogical competence

No	Pedagogical competence	IPC	APC	PCG
1	Mastering the characteristics of learners	8.3	4.8	3.5
2	Mastering learning theory and learning principles of integrated natural science	8.0	4.4	3.6
3	Developing curriculum of integrated of natural science learning	8.1	4.5	3.6
4	Conducting educational learning	8.5	5.4	3.1
5	Utilizing information and communication technology (ICT)	7.7	3.7	4.0
6	Facilitating the development of students' potentials	8.3	5.0	3.3
7	Communicating in an effective, empathetic, and polite manner with students	8.3	5.2	3.1
8	Conducting assessment and evaluation of learning processes and outcomes	8.2	5.3	2.9
9	Utilizing the assessment and evaluation results for the sake of the learning	8.3	5.5	2.8
10	Taking reflective actions to improve the quality of learning	7.6	4.0	3.6

Results of competency gap analysis in Table 1 indicates that the PCG scores of all competencies were higher than1which meant there is gap between actual competence of natural science teachers and the required pedagogical competence. The largest gap (4.0) was on the competency of utilizing of information and communication technology (ICT) in integrated natural science learning. Meanwhile, the smallest gap (2.8) was on the competency of utilizing assessment and evaluation of learning processes and outcomes. The gaps are parts of the competence that need to be overcome by training. It can be concluded that the natural science teachers of SMP Negeri Pekanbaruneed competency improvement training in all of 10pedagogical competence.

However, not all gap scan be overcome by pedagogy training. Training can only overcome gaps which are caused by behavioral factors, namely lack of knowledge, skill, and attitude. If the gap is caused by other factors, it cannot be overcome by training but through other efforts in accordance with the causes (Mc. Cann & Tashima, 1990). Factors causing the competency gap was obtained through interviews with supervisors and instructors of natural science, and school directors.

Analysis of the interviews showed that the competence gap was caused by behavioral factors. The study findings suggested that the gap of 4 pedagogical competencies of teachers due to lack of knowledge about these competencies. The four competencies were mastering theory and principles of integrated natural science learning, ability to develop an integrated natural science curriculum, ability to use information and communications technology (ICT), and the ability to perform reflective through classroom action research (CAR). Six other pedagogical competences were caused by teachers' skill to apply it. In general, the teachers already have enough knowledge these competence but they are lacking of skill in applying them. So, it is established that the gap of 10 pedagogical competencies can be overcome by training.

Training cannot all of a sudden be held for the10 pedagogical competencies. It is necessary to set a priority order of training (TPO) based on the scores of the competence gap. Results of analysis of the PCG showed that there were 3 pedagogical competences with the same PCG score, e.g.3.6 (Table 1), so that it required a more sensitive method in the determination of the TPO.

The order of priority can beset based on perception of prospective trainees which is measured by number and percentage of respondents who need training in certain competencies. Specifically, Halim *et.al*. (2008) set the TPO for secondary natural science teachers in Malaysia when the percentage of teachers who need training reaches 40% or more. In this study, the TPO was determined based on the score of the PCG, the number of teachers (NT) and the percentage of teachers (PT) need certain pedagogical competence training. The combination of these three methods was proved to be more sensitive to determine the TPO in accordance with the real needs of natural science teachers and it could determine the number of individuals who become the training target for each pedagogical competence gap.

Referring to Halim *et.al*. (2008), this study showed5pedagogical competences with percentage of teachers who need training more than 40% (Table 2). The priority of training needs was translated into training programs in the following order: (1) training of ICT in integrated natural science learning, (2) training of CAR, (3) training of theory and principles of integrated natural science learning, (4) training of development of curriculum of integrated natural science, and (5) training of mastering the characteristics of pupils.

Table 2. Analysis of priority training needs

No	Pedagogical Competence	PCG	NT	PT	TPO
1	Mastering the characteristics of pupils	3.5	83	50%	**5**
2	Mastering learning theory and learning principles of integrated natural science	3.6	109	66%	**3**
3	Developing curriculum of integrated of natural science learning	3.6	101	61%	**4**
4	Conducting educational learning	3.1	63	38%	8
5	Utilizing information and communication technology (ICT) in the learning of integrated natural science	4.0	128	78%	**1**
6	Facilitating the development of students' potentials	3.3	64	39%	6
7	Communicating in an effective, empathetic, and polite manner with students	3.1	64	39%	7
8	Conducting assessment and evaluation of learning processes and outcomes	2.9	61	37%	9
9	Utilizing the assessment and evaluation results for the sake of the learning	2.8	53	32%	10
10	Taking reflective actions to improve the quality of learning	3.6	124	75%	**2**

