

EVALUATION ON THE EDUCATIONAL PROGRAM OF SMKTI IN THE CITY OF BANDAR LAMPUNG

Sumarno

Abstract

This study aims to describe the educational program at *Sekolah Menengah Kejuruan Teknologi dan Industri* (SMKTI) in the city of Bandar Lampung, in terms of (1) program effectiveness, (2) program quality, and (3) gaps between SMKTI students' employability skills and industrial demand the first time they work. The evaluation model employed was a combination between the model of context, input, process, output, and outcome (CIPOO) and the Provus gap model. The research subjects were SMKTI students registered in the academic year 2004/2005 and employees who were SMKTI graduates. The data collecting instruments were questionnaires. The data were analyzed using MANOVA and ANCOVA. The research findings indicate that (1) from the number of classes demanded and supplied and the attainment effect, the SMKTI educational program is ineffective and the indicator of future workforce market, the SMKTI educational program is ineffective, (2) the quality of SMKTI educational program is good in developing technological skills and personal management skills but not good in developing fundamental skills and teamwork skills, and (3) the SMKTI educational program is able to equip its students with the employability skills required the first time they work.

Keywords: program evaluation, SMKTI

1. Introduction

In the national educational system, it is indirectly stated that the development of human resources could be undertaken through two types of lanes, or, rather, schools, namely, the type called SMA (Sekolah Menengah Atas), a kind of senior high school oriented to preparing students for further study at universities, and the type called SMK (Sekolah Menengah Kejuruan), a kind of vocational high school oriented to preparing students for entrance into the world of work. The SMK orienting graduates to the technological and industrial fields is called SMKTI (T and I standing for Teknologi and Industri, respectively).

The SMKTI in the city of Bandar Lampung is faced with problems of quantitative and qualitative equivalence. The problem of quantitative equivalence occurs due to an imbalance between workforce supply and demand. The demand from the business or industrial world is far less compared to the number of SMKTI graduates. The problem of qualitative equivalence occurs because fields of work have undergone such rapid changes that it has caused a gap between the competence possessed by SMKTI graduates and the competence required by the world of work.

According to Semeijn, Velden, & Boone (2000), because technology has been developing so fast and the orientation of various national and international organizations has increasingly been becoming broader, demands upon the workforce, as a result, have changed so that traditional "hard" selection devices like educational background still count, but are not sufficient anymore. According to Grip & Heijke (1998), on the face of the transition from an industrial economy to that of knowledge as indicated by a fast changing demand on skills, employability skills are required.

Employability skills have become more important since the economic crisis which has caused one to have more difficulty in getting and keeping a job (Sanders & Grip, 2003). Such skills belong to a group of transferable core skills which illustrate the functional basic characteristics of the knowledge, skills, and attitudes required for success at all workforce and educational levels (Overtoom, 2000).

Therefore, SMKTI should be capable of providing a good educational program that could adequately equip its graduates for chances to get better jobs or for various job opportunities. In other words, SMKTI as an institution involved in an early phase of human resource development in the middle-level technological sector should be capable of ceaselessly developing or improving its graduates' employability skills to make them keep matching the development of the job market.

To determine whether a certain program is needed and possible to be put into operation, whether it suffices for the fulfillment of the needs identified, whether it has run as expected, and whether it has actually helped people with their needs, an evaluation needs to be conducted on it; in other words, a program evaluation tries to provide information about the program concerned (Pasovac & Carey, 1985). To learn the current condition of the educational program at SMKTI, a problem formulation is presented as follows.

- a. How qualified is the educational program at SMKTI in developing its students' technological skills, fundamental skills, personal management skills, and teamwork skills?
- b. How far has the educational program at SMKTI equipped its students with employability skills the first time they work?
- c. How effective is the educational program at SMKTI as viewed from the development of number of students, attainment effect, and indicator of future workforce market?

