CONTINUING PROFESSIONAL DEVELOPMENT FOR BIOLOGY TEACHERS IN POST CERTIFICATION PROGRAM

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Abstract

Purpose: The paper presents the mechanism and implementation of the Continuing Professional Development Program (CPD) also the effectiveness of the program for certified biology teachers.

Methodology: Certified biology teachers in Surakarta, Indonesia were involved in the survey after the implementation of the nine steps of continuing professional development. The nine steps of the CPD are self-evaluation, performance profile, proposed activity plan, determine activity plan, distribute activity plan, implement activity, self-performance assessment, activity reflection, and propose improvement activity.

Result: The evaluation result presented in this paper can be used as a platform to improve the implementation of CPD in the next batch to upgrade the competence of the certified biology teachers from the teachers’ education at the university level.

Applications: This research can be used for the universities, teachers and education students.

Novelty/Originality: In this research, the model of the continuing professional development for biology teachers in the post certification program is presented in a comprehensive and complete manner.

Keywords: Professional competence, Biology teachers, post-certification, CPD.

INTRODUCTION

According to the Indonesian Law on Teachers and Lecturers No. 14/2005 article 1 and the Indonesian Government Regulation No. 74/2008 article 1, it stipulates that as professional educators, teachers have the tasks for educating, teaching, guiding, directing, training and evaluating students. Such a strategic position and tasks are aimed at improving the quality of education in general. In this context, teachers function as the agent of change who is expected to elevate the dignity of the nation in the future. Furthermore, in order to carry out the function and role as professional educators, they have to possess four competencies as stated in the Law on Teacher and Lecturer. The competencies include pedagogical competence, personality competence, professional competence, and social competence. Additionally, It is also stated in Article 2 of the Law on Teacher and Lecturer No14/2005 that as professionals, teachers must possess an eligible certificate of educator issued by the government (Van Driel, J. H., Beijard, D., & Verloop, N. (2001)).

Nevertheless, the teacher’s strategic position and role as mandated by the law have not been fully implemented. It is indicated by the number of teachers who have low competence although they have passed certification programs. It has implication on the instructional quality and eventually the low quality of education in Indonesia. One of the indicators to evaluate a country’s quality of education was conveyed in the Program of International Student Assessment (PISA) in 2012 also in 2015 (IES PISA, 2018), which reported that the education in Indonesia was still below the global average (Rolando, L. G. R., Salvador, D. F., Souza, A. H. S., & Luz, M. R. (2014)).

In 2007, the Indonesian Directorate General for Quality Improvement of Teacher and Education Personnel conducted a competency test for all subject teachers, in which the result showed the competence of teachers in Indonesia was generally low, including Biology teachers. Out of 40 questions, the average score for Biology teachers was 19 with a standard deviation of 4.58, while the lowest was 5 and the highest was 39 (Amaya, 2018). Furthermore, it was also verified by the result of Early Competency Test for teachers who participated in the 2012 certification. It showed that the national average score of Biology teacher was 52.87 while the highest score was 80.0 with a standard deviation of 10.1. The comparison score with other subjects is shown in Figure 1. The number of biology teachers in Surakarta who have passed the teacher certification was 332.

Following up the competency test, the Education Quality Assurance Agency of Indonesian Ministry of Education issued a policy, based on the Regulation of Minister of Administrative Reform and Bureaucratic Reform No. 16 of 2009 (Borisova & Parnikova, 2016) on the functional position of teachers that certified teachers should participate in Continuing Professional Development (CPD) program. The CPD program contains systematic activities that require teachers to continually maintain and improve their competence standards associated with their duty as professional educators.

There are much research reported on continuing professional development (CPD) to improve educators, such as in medical (Mack et al., 2016), nursing, engineering (Pérez-Foguet et al., 2018), also in higher education in general (Muyambiri & Chabaefe, 2018).
Saud proposed that to improve the quality of current education, professional teachers (educators) becomes a necessity. The improvement should comprehensively consider the development of science and technology, global competition for educational graduates, regional autonomy, and curriculum implementation. This research work proposed the mechanism and procedures of continuing professional development (CPD). The characteristics of the activities were examined and assessed the effectiveness of the program.

**RESEARCH METHODOLOGY**

The proposed nine steps continuing professional development for the certified biology teachers previously developed by Anif were implemented to all certified biology teachers in the Surakarta region, Jawa Tengah, Indonesia. Activities were introduced and implemented to all certified teachers in the region as many as 332 participants. Along with the implementation of the program, activities related to scientific publications and innovative works were monitored and recorded. The recorded activities included presentation at scientific forums, writing scientific articles, textbooks publication and innovative works development (Jaramillo, 2018). The survey was then conducted to the participant to have the perceptions of the participants to the implementation of nine steps continuing professional development. Statistical measures were employed to portray the results then descriptively explained for the meaningful outcomes.

