

**DEVELOPMENT OF SUBJECT MATTER IN VOCATIONAL PRACTICE IN
JPTM THAT RELEVANT WITH SMK TEACHER'S COMPETENCE ¹⁾
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Abstract. Between development aims a curriculum relevance enhanced, that is existence the relevance between matter that is developed with the user need. This is watchfulness aim was to produce subject matter development plan of vocational practice at JPTM FPTK UPI that is can increase relevance with vocational practice teacher competence need at SMK in mechanical engineering field. Watchfulness uses method descriptive. Data is gathered to pass documentation study and observation. Data source shaped from SMK's curriculum document in mechanical engineering field and curriculum of JPTM FPTK UPI on design and production skill area group. Watchfulness result shows; (1) found 19 practice competence kinds productive at SMK in mechanical engineering. Competences can be grouped in 4 groups, that is drawing, practice base, conventional manual machinery, and CNC conventional machinery. (2) Produced development and pattern plan of vocational practice subject matter that is composed based on sequence matter contents. mapping of vocational practice subject matter that is designed: drawing competence presents in semester 1,2 and 5, practice base competences present in semester 2,4 and 5, conventional manual machinery competences present in semester 3 and 4, CNC conventional machinery competences present in semester 6 and 7.

Keyword: relevance, vocational practice, teacher

Foreword

Education of Mechanical Engineering Department (JPTM) is element from a vocational technology education system in Indonesia. This institution responsible to supplies teacher need at vocational technology area especially in industrial technology group. Systematically quality out put influenced according to direct by process quality, thereby graduate quality (candidate teacher) as out put very base on study process quality that carried out by this institution.

In line with point of view and technology education mission and vocational, education program and practice is one of [the] main program in achieves standard profession especially uplifting of skill. Uplifting of skill very tight the hook with practice activity. From various watchfulness that done, concluded that study practice model very suited for increase university student comprehension towards a science concept. University student that do practice has result learns higher is compared with university student doesn't do practice in comprehension a concept (Cox and Junkin III, in Ida Hamidah 2004: 35). Activity practice for university student at JPTM be one of [the] study method to achieve three aims concurrently, i.e.: uplift skill cognitive, affective, and psycho-motoric. Besides study practice suited for train self inuring process in break technical problems scientifically, because all important know-how in practice can be trained concurrently. During furthermore know-how will be provision that be of benefit to university student to will achieve competence, good as also as teacher at engine technical field. Remember activity practice be activity very strategic, so must be optimized good in the plan, also the result.

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This watchfulness is grounded by facts less the optimal activity program practice at JPTM that during the time. Reviewed from planning aspect, between the indicator spread of practice subject matter in curriculum that composed less cone at one particular skill area (competence). This matter is possibility is caused data inexistence empirical related to curriculum relevance that composed with teacher standard demand SMK engine technical field. The low relevance will affect towards less ready it graduate will enter work world that mean unemployment total increase. Reviewed from execution aspect, seen that activity practice between one subject matter with subject matter other walk self. This matter shows final purpose indistinctness from activity execution practice. Besides looked at less evoke experience for pattern university student causes cost extravagance practice.

Reviewed from result, activity practice that done doesn't can produce a product that has added value. This matter is caused product that produced to pass activity practice has only structure and quality functional low so that product doesn't sold out to sold. Reviewed from production concept, product as output from production process (activity practice) doesn't experience value increase but even experience value depreciation. For example, result product practice machinery only sold out sold as seconds at the price of very far from materials price initially. of course this be a loss.

Above mentioned troubleshoots are indication less the optimal program practice. Program practice that carried out appreciable must not can to return investment. the effect tool quantity and infrastructure for example machines that broken and can not be used to return even less to regeneration. Effect other decrease it society belief towards institution. There opinion that teacher that produced by UPI especially teacher SMK theory teacher but not competent in practice. Negative effect of course not we desire. Between effort to break troubleshoot need model development practice integration. Model practice that developed supposed can to integrate all activities practice at JPTM to support university student competence achievement JPTM as student teacher SMK. During furthermore activity practice designed to produce product that can produce added value.

