

## Industrial Practice Program Evaluation Using the *Kirkpatrick* Model

Iqbal Ismawanto, Eddy Sutadji, Suharmanto, Didik Nurhadi

*Universitas Negeri Malang, Indonesia*

Email: ahmadiqbal010697@gmail.com

**Abstract.** The research objective was to evaluate the industrial practice programs using the *Kirkpatrick's* evaluation model, which focuses on human resource development. This study used a four-levels of the *Kirkpatrick* evaluation model, namely *reaction*, *learning*, *behaviour*, and *results*. The research subjects were the students majoring in mechanical engineering at Private Vocational High School Muhammadiyah 1 Kepanjen who had done industrial practices. The data was collected using a questionnaire instrument, test, interview, and documentation. Based on the data analysis, the evaluation of the industrial practice program on the student's reaction aspect using the facilities, material, instructor, time, and infrastructure indicators was in the 'good' category. The pre-test and post-test results in the learning aspect experienced an increase, as indicated by the *mean* values of 61.83 and 80.83. Behavioural aspects based on changes in work behaviour, skills and knowledge generally underwent significant changes. The results aspect showed the impact of graduate work performance on increasing incomes and positions; the data showed that only a small proportion of graduates get this increase. The school can use the results of this study as input in dealing with various problems and the success of industrial practice programs.

**Keywords:** *Evaluation, Industrial Practice, Kirkpatrick, Vocational High School*

### INTRODUCTION

The high population density of Indonesia is one of the challenges for the government to reduce unemployment. As viewed from BPS data in February 2018, BPS noted that the number of unemployed people in Indonesia reached 6.87 million people or decreased by 140,000 compared to the 2017 period of 7.01 million people. The open unemployment rate for Vocational High Schools (VHS) was recorded at the highest, reaching 8.92% (Putera, 2018). To deal with this, the Indonesian government must optimize the role of schools, mostly VHS, which is one of the formal institutions that are planned, programmed, and systematic. For this reason, Vocational High Schools need to provide job training programs in the industrial world to form professional, productive, potential and quality human resources, both in hard skills and soft skills (Yoto, 2016).

The VHS policy in Indonesia uses a dual system which is manifested by an industrial practice program which adopts the *dual system* concept from Germany. Education and vocational training dual German-style, or called VET (*Vocational Education and Training*), has been implemented in countries of the global south, especially developing countries. The VET system is an excellent example because it is considered the secret to successful education in Germany (Zimmermann, 2017). VET-related research conducted by Woods (2018) showed that young people in Australia are much helped during the transition period because VET eases their post-school path to the world of work.

The industrial practice program that is implemented in Indonesia aims for students to gain hands-on working experience in the actual industry. Based on Depdikbud (2017), the fieldwork practice guidelines objectives of industrial practice are: (1) to provide direct (*real*) work experience to instil (*internalize*) a positive work climate that is oriented towards caring for the quality of work processes and results, (2) instil a high work ethic for students to enter the world of work and face the demands of the global labour market, (3) fulfil things that have not been fulfilled in schools to

achieve the integrity of graduate competency standards, and (4) actualize the implementation of the Dual System Education model between VHS and Institutions Couples, systematically and systemically integrating educational programs in VHS and training programs in the world of work.

The implementation of industrial work practices at VHS has faced various problems. According to Agrawal (2013), in his research, most developed countries in Asia, such as Afghanistan, Bangladesh, India, and Pakistan, showed that vocational education and training systems were still not optimal. Although the governments of these countries have paid more attention to this sector in recent years, the results have been less than satisfactory. In Indonesia, the problems that occur are (1) *Link* and *match* have not been useful, (2) VHS has difficulty finding business/industrial partners, (3) There is no binding legal basis so that business/industry partners with VHS, (4) The business/industry world feels bothered by or disturbed by the presence of vocational school students/teachers, (5) The business/industry world is worried that machines/tools are damaged, and practice materials are wasted, (6) *Links* and *matches* are still formalities, rarely are followed up, (7) Teachers supervisors from the industry do not have pedagogical skills, and (8) Internship/apprenticeship students are slow to adapt to the work culture of the business/industrial world (Juliyanti, 2013). In dealing with existing problems, there is a need for program evaluation related to the feasibility of industrial practices.

