

# Model of Biology Teachers' Professional Competency Development Based on the Early Competency Test in Surakarta Residency

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Abstract: The study aims to describe a model of Biology teachers' professional competency development based on the early competency test in Surakarta residency. The procedure of research development used R & D model developed by Borg and Gall, and then simplified by Samsudi into three main stages of introduction, development, and validation for finding a model. In the stage of development, the researcher formulated an early development; then it was analyzed with the relevant theories for formulating a model design developed in the form of Figure or Model Figure after validated by focus group discussion (FGD). The results of the study stated that a model of Biology teachers' professional competency based on the early competency test included the following characters: 1) implementing a model begins with a competency test; 2) the activities reflected the aspect of continuing professional development (CDP); 3) the supervision was periodically realized by principals or course teachers); 4) giving feed-back for the next development was based on the evaluation; and 5) the experts from Higher Education with relevant sciences and competency were involved in the activities.

## 1 INTRODUCTION

Since 2015, Biology teachers of Surakarta residency have passed from a teacher certification reached 332 out of 565 people while those who have not taken it reached 233 people. The teachers with an education certification have not been in maximally and structurally sustainable development by the Education Office of Regency. Instead, it has developed them more pragmatically, but it has not employed an appropriate strategy. An unprofessional development program is due to a lack of funds. It causes a sustainable development form of teachers' profession and career to be more praxis and limited.

Referring to Act No. 14, 2015, Indonesian teachers' competency that has passed from an education certification has generally been in low grade, particularly in pedagogic and professional qualifications. Besides the Biology teachers, it has occurred to all the teachers of education levels and courses.

The condition that describes the Biology teachers' low competency is strengthened with the results of the early competency test by the teachers who will take an education certification in 2012. Their national average grades only achieve are 42.25

in a 1-100 scoring system. The highest and lowest grades respectively achieve 97.0 and 1.0 with a deviation standard of 12.72. Particularly for the Biology teachers, the highest and lowest achieve 52.87 and 80.0 with a deviation standard of 10.1 See the following figure.

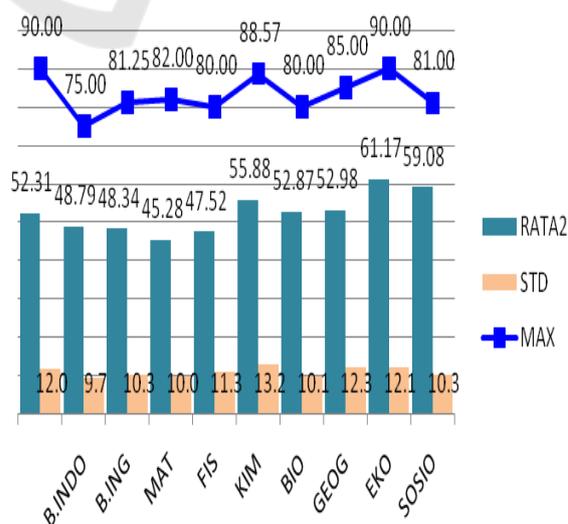


Figure 1: Grades of teachers competency test in 2012.

Because of this, to enhance a national education quality, teachers must develop their profession sustainably so that they can run their profession tasks professionally. An innovative strategy and method must be continuously realized and developed. These are consistent with the demand of profession development. Also, it is strategically relevant to Undang-Undang No. 14 (2005) about Teachers and Lecturers, stating that teachers must meet academic qualifications and must be competent; they must have an education certificate; they must be in sound mind and body; they must have an education certificate and be competent in realizing the aim of national education. The teachers' competencies of pedagogic, personality, social, and professional are developed with profession education.

## 2 LITERATURE REVIEW

The development of teachers' competency and profession is essential. It is relevant to Saud (2009), stating that for increasing a present education quality, teachers' professionalism is a must. In consideration with current condition, moreover, running a professional education must be necessary to pay more and more attention to developed and advanced science and technology, graduation global competition, local autonomy, curriculum implementation. Because this, the statement problem of the research is what is an of Biology teachers' professional competency development based on the early competency test in Surakarta residency?

## 3 RESEARCH METHODS

The procedure and research development employed a R&D model (Borg and Gall, 2007). The model by Borg and Gall (2007) uses a multi-procedure of 1) product analysis, 2) theoretical analysis, 3) development planning, 4) early model development, 5) model validation, and 6) final product. Borg & Gall identifies ten stages of working procedures of research and development model. Samsudi (2009) simplifies these stages into three stages of 1) introduction, 2) development and validation, and 3) final model/product.

The data of the research comprised primary and secondary. The primary data included the respondents' or informants' spoken and written communications and behaviors, mainly related a

model of teachers' competency development in the post-certification; the secondary data covered the documents, including regulations (or Acts), guiding books, working programs of Association of Course Teachers (ACT). In terms of the respondents as the data source, the research employed a purposive sampling. So, the researchers chose the respondents who were credibly regarded to understand the problems of the research.