2. Theoretical Review

a. Demand of SMP/Mts Graduates for SMKTI

An index of the participation of graduates of SMP (short for Sekolah Menengah Pertama, a kind of junior high school) or MTs (short for Madrasah Tsanawiyah, a kind of SMP-level Islamic boarding school) in SMKTI is an indicator of public demand for education at SMKTI. If this index rises from year to year, it indicates that public demand for SMKTI is increasing; on the contrary, a lowering of the index indicates a decrease in the public demand.

The number of students registered at SMKTI indicates the attainment effect achieved by SMKTI. The simplest kind of measurement for attainment effect is whatever is provided by the statistics of anyone enrolling to a school. From such statistics one could compare from time to time the number of students on the basis of class, level of education, or type of program. Such statistics could be used to make comparisons from time to time at the school, system, or class level or between schools or classes, whether they are within one program or different programs (Windham, 1990).

An increase in attainment is an indicator of positive effectiveness implying an increased educational output in the form of graduates. Cross-section data obtained in the same year could be used to determine a measurement of the relative difference between class levels in the form of a percentage of the earlier one. Another way that can be taken is to make an approximation of the growth of the number of students of

grade one by calculating the number of students of grade one of a certain year as a percentage of that of the previous year (Windham, 1990).

An increase in attainment would certainly result in a greater number of graduates that SMKTI could generate as output. Contrariwise, a decrease in attainment would result in a smaller number of graduates that SMKTI could generate. Generally, an increase in attainment is claimed as an indicator of positive effectiveness because the desired output of an educational institution is a greater number of graduates. According to Grip and Heijke (1998), the number of graduates of an educational institution could affect an indicator of their future workforce market prospects.

b. Industrial Quantitative Demand on SMKTI Graduates

On the demand side of SMKTI is the business or industrial world. On this side, SMKTI is viewed by industry as provider of technological and industrial technician workforce. It is hoped that SMKTI graduates match industrial needs both quantitatively (in terms of workforce size) and qualitatively in the sense of possessing the type of expertise and graduating characteristic related to capability in work and desire to remain attractive in the workforce market (in other words, in possession of employability skills).

The determination of industrial demand for workforce (in quantitative terms) is done by applying the approach of survey among employers. The approach is applied by distributing questionnaires among business companies. The content of the questionnaires is about the size of the workforce on demand three years in a row with an educational background of SMKTI or STM (short for Sekolah Teknik Menengah, a kind of high school in engineering).

The determination of new demands for workforce graduating from SMKTI is done by studying the development of job vacancies. The department managing such information is Departemen Tenaga Kerja, the workforce department. In the local level (i.e., municipal or district level), such information is handled by Dinas Tenaga Kerja, the workforce office. According to Fung (2001), the public employment service provided by institutions (such as Departemen or Dinas Tenaga kerja) and advertisements of job opportunities (or job advertisements) illustrate an effect of technological change.

To illustrate the workforce market prospects for newcomers graduating from SMKTI, the following equation of IFLM (short for Indicator of Future Labour Market) is adopted:

$$IFLM_e = \frac{E_{e03} + INS_{e03-05} + U_{e03}}{E_{e03} + \max(0; ED_{e03-05}) + RD_{e03-05} + SD_{e03-05}} \quad (\text{Grip and Heijke, 1998: 41})$$

The criteria used as indicators to identify the future workforce market prospects for SMKTI graduates are that if the workforce supply is less than the demand and

- if $IFLM < 0.85$, SMKTI graduates' future workforce market is declared excellent,
- if $0.85 \leq IFLM < 1.00$, their future workforce market is declared good,
- if $1.00 \leq IFLM \leq 1.15$, their future workforce market is declared fair, and
- if $IFLM > 1.15$, their future workforce market is declared bad.

c. Qualitative Demand on SMKTI Graduates

The industrial demand on the workforce graduating from educational institutions (SMKTI included) in qualitative terms is that they come with a certain

attribute attached to them so that with that attribute they could accomplish well the job given to them. To call the attribute, people use the term skill, qualification, or competency.

