## KRONOLOGI KORESPONDENSI PUBLIKASI ARTIKEL PADA JURNAL INTERNASIONAL BEREPUTASI DAN BERDAMPAK FAKTOR

Judul	: The alignment of productive competence on machinery between vocational		
	education institutions and industry		
Jurnal	: World Transactions on Engineering and Technology Education		
Volome	: 15		
No	: 3		
Halaman	: 256 - 259		
Penerbit	: World Institute for Engineering and Technology Education (WIETE)		
SJR Jurnal	: 0,39 (2020)		
Quratile	: Q2 (Scopus)		
Penulis	: Heri Yudiono		
Bukti Indexin	g Jurnal:		

## World Transactions on Engineering and Technology Education

COUNTRY	SUBJECT AREA AND CATEGORY	PUBLISHER
Australia   Image: Diversities and research institutions in Australia   H-INDEX 1 4	Engineering - Engineering (miscellaneous) Social Sciences - Education PUBLICATION TYPE Journals	World Institute for Engineering and Technology Education (WIETE) ISSN 14462257
COVERAGE	INFORMATION	
2009-2020	Homepage How to publish in this journal zenon.pudlowski@wiete.com.au	

The WIETE's World Transactions on Engineering and Technology Education seeks to advance continued growth and evolution in knowledge and understanding in engineering and technology education by publishing strictly refereed international articles in the field, thereby, benefiting humankind by providing the next generation of engineers and technologists with greater knowledge in educational methods.



SCOPE



## Kronologi Korespondensi Publikasi Artikel

NO	TANGGAL	WAKTU	AKTIVITAS KORESPONDENSI		LAMPIRAN
			AUTHOR	PUBLISHER	
1	12 September 2017	1.38 PM	Komunikasi submit	-	1
			artikel ke GJEE (Global		
			Journal of Engineering		
			Education)		
2	12 September 2017	11.08 PM	-	Meminta menyiapkan	2
				artikel menyesuaikan	
				template GJEE	
3	13 September 2017	12.58 AM	-	Meminta submite	3
				artikel menyesuaikan	
				template GJEE	
4	14 September 2017	3.26 PM	Submite artikel ke	-	4
			GJEE		
5	14 September 2017	7.47 PM	-	Konfirmasi	5
				penerimaan	
				komunikasi author	
6	21 September 2017	12.32 PM	-	Ketidak sesuaian	6
				artikel di GJEE dan	
				dipertimbangkan	
				publikasi ke	
				WTE&TE (World	
				Transactions for	
				Engineering and	
				Technology	
				Education)	
7	26 September 2017	9.39 AM	Submit artikel ke	-	7
			WTE&TE		
8	26 September 2017	11.25 AM	-	Menerima komunikasi	8
				yang telah dilakukan	
9	26 September 2017	1.49 PM	-	Konfirmasi satu	9

				referensi tidak sesuai	
				dengan URL dan	
				pengertian dari "sney"	
				pada Tabel 2	
10	28 September 2017	8.09 AM	Mengubah referensi	-	10
			yang dirujuk dan		
			konfirmasi pengertian		
			kata "sney" dari Tabel		
			2.		
11	28 September 2017	8.55 AM	-	Konfirmasi akronim	11
				CNC dan penjelasan	
				Tabel 2. Publisher	
				meminta jawaban dari	
				konfrimasi dan tidak	
				mengirim artikel versi	
				perubahan	
12	28 September 2017	2.36 PM	-	Artikel sudah dinilai	12
				tiga reviewer	
				internasional untuk	
				dipublikasikan ke	
				WTE&TE, Vol.15,	
				No.3.	
13	28 September 2017	3.59 PM	Konfirmasi akan	-	13
			melakukan pembayaran		
			dan mengirim tanda		
			pembayaran		
14	29 September 2017	11.33 AM	Mengirimkan tanda	-	14
			pembayaran ke		
			publisher		
15	29 Oktober 2017	12.50 PM	-	Konfirmasi telah	15
				melakukan	
				pembayaran	

16	1 Oktober 2017	4.13 PM	-	Menginformasikan	16
				akan menerima bukti	
				artikel	
17	20 Oktober 2017	6.33 AM	-	Artikel telah dikoreksi	17
				dan diformat sesuai	
				gaya WIETE untuk	
				publikasi di	
				WTE&TE, Vol.15,	
				No.3.	
18	20 Oktober 2017	8.18 AM	Menginformasikan	-	18
			akronim CNC		
			(Computer Numerical		
			Control.)		
19	20 Oktober 2017	8.26 AM	-	Menginformasikan	29
				artikel versi final	
20	29 Oktober 2017	4.03 PM	-	Menginformasikan	20
				jurnal terbit di	
				WTE&TE, Vol.15,	
				No.3.	

### Lampiran 1. Komunikasi submit artikel ke GJEE (Global Journal of Engineering

#### **Education**)

12/2/21, 10:35 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### request for author kit from Global Journal of Engineering Education

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> To: info@wiete.com.au Tue, Sep 12, 2017 at 1:38 PM

Dear Editor of Global Journal of Engineering Education

I hope this email finds you in a good health

Herewith, I would like to indicate my interest to submit my article to Global Journal of Engineering Education. Therefore, I hope I could receive a kit for authors from the Global Journal of Engineering Education.

Your warm reply would be very much appreciated

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1578314824879800454&simpl=msg-f%3A15783148248... 1/1

#### Lampiran 2. Meminta menyiapkan artikel menyesuaikan template GJEE

12/2/21, 11:19 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### request for author kit from Global Journal of Engineering Education

zenon.pudlowski zenon.pudlowski <zenon.pudlowski@wiete.com.au> Reply-To: "zenon.pudlowski zenon.pudlowski" <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> Tue, Sep 12, 2017 at 11:08 PM

Dear Mr Yudiono

Attached, please find a kit for authors. This should assist you in the preparation of your article.

In preparing your article, you should not make any changes to the template, and strictly follow the Instruction for Authors. Please do not use bold faces in the article nor in the figures! The abstract must not exceed 12 lines. Also please note that a single line space must be placed between the paragraphs, figure, captures, equations, formulas, etc. Further, would you please supply us with the original, unsaved figures, so that we can access them and make necessary corrections if required? We accept figures generated in Ms Word, Excel and Visio. More information can be found at the journal's site:

www.wiete.com.au

Also, please note that submitted articles must be accompanied by the fully filled in and signed Submission Form & Payment Details. However, you do not need to pay the publication fee at this stage. You will be asked to do so, when the article has been refereed positively.

I look forward to receiving your contribution to the GJEE journal.

Kindest regards

Zenon J. Pudlowski

> On 12 September 2017 at 16:38 Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> [Quoted text hidden]



GJEE-Submission&Payment.pdf

#### **INSTRUCTIONS FOR AUTHORS**

We aim to produce GJEE publications with as uniform an appearance as possible and, it is, therefore, requested that you conform to these instructions when preparing your GJEE articles. An attachment containing a style-file is enclosed to assist you in the laying out of your article.

In preparing their articles, authors should use the GJEE style file supplied by the publisher to ensure consistency and uniform appearance of the articles included in the GJEE publications.

Submitted articles should not exceed **six** (6) pages in total, including the title page and must be arranged as A4 size (210mm x 297mm). Each exceeding page will attract a page levy of **\$A100**, plus 10% GST, payable by Australian residents only.

#### Deadline

As indicated in the call for articles, the electronic version of the article as an MS Word file and also a PDF file must reach the WIETE by the deadline.

#### Page Layout

The correct page layout settings are as follows:

Page Setup Margins: Top: 0.9 cm Bottom: 1.5 cm Left: 2.0 cm Right: 2.0 cm

From Edge Header: 0.8 cm Footer: 0 cm

A Times New Roman font of 10-pt size on 12-pt line spacing (6 lines per inch) should be selected to write the article. The article, including the text, tables, figures, formulae, etc, should be arranged in one column, must be fully justified with the text in single-line spacing, and one-line spacing between paragraphs. Paragraphs should not be indented.

#### Title, Author(s) and Abstract

The title of the article should have only the first word capitalised (along with any proper names). Author(s), affiliation(s), city and country should use first capital letter and lower case. No acronyms or abbreviations of the affiliation should be used.

There is one-line space left between the author(s) and the affiliation(s). Authors should provide a brief and concise abstract of the article in not more than 10 lines in the field reserved in the style-file and the abstract should provide an overview of the article. Also, there should be a few keywords placed in the space provided.

#### The Text and Headings

The actual text of the article should be arranged in one column. There should be two-line space between the abstract and the first heading of the text. The consecutive pages must start from the top of the new page and there should be no space left at the top of the new page.

All section headings must be in UPPER CASE and Title Case must be used for subsection headings. Both sections and subsection headings should not be in bold. There should be one-line space between the heading/subheading and the text.

