

Revitalization Model of Industrial Apprenticeship-Based Professional Competence for Light Vehicle Engineering Expertise Teachers of Vocational School

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Abstract

The revitalization of professional competencies aimed to increase the number and quality of the light vehicle engineering (TKR) teachers' skills. The background of this study was the low absorption of human resources from the vocational school in the business world and industrial world (DU/DI), the lack of teacher expertise in teaching factory, and the gap between education and industrial demands. This study aimed to produce a revitalization model of professional competence based on industry apprenticeship that is ideal and effective for improving the competence of TKR productive teachers. This research employed Research and Development (R & D) Methods. The subject of this research was TKR Teachers in Semarang Municipality. The results of the preliminary study were analyzed using a qualitative descriptive technique. The development results, the model of readability tests, and the model tools were tested through expert judgment. The feasibility of the model was tested through forum group discussion (FGD) and evaluation, i.e. the industry effectiveness test or the professional certification body (LSP). The results of the research show the following. First, the competence of TKR productive teachers in the form of general competence is 31 - 71% and the core competency is 29 - 69% of the whole competencies that should be mastered by the teachers. Based on the empiric data, the teachers were then assigned to join an industry apprenticeship. After the industry apprentices, the teacher's competence tests either through the industry test or the LSP test recommended that they were competent. It can be concluded that the competency revitalization model of industry-based professionals for vocational school teachers of the light vehicle engineering expertise is effective to improve the competence of the productive teachers' skills.

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INTRODUCTION

Vocational school (SMK) is revitalized in order to improve the quality and competitiveness of human resources (HR) in Indonesia, among others through strengthening the performance of the Ministry of Education and Culture and the Ministry of Industry. The revitalization aimed to increase the number and competence of SMK teachers and educators and improve cooperation between the SMK students and the business world to provide wider access in doing the Job Training (PKL) and apprenticeship programs for SMK educators and personnel (Inpres RI Number 9 of 2016). In line with Moore & Swan (2008), it is important to create the need for teacher induction programs because, with industry apprentices, teachers will acquire soft skills that will be useful in soft skill formation knowledge (Schulz, 2008) and skills in accordance with industry demands or SKKNI.

SKKNI is a statement about what a person can do in the workplace (Kepmenakertran Number 116 the Year 2004). In Indonesia, SMK prioritizes the development of students' skills for a particular job. Therefore, vocational education should be close to the world of work (Government Regulation Number 19 the Year 2005). SMK has the main objective of preparing its graduates for direct employment and providing specialized reproductive and teacher-based training (Pavlova, 2009, p.7). Furthermore, Slamet (2005, pp. 45-46) states that the idealization of vocational education is very clear, that vocational education will be effective if it starts and ends in DU/DI. Based on the above explanations, SMK teachers are required to master the competencies as mentioned in SKKNI to carry out their main tasks and functions, which are to educate, teach, train, guide, direct, and evaluate.

Productive teachers are categorized as professional teachers if they have professional competencies in general and skill competencies in accordance with the SKKNI. Competence is very useful as a basis for implementing group learning tasks on subjects with vocational interest (C), i.e. three basic subjects of expertise, three basic subjects of skill courses, and four subjects of competency skills. The teachers share

the task of teaching subjects that match the needs of the school and its skill competencies. Therefore, the professional compensation of productive teacher should be developed continuously in accordance with the development of the automotive technology.

The development of professional competence, that is the competence of industry expertise, needs to be managed professionally so as to be able to provide the competency skills to the students so that it will affect the absorption of the graduates in the industrial world. Educational institutions should establish cooperation with the industrial world so that the teachers and students feel familiar with the teaching factory. In optimizing partnerships between the university and school, Villers & Mackisack (2011) discuss collaborative responsibilities in supporting students to learn about learning while teaching. The various problems that arise in partnership between industry and school are among others placement, cost, and teacher involvement issues. Therefore, it is suggested to have possible solutions such as increasing the number of stakeholders, implementing regulations, and developing private sector partnerships to help schools solve funding problems (Kwami, 2012). Despite the high costs, this partnership model greatly enhances student and teacher competence (Cordner et al., 2012).