**NINE STEPS CONTINUING PROFESSIONAL DEVELOPMENT**

The mechanism or procedure of the Continuing Professional Development (CPD) for Biology teachers in Surakarta is concisely described in Figure 2.

The implementation of Continuing Professional Development (CPD) can be specified as follows:

1. Initially, teachers prepare self-evaluation to reflect the activities of the previous academic year as the base-line of CPD program.
2. The teacher’s performance profile is devised based on self-evaluation and other supporting documents. It is employed to determine the teacher’s participation in the program of performance development to attain the expected professional competency standards or other development activities.
3. Teachers are assisted by the coordinator or senior to create CPD activity plan. It is subsequently consulted and coordinated to the principal in order to set the strategy, time and place of the activities.
4. The coordinator of CPD and the principal determine the program activities implementation.
5. The CPD activity plan is distributed to teachers. It involves in-service and other activities as well as the targets within a certain period.
6. Teachers conduct the activity plan and the principal conducts time-management hence the program does not interfere with the learning process.
The implementation is followed by the teacher’s performance assessment at the end of the semester. It is intended to evaluate the outcome after the CPD program. The score is converted to credit score and jointly with the score during CPD activities will be summed up for the promotion of functional position and the consideration for the assignment of additional tasks.

At the end of the academic year, the participants of CPD and coordinators will conduct a reflection of the outcome of the program. Do the activities have a positive impact on the learning process in the classroom?

Finally, teachers and coordinators propose the CPD activity plan for the subsequent year based on the previous teacher’s performance appraisal.

![Figure 2: Mechanism and procedure of 9 steps CPD for Biology teacher in Surakarta.](image)

**SURVEY**

The questionnaire for the survey was prepared to measure the CPD. Respondents included the Head of the Institute for Educational Quality Assurance of Central Java, the principals of the board of Biology Teacher Professional Development Forum, and Biology teachers. The selection of the respondents was as suggested by Sugiyono that the sources of data in qualitative research are people with their behaviors, phenomenon, archives, documents, and other objects (Machanic, M. (2001)). Additional informants were also employed. They were selected to potentially recognize the problems and were also a reliable source of data. Additionally, they would provide valid information, both verbal and non-verbal information, in relation to the professional competence development for certified teachers.

The data consisted of primary data and secondary data. Primary data were the words, direct information and behaviors of subjects (respondents or informants) while secondary data were obtained from relevant documents such as laws, government regulations, ministerial regulations, CPD guidebooks, CPD technical guidance, and data of CPD program activities. Furthermore, the data analysis technique was qualitative descriptive analysis. It was used to analyze the data on the mechanism or procedure of CPD implementation, materials, activities, impact or outcome gained by teachers in after the program and the effectiveness of the program.

**RESULTS AND DISCUSSION**

It was designed approximately nine months for a set of CPD activities. In fact, most Biology teachers in CPD programs required more than nine months. At the end of the activities, the results would be used as a basis for promotion and career development.

Neil and Morgan (2003) reported that the professional development program for teachers in England is simple without complicated procedures and only conducted less than three months. Moreover, each teacher registered for the program has been facilitated by the budget prior to the program implementation. The results are very exhilarating, particularly for junior teachers whose competencies are significantly improved. Consequently, they feel all prepared to teach better than before attending the program (Nadelson, L. S., & Nadelson, S. (2010)).

It is increasingly biased in determining the goals and targets towards the government policy on the professional development program for certified teachers. Are the goals and targets of CPD as the guidance for teachers in the post-
certification oriented towards competence improvement and development or as the promotion and career development?

The period required for the implementation of the CPD program is the consequence of the bureaucratic chains, particularly for activities conducted outside the school or activities managed by the Education Office through the MGMP. For instance, the MGMP must conduct the submission of activities, including the budget, from the school coordinator to the Education Office. Thus, it involves the establishment and approval of CPD activities by the school coordinator to be followed by approval from the Education Office and the disbursement of funding.

The protracted mechanism and procedure necessitate the teachers to “wait and see,” which potentially leads to tediousness among teachers, giving less serious and professional impression. Such less professional management also deteriorates the motivation from the principal and supervisor (extrinsic factor) and the teacher’s self-motivation (intrinsic factor).