#### **Tables, Figures and Captions**

Pictures, figures and diagrams should be numbered consecutively (Figure 1, 2, 3, etc) and the captions should be placed below the figures. The tables should also be arranged consecutively (Table 1, 2, 3, etc) but the captions should be placed above the tables. The captions should be centred and end with a full stop. Figures and tables ought to be included in the body of the text as much as possible. However, large-size figures and tables may be arranged at the end of the article.

#### References

References should be included in the body of the text and should be numbered with a reference number bracketed [1]. They should be listed at the end of the article in accordance with their **sequential number** and should be arranged as follows:

#### Books

- 1. Mocarianis, B.H., *The Quality of Global Engineering and Technology Education*. Sydney: Junk Publishers, 233-239 (2009).
- 2. Picolinii, K.Y. and Mocarianis, B.H., *Important Issues Engineering and Technology Education*. In: Emanualis, T.U. and Kulikokans, J.J. (Eds), Education in the 21st Century. Sydney: Junk Publishers, 233-239 (2009).

#### Journals

3. Vilanovis, L.J., The quality of global engineering education. *World J. of Engng. and Technol. Educ.*, 1, **2**, 33-39 (2009).

where 1 stands for the volume, 2 for the number (bold case), and 33-39 are the relevant pages.

#### Conference papers

4. Michalenkos, B.D., Conflicts between engineering teachers. *Proc. World Conf. on Technol. and Engng. Educ.*, Melbourne, Australia, 221-227 (2009).

#### WWW

5. Carconus, R.G., Collectivism and its impact on the environment (2008), 13 March 2009, www.coliunus.edu.tt/unises.html

where 13 March 2009 stands for the date of acquisition.

# An insight into undergraduate students' views on the profile of professional engineers in environmental engineering education

Dianne Q. Nguyen† & Zenon J. Pudlowski‡

WIETE University, Melbourne, Australia<sup>†</sup> Miramare University of Technology, Miramara, Castalonia<sup>‡</sup>

ABSTRACT: This article is based on the findings and results of a recent survey taken of final year engineering students at Miramare University of Technology, Miramara, Castalonia. The investigation had two principle objectives: the first to assess engineering students' views on the status and inclusion of environmental issues and topics in general engineering disciplines, and the second to assess what students understand to be the qualities and attributes of a professional engineer. In researching these issues particular emphasis is placed on the creation of a uniform engineering education curriculum that addresses sustainable development and environmental issues and concerns in the development of the skills and attributes that are vital for the formation of a modern professional engineer. Some revisions and improvements of existing engineering curricula in order to include important topics and ideas of environmental engineering and sustainable development are suggested and discussed in this article.

Keywords: environmental issues; qualities and attributes; sustainable development; environmental engineering;

#### INTRODUCTION

Many of the developments that engineers are involved in have an enormous impact on the environment, and as contributors to environmental degradation engineers must find ways to address environmental issues in their practice. Engineering developments must show respect for future generations as they too will rely upon the environment for the provision of clean water, air and food, without which life is not possible to sustain.

Future engineers must understand the nature and existence of environmental problems and issues of sustainable development, and engineering education is the most effective means of achieving both a better management of our decreasing environmental resources and protection of nature.

#### ENVIRONMENTAL EDUCATION

An environmentally aware engineering education should obviously include all issues and topics concerning adverse effects to the physical environment brought about by engineering development, but an effective engineering curriculum should also include environmental management, environmental law, resource management, environmental science and environmental engineering.

It should also offer direction on how to improve and design better engineering technology that is energy efficient and less polluting.

Sustainable development is an equally important issue that needs greater attention in engineering education. It is defined by the WCED as:

development which meets the needs of the present without compromising the ability of future generations to meet their own needs [1].

Although it has been a topic of discussion since the late sixties, sustainable development is a relatively fresh area of concern for engineers, but it is nevertheless gratifying to see that it has found its way into engineering education and is being addressed, considered and discussed across all branches of engineering.

The capacities of the system are shown in Figure 1.



Figure 1: The picture shows the capabilities of the system.

Most students indicated that addressing environmental issues and topics is particularly important for chemical and civil engineers. The reason could be due to a perception that only chemical engineers' work relates to the environment as they are involved in the treatment of wastes generated in chemical plants, water treatment, etc. Civil engineers are also seen as relevant to the environment due to their work on industrial structures, buildings and systems. The two groups are seen as the most prone to making changes to the environment.

Considering the impact of the work of electrical engineers on the environment (with their high-voltage lines, floating electric currents, magnetic and electric fields, etc), they too should be made more aware of environmental issues and sustainable development, and yet there is very little coverage of these issues in electrical engineering curricula.

#### Incidents of Degradation

As Nguyen and Pudlowski have pointed out, electrical engineers have much potential to contribute to environmental quality improvement, especially in the area of energy conversion and storage, environmental variables measurement, remote sensing and detection, and designing computerised environmental protection systems [2]. Some statistical data is presented in Table 1:

Table 1: Incidents and their correlation components.

Number of Incidents	Percentage %	Coefficient a	Coefficient β	Correlation
1	32	0.54	0.9	1
2	45	0.68	0.8	1

In particular, the new first year subject *Engineering Context* has a major focus on, and treatment of, the issues of engineering interaction with the community, environmental factors, and it also has a large section on sustainable development and life cycle analysis [3]. This has seen the Faculty in the forefront of engineering faculties in making these course changes.

Instances of degradation can be found using the following expression:

$$I = - + 0.56 N$$
(1)  
L

It is envisaged that a comparative study will be carried out using this survey questionnaire in two or three year's time. The objective of this second survey will be to determine how the changes in the curriculum developed students' appreciation of the issues, topics and ideas concerning environmental engineering and sustainable development.

#### CONCLUSIONS

Students should be made aware of the issues and ideas concerning the environment and the impact of new developments on it as early as possible in their education, with the objective of raising their interest in, and appreciation for, the environment and its protection.

Through industrial visits and practical terms spent in industry, students should be encouraged to make themselves familiar with new approaches to sustainable development and environmental protection undertaken by industrial organisations. Industry recognises its responsibility for the environment and is keen to be involved in environmental education and training [4].

A new way in which issues, topics and ideas concerning environmental engineering and sustainable development are addressed and treated in individual subjects is urgently needed. Engineering faculties should give more support to those colleagues across all engineering disciplines that are willing to include and address those issues and topics in their courses.

#### REFERENCES

- 1. World Commission on Environment and Development. *Our Common Future*. Oxford: Oxford University Press (1987).
- Nguyen, D.Q. & Pudlowski, Z.J., An integrated environmental engineering course in electrical engineering. *Proc.* 3<sup>rd</sup> UICEE annual Conference on Engineering Education, Sydney, Australia, 222-226 (1999).
- 3. Imre, E.S., Remaking engineering education. Proc. 1<sup>st</sup> Asia-Pacific Forum on Engineering and Technology Education, Melbourne, Australia, 127-132 (1997).
- 4. Nguyen, D.Q. and Pudlowski, Z.J., Environmental Ideas, Issues and Topics in Engineering Education Complex Views, Concepts and Future Requirements. Sydney: Junk Publishers, 233-239 (2009).

#### BIOGRAPHIES



Dianne Q. Nguyen graduated with a Bachelor of Applied Science from Deakin University, Australia, in 1994; Honours from Monash University, Australia, in 1997 and completed her Masters in Engineering Science (Research) at Monash University, Australia in 2000. She has spent some time working in research laboratories before entering academia. Between 1995 and 2008, she was with the UNESCO International Centre for Engineering Education (UICEE), based in the Faculty of Engineering at Monash University, Melbourne, Australia, as a Research Fellow and also engaged in her PhD in Environmental Engineering Education. She is currently a Project Coordinator in the School of Information Technology at Monash University and the Academic Secretary of the WIETE-IAAC. Her appointments include the following: Academic Secretary of the WIETE-IAAC; Treasurer of the International Liaison Group for Engineering Education (2006-2009); Assistant Editor of the Global Journal of Engineering Education; Manager and Assitant Editor of the World Transactions on

Engineering & Technology Education; and Production Editor of the 12th Asia-Pacific Symposium on Intelligent & Evolutionary Systems. She has published over fifty peer-referred conference and journal papers in the field of engineering and technology education, environmental engineering education and sustainability.



Zenon Jan Pudlowski graduated Master of Electrical Engineering from the Academy of Mining and Metallurgy (Cracow, Poland), and Doctor of Philosophy from Jagiellonian University (Cracow), in 1968 and 1979 respectively. Professor Pudlowski is currently Director of the World Institute for Engineering and Technology Education (WIETE), based in Melbourne, Australia, and is an Adjunct Senior Research Fellow at Monash Asia Institute (MAI), based at Monash University, Clayton, Melbourne, Australia. Most recently, he was Associate Professor, Professor, and the Director of the UNESCO International Centre for Engineering Education (UICEE) in the Faculty of Engineering Education) of the Faculty of Engineering between 1994 and 1998. From 1969 to 1976 he was a lecturer in the Institute of Technology at the University of Pedagogy, Cracow, Poland. Between 1976 and 1979 he was a researcher at the Institute of Vocational Education, Warsaw, Poland, and from 1979 to 1981

was an Adjunct Professor in the Institute of Pedagogy at Jagiellonian University in Cracow, Poland. From 1981 to 1993 he was with the Department of Electrical Engineering at The University of Sydney, Sydney, Australia, where, in recent years, he was a Senior Lecturer.

