

EVALUATION ON CURRICULUM FOR FURTHER TRAINING IN OCCUPATIONAL SKILLS FOR VOCATIONAL TEACHERS IN METAL CUTTING OCCUPATION

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1. Introduction of the Vocational education system and TVET Teacher training system of the country

A. Vocational Education system in Indonesia

The education system in Indonesia is regulated in Law No. 20 of 2003 on the national education system. Indonesia's formal education consisted of elementary education, secondary education and higher education. Primary education consists of primary and secondary schools. After primary school students may proceed to the general or vocational secondary education. After basic education there is some kind of education is general education, vocational, academic, professional, vocational, religious, and special. Graduate students to continue their education in general education academic education, vocational education graduates while students may be directly employed or continuing their education in vocational education or diploma. Chart vocational education system in Indonesia is like Figure 1 below.

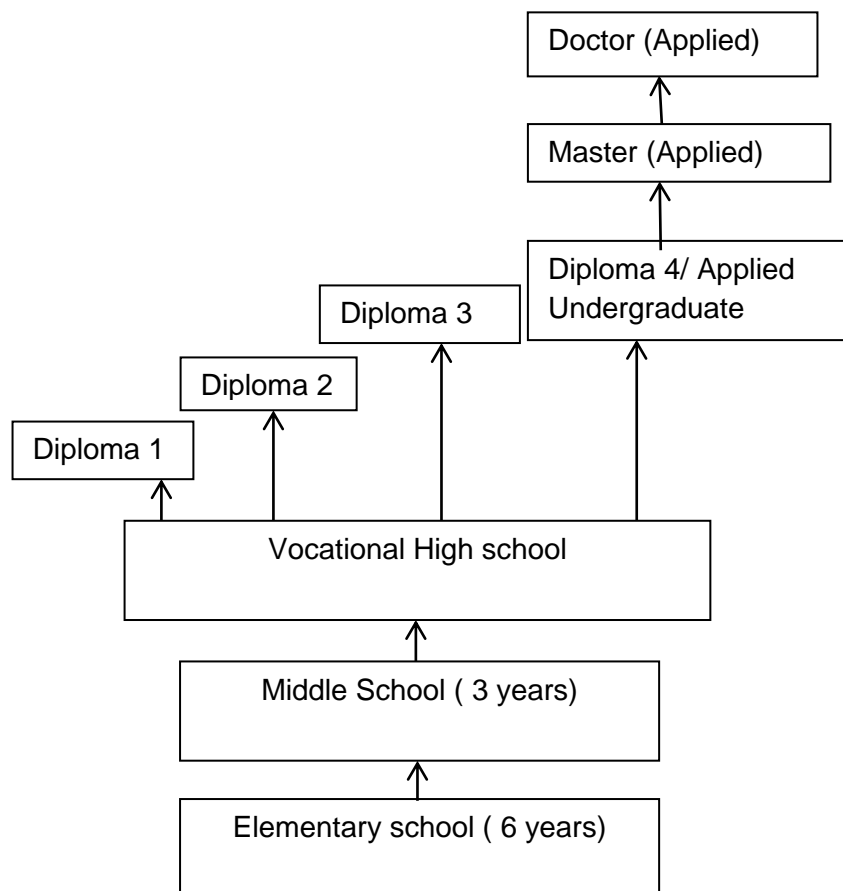


Fig. 1 Vocational education system in Indonesia

B. TVET teacher training system in Indonesia

The education of vocational teachers candidate in Indonesia are handled by ten university education and some private universities who have faculties of education. Education and training of teachers in Indonesia are handled by the Human Resources Development and Quality Assurance, Ministry of Education and Culture. Implementation of education and training to improve the competence of teachers is handled by the Centre for Development and Empowerment of Teachers and Education Personnel. Vocational education and teacher training are handled by the Vocational Education Development Center (VEDC) in Malang and Technical Education Development Center (TEDC) in Bandung Indonesia. Both institutions are addressing teacher training and vocational technical education. VEDC Malang is the center of the automotive and electronics training, while TEDC as a center for training in engineering and industrial engineering.