In the context of vocational education and training, competency refers to the ability to accomplish an assignment defined and predicted on the basis of a certain standard (Van Loo & Semeijn, 2001). In the perspective of the workforce market, the concept of competency is often replaced with the term skill or qualification. Whether one is in possession of a certain skill would be evident in one's behavior, choice, and product of work (Hale, 2002).

The skills required on the face of the transition from an industrial economy to one of knowledge as indicated by the rapid changing demands on skills are called employability skills. Employability is an individual's characteristic related to ability to work and desire to remain attractive in the workforce market (Sanders & Grip, 2003).

According to the Conference Board of Canada (2000), employability skills consist of (1) fundamental skills, i.e., the skills required as basis for further development, which consist of the abilities of communicating, managing information, and using numbers, (2) personal management skills, i.e., personal skills, attitudes, and behaviors that encourage one's potentials to grow, which consist of the abilities to demonstrate positive attitudes and behaviors, to possess a sense of responsibility, to be adaptable, to have the desire to keep learning, to work carefully, to think, and to solve problems, and (3) teamwork skills, i.e., the skills and other attributes required for the improvement of productivity, which consist of the abilities to cooperate with others and participate in accomplishing tasks.

From the various views and explanations above, it can be concluded that employability skills comprise the competence required to get a job and with such competence in one's possession, one can accomplish one's job with success. To work as technicians in the technological and industrial fields, SMKTI graduates are expected to possess the ability to operate technological equipment in accordance with their respective fields of expertise. Therefore, in order that SMKTI graduates remain attractive in the workforce market, in addition to fundamental, personal management, and teamwork skills, they should also possess technological skills.

d. Development of SMKTI Students' Employability Skills

In order that SMKTI graduates possess the attributes required by the industrial or business world, i.e., employability skills, SMKTI has prepared the necessary means for that purpose, one of which is a curriculum that accommodates three types of educational components, namely, normative, adaptive, and professional components of education (See Table 1).

Table 1
SMKTI Educational Components

SMKTI Educational Components	Description
Normative Educational Component	to form the personality
Adaptive Educational Component	To develop the self
Professional Educational Component	To form technical ability

Such components of education have considerable influence on the determination of the choice of school subjects, lesson materials, and class activities. In turn, the lesson materials and the class activities would determine the development of

the technological, fundamental, personal management, and teamwork skills that the students possess.

The normative component of education contains lesson materials and class activities oriented to enabling students to understand the importance of the rules and norms present in society, respect the presence of others, and possess a feeling of responsibility both as an individual and as a member of society, a spiritual desire, and a spirit for better life (Wardiman, 1998). With such class activities, hopefully students will acquire adequate personal management and teamwork skills.

In the adaptive component of education, the lesson materials and class activities are oriented to developing support abilities for mastery of expertise and equipping them for self-development so that they could keep up with scientific and technological developments (Wardiman, 1998). For example, mathematics is to be taught as basis for study with the nature of equipping students with abilities of logical and critical thinking which are to aid them in overcoming problems at their work. Similarly, English and Indonesian are to be taught for the development of fundamental skills related to the ability to communicate both orally and in writing and to manage information. In other words, the adaptive component is needed as basis for further development of skills along with science and technology.

The professional component of education consists of activities related to theory and practice. Such activities are intended to develop students' ability concerning the psycho-motoric skills fitting their respective programs of expertise (Wardiman, 1998). The skills include the abilities to design, use, repair, and operate mechanical equipment. The activities are oriented to equipping students with skills related to technology (here called technological skills).

Lesson materials and class activities at SMKTI also play an important part in the development of personal skills, attitudes, and behaviors, which are components of personal management skills. Such development is usually already included by teachers in the part about the affective aspect to be achieved in class activities. Besides, by holding group study activities in class, group practice work activities in workshops, or team sport activities, teachers, whether they realize it or not, are actually already developing students' teamwork skills.