## SUBMISSION FORM & PAYMENT DETAILS

Copyright of a GJEE article remains with the World Institute for Engineering and Technology Education (WIETE). However, authors are permitted to publish substantially modified versions of the article included in the GJEE, provided that an acknowledgment is made to the original publication. Also, the WIETE reserves the right to permit photocopying of the GJEE article. The submission of your article will be taken to mean that you agree to this arrangement.

It is the policy of the WIETE that where an article is accepted for the GJEE, full payment **must** be received before the publication of the article. Please complete this form and submit it with your article.

The article (please type or use block letters):

.....

**by** (include all authors):

.....

is being submitted for publication in the *Global Journal of Engineering Education* by (give full name, title, affiliation, postal and e-mail addresses):

.....

PAYMENT	DETAILS		
Amount* Note: Australian residents must include 10% GST	\$A500 (Standard fee) plus       \$A100 (per additional page)         Total \$A:		
Bank Cheque	Made payable to the <i>World Institute for Engineering and Technology Education</i> (WIETE is being couriered to the WIETE postal address. <i>Note:</i> cheque must be in Australian dollars through an Australian bank.		
Electronic Funds Transfer	Beneficiary: <i>World Institute for Engineering and Technology Education</i> (WIETE) BSB: 06 3141 Bank Account Number: 10368799 Name of Bank: Commonwealth Bank of Australia Branch: Ivanhoe VIC 3079 SWIFT Code: CTBAAU2S		

#### Author or main author of the article on behalf of all co-authors:

I, the undersigned, hereby agree that should this article be accepted for inclusion in the GJEE, transfer copyright to the WIETE, and that the money indicated above will not be refundable and will form the full payment towards the publication fee. I, hereby, give the WIETE permission to make corrections and some editorial changes to my/our article, as required, in order to maintain consistency of style and expression with WIETE publications.

I also understand that plagiarism is an offence and copyright infringement, I, or I on behalf of all the authors solemnly declare that all the sources used in this article have been properly acknowledged, and the article does not include any part that is in the language used or ideas presented plagiarised from other authors.

I represent and warrant that I am authorised to execute this arrangement on behalf of all the authors of the article referred to above.

Name (print):.....Date:....Date:

## Title of paper (e.g. Engineering education in the 21st Century)

### Author(s) (e.g. Donald N. Smith)

Affiliation (e.g. Monash University) City, Country (e.g. Melbourne, Australia)

ABSTRACT: Remove this text and key in the abstract of your article.

Keywords: Remove this text and key in the keywords

INTRODUCTION

Remove this text and arrange the text of your article in one column.

#### REFERENCES

Remove this text and arrange the references in this paragraph.

### BIOGRAPHY

Remove this test and insert your photo here. Remove this red text and type your biography here:

#### Lampiran 3. Meminta submite artikel menyesuaikan template GJEE

12/2/21, 11:25 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### request for author kit from Global Journal of Engineering Education

zenon.pudlowski zenon.pudlowski <zenon.pudlowski@wiete.com.au> Reply-To: "zenon.pudlowski zenon.pudlowski" <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri yudiono@mail.unnes.ac.id> Wed, Sep 13, 2017 at 12:58 AM

Dear Mr Yudiono

Attached, please find a kit for authors. This should assist you in the preparation of your article.

In preparing your article, you should not make any changes to the template, and strictly follow the Instruction for Authors. Please do not use bold faces in the article nor in the figures! The abstract must not exceed 12 lines. Also please note that a single line space must be placed between the paragraphs, figure, captures, equations, formulas, etc. Further, would you please supply us with the original, unsaved figures, so that we can access them and make necessary corrections if required? We accept figures generated in Ms Word, Excel and Visio. More information can be found at the journal's site:

www.wiete.com.au

Also, please note that submitted articles must be accompanied by the fully filled in and signed Submission Form & Payment Details. However, you do not need to pay the publication fee at this stage. You will be asked to do so, when the article has been refereed positively.

I look forward to receiving your contribution to the GJEE journal.

#### Kindest regards

Zenon J. Pudlowski

> On 12 September 2017 at 16:38 Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> > wrote: > [Quoted text hidden]

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1578357606436241480&simpl=msg-f%3A15783576064... 1/1

#### Lampiran 4. Submite artikel ke GJEE

12/2/21, 11:27 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

Thu, Sep 14, 2017 at 3:26 PM

#### request for author kit from Global Journal of Engineering Education

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

To: "zenon.pudlowski zenon.pudlowski" <zenon.pudlowski@wiete.com.au>

Dear Dr. Zenon J. Pudlowski

Thank you for your author kit for the Global Journal of Engineering Education submission. Herewith, I would like to attach my article along with the submission and payment form.

I am looking forward to your consideration of including my article to be submitted to Global Journal of Engineering Education

Best regards,

Heri Yudiono [Quoted text hidden]

2 attachments

100

- GJEE Submission Heri Yudiono.docx 306K
- GJEE-Submission&Payment.pdf

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1578502821012053816&simpl=msg-f%3A15785028210... 1/1

## The Alignment of Productive Competence on Machinery between Vocational Education Institutions and Industry

#### Heri Yudiono

Universitas Negeri Semarang Semarang, Central Java, Indonesia

ABSTRACT: This study was aimed to analyse the alignment performance of vocational education and industry on productive competence on machinery. This study employed concurrenttriangulation. The subjects of the study werevocational education institutions, Education Department, partners in industrial field andprofessional association. The data of this study were validated using triangulation. The results showed that the alignment performance of productive competence on machinery between industry and vocational education did not result inthe expected outcome. Academically, the overall productive competence on machinery has not been implemented in the industry and the results of alignment evaluation were still low. Institutionally, the role ofindustrial sector in the implementation of competence alignment was still low, the rate of employment of vocational school graduate in the industry showed decreasing trend, and the collaboration between industry and vocational school stakeholders has not been maximized.

Keywords: alignment, machinery competence, vocational education, industry.

#### INTRODUCTION

Vocational education is an education which prepares students to work in a certain field. Vocational education is also required to have a function of economic and strategic role in increasing the economic growth. Therefore, its implementation should be *pro-jobs*, *pro-activity*, *pro-growth*, *pro-distribution*, and *pro-prosperity*. The basic concept of vocational education should have different characteristics with other education in general in terms of education criteria, the substantive of learning, and graduates. Vocational education lesson in choosing the learning substantive must always follow the development of technology, the needs of society, the needs of individuals, and field of employment[1]. The implementation of the production-based learning assists the students to prepare beforejoining the occupational world, to develop critical thinking, to have good moral attitudes, and to motivate students to be active in learning [2]. The content of vocational education should focus on adjusting to the requirements of the labour market [3].

The vocational education is oriented on these following aspects: the performance of individuals in the occupational world, justification on the real needs in the field, the focus of the curriculum on psychomotoric, affective, and cognitive aspects, the measure of success beyond schools, sensitivity to the development of the occupational work, adequate practice facilities, and community support [4]. Vocational education plays an important role in reducing unemployment [5]. However, there are graduates of vocational education who did not get a proper job and are not satisfied with their jobs because of the unavailability of laboratory and technical equipment to develop their competence in school [6]. The conditions of vocational education indicate these following matters: 1) most vocational education institutions currently only prepare students to work on specific areas of expertise as employees, 2) vocational education institutions are less responsive to the demands of local, national, regional, and international economic development [7]. The vocational education institutions are still preoccupied with the methods and the development of learning which may have implications on the quality of graduates who have not been able to answer the challenges of the industrial sectors, if it is continuously carried out by the school then the school would be left behind [8].

One of the efforts which has been taken by the vocational education institutions to address competency gaps is by conducting the alignment of productive competence with industrial sector. Management of alignment must be conducted through institutional establishment in a planned, integrated and sustainable manner by involving stakeholders. The alignment of productive competence on machinery between vocational educationand industrial sector in quantity, quality, location, and time dimensions has not been formally organized [7]. The alignment could benefit both the vocational education institutions and industry because engineering education also has pivotal role in industry [16].

The formal organization bridging vocational education and industry is not present, there is only Indonesian Presidential Regulation Number 8 Year 2012 on Indonesian National Qualifications

Framework (KKNI). In 1994 there was a formal organization which bridged vocational education and industry, the National Vocational Education Council. The National Vocational Education Council was established through the Joint Decree of the Ministry of Education and Culture and the Indonesian Chamber of Commerce and Industry on the establishment of the Vocational Education Assembly Number 0217 / U / 1994 and 044 / SKEP / KU / VIII / 94. However, now the Institute is inactive. One of the success indicators in the implementation of alignment in productive competence of vocational education with industry is the reinforcement of the institutional role [9]. Comprehensive collaboration between stakeholders in industrial sector and vocational education institutions is absolutely necessary as a key indicator on quality and quantity aspects of vocational education implementation [10].

