ICERI 2016

by Didi Supriadi

SELF- DEVELOPMENT PROGRAM BASED ON HYBRID LEARNING TO INCREASE CHEMISTRY TEACHER ABILITY OF RESEARCH AND SCIENTIFIC PAPERS WRITING

Antuni Wiyarsi[1], Sukisman Purtadi[2]

[1,2]Chemistry Education Department
Faculty of Mathematic and Science, Yogyakarta State University
[1]e-mail: antuni_w@uny.ac.id, [2]e-mail: purtadi@yahoo.com

Abstract

This research aims to design a self-development program based on hybrid learning to increase the ability in research and write scientific papers for high school chemistry teacher. The designed include the structure of the program, media for supporting program in the form of training modules and web-based media. The method used is the exploratory mixed methods design with instrument development models. Research procedure includes four stages, namely the qualitative development of instruments, quantitative and interpretation. Qualitative phase is done with need assessment and literature. Instrument development is done by designing the program structure in the form of training activities and preparation of modules and web-based media for program implementation. The research use three instruments, i.e. a sheet of expert validation, assessment sheets of module and web based media. Assessment sheets module contains of 58 items covering three aspects of assessment, namely instructional design, content and design of technical feasibility. Web-based assessment sheets consists of 31 items statements include continuities aspects, modalities, redundancies, coherence, interactivity, personalization, simplicity and specificity. The data were analyzed descriptively. The first results is the self-development program structure based on learning hybrid with characteristics; follow the pattern In-On-In; with two training strategy -face to face and online- that conducted for 18 weeks; training materials include basic research, action research, and scientific writings. Media for supporting program include Tinular module and Tinular website. Tinular training modules consist of six chapters and further reading material. Tinular website for training can be accessed at http://dikkitinular.wix.com/titinular. Quality of Tinular modul and Tinular website are in good categories based on peer reviewers assessment.

Keyword: hybrid learning, self-development, research ability, scientific writing, chemistry teacher

1. Introduction

Continuing Professional Development (CPD) is necessary for chemistry teacher. It is a major component of teacher's activities that can be assessed for promotion. CPD activities are expected can create a professional teacher, not only has extensive knowledge, but also has a mature personality. The elements of CPD activities include self-development, scientific publications and innovative work [1]. Innovation in the learning process is one of the activities of self-development material. The innovation can be developed through action research. The result of action research can be a scientific publication that is another form of CPD for chemistry teachers. So, action research and scientific publication can be the materials that emphasized in CPD for chemistry teachers.

CPD can be structured and organized in a number of different ways, and for a number of different reasons. While most CPD experiences might be considered as means of introducing or enhancing knowledge, skills and attitudes. The models of CPD have been categorized into several form as training, award-bearing, standard-based and coaching or mentoring [2]. The training model of CPD is universally recognizable and in recent years arguably been the dominant form of CPD for chemistry teachers. It is generally delivered to the teacher by an expert in a conference or workshop. Its agenda determined by the deliverer, and the participant placed in a passive role.

Training activities is necessary because the community to be one of the important aspects in the professional development of teachers good [3]. But, there is a constraint in training for

chemistry teachers that is the difficulty in taking time in a long time to assemble. The results of previous research [4] conclude that continuing professional development that is mostly with the traditional mode of workshops and seminars by face to face to be inadequate for the teacher's self-development effectively. In this case the self-development program based on hybrid learning to be an alternative solution to overcome the constraints of time and place.

Hybrid Learning combines mode of face to face and online. A substantial proportion of course material is presented online but still has a face to face meeting [5]. Merging least two setting learning into a flexible learning environment, namely the physical classroom and web enable infinite relationships between tutors and participants [6]. Hybrid learning is expected can be overcome the constraints of time and place. However, the emphasize of matter and pedagogical aspects still fulfilled by mode of face to face.

Chemistry teacher's self-development program based on hybrid learning has not been encountered in the field. Therefore, innovative self-development program with training model based hybrid learning is the first step that is appropriate to support the program CPD for chemistry teacher. Program developed can be disseminated nationally. Part hybrid learning namely online learning will provide benefits that can be accessed by all chemistry teachers in Indonesia, whenever and wherever. This model also will improve the chemistry teacher's skills in using the information technology.