This partnership model is very useful. The students acquire industry skills, develop work habits, and inculcate a positive attitude towards the industrial world that is also beneficial in synchronizing the school curricula to cope with the rapid technological developments and bridging the gap between the knowledge gained through the school learning and industry practices (Ojimba, 2013) and how knowledge, values, and achievements in the workplace can contribute to the school curricula and its pedagogical practices (Watters et al., 2013) and skills acquisition (Rufai et al., 2013).

Matthew, et al (2015) explain the importance of partnerships on different levels but all parties maintain a shared vision, mutually agreed outcomes, and the need for public participation in automotive education (Sultana et al., 2015). Darmawang, a policymaker, (2016)

states that job skills can be seen from their ability to (1) cooperating, (2) problem solving, (3) initiative, (4) management capabilities, and (5) information technology. These level differences will provide variations in the evaluation systems that are highly beneficial to the development of skills competencies.

Collaborative assessment models from various stakeholders can provide a variety of systems and areas of assessment (Tillema, 2009). Industry-school partnerships can produce professionally useful competencies for a wide range of interests: in schools for pedagogical and teaching-learning interests, in the industry for assessing the process of acquiring skills, and in LSPS to gain recognition for their expertise.

METHODS

This research was designed by employing the Research and Development model. The model was used to develop and test an educational product (Borg and Gall, 1979, p. 624) with a mixture of qualitative and quantitative approaches. This study aimed to find a model of professional competence revitalization that was based on an ideal and effective industrial apprenticeship to be implemented for SMK productive teachers of light vehicle engineering expertise in Semarang Municipality. The qualitative approach was used to analyze the qualitative data while the quantitative approach was used to analyze the data resulted from the use of questionnaires and observation techniques, in-depth interviews, documentation, and questionnaires as a support. The study was located in Semarang Municipality. The research procedures consisted of three main steps, namely preliminary study, development, and evaluation.

The preliminary study aimed to describe and analyze the empirical facts about the development of professional competence of TKR productive teachers which have been implemented by the teachers. The study consists of three research steps: (1) literature study, (2) field survey, and (3) drafting conceptual model (Sutama, 2010, p.191). The data sources of this research were the head of Education Office of Semarang Municipality, vocational supervisor,

head of MGMP, principal, teacher, and industry. The validity of the data was tested using triangulation. The data were analyzed qualitatively utilizing interactive techniques and worked out on a continuous basis (Miles & Huberman, as cited in Sugiyono, 2013, p.404). At the development stage, the data were collected using expert and practitioner's judgment. The subjects of this research were visualization model and model implementation guidance with the academic expert, management expert, policy maker, industry expert as data sources, and teacher as executor. The data were analyzed using a quantitative descriptive technique based on Likert scale as the interpretation guideline. At the evaluation stage, the research was conducted by means of the the single one-shot case study through the industry assessment or LSP to test whether the revitalization model of professional competence based on industry internship is effective to improve the professional competence of the TKR productive teachers.

RESULTS AND DISCUSSION

The results of this study are described in three stages: preliminary study, model development result, and effectiveness test results. The preliminary study resulted in empirical facts about the development of professional competence of the TKR teachers in Semarang Municipality that (1) the data-based compilation system of the teachers' professional competence used two systems namely physical and non-physical systems or information technology-based systems. The grouping of data was based on academic qualifications as a key requirement, prior experience of working as a teacher or becoming a teacher in another school and the productive competency training he/she participates in, and the possession of a competency certificate from the LSP; (2) the competency of the TKR productive teachers in the form of general competence of productive teachers is within the range of 31 - 71% and the core competence is within the range of 29 - 69% of the whole competencies that should be mastered; (3) the management of the professional competence development includes

planning, implementation, and quality assurance.