2. Training needs of further training in occupational skills of vocational teachers

Vocational school teachers must have a vocational competency in the subject they teach. Advances in technology and science has long competences possessed by the teacher no longer in line with the demands of the working world and the new curriculum. Application of automation in industrial production machining using CNC machinery and CAD/CAM tools can not be met by most vocational schools. Thus the necessary training for teachers machining techniques, especially the CNC machining process.

a. Current practical competence/occupational skills of vocational teachers at TVET institutes

Teacher competency test that have been implemented by the ministry of education and culture in the year 2012 data showed that, teachers' professional competence and vocational pedagogy not been in line with expectations. Many teachers do not pass the competency exam. Both pedagogical and professional competence of the majority of teachers have a score below 70. Based on data from the ministry of education and culture, teacher competency test results throughout Indonesia, the average scores is 44.55, with a highest score of 91.12 and the lowest score 0. Based on these data, the education and training to improve the competence of teachers is still very necessary.

b. Present policies, legal documents relating to requirements of occupational skills of TVET teachers

Not all teachers are certified to teach vocational schools. Those who do not have a teaching certificate is not graduated from the teaching profession through education and

professional training of teachers, those who did not have a certificate, and a new teacher. Teachers are expected to have a pedagogical, professional, personal, and social competence in accordance with the regulations of the national education minister no.16 of 2007. Government Regulation no. 74 of 2008 concerning teacher mandates that teachers are required to have academic qualifications, competency, education certificates, physical and spiritual health, as well as having the ability to achieve national education goals. Professional competence of public school teachers has been specified in the rules of the national education minister no. 16 in 2007. Professional competence of vocational teachers than provided for in the regulations also stipulated in the national education minister no. 28 of 2009 on vocational competency standards vocational schools. Thus the professional competence of teachers of vocational high school refers to the vocational competency standards.

c. On-going implementation of curriculum design/development and delivery in further training in occupational skills in practice

Further education and training for vocational school teachers in Indonesia implemented by VEDC and TEDC. The curriculum used for training tailored to the curriculum of vocational schools and vocational competency standards of vocational schools. Besides training curriculum is also geared to accommodate the development of science and technology that is currently used in the machining industry nationwide.

d. Plan and trend

At this time vocational teachers must have a teaching certificate and a certificate of competency skills / professional competence. Under these conditions, the training institute will further enhance the vocational teacher competencies that all vocational teachers have sufficient competence to teach. Implementation of the competency test for teachers already certified educators will also continue to take place, so that based on the competency test data can be carried further training plan for teachers of vocational schools in Indonesia.

3. Curriculum design

a. Philosophy and approach

Approach to curriculum development is undertaken in order to improve the competence of teachers able to teach in vocational schools. The curriculum is implemented in accordance with the standards of competence and vocational competency for vocational schools, so it is relevant to the needs of teachers in schools. Teachers are trained to master the basic material and advanced materials in each subject of the training, so that teachers are expected to know more about the training materials more than the students who will be taught. Thus philosophy used is essentialism, the competence of teachers is essential as a

preparation to teach in vocational schools. Teachers who master the teaching materials will be able to teach it well.

b. Procedure for curriculum development

The process of curriculum development in VEDC Malang made and verified by instructors, disseminated, and confirmed to the related industry. For example, CADD with 3 DS software industry and authorities related training. Training materials engineering profession is validated by the Certification Body of metal and machinery. The curriculum is expected to further training curriculum for vocational high school teachers are highly relevant to industry needs.

c. Parties participating in curriculum development process

Training curriculum involving both internal and external parties. Internal party consisted of the instructors, while external parties are working in related industries, and machinery or equipment supplier.

d. Input (target group, requirements of competence, qualification), output (graduates, requirements of competence, qualification)

Target participants are teachers of vocational schools throughout Indonesia, public participants and participant education institutions and industry representatives. Teacher training is a teacher of vocational subjects according to the training material. Participants should be graduate from undergraduate study program, and commissioned by the school principal. Some materials require training via e-learning training prior to training practice.

Trainees who pass the training were given a certificate of training in an eligible practice attendance and competence matter. Some participants is allowed to take competency test, if they passed, will receive a certificates of competency. Certificates of competency issued by the Institute of Professional Certification Metal Machine Indonesia, or other agency having authority to conduct examinations and issue certificates of competence.

e. Objective of curriculum

Purpose of further training curriculum for teachers is to bring training materials with the existing curriculum at the Vocational School are used by teachers as a material for the learning process.

f. Structure of curriculum (overall, modules, lessons), theory and practice ratio

Training material and length of courses in VEDC Malang describe in table below. There are 14 training subjects in machining.