In the stage of development, it is necessary to formulate an early model development. The model is based on the reflection of the introduction stage (factual model). After that, it is analyzed by referring to relevant theories and regulations (Acts), and then, formulating a model development. The activities of the stage consist of 1) empirical and theoretical analysis in relation to a finding of factual model and formulation of model development design, 2) model instrument formulation, 3) FGD for an early model design validation, and 4) model improvement model on the basis of FGD results. The data were descriptively and qualitatively analyzed.

## 4 RESULTS AND DISCUSSION

### 4.1 Results of the Research

The results of the introduction stage describe a model of Biology teachers' professional through the forum of MGMP in Surakarta residency (factual model).

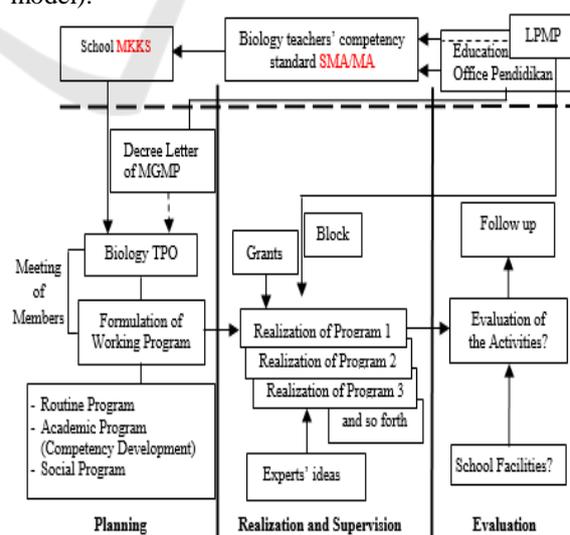


Figure 3: A model of biology teachers' competency development through the forum of MGMP in Surakarta Residency.

The results of the research show that implementing a model of Biology teachers' professional competency development through the forum of MGMP describes some weaknesses in planning, realization, and evaluation aspects. In terms of planning aspects, the activities of Biology MGMP used the general materials for all the Biology teachers, who essentially had the heterogeneous professional competencies. It means that the planning of the activities was not based on need analysis that described some weakness in each teacher's professional competency.

Regarding the realization aspect, the activities were not realized structurally and sustainably while the use of the method was dominantly 'lecturing' (one-way communication), the proportion of the activities was tendentiously routine and pragmatic, the materials focusing on professional competency development were low in quantity, there was no supervision, the experts were the senior teachers, and the activities did not collaborate with the experts from Higher Education. In relation to the evaluation aspect, the evaluation of Biology MGMP activities were not carried out structurally, so there was no feed-back for the next activities.

Based on the weaknesses in a model of professional competency through Biology MGMP, theoretically and empirically the research analyzed human resources of education by formulating a model development design after validation process in the form of FGD. The result was a model of Biology teachers' professional competency development based on the early competency test in Surakarta residency.

The new development model comprises five characters that was not found in the factual model. Firstly, the model begins with need analysis of competency developed from the early competency test. Secondly, the model is a continuing professional development (CPD). Thirdly, the model strengthens a supervision aspect that involves a supervisor of course or principal by monitoring and evaluation. Fourthly, the length of each academic and teachers' professional development activity maximally runs during six months. Fifthly, the activities of the professional competency development are realized by inviting the experts from Higher Education relevant to their science and competency.

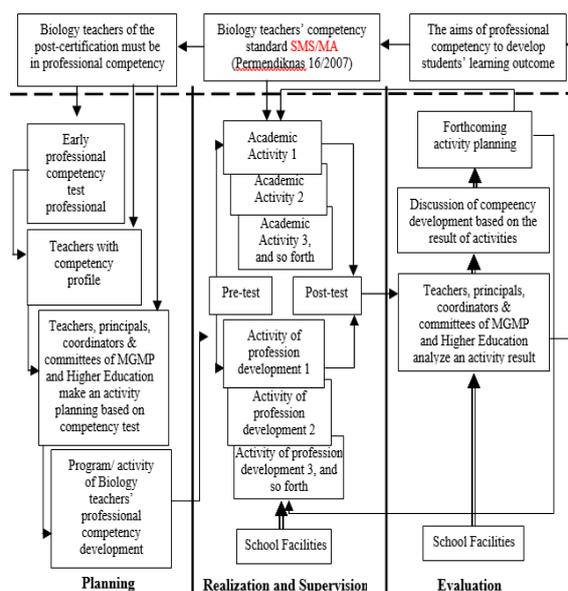


Figure 4: A model of biology teachers' professional competency development based on early competency test in Surakarta Residency (hypothetic model).

## 4.2 Discussion

As a result of development, model has five character:

- Beginning with early competency test;
- Referring to *continuous professional development (CPD)*;
- Supervising by a superior;
- Strengthening an evaluation for getting feed-back;
- Inviting an expert from Higher Education.