At the planning stage of the development, the stakeholders of the Education Office of Semarang Municipality, the MGMP, and the principal have conducted good socialization to the productive teachers. The results of this interview are supported by a questionnaire showing that 17% of the respondents said that they always receive socialization from the stakeholders, 54% said often, 17% said sometimes, and 12% said never; (4) concerning the clarity of the competencies to be developed, the types of activities, the time allotment, the requirements, the facilities, and the costs, they said that the stakeholders had given a good explanation; (5) in the development of professional competence, the teachers and industry/business world (DU/DI) were sometimes involved in determining the competencies to be developed. The development of the productive teachers' skills competencies was designed on the basis of a regulatory package that fits within the available budget; this activity is called a program package. It is supported by the questionnaire results indicating that 24% of the whole respondents said they were always involved, 43% were often involved, 18% were sometimes involved, and 15% were never involved.

The development of professional competence has been carried out on the bases of (1) the competencies possessed by the productive teachers; (2) the promoting cooperation with industry to conduct training and develop work programs for teacher competency improvement; (3) experts/instructors' inventory; (4) seeking sources both independently and in mutual assistance in the form of industry participation and CSR; (5) designing teacher needs; (6) developing teacher competence periodically and gradually.

The quality assurance of the competence has been done in Semarang Municipality to evaluate the professional competence of the productive teachers by using official guidance from the BNSP, SKKNI, industry, or government regulation. The quality assurance activities were carried out by a supervisor from an industrial or authorized person assigned or

from a sole agent (ATPM). To carry out the quality assurance tasks, the supervisor used official guidance from the BNSP or SKKNI or used instruments drawn from the relevant industry or the government or instruments determined by the MUK to be pursued on a periodical basis, at least once a year, i.e. at the beginning or end of the school year. The results are used to determine the follow-up to be done or the rewards that need to be given.

The result of this interview was confirmed by the result of the questionnaires of the respondents. The results of the questionnaires were utilized to generate the ownership of guidelines in the implementation of quality assurance of the skills competencies of the light vehicle engineering productive teachers in SMK Semarang. The questionnaire results show that 41.2% of the whole respondents answered that the Municipality Education Office always has a guidebook on the implementation and quality assurance of competence development of productive teachers' skills, 35.3% answered frequently, 5.9% occasionally, and 17.6% never. The results of the questionnaires show that 35.3% of respondents answered that the vocational supervisor always carries out supervision in accordance with the guidebook, 35.3% stated frequently, 11.8% occasionally, and 17.6% never. The results of the questionnaires indicate that 32.4% of the respondents answered that the principal always has a manual on the implementation and quality assurance of competence development of productive teacher skills, 44.1% answered frequently, 8.8% occasionally, and 14.7% never. The results of the questionnaires show that 23.5% of the respondents stated that the MGMP of SMK Semarang Municipality always has manual of implementation and quality assurance of competence development of productive teacher skill, 35.3% stated frequently, 26.5% sometimes, and 14.7% never. The summary of these empirical facts is presented in Figure 1.

From the exploration of the empirical facts, it is found that the adequacy of general competence and core competence is still low, the planning and implementation management is still low, the management of quality development and school policy is in the high

category, the implementation of quality assurance is categorized as low. This is caused by the fact that competencies are developed based on government regulations and budgets. As a result, there are some weaknesses that need to be overcome so that the development of professional competence of productive teachers further improves the skills competency based on the SKKNI. The development plan considers

several factors including (1) the absence of a written road map on skills competence development; (2) there is no industry apprenticeship for teachers, (3) the program has not reached all teachers (State/Private), (c) the program is not implemented continuously. The implementation of quality assurance is not well programmed and the coordination system is not well integrated yet.