#### METHOD

The concurrent triangulation method was used in this study. The subjects in the study were Vocational education institutions, Department of Education, industry partners and professional association. The study was conducted at SMKN 1, 4, 5, 7 in Semarang City and their partners in industry. The data were gathered from the principal, task force, chairman of the competency group, the head of secondary education at the Department of Education, school inspectors, partners in industry and professional associations. The validity of data was achieved using triangulation approach.

#### RESEARCH RESULT

The results showed that the industry only served as a place of internship program and only a small part of the partnership has Memorandum of Understanding, while the role as validator competency, assessors, and me to accept graduates relatively low, as shown in Table 1.

	Table 1. The Role of Industry in Competence Anglinent			
No	The Role of Industry	Percentage (%)		
1	The Validator of Productive Competence	3.8		
2	The Assessor of Productive Competence	3.8		
	Test			
3	Manpower Recruitment	9.54		
4	Providing a place for Internship	100		
5	Having MoU for Industry Internship	30.60		

Table 1. The Role of Industry in Competence Alignment

Table 2 showed that only few machinery competence in the industry is practiced by the students of vocational education during internship. Conventional lathing and milling competence weremostly practiced by the students during their internship in the industry, while lathing and milling competence using CNC were not conducted. Electrical and acetylene welding works were conducted during the internship. However, they were not included into productive competence of machinery.

No	Competence of Internship Industry	Percentage (%)
1	Conventional Lathe	89.58
2	Milling	72.92
3	Acetylene Welding Work	64.58
4	Electrical Welding Work	58.33
5	change and sney	56.25
6	Sawing	50.00
7	Drilling	52.08
8	Honing	54.17

Table 2. Students Competence during Internship in Industry

able 3. The Competence of	Vocational Teacher	with Machinery	Expertise
---------------------------	--------------------	----------------	-----------

No	Vocational Teacher Competence	Percentage (%)
1	On The Job Training	54.05
2	The Competence Test Assessor	22.14

Table 3 shows that the development of teacher productive competence in machinery is achieved through on-thejob training amounted to 54.05% and 22.14% of a machinery competence test assessor. Table 4 shows that the results of machinery competence test shows that learners have a good qualification. However, the scores of the students fluctuated annually.

	ruele il competency restrictsu	
No	Academic year	Score
1	2011/2012	85.30
2	2012/2013	89.80
3	2013/2014	91.41
4	2014/2015	89.36
5	2015/2016	89.40

Table 4. Competency Test Results of Machinery Expertise

The employment of graduates from Mechanical Engineering program as industrial workers, as students in higher education, and entrepreneurs showed a declining trend, as shown in Table 5.

	Table 5. The Employment of the Graduate		
No	Academic year	Percentage (%)	
1	2011/2012	82.00	
2	2012/2013	73.45	
3	2013/2014	71.46	
4	2014/2015	66.34	
5	2015/2016	70.05	

Table 5. The Employment of the Graduate

#### DISCUSSION

The results of the studyshowed that the alignment of productive competence on machinery between industry andvocational education institution did not yield outcomes as expected. Academically, overall machinery competence of graduatesdid not suit the needs of industry. Therefore, the evaluation of learning process in vocational education should not only cover the in class learning process but also competence from the alignment with the industrial sector. The management of vocational training should include pre-entering behaviour, entering behaviour, learning process in the work [12]. Institutionally, the role of the partner from industrial sector was still low in termsof the implementation of competence alignment with vocational high school, the rate of employment of the vocational school graduates in industry showed a declining trend and the partnership between vocational high school and industrial sector must be improved.

The results of this study indicated the need of institutional management by formulating a framework of productive competence management in a more productive, integrated and sustainable manner by involving stakeholders in both vocational education institutions and industry. One of the integrated and sustainableproductive competence alignment is The Engineers in Residence program in Northern Illinois University's (NIU) College of Engineering and Engineering Technology (CEET). The students of Northern Illinois University was provided with experiential learning in industry due to the support of the College stakeholders, government, industries, students and alumni [17]

The process of alignment as the work of "outside in" must also consider the elements outside the organization [13]. The alignment process must be conducted at the same time in a predetermined order [14]. Comprehensive collaboration between stakeholders in industrial sector and vocational education institutions is necessary indicator quality absolutely as а key on and quantity aspects of vocational education implementation [10].

The concept of institutional framework of competence alignment should pay attention to three main components, namely the demand, the supply and the alignment mechanism. The formulation of the comprehensive alignment program requires visions of some relevant dimensions. The projection of the future needs of the competence required by industrial sector and its numbers for every business / industry is indispensable and should refer to the special characteristics and potential of the industry.

The alignment of productive competence mechanism must be designed to ensure the implementation of the programs. Alignment mechanism includes three main aspects: (1) the mechanism must be associated with a number of required activities and programs that the information needs of the demand side can be obtained accurately and sustainably; (2) the mechanismmust be associated with the activities and programs needed for the availability of employable graduates and create employment (entrepreneurship) and (3) the mechanism must ensure the communication of the needs for information from demand side to the supply side.

#### CONCLUSION

It can be concluded from the study that:

1. The alignment of the productive competence on machinery between industry and vocational school was still problematic. The problems were centralized on the competence of the graduate which did not suit

the needs of industry, the role of the partner from industrial sector was still low in terms of the implementation of competence alignment with vocational high school, the rate of employment of the vocational school graduates in industry showed a declining trend, institutional reinforcementfor the productive competence alignment must absolutely be improved, and the productive competence alignment evaluation in vocational education should not only cover the conventional learning process in the class but also focus on the evaluation of the competence from the alignment with the industrial sector.

2. The institutional reinforcement is required to improve the performance of productive competence alignment of vocational education with industry. The aim is to develop institutional management framework with advanced aspects such as competence alignment, optimization of the role of industry and stakeholders, empowerment of resources, integration of curriculum and learning, and performance evaluation of the alignment.

#### REFERENCE

- 1. Nolker, Helmut & Schoenfeldt, Eberhard, *Pendidikan Kejuruan: Pengajaran, Kurikulum, Perencanaan,* Jakarta: PT. Gramedia, (1983) (in Indonesian).
- Ganefri, and Hendra Hidayat, Production Based Learning: An Instructional Design Model in the Context of Vocational Education and Training (VET). *Procedia - Social and Behavioral Sciences*, 204 (2015) 206 - 211.
- 3. Aleksandra Kulpa-Puczyńska, Teachers of Polish Vocational Schools vs. Changes in the Model of Employment and Organization of Work, *Procedia Social and Behavioral Sciences*, 141 969 975 (2015).
- 4. Finch, Curtis R., and Crunkilton, John R., *Curriculum Development in Vocational and Technical Education: Planning, Content, and Implementation, Allyn and Bacon , Inc., Boston (1979).*
- 5. Tatiana Blinova, *at. al.*, Vocational Education in the System of Determinants of Reducing Youth Unemployment: Interregional Comparisons, *Procedia Social and Behavioral Sciences*, 214 526 534 (2015).
- 6. Behroozi, Mohammad, A Survey About The Function Of Technical And VocationalEducation: An Empirical Study In Bushehr City, *Procedia Social and Behavioral Sciences*, 143 265 269 (2014).
- 7. Slamet, PH., Pengembangan Sekolah Menengah Kejuruan Model untuk Masa Depan. *Jurnal Cakrawala Pendidikan*, Februari 2013, Th. XXXII, No. 1: 14 26 (2013) (in Indonesian).
- 8. Waugh, Toni, Patern of Works, http://www.myfuture.edu.au/ (2004).
- 9. Heri Yudiono, Model Manajemen Sinkronisasi Kompetensi Lulusan Sekolah Menengah Kejuruan Berbasis Industri pada Kelompok Mata Pelajaran Produktif Program Keahlian Permesina, Laporan Penelitian (tidak dipublikasikan), Semarang: LP2M Unnes (2015) (in Indonesian).
- Julia Yeleneva, *et al.*, Analysis and Organizational Model for Monitoring of the Training of Workers and Specialists with Secondary Vocational Education for Innovation-Oriented Enterprises of Russia, *Procedia* - Social and Behavioral Sciences, 214 779 – 787 (2015).
- 11. Erni Munastiwi, The Management Model of Vocational Education Quality Assurance Using 'Holistic Skills Education (Holsked), *Procedia Social and Behavioral Sciences* 204 218 230 (2015).
- 12. Anna Volodina, *et al.*, Success in the first phase of the vocational career: The role of cognitive and scholastic abilities, personality factors, and vocational interests. *Journal of Vocational Behavior*, 91 11–22 (2015).
- 13. Goldstein, S., *Timeless Principles for Organizational Success: The Power of Wisdom and Human Values*, *Videoconference Series*, International Training Center (2007).
- 14. Krishnamoorthy M., Cardenas MA. and Kumar R., The Development of An ETK Methodology to Measure Organizational Synchronization, *International Journal of Technology, Knowledge and Society*, Vol. 2: 61-70 (2005).
- 15. Krishnamoorthy M., Cardenas MA. and Kumar R., The Development of An ETK Methodology to Measure Organizational Synchronization, *International Journal of Technology, Knowledge and Society*, Vol. 2: 61-70 (2005).
- 16. Valiulis, A. V., & Valiulis, D. (2010). Reforms of higher education and current engineering education developments in Lithuania. *Global Journal of Engineering Education*, 12(1), 38-44.



