

# Analysis of Construction Service Requirements towards Minimum Standards of Work Knowledge of Vocational High School Students

**<sup>1</sup>Rolly Robert Oroh \***

Universitas Negeri Manado, Indonesia

Email : <sup>1</sup>rollyoroh@unima.ac.id

\* correspondence author

---

## ARTICLE INFO

### Article history

Received Sept 14, 2023

Revised Nov 11, 2023

Accepted Nov 30, 2023

### Keywords

Work Knowledge

Concrete Construction

Construction Services

## ABSTRACT

*Vocational high school graduates in Indonesia still show a low level of employment in the construction services industry sector. The aim of this research is to find a classification of vocational high school students' occupational knowledge attainment levels that construction services require in carrying out concrete construction work. This research uses descriptive research methods. This research data was obtained through surveys, observations and focus group discussions with construction service actors. The research data collected was then categorized based on work indicators, and analyzed for conformity with Indonesian national work competency standards in the concrete structure work category. The results of the study found that the minimum work knowledge standards of vocational high school students who must meet the needs of construction services in carrying out concrete construction work are understanding about the installation of scaffolding, the making of formwork, the assembling of reinforcement, the installation of reinforcement, and the casting of concrete.*

This is an open access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



## Introduction

Vocational education is a type of education that prepares students to be able to work in certain fields. Vocational education is also an education system that can provide work experience for

---

students (Rintala and Nokelainen, 2020). Thus, it can be stated that, the principle of implementing vocational education such as vocational high schools (VHS) is primarily in the effort to prepare students to have competence and are ready to work in fields according to their expertise. The implementation of vocational education in Indonesia adopts the philosophy of vocational education according to Prossers theorem (Sudira, 2014; Wardiman, 1999). The Prosser theorem is a basic principle in the organization of vocational education so that vocational educational will be effective and efficient in preparing graduates to become a competent workforce in its field. Some of these theorems are: vocational education will be efficient if a learning environment is provided that is in accordance with the replica of the environment in which they will work in the future; and vocational education must recognize working conditions and the labor market.

Vocational education through VHS has become one of the educational institutions that functions to produce labor at the operator level, but its existence relatively has not maximized providing graduates with a level of work knowledge relevant to the needs of construction services. The relevance of the level of achievements to the work knowledge of the VHS students should be seen in accordance with the standards of construction services needs. The standard of the student's work knowledge needs should be adapted to the type of work done. Therefore, this research is important and strategic to carry out. This research is to analyze and find a classification of the level of occupational knowledge attainment of vocational school students. The indicator of VHS students' work knowledge is carrying out concrete construction work that meets the standards required for construction services.

Many VHS graduates are still faced with employment problems, this is because their competency requirements are still not in line with the types and requirements of job vacancies, so there are still many VHS graduates in various regions in Indonesia who are still unemployed. Based on data in 2022, VHS graduates constitute the largest percentage of the overall open unemployment, accounting for 10.38% of the total open unemployment. This percentage is higher than graduates in other types of education (BPS, 2022). Based on data from the previous two years, the percentage of unemployed VHS graduates was 8.42% of the total unemployed population (6.93 million) in 2020 and 11.45% of the total unemployed population (8.75 million) in 2021. This data shows that there has been an increase in the percentage in 2021 and a decrease in 2022. Even though the 2022 data shows a decrease in the percentage of unemployed VHS graduates, on average VHS graduates still contribute more to open unemployment than other graduates. Thus, the data shows that there is inequality, where VHS is the main source of unemployment even though it produces a competent workforce. Therefore, VHS students' working knowledge needs to be known whether they meet the minimum requirements set by the construction service or not.

This information shows that VHS alumni continue to contribute to the unemployed working age population. Based on 2020 data, the construction services sector made a significant contribution to national gross domestic product (GDP), namely 10.24%. This percentage means that 70% of construction workers still have a VHS education or below (Kementerian PUPR, 2021). This means that vocational students must have adequate work competency standards in doing work according to their field of expertise (Sumual and Oroh, 2018; Wibowo, et al, 2018).