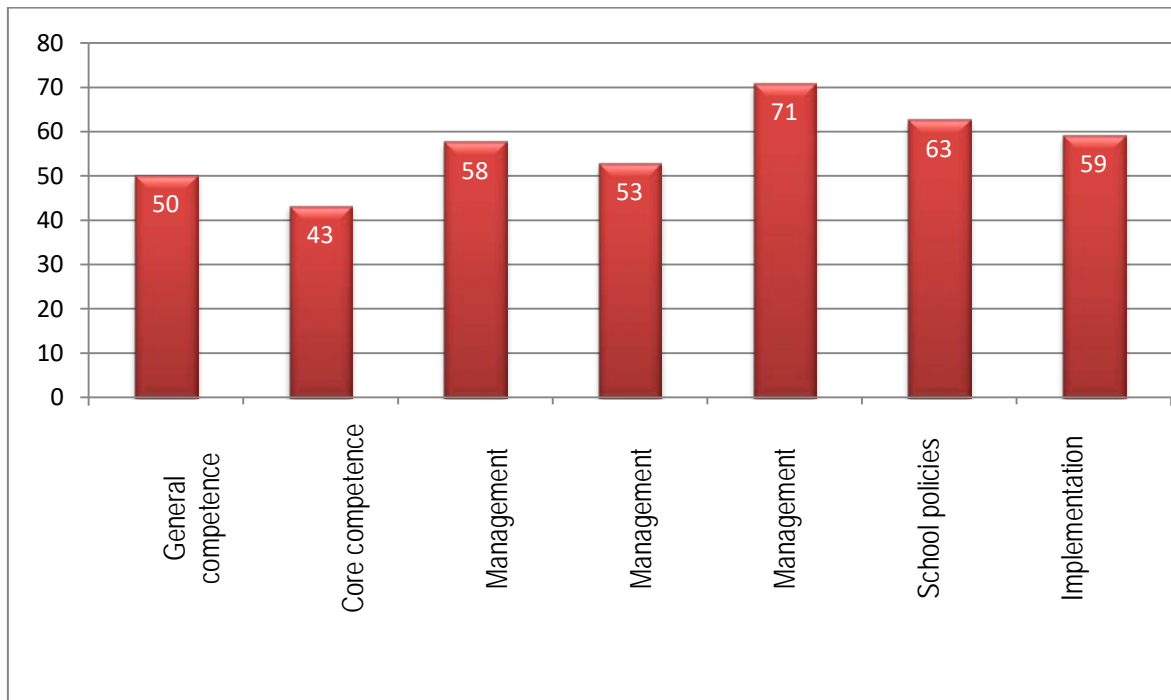


Figure 1. Empirical facts about the development of professional competence of TKR productive teachers in the Municipality of Semarang

From the exploration of the empirical facts, it is found that the adequacy of general competence and core competence is still low, the planning and implementation management is still low, the management of quality development and school policy is in the high category, the implementation of quality assurance is categorized as low. This is caused by the fact that competencies are developed based on government regulations and budgets. As a result, there are some weaknesses that need to be overcome so that the development of professional competence of productive teachers further improves the skills competency based on the SKKNI. The development plan considers

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Based on the empirical facts, it is necessary to make some improvements. The improvement actions are directed to the design of revitalization models of professional competence based on industry internships for the TKR productive teachers. The improvement includes (1) coordination and cooperation system; (2) compilation of data-based competency of teacher skill; (3) analysis of problems and teachers' needs; (4) development

programs (road-map); (5) quality assurance. After the design of the model and model device in the form of manual implementation of the model was prepared, then the model was consulted to the mentor. After getting the supervisor's approval, the model was discussed and evaluated by experts and practitioners through expert judgment. The results of the discussion and assessment of the experts and practitioners became input to refine the model design into a hypothetical model. The model was evaluated to assess (1) the model rationalization, (2) the model assumptions, (3) the rationalization of the PRK2G, (4) the tasks and roles of the PRK2G, and (5) the visualization of the model legibility. The results of evaluations by experts and practitioners are as follows.