17. Ghrayeb, O., & Vohra, P. (2011). Experential learning in engineering education: a case study at NIU. *Global Journal of Engineering Education*, 13(2).

BIOGRAPHY

Dr. Heri Yudiono, S.Pd., M.T. was born in Magetan, East Java, Indonesia, on July 26, 1967. He was qualified as Doctor of Technology and Vocational Education Management in 2015 at Universitas Negeri Semarang. Since 1993, he has been a lecturer at Universitas Negeri Semarang in the field of mechanical engineering vocational education. The subjects that he teach are: management of vocational education, vocational education curriculum, and machinery. His research interests are in the field of technology and vocational education management. In addition to being active as a lecturer, he is also a writer / presenter at various national and international seminars, as well as education consultant in the Central Java Provincial Education and Culture Office.

## SUBMISSION FORM & PAYMENT DETAILS

Copyright of a GJEE article remains with the World Institute for Engineering and Technology Education (WIETE). However, authors are permitted to publish substantially modified versions of the article included in the GJEE, provided that an acknowledgment is made to the original publication. Also, the WIETE reserves the right to permit photocopying of the GJEE article. The submission of your article will be taken to mean that you agree to this arrangement.

It is the policy of the WIETE that where an article is accepted for the GJEE, full payment **must** be received before the publication of the article. Please complete this form and submit it with your article.

**The article** (please type or use block letters):

## THE ALIGNMENT OF PRODUCTIVE COMPETENCE ON MACHINERY BETWEEN.... VOCATIONAL EDUCATION INSTITUTIONS AND INDUSTRY by (include all authors): HERI YUDIONO

is being submitted for publication in the *Global Journal of Engineering Education* by (give full name, title, affiliation, postal and e-mail addresses):

## DR. HERI YUDIONO, MT UNIVERSITAS NEGERI SEMARANG, SEMARANG, 50229, heri\_yudiono@mail.unnes.ac.id,

PAYMENT	DETAILS		
Amount* Note: Australian residents must include 10% GST	V       \$A500 (Standard fee) plus       \$A100 (per additional page)         Total \$A:       500		
Bank Cheque	Made payable to the <i>World Institute for Engineering and Technology Education</i> (WIETE) is being couriered to the WIETE postal address. <i>Note:</i> cheque must be in Australian dollars through an Australian bank.		
VBeneficiary: World Institute for Engineering and Technology Education (WIE' BSB: 06 3141Bank Account Number: 10368799 Name of Bank: Commonwealth Bank of Australia Branch: Ivanhoe VIC 3079 SWIFT Code: CTBAAU2S			

#### Author or main author of the article on behalf of all co-authors:

I, the undersigned, hereby agree that should this article be accepted for inclusion in the GJEE, transfer copyright to the WIETE, and that the money indicated above will not be refundable and will form the full payment towards the publication fee. I, hereby, give the WIETE permission to make corrections and some editorial changes to my/our article, as required, in order to maintain consistency of style and expression with WIETE publications.

I also understand that plagiarism is an offence and copyright infringement, I, or I on behalf of all the authors solemnly declare that all the sources used in this article have been properly acknowledged, and the article does not include any part that is in the language used or ideas presented plagiarised from other authors.

I represent and warrant that I am authorised to execute this arrangement on behalf of all the authors of the article referred to above.



Please fill in, scan and e-mail this form to: info@wiete.com.au

#### Lampiran 5. Konfirmasi penerimaan komunikasi author

12/2/21, 11:32 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### request for author kit from Global Journal of Engineering Education

zenon.pudlowski zenon.pudlowski <zenon.pudlowski@wiete.com.au> Reply-To: "zenon.pudlowski zenon.pudlowski" <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

Dear Mr Yudiono

Confirming receipt of your communication.

You will hear from us in due course.

Kindest regards

Zenon J. Pudlowski

> On 14 September 2017 at 18:26 Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> [Quoted text hidden] Thu, Sep 14, 2017 at 7:47 PM

 $https://mail.google.com/mail/u/0/?ik = 1a2a0f6430 \& view = pt \& search = all \& permms gid = msg-f\% 3A1578519238651291556 \& simpl = msg-f\% 3A15785192386 \dots 1/1$ 

#### Lampiran 6. Ketidak sesuaian artikel di GJEE dan dipertimbangkan publikasi ke WTE&TE

12/2/21, 11:34 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education

UNNES

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### request for author kit from Global Journal of Engineering Education

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> Thu, Sep 21, 2017 at 12:32 PM

Dear Mr Yudiono

I just have examined at your paper and wish to advise you that it is not suitable for publication in the GJEE.

However, we may consider it to be published in the World Transactions for Engineering and Technology Education.

Should you wish to take this offer up please use the attached kit for authors to format the paper and fill in the Submission Form.

Kindest regards

Zenon J. Pudlowski

[Quoted text hidden]

-25

4 attachments
WTE&TE-Instruction4authors.pdf
20K
WTE&TE-samplearticle.pdf

THE WTE&TE-samplearticle.pdf

WTE&TE-stylefile.doc 31K

WTE&TESubmission&Payment.pdf 36K

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579126029996649049&simpl=msg-f%3A15791260299... 1/1

### **INSTRUCTIONS FOR AUTHORS**

#### WTE&TE ARTICLES & CONFERENCE PAPERS

We aim to produce WTE&TE and Conference publications with as uniform an appearance as possible and it is therefore requested that you conform to these instructions when preparing your WTE&TE or Conference papers. An attachment containing a style-file is enclosed to assist you in the laying out of your paper.

In preparing their papers, authors should use the WTE&TE or Conference's style file supplied by the publisher to ensure consistency and uniform appearance of the papers included in the WTE&TE or Conference publications.

Submitted papers should not exceed six (6) pages in total, including the title page and must be arranged as A4 size (210mm x 297mm). Each exceeding page will attract a page levy of **\$A100**, plus 10% GST, payable by Australian residents only.

#### Deadline

As indicated in the call for papers, the electronic version of the paper as an MS Word file and also a PDF file must reach the WIETE by the deadline.

#### Page Layout

The correct page layout settings are as follows:

Page Setup Margins:		
Top:         0.9 cm           Bottom:         1.5 cm           Left:         2.0 cm           Right:         2.0 cm		
From Edge Header: 0.8 cm Footer: 0 cm		

A Times New Roman font of 10-pt size on 12-pt line spacing (6 lines per inch) should be selected to write the paper. The paper, including the text, tables, figures, formulae, etc, should be arranged in one column, must be fully justified with the text in single-line spacing, and one-line spacing between paragraphs. Paragraphs should not be indented.

#### Title, Author(s) and Abstract

The title of the paper should have only the first word capitalised (along with any proper names). Author(s), affiliation(s), city and country should use first capital letter and lower case. No acronyms or abbreviations of the affiliation should be used. There is one-line space left between the author(s) and the affiliation(s). Authors should provide a brief and concise abstract of the paper in not more than 10 lines in the field reserved in the style-file and the abstract should provide an overview of the paper.

#### The Text and Headings

The actual text of the paper should be arranged in one column. There should be two-line space between the abstract and the first heading of the text. The consecutive pages must start from the top of the new page and there should be no space left at the top of the new page. All section headings must be in UPPER CASE and Title Case must be used for subsection headings. Both sections and subsection headings should not be in bold. There should be one-line space between the heading/subheading and the text.

#### **Tables, Figures and Captions**

Pictures, figures and diagrams should be numbered consecutively (Figure 1, 2, 3, etc) and the captions should be place below the figures. The tables should also be arranged consecutively (Table 1, 2, 3, etc) but the captions should be placed above the tables. The captions should be centred and end with a full stop. Figures and tables ought to be included in the body of the text as much as possible. However, large-size figures and tables may be arranged at the end of the paper.

#### References

References should be included in the body of the text and should be numbered with a reference number bracketed. They should be listed at the end of the paper in accordance with their sequential number and should be arranged as follows:

#### Books

- 1. Mocarianis, B.H., *The Quality of Global Engineering and Technology Education*. Sydney: Junk Publishers, 233-239 (2009).
- 2. Picolinii, K.Y. and Mocarianis, B.H., *Important Issues Engineering and Technology Education*. In: Emanualis, T.U. and Kulikokans, J.J. (Eds), Education in the 21<sup>st</sup> Century. Sydney: Junk Publishers, 233-239 (2009).