A good training program requires an optimal design before the program starts. It is required the media that will be used to support the implementation of the program. The program that based hybrid learning requires two major media, namely in the form of print media as training material to-face and web-based media as training material online. This research aims to design a self-development program based on hybrid learning to increase the ability in research and write scientific papers for high school chemistry teacher. The designed include the structure of the program, media for supporting program in the form of training modules and web-based media.

2. Method

The method used is the exploratory mixed methods design with instrument development models. Research procedure includes four stages, namely the qualitative, development of instruments, quantitative and interpretation.

Qualitative phase is done with need assessment and literature. Questionnaire of needs assessment (NA) is used to explore problems related to the experience and ability of chemistry teachers to conduct research and write scientific papers.

Development of instruments in the form of modules and web media carried out by the analysis of material, drafting, expert validation, revision and peer assessment. The research instrument used is a sheet of expert validation, assessment sheets of module and media based on web. Assessment sheets of module contains of 58 items covering three aspects of assessment, namely instructional design, content and design of technical feasibility. Web-based assessment sheets consists of 31 items statements include continuities aspects, modalities, redundancies, coherence, interactivity, personalization, simplicity and specificity.

The data were analyzed descriptively. The analysis procedure included; scoring, calculating the mean score, and determine which the quality categories. Basis for determining the categorization adopted from [7].

3. Result

Description of self-development program based on hybrid learning

Self-development program was developed based on the model of training. The pattern applied is In-On-In with online supporting that conducted for 18 weeks. The first phase is In-(service 1) done by face to face meetings. The materials presented are the type of educational research, action research, instrument development, preparation of proposals and reports action research.

The second phase is On - (service) conducted by independent activity and collaboration among the chemistry teacher to develop proposals, conduct research and prepare a report of action research. The third phase is In - (service 2) that conducted through face to face meetings for reflecting the activities in the On phase. It also follow by workshops to prepare of scientific articles. In addition to face to face meetings, chemistry teachers can access a variety of training materials as well as communicate with tutors via a web-based media. Training participants can access a variety of training materials more operational, ask him, investigators linked the difficulties that it faces as well as interact with fellow participants.

Profiles of chemistry teachers as respondents

Need assessment conducted to collect preliminary data related teacher experience in

doing research and writing scientific papers as well as training which need to be done. It can generally be identified profile of respondents, namely all respondents (16 teachers) are bachelor in chemistry education, have teaching experience from 3.1 to 20 years and nine teachers are have been certified.

Based on analysis of the NA data there are several important issues regarding the need for training in developing teacher's ability for conducting research and writing scientific papers. There are: a) The chemistry teachers have been accustomed in using of the Internet for a variety of purposes; b). All chemistry teachers have accounts in social networks; c) Only 25% of respondents who had conducted research; d) A total of 31.25% of respondents who have never written a scientific paper; e) teachers lack an understanding of research design and its application in learning process; f) teachers' understanding of classroom action research and its implementation is still lacking; g) A total of 37.5% of respondents had attended training related to research and h) 12.5% of respondents had attended training related to writing scientific papers.

The clarity of knowledge sources on Research and Scientific Writing

Need assessment activities intended to obtain field data that will be used as the basis to develop of training including the media to be used. Tables 1 and 2 respectively presents a summary of the data related to the clarity of the source of knowledge for teachers today. The result indicates there are 15 parts that are not clearly from the source of knowledge about the research that have been read or owned by the teacher. The biggest percentage is the examples of research reports and research proposal, making instruments and research proposal. The result is used as the basis for developing modules and web. The analysis result of the clarity of the source of knowledge related to writing scientific papers indicate that there are 10 sections that has not clearly. The largest percentage of parts that have not clearly is on the examples of scientific work, turning the report into a scientific article and abstract.

Tinular module as media to support the self-development program

The first products of research is a training module for upgrading the ability of research and write scientific papers for chemistry teacher. The module was developed based on the analysis of the theory and the results of need assessment. A module consists of six chapters. In each chapter contains objectives, material descriptions, summaries and reviews as well as a bill. Here the systematics of modules:

1. Chapter 1: Introduction. This chapter consists of eight pages and contains a description of what and why the self-development program conducted with training models (hereinafter abbreviated training Tinular) required for teachers. Description about Tinular training purposes and how it is will be implemented.