To develop students' ability, besides the educational components shown in Table 1, the SMKTI curriculum also includes educational components whose implementation process is held off-school (on the field) consisting of programmed work practice activities to achieve professional expertise meeting a certain standard. The process of equipping SMKTI students in the course of preparing them for their entrance into the field of work lasts from Grade I to Grade III. In this phase of their education, it is hoped that the higher the grade they are in, the higher their level of mastery over their employability skills until finally meeting the demands of the business and industrial world.

e. Relation between Work Experience and Employability Skills

One's experience in work is indicated by how long one has worked and how long one's training has been. The longer one works and the longer the training one has undergone, the more frequently would repeated learning processes occur. In such learning processes a connection would occur between facilitator (or old) employability skills and new ones, or a repetition of the use of employability skills, so that it would improve the mastery over employability skills one possesses (Heijke, Meng, & Ramaekers, 2002).

3. Data Analysis Techniques

The data analysis was made by means of descriptive and correlative methods. The correlative methods were those of dependence statistics. They included multivariate analysis of variance (or MANOVA, for short) and analysis of covariance (or ANCOVA, for short).

The relation model analyzed by means of MANOVA involved one independent variable, i.e., class level (X), and four dependent variables, i.e., mastery of technological skills (Y_1), mastery of fundamental skills (Y_2), mastery of personal management skills (Y_3), and mastery of teamwork skills (Y_4).

4. Research Results and Discussion

APS (Angka Partisipasi Siswa), the index showing the extent to which students from the lower educational level become participants, for graduates of SLTP (Sekolah Lanjutan Tingkat Pertama), a kind of junior high school, entering SMKTI has undergone fluctuations (See Table 2). In the case of quantity, however, there has been a continuous decrease from the 2002/2003 academic year to the 2005/2006 academic year (See Table 3).

Table 2
APS of SMP/MTs Entering SMKTI

Academic Year	APS
2002/2003	0.146
2003/2004	0.126
2004/2005	0.129
2005/2006	0.127

Table 3
Developments in the Number of Students at SMKTI

FIELD AND PROGRAM OF EXPERTISE	ACADEMIC YEAR											
	2002/2003			2003/2004			2004/2005			2005/2006		
	I	II	III	I	II	III	I	II	III	I	II	III
Building Engineering	151	180	168	137	148	175	127	132	146	123	121	129
Building Drawing Engineering	34	34	32	36	31	32	36	37	34	31	39	34
Mapping Survey Engineering	36	36	35	34	36	36	36	36	36	31	29	35
Building Construction Engineering	47	65	62	34	48	62	33	32	46	31	27	30
Woodwork Engineering	34	45	39	33	33	45	22	27	30	30	26	30
Electro Engineering	533	544	543	471	489	520	439	421	468	422	435	414
Audio Video Engineering	193	202	156	188	187	188	171	173	176	137	155	159

Network Communication Engineering	33	34	34	36	36	35	36	31	36	35	32	30
Electrical Installation Engineering	273	274	319	211	232	263	196	182	224	218	214	190
Application Electrical Engineering	34	34	34	36	34	34	36	35	32	32	34	35
Machine Engineering	1458	1340	1394	1180	1311	1284	1209	1091	1153	1155	1015	1047
Machinery Engineering	367	404	451	279	345	383	268	259	321	235	238	252
Automotive Mechanical Engineering	1091	936	943	901	966	901	941	832	833	920	777	795
Total	2142	2064	2105	1788	1948	1979	1775	1644	1768	1700	1571	1590

If the 2002/2003 academic year is used as the starting point of a calculation of attainment effect, then in the academic years 2003/2004, 2004/2005, and 2005/2006 attainment effects of -0.16, -0.01, and -0.04 are respectively obtained. On the basis of the description of the developments in the number of students at SMKTI and the attainment effects that could be obtained, the educational program at SMKTI could be declared ineffective.

The developments in the number of classes from the 2002/2003 to 2005/2006 academic years are presented in Table 4. On the basis of the table, it could be clarified that the demanded number of classes has always been less than the supplied number of classes. This condition indicates that, on the basis of the number of classes demanded and supplied, the educational program at SMKTI could be declared ineffective.