Aim and Benefit

Peculiarly this watchfulness aim:

1. Get kinds identification practice relevant to subsidize university student competence achievement JPTM as engine technical field student teacher based on curriculum demand SMK.
2. Produce pattern plan spread subject matter practice that can subsidize university student competence achievement JPTM as student teacher SMK.
3. Produce university student competence formulation as student teacher practice engine technical field based on curriculum demand SMK.

This watchfulness result is very useful to increase effectiveness, efficiency, accountable, and activity program execution relevance practice at JPTM. Peculiarly this watchfulness benefit upon which evaluation concerns curriculum relevance now is applied at JPTM FPTK UPI and upon which deliberation in tool supplying and infrastructure practice for university student at JPTM FPTK UPI. In this watchfulness result intermediate range can be made basement in production unit development at JPTM FPTK UPI.

Methodology

This watchfulness will be development watchfulness that will use descriptive method. but remember time limitedness and watchfulness cost, this watchfulness is limited only come up with stage produces model design draft, that is model that produced based on study experts in focus group discus.

Data that need in this watchfulness covers kinds data practice, standard student competence SMK in practice in technical engineering program, and subject matter data practice at JPTM FPTK UPI production skill area group and planning. Data that need got to pass documentation study. Data source covers curriculum SMK engine technical field and curriculum JPTM FPTK UPI production skill area group and planning with subject matter curator lecturer practice at JPTM FPTK UPI. Data that gather be analyzed to will produce model pattern practice integration with steps as follows:

- 1) Identify and group data of vocational practice in mechanical engineering I field based on curriculum SMK
- 2) Identify competence, work performance criteria, and process kind every vocational practice based on curriculum SMK
- 3) Identify pattern spread vocational practice based on curriculum SMK.
- 4) Make teacher competence mapping practice engine technical field based on curriculum SMK.
- 5) Identify subject matter practice at JPTM relevant with university student competence demand as student teacher practice engine technical field at SMK.
- 6) Design pattern spread subject matter practice for university student at JPTM.
- 7) Decide matter practice in subject matter practice relevant at JPTM.
- 8) Develop competence formulation and criteria performance subject matter work practice relevant at JPTM pass focus group discus (FGD).

Result and Discussion

1. Kind description practice for university student JPTM

In line with watchfulness aim, to identify kind practice relevant for university student JPTM FPTK UPI especially for production skill area university student and planning with analyze kind practice at SMK engine technical field. kind practice at SMK visible in curriculum SMK especially in competence achievement diagram (drawing 1).

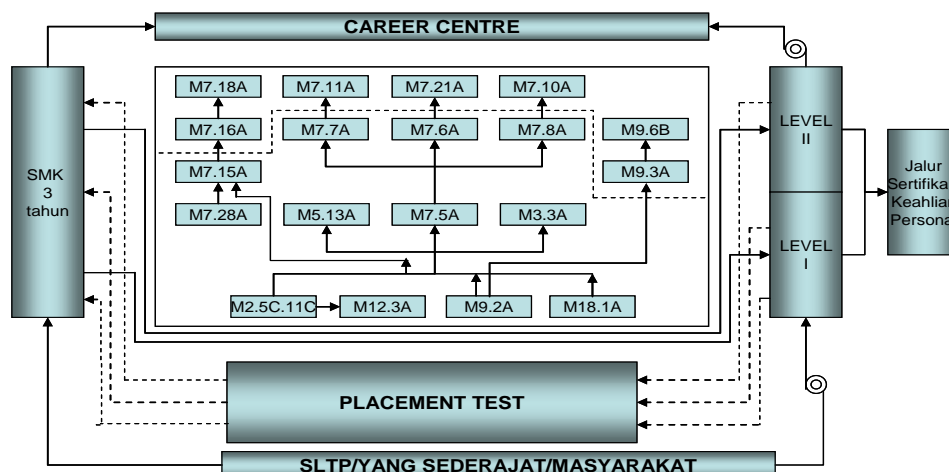


Fig. 1. Competence flow in SMK

Based on diagram, found nineteen supposed competences can be filled by graduate SMK. Based on curriculum SMK, so curriculum 2007 now being used to be development from curriculum 2004. Curriculum 2007 or more knowledgeable as KTSP if watched actually resemble or we can say equal to KBK. in lesson/eye vocational practice permanent voluminous stills to use competence term that be word key KBK 2004. End from diagram skill certification personal also equal to KBK 2004. Another matter equality input and output multi exit and multi entry. Several things that distinguish between KTSP with KBK are:

1. Total and competence kind. In KTSP the competence total as much as 19 kind, while in KBK as much as 16. This total change actually has been development from competence that there and new competence increasing. Competence development in KTSP that is in competence that engine NC/CNC which is on KBK only 2 competences while in KTSP be 4 competences. Competence other that developed drawing area competence, where in KTSP augmenting with competence design technique drawing in detail. Meanwhile new competence that augment in KTSP competence does welding according to manual and assembling competence and copy. Competence increasing implicated towards abolition several competences uses engine for operation. Competence development in machinery NC/CNC may be caused by more the increasing of tool engine use based on CNC compared mechanically tool manual. This matter is natural because tool engine CNC can produce the product with quality and productivity higher is compared tool engine manual. Technique drawing planning competence development caused by graduate demand existence SMK must can to design a product more complex compared just can read and drawing sketch. Thereby there competence enhanced in planning. Meanwhile competence increasing does welding according to manual provided by fact that welding be integral part from a opportunity to put hand to part welding.
2. Code writing. all competence codes in KTSP differ from KBK, where is code in KTSP use federation between font and number all the it begun with font m capital while in KBK used font in a series from a until p. for example competence code reads technique drawing which is on KBK use font code a in KTSP the code is m9.2a. but deficit code system in KTSP that code that composed to still less show sequence or sequent standard so that difficult in realize it. For example code M2.5C.11C code for competence measuring by using measuring instrument and code M12.3A code for competence measuring by using precision measuring instrument. If seen from competence achievement diagram so M2.5C.11C be prerequisite for competence M12.3A, temporary if seen from that competence second the code doesn't demo hook existence. May be best code that composed based on sequent the competence.
3. Competence name. Nomenclature a competence in KTSP in comparison with competence name in KBK there being equal, there that developed, and there bew. Competence name example that still permanent competence reads technique drawing, use hand tool, and another. While competence name that developed the example competence uses measuring instrument is competence measuring by using measuring instrument. Meanwhile new competence name competence really in KBK there is no, the example competence does welding according to manual.

2. Competence subdividing and practice subject matter at JPTM relevant

Based on competence kind and the achievement diagram, pass this watchfulness then is made competence subdividing based on root of science or matter nearness from every competence. According to theoretical to 19 competences in voluminous subject at SMK that is canvassed can grouped to be four competence groups, that is drawing competence, practical base, manual conventional machinery, and CNC machinery. (Table 1). Thereby vocational competence development for university student JPTM FPTK UPI as student teacher SMK properly minimal is based on four principal competences. Drawing competence, make possible somebody to be expert in the field of drawing/design that is ability from read technique drawing comes ability designs technique drawing. Drawing is principal communication means for that at technical field especially in technical engineering. Communication key message arrival to receivers, thereby somebody ability in drawing influence it in will submit also will get pean in will communicating. Therefore this competence is of vital importance to is dominated by university student especially technical engineering university student.