2. Chapter 2: Research in education. This chapter contains 19 pages. Matters discussed in this chapter include; basic understanding of research, research skills, research variables, hypothesis, literature review and sources, sampling and instrument.

3. Chapter 3: Types of educational research. The chapter consists of 12 pages. Chapter 3 discusses design of qualitative research, quantitative and mixed methods

4. Chapter 4: classroom action research. The chapter contains of 12 pages. Description delivered include; definitions, types and steps action research.

5. Chapter 5: Do action research. The chapter consists of 17 pages. The topics discuss how to write proposals and reports action research. Output of this chapter is the proposal and report of action research.

6. Chapter 6: Writing scientific articles. This chapter consists of seven pages. The contents are "what, why and how to" write a scientific article.

7. Further Reading. This section contains about another references that can be accessed.

8. References of Tinular module.

The Tinular module is validated by three experts. Feedback given by experts is used for revising the product. After that, the module is assessed. The results of the assessment of five peer reviewers for each aspect served successively in Fig. 1, 2 and 3.
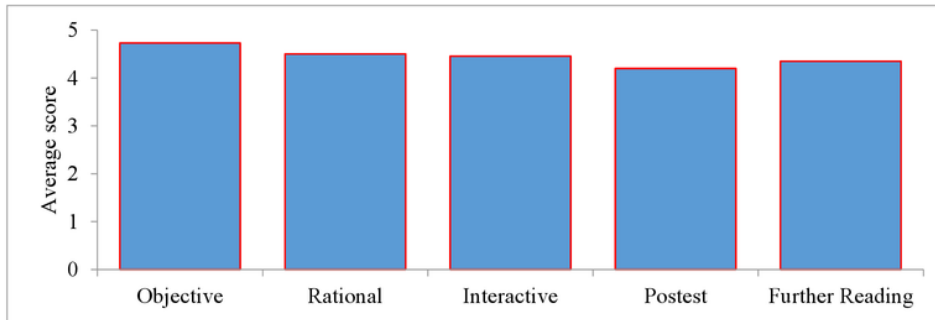
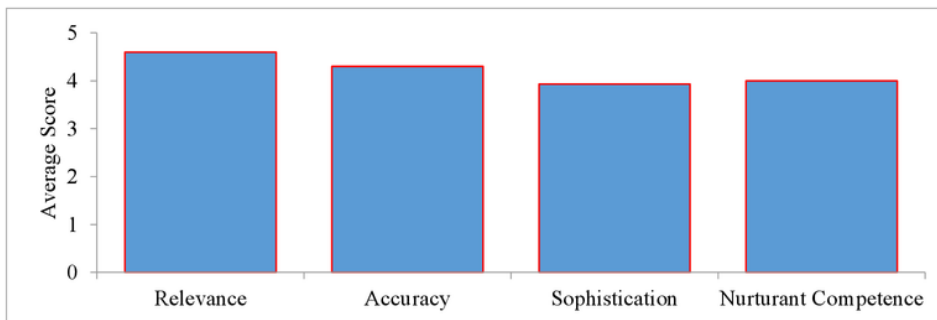Figure1. Assessment of instructional design aspects

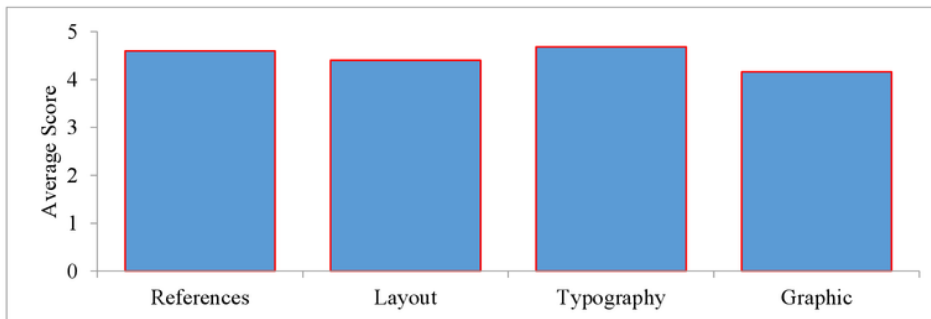Figure 2. Assessment of feasibility contents aspects