In terms of the first character, implementation teachers' competency development model will begin with early competency test. The result of the test has the following two functions 1) as a basis for planning an activity of competency development relevant to teachers' needs, and 2) as a baseline of each teacher's professional competency. It is a core of planning a human resources development of education.

Mathis and Jackson (2006) state that the human resources development must begin with need analysis of individual and organization. Although the need analysis of individual gets less attention, it is a determinant factor in finding an optimal result and encouraging to achieve an organization's goal as expected.

Jones and Walter (2008) suggest a task for a school (principal) to make a strategic planning of the educative and administrative staff competency and

development. In an education field, they must have an opportunity to develop their potency for a performance achievement. Moreover, it is said that for a performance achievement, teachers and administrative staff need to get training for competency development.

In terms of the second character, it is related to a sustainable professional competency development activity or a continuing professional development (CPD)-based activity. The activity is a solution to the problem of factual model, i.e. a process of a Biology teacher's professional competency development, including a kind or material of activities, is not realized structurally and there is no follow up for unfinished activities.

Regards a sustainable professional development, Guskey (2000) and Day and Sachs (2004) propose that teachers' professional competency must be developed continuously for anticipating an education and science and technology development and advance, in general. Additionally, it is suggested that continuing professional development is a systemic process in consideration with changes in a given period of time. The activities of CPD must meet individual teachers' professional need and can indicate a correlation between teachers' profession and school' development needs. It is line with Mathis and Jackson (2006) and Jones and Walters (2008). Guskey (2000) suggests that it is necessary to develop teachers' professional competency continuously. Mathis and Jackson (2006) emphasize a human resources development of education that must be relied on an individual teacher's and school's needs. Therefore, an early condition analysis of teachers' competency functions as a base-line and it serves a basis of need analysis of teachers' competency in the future as well as a determinant factor in a kind of activity in the forthcoming.

Guskey (2000) proposes some activities of CPD, including 1) formal activities, 2) teachers' attendance for taking a course and training of learning methods, learning media and facilities, and instructional materials development, 3) private study for developing materials relevant to science and competency or general education, and 4) class action research.

The third character is concerned with strengthening a supervision aspect by a superior (principal) in a process of activity realization. Strengthening the supervision is a solution to the problems found in the factual model, i.e. there is a lack of supervision and even there is no supervision by the superior. The results of the research show that

the supervision activity does not run well and even there is no supervision for Biology MGMP.

According to Cicih and Nurdin (2011), an analysis result of data by National Education Office, National Planning Board, and World Bank in 1999 indicates that a teacher is a key to improve and develop an education quality. It is greatly determined by learning quality. For improving and developing a learning quality, a teacher is a core figure in the class. Additionally, he or she must continuously be supervised and developed by a principal or other related superiors. It is consistent with a supervision concept, stating that *supervision* is an aid and advice or suggestion for teachers in instructional field, teaching and learning, and curriculum for achieving a school's goal (Neagley and Dean, 1980).

Bessong and Felix (2009) state that supervision is one of the effective instruments in a learning process in the class because it will improve and develop a learning quality continuously and systematically, so it will take a positive effect on improving and developing students' learning achievement. Fritz (2003) relates a supervision activity to a principal's substantial task. It is suggested that for advancing a learning field, supervision is a main option and inevitable for education improvement and development.

Referring to the concept, education supervision not only functions to give some aid and advice by a principal, but also gives some motivation and stimulant to teachers so that they can develop their competency maximally as a professional teacher relevant to a school's needs. Cicih and Nurdin (2012) state that supervision is a process, a sequence of activities that makes teachers develop their competency.

The fourth character is related to evaluation aspect. In a management of education human resources, a lack of evaluation process in working program for developing workers' performance achievement is a very great error because each organizational management must operate all the activities as planned, so it needs some evaluation to achieve an organization's goal (Jones and Walters, 2008). Based on the analysis, implementing a model needs an evaluation process for developing human resources comprehensively and structurally to achieve a standardized education.

In relation to the fifth character, it invites an expert (lecturer) from Higher Education. Based on the results of the research, the activities of teachers' competency development through Biology MGMP in the post-certification indicate a lack of the experts

from Higher Education but these invite the senior teachers. Inviting an expert from Higher Education is said to be very essential for developing materials more comprehensively, including philosophical aspects and their implementation to science and technology. The expert can help teachers understand the materials more deeply and use laboratory facilities for more comprehensive instructional materials of biology.

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## 5 CONCLUSIONS

From the Discussion it can be concluded that 1) implementing the model begins with the early competency test that will be a basis of need analysis of competency development, 2) the model development has a continuing professional development (CPD) aspect, 3) the realization of the activities is needed to strengthen a supervision by a principal or course supervisor. It can be conducted periodically, 4) Strengthening an evaluation aspect is intended to get feed-back for forthcoming activity planning and 5) Inviting an expert from Higher Education relevant to his or her science and competency is greatly necessary.

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