Table 4
Developments in the Number of Classes Demanded and Supplied

Grade	Academic Year							
	2002/2003		2003/2004		2004/2005		2005/2006	
	demand	supply	Demand	supply	demand	supply	demand	supply
I	54	57	46	51	47	51	45	49
II	52	54	50	53	43	46	42	47
III	54	57	52	54	45	50	41	50

To determine the indicator of the future workforce market situation for SMKTI graduates, the magnitudes of some variables should be first inserted into the IFLM equation. The variables are the number of workers who are SMKTI graduates in 2003 (E_{e03}), the flow of SMKTI graduates in the period from 2003 to 2005 (INS_{e03-05}), the number of SMKTI graduates remaining unemployed in less than one year in 2003 (U_{e03}), the number of SMKTI graduates on expanded demand in the period from 2003 to 2005 (ED_{e03-05}), the number of SMKTI graduates on demand to replace the predicted number in the period from 2003 to 2005 (RD_{e03-05}), and the number of

SMKTI graduates on demand as substitutes in the period from 2003 to 2005 (SD_{e03-05}). The magnitudes are presented in Table 5.

Table 5

Variable	Magnitude
E_{e03}	1922
INS_{e03-05}	5890
U_{e03}	2214
ED_{e03-05}	227
RD_{e03-05}	0
SD_{e03-05}	0

By inserting the magnitudes above into the equation, $IFLM_e = 4.66$ was obtained. Because $IFLM_e > 1.15$, it could then be stated that the future labor market prospect for SMKTI graduates is not good. On the basis of this indicator, it could be stated that the educational program at SMKTI is ineffective.

The result of applying MANOVA with the test on between-subjects effects indicate that, among subjects from the three grades, technological skills, fundamental skills, personal management skills, and teamwork skills have statistical significance on respectively 0.007, 0.765, 0.000, and 0.621. It indicates in turn that there is a significant difference in level of mastery over technological skills and personal management skills among the three grade-level groups (i.e., the groups from Grades I, II, and III, respectively) while there is no significant difference in level of mastery over fundamental skills and teamwork skills among the three groups. It further indicates that the quality of the educational program at SMKTI in developing technological skills and personal management skills in the students could be declared good but not so in developing fundamental skills and teamwork skills in them.

Results of the post hoc test indicate that (1) in terms of the variable of their technological skills, there is no statistically significant difference between Grades I and II while there is a statistically significant difference between Grades I and III and between Grades II and III, (2) in terms of the variable of their fundamental skills, there is no statistically significant difference among the three grades, (3) in terms of the variable of their personal management skills, there is no statistically significant difference between Grades I and II while there is a statistically significant difference between Grades I and III and between Grades II and III, and (4) in terms of the variable of their teamwork skills, there is no statistically significant difference among the three grades.

Table 6
Group ANAVA

Dependent Variable: EMPLOY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8477.569 ^a	3	2825.856	61.500	.000
intercept	930858.951	1	930858.951	20258.426	.000
GROUP	8477.569	3	2825.856	61.500	.000
Error	11625.154	253	45.949		

Total	1394065.031	257			
Corrected Total	20102.723	256			

a. R Squared = .422 (Adjusted R Squared = .415)

Results of ANCOVA (See Table 6) indicate that groups have a significance < 0.05 , which means that there is a difference in mastery over employability skills among the groups. Therefore, it can be inferred that in level of the mastery the workforce who are graduates of SMKTI and students of Grade III differ significantly.

To determine the influence of the covariates of duration of work and length of training, these two variables are inserted into the ANCOVA application. By inserting the two variables into the abovementioned model, the results as indicated in Table 7 are obtained.

Table 7 indicates that the covariate duration of work is statistically significant but statistically there is no significance in relation to length of training. It means that duration of work has an influence upon the level of mastery over employability skills but length of training has no influence upon the level of mastery over employability skills. This condition is understandable because only a few workers (i.e., 23.8%) who are graduates of SMKTI have received training.