The rationalization model gives the average score of 3.80 which can be argued that in general the rationalization of the revitalization model of professional competence based on industry internship is in a very good category.

The experts and practitioners' recommendations on the importance of the model and the superiority of the revitalization model of professional competence indicate that the model is very effective to be applied for SMK light vehicle engineering expertise teachers. In general, it can be inferred that the revitalization model of the industry-based professional competence gives an average score of 3.67 which is in a very good category. The recommendations from the practitioners indicate the clarity of the related assumptions model revitalization of professional competence shown by the PRK2G-based internship industry. This model was needed to improve the professionalism of the light vehicle engineering productive teachers.

The clarity of argument about the importance of the PRK2G gave a mean score of 3.69 implying that in general the rationalization of the PRK2G in the revitalization model of professional competence based on industry internship is in a very good category. The recommendations given by the practitioners provide clarity on the importance of the PRK2G

with the success rate of professional competency revitalization that needs to be emphasized.

The task and role clarity of PRK2G in the revitalization of professional competence of the productive teacher gave an average score 3.25. Thus, it can be said that in general the task and role of the PRK2G in the revitalization model of professional competence based on industry internship are in a good category. The experts and practitioners' recommendation is that the clarity of the tasks and roles that the parties involved in the PRK2G greatly determined the successful revitalization of the professional competence of productive teachers.

The visualization and legibility of the model gave a mean score of 3.37. Thus, it can be argued that in general the visualization and readability of the revitalization model of professional competence based on industry internship are in a very good category. The expert and practitioner's recommendation is that the visualization and legibility of the model are very clear.

The design of the model was refined based on the recommendation from the academic experts who stated that the planning includes pre-planning activities consisting of (1) position analysis and teacher competence, (2) problem analysis and teacher needs in skills competence development, (3) data-based mapping, (5) planning of skill competency development program, (6) determination of skill competence to be developed and achieved by the teacher, (7) determination of material, instructor, time, method, facilities, and costs, (8) establishment of evaluation and reward systems, and (9) participant forms of participation.

At the implementation stage, the PRK2G submits (1) a list of titles of competency units to be developed and achieved by the teachers, (2) implementation schedule, (3) industry apprenticeship, (4) list of participants, and (5) participant form. The task of the industry consists of (1) establishing the internship pattern, (2) preparing the instructor/resource person, (3) providing the facility, (4) setting the schedule of activities, (5) setting the performance criteria, (6) carrying out the guidance and mentoring, and (8) carrying out appraisal of the industrial apprenticeship processes. The

evaluation/quality assurance phase is divided into three categories, namely (1) school, (2) industry, and (3) professional certification body (LSP). Each category prepares (1) the industry apprenticeship guidance, (2) the appraisal instrument of knowledge and performance of the competency unit, and (3) administration of assessment and evaluation, and (4) providing follow-up based on the results of the assessment and evaluation.

After obtaining the assessment and approval of the experts and practitioners for the refinement done by the researchers, the feasibility test of the model implementation was done through a limited focus group discussion (FGD) which was expanded. The FGD result is that the revitalization model of the professional competence based on the industrial internship for productive teachers' competence in light vehicle engineering expertise in Semarang Municipality is very feasible to be implemented. This assessment can be explained that

Evaluation through questionnaire with pre-planning indicator revitalization model of the professional competence by the nine participants gave a mean score of 4.42. Thus, it can be said that in general the pre-planning revitalization model of the professional competence based on the internship industry is in a very decent category.

Planning gives an average score of 4.36. Thus, it can be argued that in general the planning of the revitalization model of professional competence based on industry internship is in a very good category.

Implementation gives an average score of 4.36. Thus, it can be said that in general the implementation of the revitalization model of professional competence based on industry internship is in the category very feasible category.

Quality assurance gives an average score of 4.72. Thus, it can be said that in general the quality assurance on the revitalization model of the industry-based professional competency is in the category of very decent.