Figure 3. Assessment of Technical design aspects

The evaluation criterion for the module in the feasibility content aspects consists of relevance, accuracy, currency and nurturant competence. In Figure 3, it appears that all the assessment criteria are in good category (the average score> median). This shows that in terms of content, the modules fit for use in training activities to be conducted. As for the other aspect of the assessment is a technical design (Figure 3). The criteria in these aspects include; references, layout, typography and graphics that are all in good category.
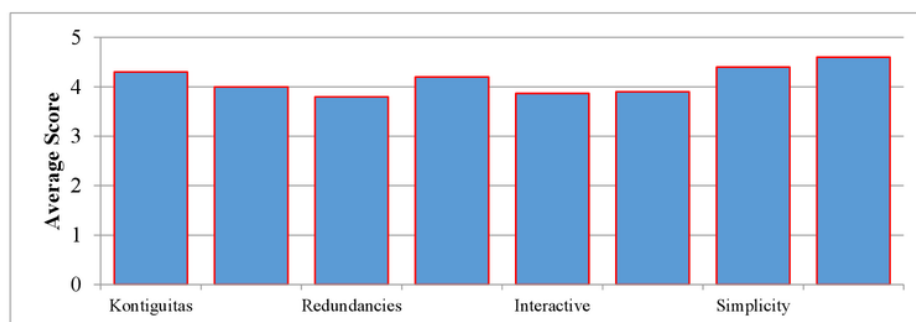
Figure 3. Results of assessment for the training web Tinular

Results of assessment for the training web Tinular

The second product developed is training media web. The media is characteristic of hybrid learning, where training is conducted through face-to-face and online sessions. Web can be opened in http://dikkitinular.wix.com/titinular address. Menu of media contains home, schedule, materials, resources, news, about us and contact. In this website also provided space communication between trainees with a tutor. The material presented in part is the same material as the module, but others are additional materials. Additional material is examples of proposals and scientific articles. Moreover, this website also has shown a video about the explanation of some of the material.

Media website developed also validated by experts. The results of the expert input are used as a basis for revision and subsequent media assessed by peers (peer). The assessment results are presented in Figure 4. There are eight assessment criteria, namely kontiguitas, modalities, redundancies, coherence, interactivity, personalization, simplicity and specificity. Based on the pictures, it appears that the average score for all of the criteria of assessment results over a median score. This means that the developed web media fit for use in training activities Tinular.

In general, media training modules and web Tinular be developed in compliance with the eligibility for use in the training program to be conducted

4. Discusion

The survey showed that of the 16 teachers, six of them getting training. The form of training includes training of action research proposal preparation and training that is integrated in the activities PLPG. Next, the teacher stated that the training had attended still not meet the adequacy supplies teachers in implementing research in the classroom. Things have not been fulfilled, according to the teacher, was the absence of a competent core resource persons, no follow-up training, and there are no concrete examples of action research proposals. As related to teacher training experience of writing scientific papers, only two teachers who said that they had followed him. However, according to them, he followed training is still not satisfactory, especially related to training that is only theoretical as well as the exposure is less clear. These two facts indicate need for training activities that can provide a good understanding of research and writing scientific papers as well as provide an opportunity for teachers to implement the understanding in real terms in the field, accompanied by a real follow-up.

In addition, teachers also provide advice regarding good training. There are eight main things to be considered in teacher training. Related to the execution time, most teachers require training schedule that does not interfere with teaching schedule, and supported by a strategic place with the support of adequate facilities. Things can be done is to combine face-to-face training and on line. Training materials associated with emphasis on materials applicable not just theoretical with complete training and media interest. Expected training methods are interactive delivery is accompanied by direct practice with competent mentor (both content and pedagogical) and communicative. One thing that is important is the need for teachers according to feedback and follow-up of training activities that follow. In addition, the associated ease of bureaucracy, teachers want notifications and official invitation to the schools so that teachers can attend training well. All these teachers suggestions into consideration in developing training on research and writing scientific papers either.