Information obtained from interviews explained that the high demand for training ICT (78%) was due to the teachers' lack of knowledge about how to use computers, laptops, LCDs, and Electronic version in the learning process. Teachers also did not know how to design instructional media by using the latest ICT-based applications. The high demand for CAR training (75%) due to the facts that the teachers did not know how to do research, not familiar with research procedures, and lack of financial support to motivate teachers to do research. The third priority of training needs (66%) due to the teachers' lack of knowledge about the theories, principles, approaches, strategies, methods, and techniques of learning. This finding was uniquebecause86% of respondents were graduates from Faculty of Teachers Training and Education (LPTK), that assumed they competent in applying the theories and principles of learning.

The need for training of development of integrated natural science curriculum (61%) due to changes of curriculum from competence-based curriculum (KBK 2004) to school-based curriculum (KTSP 2006) and then to curriculum 2013. KTSP 2006 contains learning innovation that combines fields of studies of physics, biology, chemistry (Puskur, 2006), earth and space into integrated natural science (Wilujeng *et.al*. 2010; Arlitasari *et.al*. 2013). Curriculum 2013 through Regulation of Ministry of National Education No. 64, 2013 on SI-PDM reaffirms implementation of learning of integrated natural science in junior high school with the change of name to natural science.

It is strongly believed that the natural science teachers of junior high school was not equipped with training of development of integrated natural science curriculum. The assumption was analogical with results of a study (Wilujeng *et.al*. 2010) which stated that almost all natural science teachers of junior high school in Indonesia had not yet to implement an integrated natural science learning because they are afraid not deliver the content of the curriculum materials. This happened because the teachers did not have ability to develop the KTSP curriculum in relation to the subject they administered because they still oriented to the curriculum of KBK 2004 (Munandar *et.al*. 2013).

Unlike the four previous order of priorities, the 5th training priority was mastering characteristics of learners (50%) which due to teachers lacking of skill. Such as skills of explaining the development of learners with regard to the physical, intellectual, social-emotional, moral, spiritual, cultural and social background, identifying initial ability and categorizing potentials of learners, and identifying learners' learning difficulties.

The result of FGD showed that teacher's group agreed that the study was highly in accordance with the real needs of natural science teachers of SMP Negeri Pekanbaru. It revealed that the difficulties faced by teachers in applying the competence of mastering pupils' characteristics was caused by a new government policy that determines a minimum of 24 hours per week teaching for teachers. Natural science subjects were taught for 4 hours per class, so teachers should teach a minimum of 6 classes consisted35-40 pupils per class. This meant that a natural science teacher should teach 210-240 pupils, so it was difficult for a teacher to learn the characters of each pupils. Natural science teachers of SMP Negeri Pekanbaru need training to obtain new skills on mastering pupils' characteristics where the number of pupils is large.

In general, the expert group recommended *In House Training* (IHT), specific training, apprenticeship, and short courses as training methods. It is recommended that the trainings are organized by subject teacher council of natural science teachers (MGMP IPA) of SMP/MTs, Education Office of Pekanbaru City, Education Quality Assurance Agency (LPMP) of Riau Province, Science

Empowerment and Development Education Centre (SEDEC/P4TK IPA) Bandung, LPTK University of Riau, and private institutions/companies

The recommendation expert group were qualitative data which validity was tested using triangulation technique through interview, questionnaire, and policy documentation study. Interview was conducted with Head of Division of High School Development, Education Office of Pekanbaru City, while questionnaires were distributed to natural science core teachers of SMP/MTs Pekanbaru, and documentation study of policy of teacher professional development by Ministry of National Education (BPSDMPK & PMP, 2012). Result of credibility test through triangulation technique was presented in Table 3.

Table3. Recommendation of training methods and organizers

No	Training Program	Training Method	Training Organizer
1	Training of ICT in learning	*In House Training* Short course	MGMPs IPA Private institutions/companies
2	Training of classroom action research (CAR)	*In House Training* Specific training	Education Office of Pekanbaru City LPMP of Riau Province
3	Training of theory and principles of integrated natural science learning	*In House Training* Specific training	Education Office of Pekanbaru City Universities
4	Training of development of integrated natural science curriculum	Specific training	LPMP of Riau Province Universities
5	Training of mastering the characteristics of learners	Short course	Private institutions/companies Universities

Apprentice ships and SEDEC Bandung could not be recommended as a method and training organizer (Table 3). Apprenticeship is sending of employee of an organization to other agencies/organizations that are considered more developed, both in groups and individual (Notoatmodjo, 2009). This become a constraint because teachers felt reluctant when they have to leave their duties even though only temporarily. In addition, the education office had to prepare a large fund to be able to send teacher groups to SEDEC Bandung. Furthermore, the results of training evaluation showed that teachers who had attended training in SEDEC Bandung were not be able to apply their skills since facilities they use in SEDEC were not available in their schools of origin. Meanwhile, documentation study of policy of teacher professional development explains that the apprenticeship program was for vocational school teachers who want to improve their professional competence.