Evaluation is an essential thing that must be done in implementing a program. Following the opinion of Arikunto and Jabar (2009), evaluation is an activity to collect information about the work of something which is then used to determine the right alternative in making a decision. In general, evaluation is an activity or systematic action to capture and analyze information or data relevant to specific techniques to make decisions related to the level of effectiveness, efficiency, and attractiveness of a program (Mukhadis, 2016). The program is an essential part of a complex strategic initiative that has the impact of output effects that can be observed over time by stakeholders as well as the results of specific changes in behaviour, knowledge, skills, conditions, and the level of activity/operation of a program's target (Linzalone & Schiuma, 2015). The function of evaluation in education cannot be separated from the purpose of the assessment itself, that the purpose of evaluating educational programs is to obtain evidentiary data that will show to what extent the level of ability and success of students in achieving curricular goals (Philip, 2003).

In implementing program evaluation, many types and methods can be used in this study using the *Kirkpatrick's* Evaluation Model. The *Kirkpatrick's* Evaluation Model consists of reactions, learning, behaviour, and results. The level of response measures the level of participant satisfaction. The second level is learning to measure the level of knowledge, skills and changes in attitudes and behaviour of trainees. The third level is behaviour which is useful to find out whether the program brings changes to the work climate. The last level is the result which helps assess the overall impact of the training program implemented (Kirkpatrick & Kirkpatrick, 2006). Based on the explanation above, the researcher is interested in research to evaluate the industrial practice program in one school in the hope that it can overcome various existing problems and the results in this study can be compared.

## **METHOD**

This research conducted observations from 2019 to 2020 to evaluate the industrial practice program at Private Vocational High School Muhammadiyah 1 Kepanjen. The reason the researchers chose Private Vocational High School Muhammadiyah 1 Kepanjen was because it is one of the private vocational schools that acts as a reference for other schools which is part of government policy through the Ministry of Education and Culture in directing a vocational training centre since 2015 (Sukoco, 2015). Private Vocational High School Muhammadiyah 1 Kepanjen is also one of the

private vocational schools in Malang Regency which has a fieldwork practice program with various problems, so it was interesting to study.

This study used a sample with a *purposive sampling method* with the following criteria: (1) students majoring in mechanical engineering and (2) students who had implemented industrial practice programs. It was known that the population of students majoring in mechanical engineering were 240 and those who had implemented industrial practices in the mechanical engineering department were 60 students, all of whom were male. This study used primary data with data collection techniques using a questionnaire, *pre-test & post-test*, interviews, and documentation. Table 2.1 shows four aspects regarding the instrument to be used for research. Aspect one (students' reactions) was carried out in the second semester after students performed industrial practice, while for aspect two (learning), using a *pre-test*, was carried out in the first semester before students performed industrial practice. The post-test was carried out after students performed industrial practice in the semester second, aspect three (changes in student behaviour) used closed interview methods for students who had graduated. In contrast, aspect four (results) used interview methods and documentation from student respondents who had worked.

Table 1. Four Levels of Evaluation of the Kirkpatrick Model

No.	Evaluation Level	Description	Data collection method
1.	Reaction	Measuring the level of satisfaction of trainees with the training program that is being followed.	Questionnaire (student sample) with a measurement scale that is a <i>Likert</i> scale.
2.	Learning	Measuring the level of learning experienced by students	<i>Pre-test &amp; post-test</i>
3.	Behaviour	Measure changes in graduate work attitudes	Interview
4.	Result	Knowing the impact of industrial practice when students are already employed	Interview and documentation of graduate data

## RESULTS AND DISCUSSION

### Reaction Aspects

The findings of this study, shown in Table 2, was that the results of data analysis on the reaction aspects of all aspects are in a good category. Thus the findings did not need further evaluation in the research. This category was intended in the form of field reaction activities for student knowledge which was measured based on facilities, material, instructors, time and infrastructure. If some of these aspects showed a bad condition and were not following level 1 in the Kirkpatrick model, there would be an essential evaluation according to the stage levels in the model.