Several studies have been conducted on VHS students' work knowledge competencies, and only analyze the relevance of work knowledge in construction work (Sumual & Oroh, 2018) and analyze the dominant factors of work knowledge in carrying out shallow foundation work (Oroh, 2021). Other research also states that the competency of vocational school graduates required by the construction services industry is work knowledge competency (Iswardhany, 2018) in carrying out concrete construction work (Almira, et al, 2016). A classification of the work knowledge competency of VHS students that satisfies the performance standards in the minimum standards for construction services necessary to complete concrete construction work has not been analyzed and found in some of these studies. Consequently, it is critical to conduct this research in order to classify the minimal competency requirements for students in vocational schools' work knowledge component in accordance with the needs of the construction service industry.

The mismatch between the quality of graduates and the demands of the labor market accounts for the low level of absorption of VHS graduates in the provision of construction services (BPS, 2022). To guarantee that student competencies meet the needs of construction services, it is crucial to keep developing the work knowledge competency profile of VHS students in a way that takes those needs into account. The aim of the findings of this research is to support efforts aimed at improving the quality and relevance of VHS students' work knowledge competencies.

Vocational students' work competencies can be obtained through a productive competency program learning approach. Competence is the basis for learning and assessing student learning outcomes (Kreuzer and Weber, 2018; Nore and Lahn, 2014). Good student work competence will increase their productivity, with better jobs and higher income (Adrian and Oscar, 2019; Papakitsos, 2016). Competency-based work is defined as the employability required to demonstrate knowledge, skills and abilities. Competency of vocational students' working knowledge is developed from productive program learning in VHS, because in the VHS curriculum structure, subjects are divided into three groups, namely groups of normative, adaptive, and productive programs. Productive program group subjects provide teaching materials that prepare students with work competencies, so that students are able to do a good job according to their field of expertise. The teaching materials given to VHS students will be in accordance with what is needed by the construction service

industry. This shows that vocational schools are able to provide work knowledge competencies for students so that later it is easier to access jobs after graduating in education, because educational models such as those applied in vocational education (or VHS) can provide access to the job market for students who are prepared to become skilled workers (Virolainen and Stenström, 2014).

The construction service industry in North Sulawesi is still demonstrating dynamics of development in the business of building infrastructure in various fields. According to a number of studies, skilled labor is necessary for North Sulawesi to implement construction services, but more data is still imported from outside the region (Oroh, 2021). The demand for labor in North Sulawesi's construction industry is steadily rising, which is essential to make sure the business is implemented successfully. Vocational education must produce a workforce with competencies relevant to industry demands in order to meet the needs of the North Sulawesi construction industry and deter outside workers. This makes the need for graduates from vocational schools in the region even more pressing. With a comparatively high labor absorption rate, the construction sector is the largest source of income for a nation (Halpin and senior, 2011).

Given the significance of the construction services sector to the growth of a region, it is imperative that there be a skilled labor pool for construction-related jobs. One source of workers with construction work competencies is vocational high schools. Therefore, even though the implementation of Vocational High Schools has not optimally met the needs of construction services, they still need to constantly prepare their students to have good competencies. Therefore, this research is important to find the competency of vocational students' knowledge of work that suits the needs of the implementation of construction services, with the type of concrete construction work.

## **Method**

### **Research Design**

This study uses a descriptive research approach. Descriptive research design is a research approach in which the researcher stays close to the data, uses limited frameworks and interpretations to explain the data, and catalogs information into themes (Creswell & Creswell, 2022) and to discover trends in the research context (Roni, et al, 2020). The descriptive research data was collected through survey activities, field observations, and focus group discussions (FGD) which were conducted on a limited basis with construction service industry actors. The FGD material was created based on field observations and survey results, and it complies with Indonesian work standards that are currently in effect. The Indonesian national qualifications framework (KKNI) (Perpres RI, 2012) and the Indonesian national work competency standards (SKKNI) (Kepmenaker RI, 2021) are the standards used. The SKKNI standards used are concrete

structure work standards, and the KKNi is adjusted to the level of VHS graduates.

With consideration for the requirements of construction service providers, this research attempts to classify the work knowledge achievements of VHS students at a certain level. Furthermore, the need for construction services is obtained by conducting discussions and in-depth research through FGDs with construction service actors, and conducting FGDs is based on performance criteria in carrying out stages of concrete construction work. The classification of the level of work knowledge achievements of VHS students is based on responses and/or approval responses from construction service providers. So the descriptive research approach in this research was the right choice because this research was to describe the classification of the level of work knowledge achievements of VHS students through responses from FGD participants.