No	Training Subject	Training hours	Modules
1	Basic Lathe	100	Basic Lathe
2	Advanced Lathe	100	Advanced Lathe
3	Lathe Machining Complex	100	Lathe Machining Complex
4	Grinding	100	Grinding
5	Basic Milling	100	Basic Milling
6	Advanced Milling	100	Advanced Milling
7	Milling Machining Complex	100	Milling Machining Complex
8	EDM	100	EDM
9	Maintenance and Repair	100	Maintenance and Repair
10	CNC Lathe	100	CNC Lathe
11	CNC Milling	100	CNC Milling
12	Mastercam	100	Mastercam
13	CADD Inventor	100	CADD Inventor
14	Basic mechanics	100	Basic mechanics

Ratio between theory and practical implementation of the training is 20% : 80%. Implementation of learning theory is on the first day of training every day. Training methods used are lectures, problem solving, discussion, lab work, assignments, distance learning / e-learning / blended learning. So before the participants were invited to training, it is required to follow e-learning. For those who obtain good scores on learning on e learning, teachers will be selected to be invited to training in VEDC. The group of the trainees for each training is 12 people, with 1 or 2 instructors. Schedule discussed since the beginning with all relevant parties (instructor, finance, participants). Course duration of each training is 100 hours or 10 days lesson.

4. Content of curriculum

a. Relevance and correctness of content of the curriculum

Based on the results of a survey completed after the training, some participants said that the training material is relevant to them as a teacher in vocational schools. Most of the graduates want to attend the training again in the future.

5. Basic conditions for delivering the curriculum in practice

a. Trainers (requirements for competence, qualifications, work full-time, part-time)

Competence of the instructor is: has teaching experience for at least 5 years in VEDC and master the skills it teaches. Instructor must have sufficient competence in the operation of machine tools or training related fields. Minimum qualifications for instructors are certified undergraduate and attended training on the field. Working hours for trainers is 50 hours/week. Employees across VEDC is 240 people and 80 people part-time employees.

b. Training organization (part-time, full-time)

Training is handled by one or two instructors and one technician. The instructor acts as a teacher or trainer and facilitator. Technicians prepare a tool for training. Administrative help to administer the training include the attendance list, biographical data, module, and reporting.

c. Infrastructure (requirements for training venue, equipment, workshop)

Some machinery and infrastructure available at VEDC. Infrastructure includes land, buildings (classrooms or labs and workshops), electricity and water networks. Equipment includes machine tools and computers. Facilities owned is list in the table below.

No	Facilities	numbers
1	The number of lab and shop for machining	8 rooms
2	The overall area of the lab / workshop machining	400 m ²
3	Class room	3 rooms
4	The overall area of classroom	108 m ²
5	Lathe (conventional)	12 units
6	Milling Machine	4 units
7	Drilling	3 units
8	CNC Lathe	3 units
9	CNC Milling	2 units
10	Surface grinding	1 units
11	Cylindrical grinding	1 units
12	Tool grinding machine	2 units
13	Computer /CADD	14 units
14	EDM	1 units

d. Financing sources, financing scheme, affordability for the curriculum delivery and ensure quality

Funds used by VEDC include funds from local and central government, and public funds (individuals and institutions). Proceeds from the central government and the city is very adequate for the purchase of materials and tools. However, there is not sufficient when the machine tool failure and had to replace an expensive component.

e. Graduation prerequisites and requirements

Terms graduation training covers three aspects, namely: attendance/ discipline, competence, and activity. All participants must have 100% attendance, and finish all assignments. The product of practice course is assessment by two instructors. The minimum grade of achievement of theory and practice is 80. All participant should active for all type of course (e learning, theory class, and practice course), all assignments must submitted.

f. Assessment procedure (kind of assessment; e.g. continuing final competence assessment, teaching practice test, paper based test, etc.)

Assessment is conducted after participants training for 100 hours. Final tests is conducted for 30 hours. Exam covers three domains i.e. knowledge, skills and attitudes. All components must reach grade 80. Participants passed if the grade on the three aspects of at least 80.

g. Certification Authority

Training certificate issued by VEDC. If participants want a certificate of competency, the competency examination conducted by the certification body or authority of the professional training center in accordance with the area of expertise.

h. Assessors involved in the assessment procedures (how are assessments organized)

Assessor competency test was not involved in the training. The trainee can have two kinds of certificates are certificates of training and competency certificates. Some of the participants, who did not pass the competency test, just obtain one certificate, the certificate of training.

i. Benefits for graduates

Some of the advantages are gained by the trainees at VEDC. Profits are to increase competence in the field of engineering in accordance with their fields, competency test

experience, experience managing training and self-learning experience. With the mastery of these skills, teachers are ready to teach in vocational high schools.

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