The assessment results by the FGD participants were used as a basis for testing the effectiveness of the models and model devices through industry internships. The industry internships are conducted by five teachers alternately according to the teacher's time and the agreement between teacher and industry for 4 to 6 weeks. The teacher did the learning, training, guidance, and mentoring of the competency unit that was being traded. During the apprenticeship process, the industry prepared instructors, materials, facilities, evaluation systems, and industrial process appraisal and apprenticeship instruments. The industry internship that had been done by the teacher provided the skill competence. A teacher who had undertaken an industrial internship and conducted LSP testing was recommended as a competent teachers with No.Reg. OTO.001.0001993. 2008 for the light four sub sector skill program with qualified competence: mastering the expertise as a conventional engine tune up technician. The competency unit titles are presented in Table 1.

Table 1. List of Titles of Competency Units

No	<i>Code of Competency Unit</i>	Title of Competency Unit
1	OTO.KR01.001.01	Melaksanakan Pemeliharaan/Servise Komponen <i>Carry Out Maintenance and/or component servicing operations</i>
2	OTO.KR01.009.01	Membaca dan memahami gambar teknik <i>Read and interpret engineering drawings</i>
3	OTO.KR01.010.01	Menggunakan dan memelihara alat ukur <i>Use and maintain measuring equipment</i>
4	OTO.KR01.016.01	Mengikuti prosedur kesehatan dan keselamatan kerja <i>Follow workplace occupational health and safety procedures</i>
5	OTO.KR01.017.01	Menggunakan dan memelihara peralatan dan perlengkapan tempat kerja <i>Use and maintain workplace tools and equipment</i>
6	OTO.KR01.018.01	Kontribusi komunikasi di tempat kerja <i>Contribute to workplace communication</i>
7	OTO.KR01.019.01	Melaksanakan operasi penanganan secara manual <i>Carry out manual handling operations</i>
8	OTO.KR02.010.01	Memelihara/servise sistem pendingin dan komponen – komponennya <i>Service cooling system and associated components</i>
9	OTO.KR02.014.01	Memelihara sistem bahan bakar bensin <i>Service petrol fuel system.</i>
10	OTO.KR02.020.01	Memelihara sistem kontrol emisi <i>Service and repair emission control system</i>
11	OTO.KR05.001.01	Menguji, memelihara/service dan mengganti baterai <i>Test, service, and replace battery</i>
12	OTO.KR05.011.01	Memperbaiki sistem pengapian <i>Repair ignition systems</i>
13	OTO.KR02.012.01	Memelihara/service dan perbaikan Engine management system <i>Service and repair electronic Engine Management System</i>