### **Population, Sample and Respondents**

The population of this research is construction service actors who have construction project work activities in North Sulawesi Province and its surroundings. The research sample was determined randomly, namely construction service actors who had employed vocational school graduates in North Sulawesi. Furthermore, construction service respondents were taken from representatives of 6 construction service companies registered with the North Sulawesi Construction Services Development Agency (LPJK) whose work activities carry out construction work in North Sulawesi Province and its surroundings. The number of construction service actors as respondents involved in this research was taken randomly with 1 construction service actor each from 6 districts/cities in North Sulawesi who had a VHS with expertise in construction and property technology.

### **Data Collection**

Data collection is carried out through FGD with construction service actors. Through the FGD conducted, it was found that the minimum standard of competency of vocational students' knowledge of work in carrying out concrete construction work, equipped with indicators and descriptions of the criteria for each of these work indicators. The FGD was conducted by conducting separate discussions and deepening with construction service actors in North Sulawesi, and continued by asking for responses to work competencies from the dimensions of construction work. The indicators and criteria for construction work discussed in the FGD were carried out with theoretical considerations and performance criteria adjusted to the SKKNI and level 2 KKNi.

### **Research Instrument**

FGD activities in this research were directed and limited to discussion and in-depth material provided to respondents. Discussion and in-depth material are depicted in the research instrument. The research instrument provides an overview and indicators of work knowledge in carrying out

concrete construction work, where concrete construction work consists of several stages of work that must be carried out. There are several jobs related to reinforced concrete construction work, namely formwork installation, reinforcement placement, and concrete placement (Fanella, 2016).

### **Research Data Analysis**

Data analysis in this research uses descriptive analysis. Research data as a result of the FGD emerged several performance indicators which became criteria for the level of achievement of students' work knowledge competency in the dimensions of concrete construction work. Minimum standard indicators for construction service needs were obtained and compiled from the results of discussions and responses given by the majority of construction service actors involved in FGD activities. The criteria used in determining these indicators are based on the appropriateness of the level of work qualifications of VHS students (level 2 KKNI), because from the discussions carried out several indicators emerged that, if understood, are not at the level of VHS students. The indicators obtained are then validated by carrying out analysis and adjustments to determine whether these indicators are included in the Indonesian national work qualification standards in the building category for concrete structure work or not.

Determination of the scale or achievement score in the classification of students' work knowledge achievement levels is developed and determined from the responses of the majority of the construction service actors involved. This achievement classification was created to provide an overview of the level of achievement of minimum standard indicators that can be demonstrated by students. FGD provides three classifications of the minimum standard of work knowledge indicator that students can achieve in accordance with the needs of construction services, where classification A means being in the good category, while B means being in the category enough and C means it is in the less category.

### **Result and Discussion**

The knowledge competencies of VHS students with the minimum standards required by construction service actors are shown in Table 1. The minimum standards of competence are obtained through FGD with construction service actors. The FGD was conducted on a limited basis with construction service actors in North Sulawesi, and was continued by asking for responses to work competencies from the dimensions of the job. The material is developed and adjusted to the work standards used for FGD with construction service actors. That is adjusted to the work indicators of the concrete construction work dimension. FGD findings determine the minimum level of student productive knowledge and competencies in relation to the demands of the construction services industry, as illustrated in Table 1.

Six construction service companies operating in North Sulawesi, Indonesia, were involved in the FGD with construction service actors. The companies' details included one large classification company, four medium classification companies, and one small classification company. Table 1 describes the indicators of need and or performance criteria which are the types of job indicators that most often arise from discussions and responses with construction service actors in North Sulawesi. The description of the minimum standard of student knowledge competence in Table 1 is the result of discussion and mutual agreement with construction service industry actors through FGDs, and adjusted to the contents of the SKKNI and KKNI standards.