Table 1. Grouping of competences standard

No	Kelompok Kompetensi	Standar Kompetensi		Σ JP	Waktu TM+PS
		Kode	Unit Kompetensi		
1.	Gambar	M9.2A	Membaca gambar teknik	72	96
		M9.3A	Mempersiapkan gambar teknik (dasar)	72	84
		M9.6B	Merancang gambar teknik secara rinci (lanjut)	72	84
2.	Praktek Dasar	M2.5C.11A	Mengukur dengan menggunakan alat ukur		
		M.12.3A	Mengukur dengan alat ukur presisi	36	36
		M18.1A	Menggunakan perkakas tangan	72	90
		M3.3A	Perakitan pelat dan lembaran	36	42
		M5.13A	Melakukan pengelasan secara manual	36	48
3.	Pemesinan Konvensional	M7.5A	Bekerja dengan mesin umum	72	78
		M7.6A	Melakukan pekerjaan dengan mesin bubut	108	96
		M7.21A	Mempergunakan mesin bubut (komplek)	108	102
		M7.7A	Melakukan pekerjaan dengan mesin frais	72	72
		M7.11A	Memfrais (komplek)	72	78
		M7.8A	Melakukan pekerjaan dengan mesin gerinda	36	36
		M7.10A	Menggerinda pahat dan alat potong	36	42
4.	Pemesinan dengan CNC	M7.28A	Mengoperasikan mesin/proses NC/CNC (dasar)	36	36
		M7.15A	Mengeset mesin/proses NC/CNC (dasar)	36	42
		M7.18A	Memprogram mesin NC/CNC (dasar)	36	42
		M7.16A	Mengeset dan mengedit program mesin/proses	30	36

Competence in practice group base concern competence related to ability uses appropriate measuring instrument, ability uses production technical equipment basis for product working according to manual good product shaped thing solid also from ingredient shaped copy, also can use engine in character base like sawing machine,

drill manual, weld manual, and as it. This competence necessary be dominated by involver in course of production because not all products by engine, also ability in the field of this is very useful for process finishing a product.

Competence in conventional machinery, be competence in productive technique by using tool engine the controlling stills has manual. Kind machinery this cover machinery by using lathe, hobing, shaping and grinding. This competence be base for somebody to can produce a product by using tool engine. Competence is important because fact be wide industrials machinery in Indonesia a large part still to use tool engine manual. profit from useful tool engine manual besides can absorb labour more quite a few more beneficial for production process in number a little but variation many. Thereby this competence is absolute is need by university student JPTM FPTK UPI good as student teacher SMK also if work at industrial.

Competence CNC machinery be competence in character advance be aftermath from competence machinery manual. This competence concerns productive technique by using tool engine that is controlled according to numeric by computer. This competence is necessary has caused by inclination that industrial machinery begins to shift from tool engine use manual be tool engine CNC. Not just because engine CNC product quality level higher produce but also because the price cheaper.

Threaten in competence subdividing then identified then compared with subject matter practice that has relevance at JPTM FPTK UPI in production skill area and planning. Identification result as showed in table 2.

Table 2. Subject mater that relevance with SMK competence

No.	Kelompok Kompetensi	Mata Kuliah			Alokasi Waktu
		Kode	Nama	SKS	
1.	Gambar	PP 210	Gambar Teknik	2	53,33
		PP 451	Auto CAD dan Gambar Merencana	2	53,33
2.	Praktek Dasar	PP 221	Fabrikasi Logam	3	80
		PP 241	Teknik Penyambungan	3	80
		PP 251	Teknik Pembentukan	2	53,33
3.	Pemesinan Konvensional	PP 253	Teknik Pemesinan	2	53,33
4.	Pemesinan dengan CNC	PP 471	Teknik Pemesinan CNC	4	106,67

Based on data, found several things that explainable as follows:

1. Relevant subject matter with competence demand at SMK only numbers 7 fruit or only 9% from subject matter total with heavy 18 SKS or only as big as 11.69% from total SKS that must be finished by university student s-1. While to SMK vocational competence subject total achieves 18 fruit or as big as 45.4% from subject total with heavy 1044 JP or equal with 23,67 % from full scale period. Subject matter total lameness practice vocational this is related also with matter/vocational competence by graduate JPTM. This competence lameness is indicated that graduate the weak cause JPTM FPTKUPI to teacher vocational practice subject matter at SMK.
2. Subject matter time allocation practice at JPTM FPTK UPI in comparison with at SMK only as big as 42,32%. This condition shows that university student less get to chance to practice in activity practice vocational. As we know that one of [the]

training successful factor skill training intensification that is done somebody. thereby not moderately time allocation that provided for university student to practice in activity practice cause university student less has know-how in practice so that decrease their immediacy to is teacher at SMK especially teacher in practice/voluminous subject.