Table 1: Activity Materials in Continuing Competence Development (CPD) for Biology Teachers

| No | Material                                                                 | Method                  | Facilitator          |
|----|--------------------------------------------------------------------------|-------------------------|----------------------|
| 1  | Education planning and work program                                      | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
| 2  | Curriculum development, Lesson Plan preparation, and teaching materials development | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
|    |                                                                          | 3. Workshop             | 3. Functional officer|
|    |                                                                          | 4. Presentation         |                      |
| 3  | Development of methodology                                               | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
| 4  | Assessment of learning processes and learning outcomes of learners       | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
| 5  | Utilization and development of informatics and computer technology (ICT) in the learning process | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
|    |                                                                          | 3. Presentation         | 3. Functional officer|
| 6  | The innovation of learning process                                       | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
|    |                                                                          |                         | 3. Functional officer|
| 7  | Professional competence development in coping with current theoretical demands | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Workshop             | 2. Mentor            |
|    |                                                                          |                         | 3. Functional officer|
| 8  | Writing scientific publications                                          | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
|    |                                                                          | 3. Presentation         | 3. Functional officer|
| 9  | Development of innovative work                                           | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
|    |                                                                          | 3. Workshop             |                      |
| 10 | Ability to present personal work                                         | 1. Seminar & discussion | 1. Senior teacher    |
|    |                                                                          | 2. Training             | 2. Mentor            |
|    |                                                                          | 3. Presentation         | 3. Functional officer|

Onchwari and Keengwe (2008) suggested the mentor-coaching model in developing teacher professionalism in Dakota USA had a significant result. The achievement of this professional development even had an impact on the successful implementation at the classroom level. It implies that the activity of competence improvement and development should involve uncomplicated and short-duration procedure as well as the appropriate model that will affect the expected outcome. In this context, the model should be adjusted to the conditions and characteristics of the teacher.

The present study reveals the characteristics of training materials in the CPD program. It indicates that the elements of developed materials and approaches, both through functional training and collective activities of Biology teachers are generally linked to the development of pedagogical competence and professional competence. The content materials of CPD are listed in Table 1.

Table 1 depicts the materials of the CPD program. Materials listed no 1 to 6 are the pedagogical competence, meanwhile, no 7 to 10 cover the development core of professional competence. This design indicates that pedagogical competence is still considered as the basic principle to professional competence.

The finding on the characteristics of the impact or outcome achieved by Biology teachers in the post-CPD program is listed in Table 2.
Table 2: Indicator of scientific publication and innovative works

| No | Scientific publication & Innovative works | Type of activity | Number of teachers | Percentage of achievements (%) |
|----|------------------------------------------|------------------|-------------------|-------------------------------|
| 1  | Presentation at scientific forum          | 1. Resource person in seminar | 2                |                               |
|    |                                           | 2. Resource person in workshop | 1                |                               |
|    |                                           | 3. Resource person in colloquium | -                | 13.2                          |
|    |                                           | 4. Resource person in scientific forum | 4                |                               |
| 2  | Scientific publication article            | 1. Article/report of research | 1                | 7.5                           |
|    |                                           | 2. Article of scientific ideas | 2                |                               |
|    |                                           | 3. Popular scientific writing | 1                |                               |
| 3  | Textbook publication                      | 1. Textbook       | 2                |                               |
|    |                                           | 2. Module/dictate book | 8                | 22.6                          |
|    |                                           | 3. Teacher guideline |                   |                               |
| 4  | Innovative works                          | 1. Effective technology | 1                |                               |
|    |                                           | 2. Development of artwork | -                |                               |
|    |                                           | 3. Lesson tools creation/ modification | 3                | 15.1                          |
|    |                                           | 4. Preparation of guideline (practical guideline) | 4                |                               |

The data depicts the achievement level of Biology teachers in the CPD program in the parameter of scientific publications and innovative works are relatively low. The teachers participating in CPD programs who are able to produce scientific articles published through their role as resource persons in seminars, workshops, colloquium, and scientific forums merely 13.2% of the total 53 participants.

The achievement of indicators of scientific publication, both research reports/articles, scientific ideas, and popular scientific writing is approximately 7.5%. The achievement for textbook publication, both in the form of textbooks, modules/dictates, and teacher guidelines is 22.6%. It is the highest achievement compared to other indicators. It is possibly due to prior to the CPD program, the participants were required to compile modules or dictate. Meanwhile, the achievement of innovative works of 15.1% is dominated by guideline in the form of practical guideline (four teachers).

Comparing with the number of participants (53 teachers), this achievement is relatively low. Thus, the achievement for the indicator of scientific publication and innovative work is far from optimal. It implies the low capacity of CPD activities to improve professional competence, particularly for the sub-competence of professional development of teachers.

The finding demonstrates the effectiveness of professional competence development of Biology teachers through the CPD program covering the aspects of mechanism and management, material and elements, and impact of CPD implementation as in Table 3.