Table 2. Results of Reaction Level Data Analysis

Reaction Aspects	Percentage average	Category
Amenities	71%	Well
Material provided	79%	Very good
Field instructor	79%	Very good
Industry practice time	74%	Well
Facilities and infrastructure	80%	Very good

The results on the reaction aspects of students were in a good category, as evidenced by the average reaction of students who agreed with the school and industrial services. The quality of the process or implementation of training can be measured by the level of satisfaction of the participants;

the results of both are always directly proportional (Silberman et al., 2006). In line with Iskandar (2018), research results on the level of the reaction of training participants where five sub-indicators were stated to be very satisfied.

### ***Facilities***

The reaction of students at the industrial practice program facilities was mostly agreed. The result was evidenced by the average percentage of 71% covering the selection of industrial practice places, provision before industrial practice, guidance on industrial work practices, and monitoring of conditions in the industry. Students will have interest, attention, and motivation to learn better when they react positively to the learning environment or facilities received (Bates, 2004).

According to Mefinal (2017) research findings, students are given leeway to choose industrial practice places. Also, there is a role for the school in equipping students by providing socialization provided by productive teachers or supervisors, and supervising by the supervisor every month by visiting industrial places to find out about the development of students.

### ***Material***

The results showed that the material indicators most of the students strongly agreed with the working given assignments. In practice, students have the opportunity to operate machines in the industry. Besides, the students' abilities through training and practice at school are implemented in real terms as an effort to apply their competencies in the world of work (Pamekas, 2016). The data above is supported by research by Syahroni (2014) which stated that the implementation of industrial work practices is an implementation of the theory/material obtained in schools, as seen from 79% of students who said that industrial work practices are useful in the suitability of the material to the relevance of knowledge.

### ***Field Instructors***

The student's reaction to the field instructor received a very agreeable response. The result of the research is an average percentage of 79% which shows that most of the field instructors have performed the procedure well, this is an effort to participate in DU/DI to make industrial practice programs a success. According to Sunardi & Sudjimat (2016), field instructors are one of the most dominant, professional and have deep insights into the world of work, both the business world and the industrial world.

In the guidance process, it was known that most respondents expressed an excellent perception of the implementation of fieldwork practices at Private Vocational High School Muhammadiyah 1 Kepanjen because the industry can accept industry practice participants well. Field instructors also provided an introduction to the industrial environment and the mentoring process for conditioning and supervising industrial practice participants.

### ***Industrial Practice Time***

The results of the research on industrial practice time indicators showed that most of the students agreed on the industrial practice schedule. The results were evidenced by the average percentage of 75%, which includes carrying out industrial practice for three full months, implementing working hours for 8 hours. However, most industries do not require overtime for students and require permits when absent during industrial practice.

The implementation of industrial practice in several European countries was carried out for a very long time because it was considered very important for students. Through industrial practice, students have the opportunity to explore and apply the learned theories (Irawan et al., 2017). In line with Aminah (2015), 70.98% of respondents agreed with the existing training schedule. However, this

was not very satisfactory, and this is related to the remaining percentage of a small percentage of people who answer less satisfied.

**Facilities and Infrastructure**

The results of the facilities and infrastructure indicators most of the students answered agree. The results were evidenced by an average percentage of 80%, which showed that the industry occupied by students had machines that match what was needed, and students were given protective equipment (PPE) during industrial practice. According to Cox (2006), the quality of a program depends on the facilities and infrastructure that involve students. In line with Nidhom (2015) research, it shows that the ability of students related to their skill competencies will increase drastically because DU/DI has sophisticated equipment, as well as to obtain information on technological developments that have not been received in schools.

**Learning Aspects**

In Table 3, the mean value of the *pre-test* results <*post-test*, it means that descriptively, there is a difference or increase in the average learning outcome between the *pre-test* and the *post-test* results. The value shows that there is a positive development in the results of industrial practices that improve student learning outcomes. This increase was because when in the industrial world students were required not only to learn but to be part of the company and to achieve predetermined targets, besides, there was much new knowledge that students got in industrial practice places.