Time allocation shows the long somebody studies certain matter until he dominates a competence. although in training based on principal aim competence reach and not in the long training, but training whatever must pay attention minimal time and the maximal time so that program can be planned and carried out effectively and efficient.

3. Vocational practice subject matter development at JPTM

Based on data in table above seen that found difference between competence and vocational practice subject matter execution time allocation at JPTM FPTK UPI with is done by student. Thereby need subject matter development at JPTM FPTK UPI especially in group competence drawing and machinery conventional.

Development that this watchfulness covers lecture matter increasing, time allocation increasing for practice activity and pattern spread vocational practice subject matter (table 3).

Table 3. Development of vocational practice subject matter to JPTM

No.	Kompetensi	Mata Kuliah				
		Kode	Nama	Bobot	Smt	Ket.
1.	Gambar	PP 210	Gambar Teknik	2	1	Tambah materi
		PP 220	Auto CAD	3	2	Tambah MK
		PP 451	Gambar Merencana	3	5	Tambah materi
2.	Praktek dasar	PP 221	Fabrikasi Logam	3	2	Tetap
		PP 241	Teknik Penyambungan	3	4	Tetap
		PP 251	Teknik Pembentukan	2	5	Tetap
3.	Pemesinan Konvensional	PP 231	Teknik Pemesinan I	4	3	Tambah materi
		PP 452	Teknik Pemesinan II	4	4	Tambah MK
4.	Pemesinan CNC	PP 261	Pemesinan CNC I	2	6	Tambah materi
		PP 472	Pemesinan CNC II	3	7	Tambah MK

Matter increasing is attributed for drawing competence and machinery CNC, while matter increasing and time allocation for competence machinery conventional. For matter mechanical technology competence that is given fulfil tall relevance level. This development brings consequence that is lecture time allocation increasing or total increasing SKS from SKS at first. Necessary and think that total SKS standard for university student s-1 144 SKS. Thereby increasing SKS in practice subject matter causes time allocation change for other subject matter.

Vocational practice subject matter total increased from at first 7 fruit be 10 fruit. time allocation to 10 subject matters as big as 29 SKS or equal with 773 clocks. At the present time allocation in comparison with training time allocation at SMK equal with 74,1 % or experience enhanced as big as 31,78%.

Supposed at the present time allocation enhanced can give to chance more many to university student to practice to increase skill that can subsidize the competence enhanced especially vocational competence. In the implementation later at the present time allocation increasing must be balanced with tool availability and infrastructure that used university student in practice. Equally ratio between tools that use to practice with university student as according to standard. If supposed condition can be realized, this matter will increase effectiveness and efficiency program execution practice that designed. Furthermore university student that produced from program practice that designed this will increase the vocational competence so that more their immediacy increase to will jump at education world as teacher practice vocational at SMK.

Conclusion and Suggestion

Several conclusions that can be pulled from this watchfulness result:

1. Kind practice relevant to subsidize university student competence achievement JPTM production skill area and planning as student teacher SMK engine technical field consists of 19 kind practices that grouped to be 4 competence groups practice that cover drawing competence, practice base, machinery conventional, and machinery CNC.
2. Produced development plan and pattern spread vocational practice subject matter to JPTM FPTK UPI. Development covers matter increasing, subject matter increasing, and practice time allocation increasing as big as 31,78%. Spread practice subject matter that designed: drawing competence present in semester 1,2 and 5, practice base competence present in semester 2,4,dan 5, conventional machinery competence present in semester 3 and 4 and CNC machinery competence present in semester 6 and 7.

Several suggestions that can be proposed with reference to watchfulness result:

1. For side SMK should coding competence is completed to return with system coding easy understood and can show connection between competence with existence sequent reasonable.
2. For side JPTM FPTK UPI so that always do evaluation especially concern curriculum relevance development with need. SMK so that can to produce curriculum that has tall relevance with the user need.
3. For watchfulness furthermore necessary developed watchfulness concerns subject matter implementation evaluation practice vocational that produced in watchfulness be of benefit to development next.

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