Table 3: Effectiveness of the CPD program on Biology teachers in the post-certification program

| Percentage of category | Less effective | Moderately effective | Effective | Total |
|------------------------|----------------|----------------------|-----------|-------|
| Category of mechanism and management of CPD (No. 1 - 23) | 51 % | 26 % | 23 % | 100 % |
| Category of material and elements (No. 24 - 41) | 10 % | 27 % | 63 % | 100 % |
| Category of Impact of CPD (No. 42 - 52) | 58 % | 30 % | 12 % | 100 % |

In accordance with the data, the category of mechanism and management of CPD is perceived as less effective with percentage of 51% and the category of CPD impact of 58%. Furthermore, the material substance is classified effective equal to 63%. It affirms that the development of model related to the implementation and management of CPD program and the impact of the implementation should be conducted to provide optimal and effective outcomes.

The less effectiveness of the implementation and management of CPD program as indicated by the result of questionnaire is possibly due to three factors: (1) the long period of implementation (nine months); (2) the protracted bureaucratic chain; (3) the lack of supervision; and (4) the involvement as mentoring is still dominated by senior teachers while the participation of academicians from universities is not optimal.
The less effectiveness of the CPD program on the quality of learning process is affected by three factors: (1) the less factual self-evaluation; (2) the low teacher’s motivation; and (3) the low level of monitoring and evaluation by the principal and school supervisors. It is linked to the low supervision from school, which should be the most important element of school development strategies to achieve the optimal school performance.

Danim and Suparno asserted that in addition to motivation, the principal must also conduct monitoring or supervision, both on the learning process and administration. Moreover, supervision is able to generate significant motivation among teachers and encourage them to perform better. It is reaffirmed by Sagala, that the supervision is to improve teacher performance that will affect the improvement of the learning quality in the classroom.

Huntly suggested that the competencies of junior teachers are generally affected by educational background and more or less teaching experience in the field. Therefore, one of the approaches used to improve the competence of teachers is by the appraisal process. It should be done continuously while the principal can supervise periodically to generate motivation.

The less effectiveness of the outcome of CPD activities on the learning quality in school (by 58%) based on the questionnaire is caused by three factors, in which one of the most influencing factors is the less factual self-evaluation. In the first stage of the procedure of the CPD program, teachers are required to devise self-evaluation as the basis for determining the type of CPD activities. Regarding, teacher prepares a self-evaluation based on inaccurate data or documents. Teachers have not fully realized the significance of the function of self-evaluation. As a consequence of less valid self-evaluation, it results in the planned activities of the CPD, which is not in accordance with the needs of respective teacher. Hence, the implemented CPD program is inappropriate or cannot address the weaknesses of existing competencies of respective teacher.

Conceptually, the CPD program is initiated by the preparation of self-evaluation as a form of planning activities to increase the ideal competence, yet it necessitates high honesty and integrity. It is one of the weaknesses and drawbacks of teachers in Indonesia.

Day and Judith asserted that the quality of Continuing Professional Development is highly influenced by the content, process, and context, all of which will determine the effects of knowledge and teaching practices development in school. The activities should meet the needs of individual teacher professionals and may demonstrate a correlation between the requirements of teacher professional development and school development.

It is also argued that in addition to suitability with the personal needs of the teacher and school development, the quality of the continuing teacher professional development is also affected by monitoring and evaluation carried out by the principal. Monitoring is conducted as a form of supervision by the principal to assess the on-going seriousness and development, also the evaluation of the weaknesses during the development activities. Furthermore, monitoring and supervision conducted by the principal potentially trigger the enhancement in teacher motivation during the continuing professional development program.

CONCLUSION AND RECOMMENDATION

The mechanism and procedure of CPD program consist of nine stages of: (1) the preparation of teacher’s self-evaluation; (2) The preparation of teacher’s performance profile; (3) The formulation of CPD activity plan by teachers and coordinator; (4) The determination of CPD activity plan by principal and coordinator; (5) The distribution of CPD activity plan on teachers; (6) The implementation of CPD activity plan by teachers; (7) The teacher performance appraisal (PKG) in the end of the semester; (8) The reflection of CPD program by teacher and coordinator; (9) The arrangement of CPD program for the subsequent academic year by teachers and coordinator.

Characteristics of indicators and materials of the CPD program consist of self-development, scientific publications, and innovative works. Self-development is conducted through the functional training and/or collective activities of teachers. Teacher collective activities are carried out in the form of scientific forum or the participation of teachers at internal and external activities (such as teacher working group/KKG and teacher professional development forum/MGMP).

Impacts or outcomes of the participation of teachers in CPD program are in the form of scientific publications and innovative works. The activities are: (1) presentation on scientific forum by 13.2%; (2) writing scientific publication articles by 7.5%; (3) textbooks publication by 22.6%; and (4) creation or development of innovative works by 15.1%.

The effectiveness of CPD model on Biology teachers in the post-certification program can be specified as follows: (1) The mechanism and management of CPD is less effective by 51%; (2) the impact or outcome for teachers after the CPD program is 58%; and (3) the material substance is classified effective by 63%.

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