This study recommended In House Training (IHT), specific training, and short courses. IHT is a training implemented internally in MGMP, school or other specified places. IHT is based on the premise that improvement of teacher's competency can be done by teachers who have a certain competence to teachers who do not have that particular competence. This strategy can improve cooperation among natural science teachers, as well as costs and time saving. Specific training is designed based on specific needs or due to new developments in natural science such as CAR training, training of theory and principles of integrated natural science learning, and training of development of integrated natural science curriculum. There was an information that the CAR training was conducted in MGMPs IPA, but the result was not satisfying. Education Office of Pekanbaru City and LPMP of Riau Province are expected to be able to design specific training to enhance the CAR ability ofnatural science teachers of SMP Negeri Pekanbaru.

There was an interesting finding at the beginning of the study that there was a suspected lack of teacher's knowledge about the theory and principles of learning due to the quality of education of candidates of teachers in LPTK. Therefore, LPTK of the University of Riau as the nearest university is recommended as the provider of training of theory and principles of integrated natural science learning. A short course of ICT training is conducted in cooperation with a computer course institution. While the short course training of mastering characteristics of learners can be done through cooperation with the consultancy bureau/institution of child psychology.

Conclusions

The research on competency-based training needs analysis based on pedagogical competence of natural science teachers of SMP Negeri Pekanbaru produces 4 conclusions, namely: (1) that actual pedagogic competence of natural science teachers of SMP Negeri Pekanbaru was below the ideal competence, (2) natural science teachers of SMP Negeri Pekanbaru needed trainings for 10 pedagogical

competence, (3) Five most needed training program for the teachers were: the training of ICT, classroom action research (CAR), the theory and principles of learning on integrated natural science, curriculum development, and understanding on pupils' characteristics, and(4) In House Training(IHT), specific training, and short courses were recommended as effective training methods to improve the pedagogical competence of natural science teachers of SMP Negeri Pekanbaru.

Acknowledgement

References

Amin M., Aunurrahman and Thamrin, M. (2013). Hubungan Kompetensi Pedagogik dan Kompetensi Kepribadian dengan Kinerja Guru. *Jurnal Pendidikan dan Pembelajaran. 2*(7):1-18.

Arlitasari O., Pujayanto and Budiharti R. (2013). Pengembangan Bahan Ajar IPA Terpadu Bebasis Saling Temas dengan Tema Biomassa Sumber Energi Alternatif Terbarukan. *Jurnal Pendidikan Fisika. 1*(1):81-89.

Awang, M.M., Jindal-Snape, D., and Barber, T. (2013). A documentary analysis of the government's circulars on positive behavior enhancement strategies".*Asian Social Science. 9*(5):203-208.

[BPSDMPK-PMP] Badan Pengembangan Sumber Daya Manusia Pendidikan dan Kebudayaan dan Penjaminan Mutu Pendidikan. (2012). Kebijakan Pengembangan Profesi Guru. Jakarta (ID): Kemendiknas.

[BSNP-Depdiknas] Badan Standar Nasional Pendidikan Departemen Pendidikan Nasional. (2009). Laporan BSNP Tahun 2009. Jakarta (ID): Depdiknas.

Darling-Hammond, L. (2006). Powerful Teacher Education: Lesson from Exemplary Program. US: Jossey-Bass.

Halim L., Osman K., and Meerah T.S. (2008). Trends and Issues of Research on in-Service Needs Assessment of Science Teachers: Global vs the Malaysian Context. *Trends in Science Education Research*. [Electronic vertion]. [Received 2013 Apr 27]. From http://www.hbcse.tifr.res.in/episteme1/allabs/lilia_abd.pdf.

Hotaman D. (2010). The Teaching Profession: Knowledge of subject matter, teaching skills and personality traits. *Procedia Social and Behavioral Sciences*. 2: 1416-1420. doi:10.1016/j.sbspro.2010.03.211.

Jahiriansyah, Wahyudi and Syukri M. (2013). Peran kepala sekolah sebagai pendidik dalam meningkatkan kompetensi pedagogik guru. *Jurnal Pendidikan dan Pembelajaran"*. *2*(10):1-16.