#### Journals

3. Vilanovis, L.J., The quality of global engineering education. *World J. of Engng. and Technol. Educ.*, 1, **2**, 33-39 (2009).

where 1 stands for the volume, 2 for the number (bold case), and 33-39 are the relevant pages.

#### Conference papers

4. Michalenkos, B.D., Conflicts between engineering teachers. *Proc. World Conf. on Technol. and Engng. Educ.*, Melbourne, Australia, 221-227 (2009).

#### WWW

5. Carconus, R.G., Collectivism and its impact on the environment (2008), 13 March 2009, www.coliunus.edu.tt/unises.html

where 13 March 2009 stands for the date of acquisition.

## An insight into undergraduate students' views on the profile of professional engineers in environmental engineering education

#### Dianne Q. Nguyen<sup>†</sup> & Zenon J. Pudlowski<sup>‡</sup>

WIETE University, Melbourne, Australia† Miramare University of Technology, Miramara, Castalonia‡

ABSTRACT: This paper is based on the findings and results of a recent survey taken of final year engineering students. The investigation had two principle objectives: the first to assess engineering students' views on the status and inclusion of environmental issues and topics in general engineering disciplines, and the second to assess what students understand to be the qualities and attributes of a professional engineer. In researching these issues particular emphasis is placed on the creation of a uniform engineering education curriculum that addresses sustainable development and environmental issues and concerns in the development of the skills and attributes that are vital for the formation of a modern professional engineer. The paper suggests some revisions and improvements of existing engineering curricula in order to include important topics and ideas of environmental engineering and sustainable development.

#### INTRODUCTION

Many of the developments that engineers are involved in have an enormous impact on the environment, and as contributors to environmental degradation engineers must find ways to address environmental issues in their practice. Engineering developments must show respect for future generations as they too will rely upon the environment for the provision of clean water, air and food, without which life is not possible to sustain.

Future engineers must understand the nature and existence of environmental problems and issues of sustainable development, and engineering education is the most effective means of achieving both a better management of our decreasing environmental resources and protection of nature.

#### ENVIRONMENTAL EDUCATION

An environmentally aware engineering education should obviously include all issues and topics concerning adverse effects to the physical environment brought about by engineering development, but an effective engineering curriculum should also include environmental management, environmental law, resource management, environmental science and environmental engineering. It should also offer direction on how to improve and design better engineering technology that is energy efficient and less polluting.

Sustainable development is an equally important issue that needs greater attention in engineering education. It is defined by the WCED as:

## development which meets the needs of the present without compromising the ability of future generations to meet their own needs [1].

Although it has been a topic of discussion since the late sixties, sustainable development is a relatively fresh area of concern for engineers, but it is nevertheless gratifying to see that it has found its way into engineering education and is being addressed, considered and discussed across all branches of engineering. The capacities of the system are shown in Figure 1.

Most students indicated that addressing environmental issues and topics is particularly important for chemical and civil engineers. The reason could be due to a perception that only chemical engineers' work relates to the environment as they are involved in the treatment of wastes generated in chemical plants, water treatment, etc. Civil engineers are also seen as relevant to the environment due to their work on industrial structures, buildings and systems. The two groups are seen as the most prone to making changes to the environment.

Considering the impact of the work of electrical engineers on the environment (with their high-voltage lines, floating electric currents, magnetic and electric fields, etc), they too should be made more aware of environmental issues and sustainable development, and yet there is very little coverage of these issues in electrical engineering curricula.

Incidents of Degradation

As Nguyen and Pudlowski have pointed out, electrical engineers have much potential to contribute to environmental quality improvement, especially in the area of energy conversion and storage, environmental variables measurement, remote sensing and detection, and designing computerised environmental protection systems [2]. Some statistical data is presented in Table 1:

Т	able 1: Incidents	and their correlation co	omponents.	
				_

Number of Incidents	Percentage %	Coefficient a	Coefficient β	Correlation
1	32	0.54	0.9	1
2	45	0.68	0.8	1

In particular, the new first year subject *Engineering Context* has a major focus on, and treatment of, the issues of engineering interaction with the community, environmental factors, and it also has a large section on sustainable development and life cycle analysis [3]. This has seen the Faculty in the forefront of engineering faculties in making these course changes.

Instances of degradation can be found using the following expression:

$$U = - + 0.56 N$$
(1)  
L

It is envisaged that a comparative study will be carried out using this survey questionnaire in two or three year's time. The objective of this second survey will be to determine how the changes in the curriculum developed students' appreciation of the issues, topics and ideas concerning environmental engineering and sustainable development.

#### CONCLUSIONS

Students should be made aware of the issues and ideas concerning the environment and the impact of new developments on it as early as possible in their education, with the objective of raising their interest in, and appreciation for, the environment and its protection. Through industrial visits and practical terms spent in industry, students should be encouraged to make themselves familiar with new approaches to sustainable development and environmental protection undertaken by industrial organisations. Industry recognises its responsibility for the environment and is keen to be involved in environmental education and training [4].

A new way in which issues, topics and ideas concerning environmental engineering and sustainable development are addressed and treated in individual subjects is urgently needed. Engineering faculties should give more support to those colleagues across all engineering disciplines that are willing to include and address those issues and topics in their courses.

#### REFERENCES

- 1. World Commission on Environment and Development. *Our Common Future*. Oxford: Oxford University Press (1987).
- 2. Nguyen, D.Q. & Pudlowski, Z.J., An integrated environmental engineering course in electrical engineering. *Proc.* 3<sup>rd</sup> UICEE annual Conference on Engineering Education, Sydney, Australia, 222-226 (1999).
- 3. Imre, E.S., Remaking engineering education. *Proc.* 1<sup>st</sup> Asia-Pacific Forum on Engineering and Technology *Education*, Melbourne, Australia, 127-132 (1997).
- 4. Nguyen, D.Q. and Pudlowski, Z.J., *Environmental Ideas, Issues and Topics in Engineering Education Complex Views, Concepts and Future Requirements.* Sydney: Junk Publishers, 233-239 (2009).

## Title of paper (e.g. Engineering education in the 21st Century)

## Author(s) (e.g. Zenon J. Pudlowski)

Affiliation (e.g. WIETE University) City, Country (e.g. Melbourne, Australia)

ABSTRACT:

INTRODUCTION

## SUBMISSION FORM & PAYMENT DETAILS

Copyright of a WTE&TE article remains with the World Institute for Engineering and Technology Education (WIETE). However, authors are permitted to publish substantially modified versions of the article included in the WTE&TE, provided that an acknowledgment is made to the original publication. Also, the WIETE reserves the right to permit photocopying of the WTE&TE article. The submission of your article will be taken to mean that you agree to this arrangement.

It is the policy of the WIETE that where an article is accepted for the Transactions, full payment **must** be received before the publication of the article. Please complete this form and submit it with your article.

The article (please type or use block letters):

.....

**by** (include all authors):

.....

is being submitted for publication in the *World Transactions on Engineering and Technology Education* by (give full name, title, affiliation, postal and e-mail addresses):

.....

PAYMENT	DETAILS		
Amount*	\$A500 (Standard fee) plus \$\$A100 (per additional page)		
<b>Note:</b> Australian residents must include 10% GST.	Total \$A:		
Bank Cheque	Made payable to the <i>World Institute for Engineering and Technology Education</i> (WIETE) is being couriered to the WIETE postal address.		
	<i>Note</i> : cheque must be in Australian dollars through an Australian bank.		
	Beneficiary: World Institute for Engineering and Technology Education (WIETE)		
	BSB: 06 3141		
	Bank Account Number: 10368799		
	Name of Bank: Commonwealth Bank of Australia		
Electronic Funds Transfer	Branch: Ivanhoe VIC 3079		
	SWIFT Code: CTBAAU2S		

#### Author or main author of the article on behalf of all co-authors:

I, the undersigned, hereby agree that should this article be accepted for inclusion in the WTE&TE, transfer copyright to the WIETE, and that the money indicated above will not be refundable and will form the full payment towards the publication fee. I, hereby, give the WIETE permission to make corrections and some editorial changes to my/our article, as required, in order to maintain consistency of style and expression with WIETE publications.

I also understand that plagiarism is an offence and copyright infringement, I, or I on behalf of all the authors solemnly declare that all the sources used in this article have been properly acknowledged, and the article does not include any part that is in the language used or ideas presented plagiarised from other authors.

I represent and warrant that I am authorised to execute this arrangement on behalf of all the authors of the article referred to above.

Name (print):.....Date:....Date:

#### Lampiran 7. Submit artikel ke WTE&TE

12/2/21, 11:40 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### request for author kit from Global Journal of Engineering Education

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> To: Zenon Pudlowski <zenon.pudlowski@wiete.com.au> Tue, Sep 26, 2017 at 9:39 AM

Dear Dr. Zenon Pudlowski

I hope this email finds you in a good health. Thank you for your feedback and suggestion for my paper submission to the World Transaction for Engineering and Technology Education.

Herewith, I would like to submit my article to World Transaction for Engineering and Technology Education.