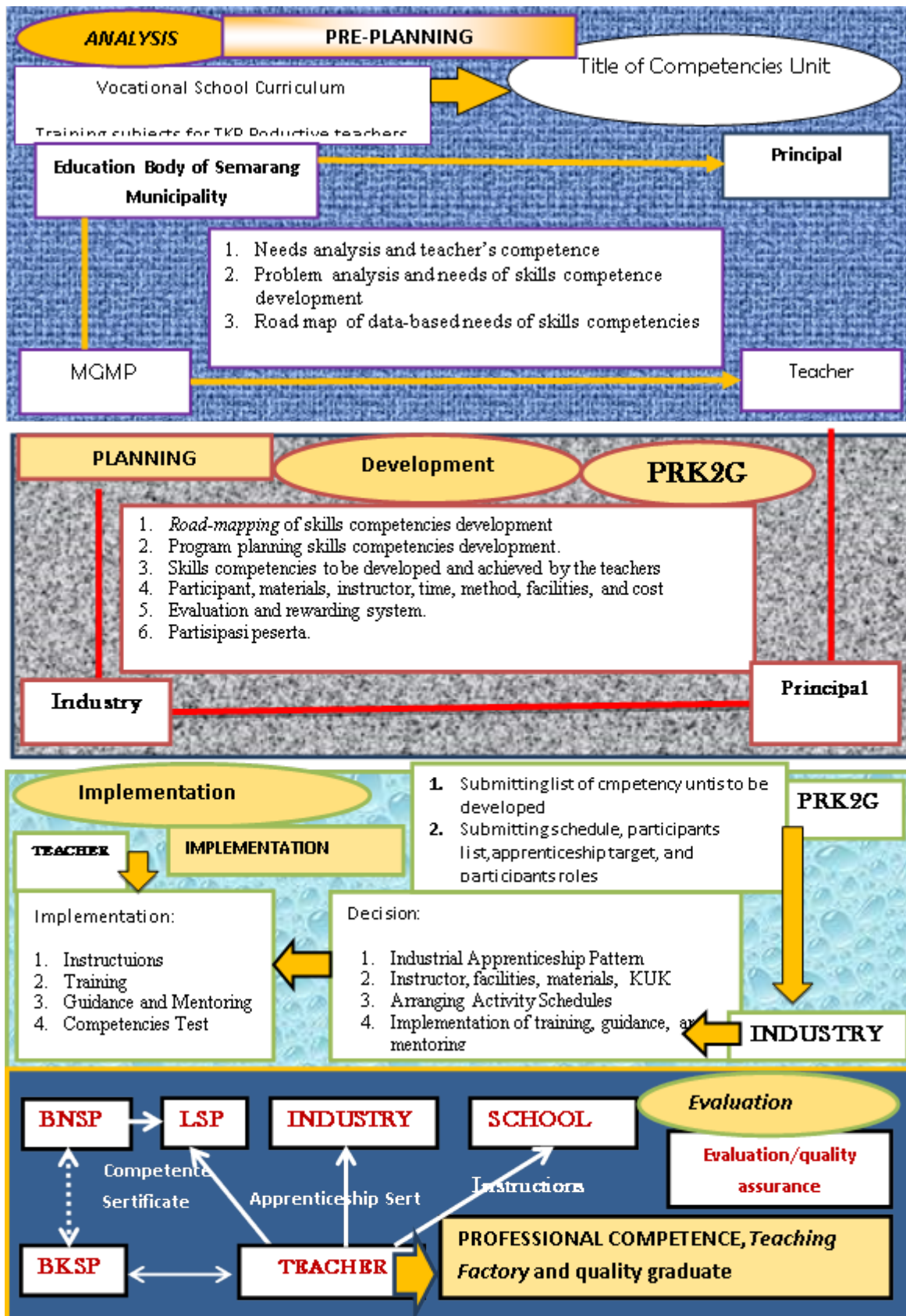


Figure 1. The final model of the revitalization of professional competence based on industry internship for SMK teachers of light vehicle engineering expertise in Semarang Municipality.

CONCLUSION

The empirical facts about the development of professional competence of productive teachers for public and private schools indicate that (a) the general competence controlled by productive teachers gives an average score of 50% and the mastery of core competencies gives an average score of 43% of all competencies that should be mastered. These scores are in a low category; (b) the management of competency development planning and its implementation are also in the low category; (c) on the contrary, the quality assurance management and school policies are in the high category.

The development of revitalization model of the productive teachers' professional competence that is based on industry internships is the innovation of teacher competency development that has been done so far. This activity is focused on developing the competence of industry-based internship skills. The innovation lies in the steps of the competence development including analysis, design, development, implementation, and evaluation. The internal and external validation results through expert and practitioner tests followed by FGD show that the revitalization model of industry-based professional competency for productive teachers of light vehicle engineering is recommended as a very feasible model to be implemented.

The final results of this model include five stages: Analysis, design visualized in pre-planning, development visualized in planning, implementation visualized in implementation, and evaluation visualized in the evaluation. The model implemented through the industry apprenticeship is effective to improve the competence of productive teachers of light vehicle engineering expertise.

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