**Table 1. Minimum standards of student work knowledge competence according to industry**

<b>Work dimensions</b>	<b>Indicators of work knowledge (Understand)</b>	<b>Achievement scale</b>	<b>Classification</b>
Concrete construction	1. installing of scaffolding	A = all indicators achieved	A = good
	2. making of formwork	B = 4 indicators achieved	B = enough
	3. assembling of reinforcement	C = 3 indicators achieved	C = less
	4. installation of reinforcement		
	5. casting of concrete		

Based on Table 1, it can be stated that there are several minimum standard indicators as criteria for the level of understanding of students' productive knowledge competence on the dimensions of concrete construction work. This indicator as a criterion for the level of understanding of students' work is the result of discussions and responses given by most of the construction service actors involved in the FGD activities carried out. The indicators described in Table 1 are the result of an inventory and identification of several indicators that emerged from discussions with construction service industry actors. The determination of these indicators is based on the qualifications of VHS students (level 2 KKNI), because from the discussions carried out, several indicators emerged which if understood were no longer at the level of SMK students.

The determination of the achievement scale or score in Table 1, is made to illustrate the level of achievement of the minimum standard indicators that can be shown by students, and is also developed and determined from the level of frequency of responses from the industry involved. Additionally, three (three) classifications of the minimum number of standard indicators attained by students in accordance with industry requirements are proposed for the purpose of classification; classification A indicates that the item is in a good category, classification B indicates that it is in the enough category, and classification C indicates that it is in the less category. The classification of knowledge competence A is the minimal standard that students must meet in order to meet the demands of the construction services. Classification A with indicators must understand about the installation of scaffolding, the making of formwork, the assembling of reinforcement, the

installation of reinforcement, and the casting of concrete. The description of the classification in Table 1 is the result of discussions and mutual agreements with industry actors through FGD.

Based on the results of this research analysis through survey and observation activities at several VHS, it was found that the implementation of learning carried out through teaching materials in productive lesson groups had accommodated the need for work knowledge competencies that were in line with the needs of construction services. However, students' work knowledge competencies are only formed at the practical learning pattern stage of field work in the form of practical learning in industry. This learning pattern occurs through a form of collaboration between schools and construction services. Therefore, such collaborative learning can provide good work knowledge competencies for students through learning patterns where students learn in a real work environment. So through the analysis and findings of this research, it can be concluded that VHS students have work knowledge competencies that are in accordance with construction services industry standards. This means that students at vocational schools have work competencies that meet the demands of the construction services industry (Oroh, 2021). This is because students are constantly exposed to learning environments, such as those found in real workplaces (Pradana, et al, 2021). In addition, because work standards are very important for students to be successful in the workplace, the work knowledge competencies that students acquire while attending vocational schools will result in high work standards (Bukit, 2014). VHS student competencies must always be current or in line with industry demands (Hanavi, 2014). Therefore, the demands for work knowledge competency must be met by VHS students when carrying out construction work which must be in line with the needs of the construction industry. So that students' good and relevant work knowledge competencies will have an impact on the absorption of VHS graduates with relatively short waiting times by construction services, and also the workforce needs for construction service actors will be met by the availability of VHS graduates who have good work knowledge.

According to the analysis's findings, students enrolled in vocational schools need to possess strong productive knowledge competencies in order to meet the requirements of the work indicator achievement classification. Therefore, if students in vocational schools can meet good classification, their work knowledge competency will be in accordance with work standard requirements (Oroh, 2021). If students are constantly involved in learning experiences that are pertinent to the workplace, their work knowledge competency in concrete construction will be in line with the needs of construction services (Willert, et al, 2011; Hiim, 2017; Sylte, 2020; López and Lopez, 2020). Furthermore, with the competence of work knowledge that students get in learning at VHS will provide good work standards, because work standards are the key to success for students in work (Bukit, 2014). Knowledge is a prerequisite for students to be successful (Michaelis and Richter,



2022; Billet, 2020) in every problem solving (Mentele and Heinzer, 2021). Competencies developed in VHS must always be relevant or according to industry needs (Hanavi, 2014). So that vocational school students' work knowledge competency in concrete construction work with achievement classification, can become a standard for the learning process to suit the needs of the industrial world.

The significance and pertinence of the study's findings stem from the fact that construction service providers heavily rely on the knowledge proficiency of vocational students to ensure the seamless execution of every project. According to a number of studies, concrete construction work requires vocational graduates to possess the working knowledge or cognitive competence required by the construction industry (Almira, et al, 2016), because the competency profile of construction work knowledge in VHS is in the relevant category (Safitri, et al, 2012). The importance of knowledge because knowledge is one of the dimensions of competence for each individual to do a certain job according to his field of expertise. Because if someone wants to be said to be competent in their field, they must have good job knowledge aspects in addition to having good skills and attitudes. Because by having good competence, it will be a person's main capital when taking the competency certification test for construction workers (Kementerian PUPR, 2019). It follows that if a student has good working knowledge, their work competence will also be good.