Your warm reply would be very much appreciated [Quoted text hidden]

#### 2 attachments

- WTE&TE submission Hery Yudiono.doc 104K
- WTE&TESubmission&Payment(1).pdf 129K

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579568118523621124&simpl=msg-f%3A15795681185... 1/1

## The Alignment of Productive Competence on Machinery between Vocational Education Institutions and Industry

#### Heri Yudiono

Universitas Negeri Semarang Semarang, Central Java, Indonesia

ABSTRACT: This study was aimed to analyse the alignment performance of vocational education and industry on productive competence on machinery. This study employed concurrent triangulation. The subjects of the study were vocational education institutions, Education Department, partners in industrial field and professional association. The data of this study were validated using triangulation. The results showed that the alignment performance of productive competence on machinery between industry and vocational education did not result in the expected outcome. Academically, the overall productive competence on machinery has not been implemented in the industry and the results of alignment evaluation were still low. Institutionally, the role of industrial sector in the implementation of competence alignment was still low, the rate of employment of vocational school graduate in the industry showed decreasing trend, and the collaboration between industry and vocational school stakeholders has not been maximized.

#### INTRODUCTION

Vocational education is an education which prepares students to work in a certain field. Vocational education is also required to have a function of economic and strategic role in increasing the economic growth. Therefore, its implementation should be *pro-jobs*, *pro-activity*, *pro-growth*, *pro-distribution*, and *pro-prosperity*. The basic concept of vocational education should have different characteristics with other education in general in terms of education criteria, the substantive of learning, and graduates. Vocational education lesson in choosing the learning substantive must always follow the development of technology, the needs of society, the needs of individuals, and field of employment [1]. The implementation of the production-based learning assists the students to prepare before joining the occupational world, to develop critical thinking, to have good moral attitudes, and to motivate students to be active in learning [2]. The content of vocational education should focus on adjusting to the requirements of the labour market [3].

The vocational education is oriented on these following aspects: the performance of individuals in the occupational world, justification on the real needs in the field, the focus of the curriculum on psycho motoric, affective, and cognitive aspects, the measure of success beyond schools, sensitivity to the development of the occupational work, adequate practice facilities, and community support [4]. Vocational education plays an important role in reducing unemployment [5]. However, there are graduates of vocational education who did not get a proper job and are not satisfied with their jobs because of the unavailability of laboratory and technical equipment to develop their competence in school [6]. The conditions of vocational education indicate these following matters: 1) most vocational education institutions currently only prepare students to work on specific areas of expertise as employees, 2) vocational education institutions are less responsive to the demands of local, national, regional, and international economic development [7]. The vocational education institutions are still preoccupied with the methods and the development of learning which may have implications on the quality of graduates who have not been able to answer the challenges of the industrial sectors, if it is continuously carried out by the school then the school would be left behind [8].

One of the efforts which has been taken by the vocational education institutions to address competency gaps is by conducting the alignment of productive competence with industrial sector. Management of alignment must be conducted through institutional establishment in a planned, integrated and sustainable manner by involving stakeholders. The alignment of productive competence on machinery between vocational education and industrial sector in quantity, quality, location, and time dimensions has not been formally organized [7]. The alignment could benefit both the vocational education institutions and industry because engineering education also has pivotal role in industry [16].

The formal organization bridging vocational education and industry is not present, there is only Indonesian Presidential Regulation Number 8 Year 2012 on Indonesian National Qualifications Framework (KKNI). In 1994 there was a formal

organization which bridged vocational education and industry, the National Vocational Education Council. The National Vocational Education Council was established through the Joint Decree of the Ministry of Education and Culture and the Indonesian Chamber of Commerce and Industry on the establishment of the Vocational Education Assembly Number 0217 / U / 1994 and 044 / SKEP / KU / VIII / 94. However, now the Institute is inactive. One of the implementation of alignment in indicators in the productive competence of vocational success education with industry is the reinforcement of the institutional role [9]. Comprehensive collaboration between stakeholders in industrial sector and vocational education institutions is absolutely necessary as a key indicator on quality and quantity aspects of vocational education implementation [10].

#### METHOD

The concurrent triangulation method was used in this study. The subjects in the study were Vocational education institutions, Department of Education, industry partners and professional association. The study was conducted at SMK N 1, 4, 5, 7 in Semarang City and their partners in industry. The data were gathered from the principal, task force, chairman of the competency group, the head of secondary education at the Department of Education, school inspectors, partners in industry and professional associations. The validity of data was achieved using triangulation approach.

#### **RESEARCH RESULT**

The results showed that the industry only served as a place of internship program and only a small part of the partnership has Memorandum of Understanding, while the role as validator competency, assessors, and me to accept graduates relatively low, as shown in Table 1.

No	The Role of Industry	Percentage (%)
1	The Validator of Productive Competence	3.8
2	The Assessor of Productive Competence	3.8
	Test	
3	Manpower Recruitment	9.54
4	Providing a place for Internship	100
5	Having MoU for Industry Internship	30.60

#### Table 1. The Role of Industry in Competence Alignment

Table 2 shows that only few machinery competence in the industry is practiced by the students of vocational education during internship. Conventional lathing and milling competence were mostly practiced by the students during their internship in the industry, while lathing and milling competence using CNC were not conducted. Electrical and acetylene welding works were conducted during the internship. However, they were not included into productive competence of machinery.

Table 2. Students Competence during Internship in Industry

No	Competence of Internship Industry	Percentage (%)
1	Conventional Lathe	89.58
2	Milling	72.92
3	Acetylene Welding Work	64.58
4	Electrical Welding Work	58.33
5	change and sney	56.25
6	Sawing	50.00
7	Drilling	52.08
8	Honing	54.17

Table 3. The Competence of Vocational Teacher with Machinery Expertise

No	Vocational Teacher Competence	Percentage (%)
1	On The Job Training	54.05
2	The Competence Test Assessor	22.14

Table 3 shows that the development of teacher productive competence in machinery is achieved through on-the-job training amounted to 54.05% and 22.14% of a machinery competence test assessor. Table 4 shows that the results of machinery competence test shows that learners have a good qualification. However, the scores of the students fluctuated annually.

#### Table 4. Competency Test Results of Machinery Expertise

No	Academic year	Score
1	2011/2012	85.30
2	2012/2013	89.80
3	2013/2014	91.41
4	2014/2015	89.36
5	2015/2016	89.40

The employment of graduates from Mechanical Engineering program as industrial workers, as students in higher education, and entrepreneurs showed a declining trend, as shown in Table 5.

No	Academic year	Percentage (%)
1	2011/2012	82.00
2	2012/2013	73.45
3	2013/2014	71.46
4	2014/2015	66.34
5	2015/2016	70.05

Table 5. The Employment of the Graduate

#### DISCUSSION

The results of the study showed that the alignment of productive competence on machinery between industry and vocational education institution did not yield outcomes as expected. Academically, overall machinery competence of graduates did not suit the needs of industry. Therefore, the evaluation of learning process in vocational education should not only cover the in class learning process but also competence from the alignment with the industrial sector. The management of vocational training should include pre-entering behaviour, entering behaviour, learning process, assessment, evaluation and output [11]. The important role of soft skills and hard skills are critical to success in the work [12]. Institutionally, the role of the partner from industrial sector was still low in terms of the implementation of competence alignment with vocational high school, the rate of employment of the vocational school graduates in industry showed a declining trend and the partnership between vocational high school and industrial sector must be improved.

The results of this study indicated the need of institutional management by formulating a framework of productive competence management in a more productive, integrated and sustainable manner by involving stakeholders in both vocational education institutions and industry. One of the integrated and sustainable productive competence alignment is The Engineers in Residence program in Northern Illinois University's (NIU) College of Engineering and Engineering Technology (CEET). The students of Northern Illinois University was provided with experiential learning in industry due to the support of the College stakeholders, government, industries, students and alumni [17]

The process of alignment as the work of *"outside in"* must also consider the elements outside the organization [13]. The alignment process must be conducted at the same time in a predetermined order [14]. Comprehensive collaboration between stakeholders in industrial sector and vocational education institutions is absolutely necessary as a key indicator on quality and quantity aspects of vocational education implementation [10].

The concept of institutional framework of competence alignment should pay attention to three main components, namely the demand, the supply and the alignment mechanism. The formulation of the comprehensive alignment program requires visions of some relevant dimensions. The projection of the future needs of the competence required by industrial sector and its numbers for every business / industry is indispensable and should refer to the special characteristics and potential of the industry.

The alignment of productive competence mechanism must be designed to ensure the implementation of the programs. Alignment mechanism includes three main aspects: (1) the mechanism must be associated with a number of required activities and programs that the information needs of the demand side can be obtained accurately and sustainably; (2) the mechanism must be associated with the activities and programs needed for the availability of employable graduates and create employment (entrepreneurship) and (3) the mechanism must ensure the communication of the needs for information from demand side to the supply side.