Table 3. Results of Descriptive Learning Aspect Data Processing

	<i>Mean</i>	<i>N</i>	<i>Std. Deviation</i>	<i>Std. Mean Error</i>
Pre-test value	62.82	60	15.06	1.94
Post-test scores	81.68	60	7.56	0.98

Table 4. Results of Learning Aspect Data Processing Using *Paired Sample t-Test*

	<i>Correlation</i>	<i>Mean</i>	<i>p-value</i>
Value <i>Pre-test</i> and the value of the <i>Post-test</i>	1.00	-18.87	0.00

In Table 4, the *paired sample t-test results* show that the *correlation* value is 1.00, which means that there is a very strong and positive relationship between the two data or the relationship between the *pre-test* variable and the *posts-test* variable. The results above also show a *p-value* of 0.00 (p-value <0.05); it can be said that there is a difference between the *pre-test* and *post-test* values. The mean value shows -18.87 or negative, meaning that there is a tendency to increase in value after industrial practices exist.

The results of the study as a whole from the mean value obtained by the students' *pre-test* results showed the number 62.82, and after doing industrial practice, the *post-test* results were at an average number of 81.68. Because the mean value of the *pre-test* results is <*post-test*, it means that descriptively there is a difference or increase in the average learning outcome between the *pre-test* and the *post-test* results. The results of the *paired sample t-test* to prove that n significant values show a *p-value* of 0.00 (p-value <0.05), it can be said that there is a difference between the *pre-test* and *post-test* values.

The increase in value in the implementation of industrial work practices is possible for student motivation to learn during industrial practice as a provision in the future (Pamekas, 2016). The statement is in line with the research of Chatterjee et al. (2018) which shows that increasing student

knowledge through *pre-test* and *post-test* is based on the need to attend workshops as a forum to gain insight in facing challenges in the future. The existence of a reasonably high increase in knowledge after the implementation of industrial practice may also affect the skills of these students (Yoto, 2016).

### **Aspects of Behavior**

The closed interview method was conducted on graduates who worked mostly stated that they had experienced changes in work attitudes, including being able to think constructively in seeing job opportunities in the future, as evidenced by some graduates who opened their businesses according to their fields. Experience industrial work practices make graduates able to communicate and interact better in the workplace, in addition to industrial practice facilities where they hone their mentality, work ethic, discipline, and make them accustomed to working under pressure. Graduates were grateful because, with industrial practices, they gain knowledge and skills that are not obtained in school and can be applied to the world of work.

The researcher highlighted several findings in the interview method. For example, there were still graduates who did not benefit from industrial practices because their workplaces currently have more sophisticated tools and machines than the apprenticeship. Other findings, including some graduates who frequently moved around places of work, working not following their specialities, and some were still unemployed.

The results of the study indicated that graduates experience changes in work behaviour in terms of mindset so that they can assist graduates in designing a work environment consistently and measurably. Also, it makes it easier to understand what is expected of them in the work environment (Borrego & Cutler, 2010). The application of the thinking constructively is likely to lead to the need for a supportive environment to achieve maximum work results (Gharaibeh et al., 2013).

The industrial practice experience that graduates feel has had an impact on skills in interaction and communication in the workplace; communication is considered necessary for many disciplines, its significance has emphasized aspects of the engineering profession to adapt to the work environment (Werner et al., 2017). Passow & Passow (2017) show that communication is vital to the world of engineering, and technicians spend more than half of their working day communicating and discussing. Nathans-Kelly & Evans (2017) added that communication is not only essential but can no longer be separated from *engineering* practices such as *hard skills* or *soft skills*.

Changes in work behaviour experienced by graduates due to industrial practices can be seen in mental resilience, the formation of work ethics, and a sense of responsibility at work. The school-industry collaboration program facilitates students to develop their knowledge and knowledge and demands that graduates compete to face the challenges of technological advancement and job competition (Sylvester, 2006). Graduates experience changes in work behaviour both in *hard skills* and *soft skills*, however, some graduates who have not worked, often move workplaces and who have not felt the benefits of industrial practices need more attention from schools.

### **Aspects of Results**

Result data obtained by interview method and documentation data of graduates who had worked to determine the impact of industrial practices on work performance so that graduates get company appreciation in the form of promotions and income. The result was that most of the graduates who work in large companies have not yet received a job promotion or an increase in income. This occurrence was not because their work performance was terrible, but some companies apply career paths that require graduates to achieve the prerequisites set by the company.