[MDF] Management for Development Foundation. (2005). Training needs assessment. [Electronic vertion]. [Received September 6, 2013]. From: *www.toolkitsportdevelopment.org/.../12%20Training%20Needs%20Asse...*

Munandar A., Sulistyarini and Zakso A.(2013). Analisis Kompetensi Pedagogik Guru dalam Pembelajaran Sosiologi di SMA Negeri 1 Jawai. *Jurnal Pendidikan dan Pembelajaran. 2*(9):1-9.

McCann T.A., and Tashima J.T. (1990). Training Needs Assessment Tool: Trainer Guide. Organization Design and Development, Inc.

Musfah J. (2011). Peningkatan Kompetensi Guru Melalui Pelatihan dan Sumber Belajar Teori dan Praktik. Jakarta (ID): Kencana.

Notoatmodjo S. (2009). Pengembangan Sumber Daya Manusia. Jakarta (ID): Rineka Cipta.

Pujiastuti E., Raharjo T.J, and Widodo A.T. (2012). Kompetensi Profesional, Pedagogik Guru IPA, Persepsi Siswa tentang Proses Pembelajaran, dan Kontribusinya Terhadap Hasil Belajar IPA di SMP/MTs Kota Banjarbaru. *Innovative Journal of Curriculum and Educational Technology. 1*(1): 22-29.

[Puskur] Pusat Kurikulum Badan Penelitian dan Pengembangan Departemen Pendidikan Nasional. (2006). Panduan Pengembangan Pembelajaran IPA Terpadu SMP/MTs. Jakarta (ID).Depdiknas

Retnowati K.S. (2013). Meningkatkan Kreativitas Guru TK Melalui Pengembangan Motivasi Berprestasi dan Kompetensi Pedagogik. *Jurnal Pendidikan Penabur.* 20(12): 1-12.

Rosnita (2011). Standar Pendidikan untuk Calon Guru Sains: Pedagogi Materi Subjek sebagai Sarana Pengembangan Pengetahuan Konten Pedagogi Calon Guru. *Jurnal Cakrawala Pendidikan.* [Electronic vertion]. [Received November 11, 2013]; 9(2). From: http://jurnal.untan.ac.id/index.php/jckrw/article/view/140/142.

Sherazi S.K., Ahmed I., Iqbal M.Z., Umar M. and Rehman K. (2011). Training needs Assessment Practices in Corporate Sector of Pakistan. *African Journal of Business Management. 5*(28):11435-11441. doi: 10.5897/AJBM11.542.

Sudirman and Purnamasari U. (2009). Potret Pedagogik dan Kompetensi Profesional Guru Mata Pelajaran IPA SMP Negeri di DKI Jakarta. *Jurnal Lingkar Mutu Pendidikan. 2*(1):78-85.

Sugiyono (2010). Metode Penelitian Pendidikan. Bandung (ID): Alfabeta

Sumantri (2012). Kompetensi Pengelolaan Pembelajaran, Kecerdasan Interpersonal, Komitmen, dan Kepuasan Kerja Guru SMK. *Jurnal Ilmu Pendidikan. 18*(1). [abstract].

Turnuklu E.B., and Yesildere S. (2007). The Pedagogical Content Knowledge in Mathematics: Preservice Primary Mathematics Teachers' Perspectives in Turkey. *IUMPST. 1*:1-13.

Widiarsa I.G.P., Marhaeni A.A.I.N., and Sutama I.M. (2013). Kontribusi Kompetensi Pedagogik dan Kompetensi Profesional terhadap Hasil Belajar IPS. *e-Journal PPs UNDIKHSA* [Electronic vertion]. [ReceivedOktober 11, 2013]; 3(1). From: http://pasca.undiksha.ac.id/e-journal/index.php/jurnal.

Widoyoko, S.E.P., and Rinawati, A. (2012). Pengaruh Kinerja Guru Terhadap Motivasi Belajar Siswa. *Cakrawala Pendidikan. 31*(2):278-289.

Wilujeng I., Setiawan A., and Liliasari (2010). Kompetensi IPA Terintegrasi Melalui Pendekatan Keterampilan Proses Mahasiswa S-1 Pendidikan IPA. *Cakrawala Pendidikan. 3*: 353-364.

Yulianti F. (2012). Hubungan Kompetensi Pedagogik Guru PAI dengan Prestasi Belajar pada Mata Pelajaran PAI. *JurnalTarbawi. 1*(2):109-123.