## **Conclusion**

According to the study's findings, VHS students' minimal requirements for work knowledge in order to fulfill the demands of construction services and perform concrete construction work are understanding about the installation of scaffolding, the making of formwork, the assembling of reinforcement, the installation of reinforcement, and the casting of concrete. Furthermore, it was found 3 classifications of achievement of the minimum number of standard indicators achieved by students according to the needs of construction services, where classification A means being in the good category by achieving at least five standard indicators of minimum work knowledge in carrying out construction work according to construction service needs. While B means is in the enough category and C means it is in the less category.

If vocational school students are provided with learning experiences that are pertinent to the workplace, their work knowledge competencies will align with industry demands. Because work knowledge is a requirement for success in all problem solving, students who possess strong work knowledge competencies will always succeed in their careers. Students in vocational schools must acquire work knowledge competencies that align with the demands of the industrial world during their educational journey. Students' working knowledge will be better and more relevant if students

are continuously involved in collaborative learning with industry such as learning industrial work practices.

This research can provide recommendations or considerations for all policy makers (government) and schools so that they can carry out periodic evaluations of the content and learning patterns of VHS students so that they remain relevant to industry needs. This research only analyzed the work skills aspect, so further research needs to be carried out with a focus on analysis on other aspects.

## **References**

- Adrian, Z., & Oscar, V. (2019). TVET policy reforms in Chile 2006–2018: between human capital and the right to education. *Journal of Vocational Education & Training*, 71(4), 579-599. DOI: 10.1080/13636820.2018.1548500.
- Almira, D., Dardiri, A., & Isnandar. (2016). Kompetensi lulusan SMK program keahlian teknik bangunan kompetensi keahlian teknik konstruksi batu dan beton yang dibutuhkan industri jasa konstruksi di Jawa Timur. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 1(4): 673-680.
- Billett, S. (2020). *Learning in the workplace, Strategies for effective practice*. Routledge, Taylor & Francis Group, New York, USA.
- Bukit, M. (2014). *Strategi dan inovasi pendidikan kejuruan, dari kompetensi ke kompetisi*. Bandung: Alfabeta.
- BPS. (2022). *Keadaan ketenagakerjaan Indonesia per Februari 2022*. BPS RI, Jakarta, Indonesia.
- Creswell, J. W., & Creswell, J. D. (2022). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage Publications.
- Fanella, D.A. (2016). *Reinforced concrete structures, analysis and design*. McGraw-Hill Education, New York, USA.
- Halpin, D. W., & Senior, B. A. (2011). *Construction management*. Fourth edition. John Wiley & Sons, Inc., USA.
- Hanavi, I. (2014). *Pendidikan teknik & vokasional, menggali pengalaman sukses bi-national di negeri Jiran, dari konsep hingga implementasi*. Bandung: Rafika Aditama.
- Hiim, H. (2017). Ensuring curriculum relevance in vocational education and training: epistemological perspectives in a curriculum research project. *International Journal for Research in Vocational Education and Training*, 4(1), 1-19. DOI: <https://doi.org/10.13152/IJRVET.4.1.1>
- Iswardhany, R. (2018). *Relevansi kompetensi lulusan smk program keahlian teknik gambar*