In contrast to graduates who worked in companies at or below their industrial practice level, some graduates stood out because of sufficient provision and work experience and companies give

appreciation for promotion but their income results are still inferior to friends who work in large companies.

Research on the outcome aspect aimed to determine the long-term impact that graduates experience from industrial practice programs. In this study, the researcher discussed the work performance of graduates. Matusovich et al. (2014) explained that the work performance of each individual is shaped by their beliefs, values, and goals, whether it has an impact on the returns that graduates feel in the form of increased income or position. The result was that there are two specifications made by researchers between graduates who work in national and local scale companies. For graduates who worked in national scale companies, based on the data obtained, they got equal rewards even more for their performance, but it took a long process to get an increase in position because the company selects strictly and they must meet the requirements set by the company. In contrast to graduates who worked in local companies, from the data obtained, most of them complained about minimal income even though their performance was excellent.

## CONCLUSION

The evaluation of the industrial practice program of the engineering expertise program at Private Vocational High School Muhammadiyah 1 Kepanjen which used the *Kirkpatrick* evaluation model was as follows: (1) evaluation of industrial practice programs in the reaction aspect showed student satisfaction at school (the facilities provided) to prepare for the implementation of industrial practice in good categories and student assessments in the industrial world (provided material, field instructors, industrial practice schedules, and infrastructure) were carried out in the implementation process industry practice in good category, (2) evaluating industrial practice programs on the learning aspects in general had a positive impact on the learning process of students after implementing industrial practice, especially in the knowledge aspect, (3) evaluating industrial practice programs on the learning aspects which showed a positive influence, impact on changes in work behavior of graduates, and (4) evaluation of industrial practice programs on the aspects of results showing performance. High school graduate jobs leading to increased income and positions are still minimal; only graduates who worked in large-scale companies got an increase in income.

## REFERENCES

- Agrawal, T. (2013). Vocational Education and Training Program (VET): an Asian Perspective. *Asia-Pacific Journal of Cooperative Education*, 14(1), 15–26.
- Amat Mukhadis. (2016). *Metodologi Penelitian Kuantitatif: Bidang Pendidikan dan Contoh Aplikasinya*. Aditya Media Publishing.
- Aminah, H. (2015). Model Evaluasi Kirkpatrick dan Aplikasinya dalam Pelaksanaan Pelatihan (Level Reaksi dan Pembelajaran) di Pusat Pendidikan dan Pelatihan Perum Jakarta. *Jurnal Riset Manajemen Sains Indonesia*, 6 (1), 376–394.
- Arikunto, S., & Jabar, C. S. A. (2009). *Evaluasi Program Pendidikan*. Bumi Aksara.
- Bates, R. (2004). A Critical Analysis of Evaluation Practice: The Kirkpatrick Model and The Principle of Beneficence. *Journal Evaluation and Program Planning*, 27, 341–347.
- Borrego, M., & Cutler, S. (2010). Constructive Alignment of Interdisciplinary Graduate Curriculum in Engineering and Science: An Analysis of Successful IGERT Proposals. *Journal of Engineering Education*, 99 (4), 355–369.
- Chatterjee, K., Yadav, A. K., N, A., Malik, A., Kotwal, A., & Kunte, R. (2018). Use of Kirkpatrick's Model for Evaluation of Reaction and Learning of Participant of National Level Workshop on Linear Regression. *International Journal of Community Medicine and Public Health*, 5 (11),

4909–4011.

Cox, J. (2006). *The Quality of an Instructional Program*.

Depdikbud. (2017). *Pedoman Praktik Kerja Lapangan*. Depdikbud.

Gharaibeh, K., Harb, B., Salameh, H. B., Zoubi, A., Shamali, A., Murphy, N., & Brennan, C. (2013). Review and Redesign of the Curriculum of a Masters Programme in Telecommunications Engineering – Towards an Outcome-Based Approach. *European Journal of Engineering Education*, 38 (2), 194–210.

Irawan, V. T., Sutadji, E., & Widiyanti. (2017). Blended Learning Based on Schoology: Effort of Improvement Learning Outcome and Practicum Chance in Vocational High School. *Curriculum & Teaching Studies. Research Article*, 4 (1282031).

Iskandar, M. (2018). Evaluasi Reaction Kirkpatrick pada Program Keahlian Teknik Otomotif di UPT Pelatihan Kerja Pasuruan. *Universitas Negeri Malang*.