Table 7
ANCOVA with Covariates Duration of Work and Length of Training
Dependent Variable: EMPLOY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8937.311 ^a	5	1787.462	40.182	.000
intercept	43187.114	1	43187.114	970.852	.000
MASKER	366.143	1	368.143	8.231	.004
TRAINING	42.315	1	42.315	.951	.330
GROUP	142.819	3	47.606	1.070	.362
Error	11165.412	251	44.484		
Total	1394065.031	257			
Corrected Total	20102.723	256			

a. R Squared = .445 (Adjusted R Squared = .434)

In a previous section (See Table 6), it is seen that statistically the groups have significance but when the covariates (duration of work and length of training) are inserted into the ANCOVA application (See Table 7), the groups become statistically insignificant, duration of work become statistically significant, and length of training become statistically insignificant. Such result indicates that if duration of work is controlled, in their employability skills members of the workforce who are SMKTI graduates do not differ from students of Grade III at the school at the end of the academic year. In other words, SMKTI is already able to equip its graduates with employability skills meeting initial requirements for industrial jobs.

5. Conclusion

- a. On the basis of the number of classes on demand, it could be stated that the educational program at SMKTI is ineffective (according to evaluation on input). On the basis of the attainment effects, it could be stated that the educational program at SMKTI is ineffective (according to evaluation on output). On the basis

of the indicator of the workforce market for graduates of SMKTI, it could be stated that the educational program at SMKTI is ineffective (according to evaluation on output and context).

- b. In quality, the educational program at SMKTI is good in developing technological skills and personal management skills in the students but it is not good in developing fundamental skills and teamwork skills in them (according to evaluation on process).
- c. The educational program at SMKTI is able to equip its students with the employability skills required for the first time they are at work. SMKTI graduates' employability skills meet industrial requirements the first time they are at work (according to evaluation on any gap between output and outcome).

References

Conference Board of Canada. (2000). *Employability Skills 2000+*. Retrieved on January 12th, 2004 from <http://www.conferenceboard.ca/nbec>.

Fung, K.M. (2001). *An Examination of the Major Components for a Comprehensive Manpower Planning Model*. Hongkong: International Vocational Education and Training Association (IVETA). Retrieved on May 4th, 2003 from <http://www.ivetajamica.com>.

Grip, A. de & Heijke, H. (1998). *Beyond Manpower Planning: ROA's Labour Market Model and its Forecasts to 2002*. Maastricht: Research Centre for Education and the Labour Market, Faculty of Economics and Business Administration.

Heijke, H., Meng, C. & Ramaekers, G. (2002). *An Investigation Into the Role of Human Capital Competences and Their Pay-Off*. Maastricht: Research Centre for Education and the Labour Market, Faculty of Economics and Business Administration.

Overtoom, (2000). *Employability Skills: An Update*. Eric Digest: Center on Education and Training for Employment. The Ohio State University.

Pasovac, E.J. & Carrey, R.G. (1985). *Program Evaluation: Methods and Case Studies*. New Jersey: Prentice-Hall, Inc.

Sanders, & Grip, A. de (2003). *Training, Task Flexibility and Low-Skilled Workers' Employability*. Maastricht: Research Centre for Education and the Labour Market, Faculty of Economics and Business Administration.

Semeijn, J., Velden, Van der & Boone, C. (2000). *Personality Characteristics and Labour Market Entry: An Exploration*. Maastricht: Research Centre for Education and the Labour Market, Faculty of Economics and Business Administration.

Van Loo, J. & Semeijn, J. (2001). *Measuring Competences in School-Leaver Survey*. Maastricht: Research Centre for Education and the Labour Market, Faculty of Economics and Business Administration.

Wardiman, J. (1998). *Pengembangan Sumber Daya Manusia Melalui Sekolah Menengah Kejuruan (SMK)*. Jakarta: P.T. Jayakarta Agung Offset.

Windham, D.M. (1990). *Improving the Efficiency of Educational Systems: Indicators of Educational Effectiveness and Efficiency*. New York: United States Agency for International Development, Bureau for Science and Technology, Office of Education.