Tinular training modules developed based on theoretical analysis and user requirements. Offline and online training needs require modules. Learning module is a freelance unit that contains a self-learning that is designed to be used for the learners themselves or a small group without the presence of a teacher means fundamentally that required students to learn in the module.

Tinular developed training modules consist of six chapters, further reading and bibliography. Cover module is presented in Figure 5. The Tinular module accordance with the rules that must be met in learning, such as the clarity of learning objectives and their final test. Participants have clear guidelines in studying the content of the module can simultaneously assess her abilities independently. In addition, the material presented interactively with the various methods of delivery. Starting from the concept of exposure, excavation problems, questions or begins with examples. Some manner of presentation makes the modules more easily understood by the reader and at the same time can accommodate different learning styles and abilities of different readers in understanding the reading material.

Figure 5. Modul Cover

The Tinular module has a good feasibility in terms of content. The materials presented are relevant to the needs of self-development chemistry teacher because the teacher associated with the obligation to investigate. The material presented is sourced from the latest research results and resources so that up to date. The use of modules is expected to add insight about the chemistry teacher action research and write scientific papers. Meanwhile, web-based media that was developed was also instrumental in developing the ability of chemistry teachers. The

media of interactive website by giving concrete examples of action research that applicable to teachers. In general, media training modules and web Tinular be developed in compliance with the eligibility for use in training programs to be conducted.

5. Conclusion

Has designed self-development program to increase the ability of research and writing scientific papers for chemistry teachers. The self-development program structure based on learning hybrid with characteristics; follow the pattern in service 1-on service-in service 2; with two training strategy -face to face and online- that conducted for 18 weeks; training materials include basic research, action research, and scientific writings based hybrid learning, which combines face-to-face and online presentation. Similarly, the media will be used, in the form of modules and to support the implementation of the program. Tinular media in the form of training modules consist of six chapters and further reading material. The quality modules and web developed by peer reviewers (5 chemistry lecturer) categorized in good quality so worth it to be used as a medium in the implementation of self-development program at the next research.

REFERENCES

[1] PermenPAN-RB Nomor 16 Tahun 2009. Tentang Jabatan Fungsional Guru Dan Angka Kreditnya

[2] Kennedy, A. 2005. Models of Continuing Professional Development: a framework for analysis. *Journal of In-service Education*, 31(2), 235-250.

[3] Wei, R.C., Andrée, A., & Darling-Hammond, L. 2009. How nations invest in teachers high-achieving nations treat their teachers as professionals. Educational Leaderships, 28 – 33.

[4] Ememe P.I., Aitokhuehi, MRS. O.O., Jegede, S. & Ojo-Ajibare, J.O. 2013. Enhancing teaching quality through continuing professional education. *European Journal of Educational Studies*, 5(2), 277-291.

[5] Boettcher, J.V. & Conrad, R.M. 2010. The online teaching survival guide : simple and practical pedagogical tips. San Francisco: Jossey-Bass.

[6] Hastie, M., Hung, I.C., Chen, N.S., & Kinshuk. 2010. "A blended synchronous learning model for educational international collaboration". *Innovations in Education and Teaching International*, 47 (1), 9–24.

[7] Widoyoko, E.P. 2009. Evaluasi Program Pembelajaran. Yogyakarta: Pustaka Pelajar.

ICERI 2016

| 8 | "Intelligent Information and Database Systems", Springer Nature America, Inc, 2016 | <1% |
| | Publication | |

| 9 | digitalcommons.unl.edu | <1% |
| | Internet Source | |

| 10 | "Rethinking Educational Practice Through Reflexive Inquiry", Springer Nature America, Inc, 2011 | <1% |
| | Publication | |

| 11 | Aileen Kennedy. "Models of Continuing Professional Development: a framework for analysis", Journal of In-service Education, 6/1/2005 | <1% |
| | Publication | |

| 12 | "Hybrid Learning and Continuing Education", Springer Nature America, Inc, 2013 | <1% |
| | Publication | |

| Exclude quotes | On | Exclude matches | Off |
| Exclude bibliography | On | | |