- bangunan dengan kebutuhan dunia usaha/dunia industri jasa konstruksi di kota Bandung, Tesis, tidak dipublikasikan. UPI Bandung, Bandung.
- Kepmenaker RI. (2021). Standar Kompetensi Kerja Nasional Indonesia (SKKNI) pada jabatan kerja pelaksana lapangan pekerjaan gedung. Regulation of the Minister of Manpower of the Republic of Indonesia (Kepmenaker RI). Jakarta, Indonesia.
- Kementerian PUPR. (2019). Sertifikasi tenaga kerja konstruksi. Buletin konstruksi, edisi 2 dan edisi ke 3 tahun 2019, Direktorat Jenderal Bina Konstruksi, Jakarta.
- Kementerian PUPR. (2021). Era baru konstruksi berkarya menuju Indonesia maju, Buku konstruksi Indonesia 2021, Buku 1. Kementerian PUPR. Jakarta, Indonesia.
- Kreuzer, C., & Weber, S. (2018). Modelling opportunity recognition competence as a foundation for teaching and learning in vocational education. *Vocations and Learning*, 11:399–423. <https://doi.org/10.1007/s12186-017-9194-7>.
- López, I. C., & López, B. R. (2020). The relevance of transversal competences in vocational education and training: a bibliometric analysis. *Empirical Research in Vocational Education and Training*, 12:12. <https://doi.org/10.1186/s40461-020-00100-0>
- Michaelis, Ch., & Richter, M. (2022). Discontinuities in vocational education and training: the influence of early-risk factors and personality constructs on premature training termination and subsequent trajectories. *Empirical Research in Vocational Education and Training*, 14:7. <https://doi.org/10.1186/s40461-022-00135-5>
- Mentele, S. R., & Heinzer, S. F. (2021). Practical validation framework for competence measurement in VET: a validation study of an instrument for measuring basic commercial knowledge and skills in Switzerland. *Empirical Research in Vocational Education and Training*, 13:18. <https://doi.org/10.1186/s40461-021-00122-2>
- Nore, H., & Lahn, L. Ch. (2014). Bridging the gap between work and education in vocational education and training. a study of Norwegian apprenticeship training offices and e-portfolio systems. *International Journal for Research in Vocational Education and Training*, 1(1), 21-34.
- Oroh, R. (2021). Dominant factors of the knowledge competency of vocational high school students according to the need of construction services. In *Proceedings of the 4th International Conference of Vocational Higher Education – ICVHE*. ISBN 978-989-758-530-2, p. 117-121. DOI: 10.5220/0010036400002967.
- Papakitsos, E. C. (2016). Systemic modelling for relating labour market to vocational education. *International Journal for Research in Vocational Education and Training*, 3(3), 166-184.

- Perpres RI. (2012). Kerangka Kualifikasi Nasional Indonesia (KKNI). Perpres RI. Jakarta, Indonesia.
- Pradana, D. H. E., Yoto, & Nyoto, A. (2021). The strategy to implement work-based learning through field work practices in vocational high schools (multiple case studies in Malang regency and Blitar city). *Journal of Vocational Education Studies*, 4(2), 196-209. <https://doi.org/10.12928/joves.v4i2.4792>
- Rintala, H., & Nokelainen, P. (2020). Vocational education and learners' experienced workplace curriculum. *Vocations and Learning*, 13, 113–130. <https://doi.org/10.1007/s12186-019-09229>.
- Roni, S. M., Merga, M. K., & Morris, J. E. (2020). *Conducting quantitative research in education*. Springer, Singapore.
- Safitri, B. R. A., Syafrudie, H.A., & Sutrisno. (2012). Relevansi program studi keahlian teknik bangunan dengan pekerjaan lulusan. *Teknologi dan Kejuruan*, 35 (1): 29-36.
- Sudira, P. (2014). Indonesia Vocational education praxis between mazab John Dewey and Charles Prosser. *International Conference On Vocational Education And Training (ICVET)*. May 14 th, 2014. ISSN 2301-7147.
- Sumual, H., & Oroh, R. R. (2018). Relevance of student knowledge competency according to needs of construction business. *International Conference Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO)*. Unesa, Surabaya.
- Sylte, A.L. (2020). Predicting the future competence needs in working life: Didactical implications for VET in Norway. *International Journal for Research in Vocational Education and Training*, 7(2), 167–192. <https://doi.org/10.13152/IJRVET.7.2.3>.
- Virolainen, M., & Stenström, M. L. (2014). Finnish vocational education and training in comparison: strengths and weaknesses. *International Journal for Research in Vocational Education and Training*, 1(2), 81-106.
- Wardiman. (1999). *Pengembangan sumber daya manusia melalui Sekolah Menengah Kejuruan*. Jayakarta Offset, Jakarta.
- Wibowo, P. A., Kuat, T., & Sayuti, M. (2018). Integrated learning based on competence in vocational high school. *Journal of Vocational Education Studies*, 1(2), 71-76. DOI: <https://doi.org/10.12928/joves.v1i2.699>.
- Willert, S., Keller, H.D., & Stegeager, N. (2011). Academic vocational training: bridging the gap between educational space and work space. *Electronic Journal of Knowledge Management*, 9 (2), 168-180. Available online at [www.ejkm.com](http://www.ejkm.com).