Juliyanti, L. (2013). Peran DUDI dalam Implementasi Pendidikan Sistem Ganda di SMKN I Salatiga. *Program Pasca Sarjana Universitas Kristen Satya Wacana*.

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating Training Program the Four Levels*. Berrett Kohler Publisher, Inc.

Linzalone, R., & Schiuma, G. (2015). A Review of Program and Project Evaluation Models Measuring Business. *Business Journal and Management*, 19 (3), 90 – 99.

Matusovich, H. M., Paretto, M. C., McNair, L. D., & Cory, H. (2014). Faculty Motivation: A Gateway to Transforming Engineering Education. *Journal of Engineering Education*, 103 (2), 302–330.

Mefinal, D. A. (2017). Studi Pelaksanaan Praktik Kerja Industri untuk Mempersiapkan Tenaga Terampil di SMK Muhammadiyah 1 Kepanjen. *Universitas Negeri Malang*.

Nathans-Kelly, T. M., & Evans, R. (2017). Creating Communicative Self-Efficacy through Integrating and Innovating Engineering Communication Instruction. *American Society for Engineering Education*.

Nidhom, A. N. (2015). Hubungan Kesiapan Belajar, LamaPembelajaran, Kesesuaian Tempat dan Partisipasi DU/DI dengan HasilPrakerin Peserta Didik Kompetensi Keahlian TKJ di SMK Kota Batu. *E-Journal Program Studi Pendidikan Kejuruan PascasarjanaUniversitas Negeri Malang*.

Pamekas, R. (2016). *Pelaksanaan Praktik Kerja Industri Peserta Didik Kelas XI Kompetensi Keahlian Administrasi Perkantoran SMK BOPKRI 1 Yogyakarta*. Universitas Negeri Malang.

Passow, H. J., & Passow, C. H. (2017). What Competencies Should Undergraduate Engineering Programs Emphasize? A Systematic Review. *Journal of Engineering Education*, 106 (3), 475–526.

Philip, K. (2003). *The Art Of Building Customer Value*. LPMB.

Putera, A. D. (2018). *Pengangguran Berkurang 14000 Orang dalam Setahun Terakhir*. <https://ekonomi.kompas.com/read/2018/05/07/173131526/bps-pengangguran-berkurang-140000-orang-dalam-setahun-terakhir>

Silberman, M. L., Biech, E., & Auerbach, C. (2006). *Active Training: A Handbook of Techniques, Designs, Case Examples, and Tips, 4th Edition*. Pfeiffer an Imprint of Wiley.

Sukoco. (2015). *SMK Muhammadiyah 1 Kepanjen Jadi SMK Rujukan Tahun ini Siap Membina 10-16 SMK Sekitarnya*. <http://www.smkm1kpn.sch.id>

Sunardi, & Sudjimat, D. A. (2016). Magang Industri untuk Meningkatkan Relevansi Kompetensi Profesional Guru Produktif SMK. *Jurnal Teknologi Dan Kejuruan*, 39 (2), 171–182.

Syahroni, F. (2014). Persepsi Siswa terhadap Manfaat Pelaksanaan Praktek Kerja Industri di SMKN 1 Lembah Gumanti. *Jurnal Administrasi Pendidikan*, 2 (1), 275–831.

Sylvester, A. (2006). Development of strategic international industry links to promote undergraduate

- vocational training and postgraduate research programmes. *European Journal of Engineering Education*, 31(3), 283–301. <https://doi.org/10.1080/03043790600644412>
- Werner, N., Dickert, J., Shanmugaraj, N., Monahan, K. G., Wallach, S., & Keating, J. (2017). *No Title*.
- Woods, D. (2018). The impact of VET on Transition to Work for Young People in Australia. *Journal Vocational Education*, 50 (6), 465–473.
- Yoto. (2016). *Model Alternatif Pengembangan SMK di Indonesia (Upaya Penyiapan Tenaga Kerja Terampil di Industri)*.
- Zimmermann, N. (2017). *Germany exports a secret of its success: vocational education*. <https://www.dw.com/en/germany-exports-a-secret-of-its-success-vocational-education/a-38114840>