#### CONCLUSION

It can be concluded from the study that:

1. The alignment of the productive competence on machinery between industry and vocational school was still problematic. The problems were centralized on the competence of the graduate which did not suit the needs of
industry, the role of the partner from industrial sector was still low in terms of the implementation of competence alignment with vocational high school, the rate of employment of the vocational school graduates in industry showed a declining trend, institutional reinforcement for the productive competence alignment must absolutely be improved, and the productive competence alignment evaluation in vocational education should not only cover the conventional learning process in the class but also focus on the evaluation of the competence from the alignment with the industrial sector.

2. The institutional reinforcement is required to improve the performance of productive competence alignment of vocational education with industry. The aim is to develop institutional management framework with advanced aspects such as competence alignment, optimization of the role of industry and stakeholders, empowerment of resources, integration of curriculum and learning, and performance evaluation of the alignment.

## REFERENCE

- 1. Nolker, Helmut & Schoenfeldt, Eberhard, *Pendidikan Kejuruan: Pengajaran, Kurikulum, Perencanaan,* Jakarta: PT. Gramedia, (1983) (in Indonesian).
- 2. Ganefri, and Hendra Hidayat, Production Based Learning: An Instructional Design Model in the Context of Vocational Education and Training (VET). *Procedia Social and Behavioral Sciences*, 204 (2015) 206 211.
- 3. Aleksandra Kulpa-Puczyńska, Teachers of Polish Vocational Schools vs. Changes in the Model of Employment and Organization of Work, *Procedia Social and Behavioral Sciences*, 141 969 975 (2015).
- 4. Finch, Curtis R., and Crunkilton, John R., *Curriculum Development in Vocational and Technical Education: Planning, Content, and Implementation,* Allyn and Bacon, Inc., Boston (1979).
- 5. Tatiana Blinova, *at. al.*, Vocational Education in the System of Determinants of Reducing Youth Unemployment: Interregional Comparisons, *Procedia Social and Behavioral Sciences*, 214 526 534 (2015).
- 6. Behroozi, Mohammad, A Survey About The Function Of Technical And VocationalEducation: An Empirical Study In Bushehr City, *Procedia Social and Behavioral Sciences*, 143 265 269 (2014).
- 7. Slamet, PH., Pengembangan Sekolah Menengah Kejuruan Model untuk Masa Depan. *Jurnal Cakrawala Pendidikan*, Februari 2013, Th. XXXII, No. 1: 14 26 (2013) (in Indonesian).
- 8. Waugh, Toni, Patern of Works, http://www.myfuture.edu.au/ (2004).
- 9. Heri Yudiono, Model Manajemen Sinkronisasi Kompetensi Lulusan Sekolah Menengah Kejuruan Berbasis Industri pada Kelompok Mata Pelajaran Produktif Program Keahlian Permesina, Laporan Penelitian (tidak dipublikasikan), Semarang: LP2M Unnes (2015) (in Indonesian).
- Julia Yeleneva, *et al.*, Analysis and Organizational Model for Monitoring of the Training of Workers and Specialists with Secondary Vocational Education for Innovation-Oriented Enterprises of Russia, *Procedia -Social and Behavioral Sciences*, 214 779 – 787 (2015).
- 11. Erni Munastiwi, The Management Model of Vocational Education Quality Assurance Using 'Holistic Skills Education (Holsked), *Procedia Social and Behavioral Sciences* 204 218 230 (2015).
- 12. Anna Volodina, *et al.*, Success in the first phase of the vocational career: The role of cognitive and scholastic abilities, personality factors, and vocational interests. *Journal of Vocational Behavior*, 91 11–22 (2015).
- 13. Goldstein, S., *Timeless Principles for Organizational Success: The Power of Wisdom and Human Values*, *Videoconference Series*, International Training Center (2007).
- 14. Krishnamoorthy M., Cardenas MA. and Kumar R., The Development of An ETK Methodology to Measure Organizational Synchronization, *International Journal of Technology, Knowledge and Society*, Vol. 2: 61-70 (2005).
- 15. Krishnamoorthy M., Cardenas MA. and Kumar R., The Development of An ETK Methodology to Measure Organizational Synchronization, *International Journal of Technology, Knowledge and Society*, Vol. 2: 61-70 (2005).
- 16. Valiulis, A. V., & Valiulis, D. (2010). Reforms of higher education and current engineering education developments in Lithuania. *Global Journal of Engineering Education*, 12(1), 38-44.
- 17. Ghrayeb, O., & Vohra, P. (2011). Experential learning in engineering education: a case study at NIU. *Global Journal of Engineering Education*, 13(2).

## SUBMISSION FORM & PAYMENT DETAILS

Copyright of a WTE&TE article remains with the World Institute for Engineering and Technology Education (WIETE). However, authors are permitted to publish substantially modified versions of the article included in the WTE&TE, provided that an acknowledgment is made to the original publication. Also, the WIETE reserves the right to permit photocopying of the WTE&TE article. The submission of your article will be taken to mean that you agree to this arrangement.

It is the policy of the WIETE that where an article is accepted for the Transactions, full payment must be received before the publication of the article. Please complete this form and submit it with your article.

The article (please type or use block letters):

## The Alignment of Productive Competence on Machinery between Vocational **Education Institutions and Industry**

**bv** (include all authors):

## Heri Yudiono

is being submitted for publication in the World Transactions on Engineering and Technology Education by (give full name, title, affiliation, postal and e-mail addresses):

## Dr. HERI YUDIONO, S.Pd., MT., UNIVERSITAS NEGERI SEMARANG,

## SEMARANG, 50229, heri\_yudiono@mail.unnes.ac.id,

PAYMENT	DETAILS				
Amount* Note: Australian residents must include 10% GST.	V       \$A500 (Standard fee) plus       \$A100 (per additional page)         Total \$A:       500				
Bank Cheque	Made payable to the <i>World Institute for Engineering and Technology Education</i> (WIETE) is being couriered to the WIETE postal address. <i>Note</i> : cheque must be in Australian dollars through an Australian bank.				
V Electronic Funds Transfer	Beneficiary: <i>World Institute for Engineering and Technology Education</i> (WIETE) BSB: 06 3141 Bank Account Number: 10368799 Name of Bank: Commonwealth Bank of Australia				
Electronic Funds Transfer	SWIFT Code: CTBAAU2S				

## Author or main author of the article on behalf of all co-authors:

I, the undersigned, hereby agree that should this article be accepted for inclusion in the WTE&TE, transfer copyright to the WIETE, and that the money indicated above will not be refundable and will form the full payment towards the publication fee. I, hereby, give the WIETE permission to make corrections and some editorial changes to my/our article, as required, in order to maintain consistency of style and expression with WIETE publications.

I also understand that plagiarism is an offence and copyright infringement, I, or I on behalf of all the authors solemnly declare that all the sources used in this article have been properly acknowledged, and the article does not include any part that is in the language used or ideas presented plagiarised from other authors.

I represent and warrant that I am authorised to execute this arrangement on behalf of all the authors of the article referred to above.

Name (print): HERI YUDIONO Signature:

Date: 26<sup>th</sup> of September 2017 H

## Lampiran 8. Menerima komunikasi yang telah dilakukan

12/2/21, 12:19 PM

UNNES Mail - Receipt of Paper



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### **Receipt of Paper**

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> Tue, Sep 26, 2017 at 11:25 AM

Dear Mr Yudiono

We have received your communication.

You will hear from us in due course.

Kindest regards

Zenon J. Pudlowski

From: Heri Yudiono [mailto:heri\_yudiono@mail.unnes.ac.id] Sent: Tuesday, 26 September 2017 12:39 To: Zenon Pudlowski <zenon.pudlowski@wiete.com.au> Subject: Re: request for author kit from Global Journal of Engineering Education

Dear Dr. Zenon Pudlowski

I hope this email finds you in a good health. Thank you for your feedback and suggestion for my paper submission to the World Transaction for Engineering and Technology Education.

Herewith, I would like to submit my article to World Transaction for Engineering and Technology Education.

Your warm reply would be very much appreciated

On Thu, Sep 21, 2017 at 12:32 PM, Zenon Pudlowski <zenon.pudlowski@wiete.com.au> wrote:

Dear Mr Yudiono

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579574809942611665&simpl=msg-f%3A15795748099... 1/3

12/2/21, 12:19 PM

#### UNNES Mail - Receipt of Paper

J just have examined at your paper and wish to advise you that it is not suitable for publication in the GJEE.

However, we may consider it to be published in the World Transactions for Engineering and Technology Education.

Should you wish to take this offer up please use the attached kit for authors to format the paper and fill in the Submission Form.

Kindest regards

Zenon J. Pudlowski

From: Heri Yudiono [mailto:heri\_yudiono@mail.unnes.ac.id] Sent: Thursday, 14 September 2017 18:27 To: zenon.pudlowski zenon.pudlowski <zenon.pudlowski@wiete.com.au> Subject: Re: request for author kit from Global Journal of Engineering Education

Dear Dr. Zenon J. Pudlowski

Thank you for your author kit for the Global Journal of Engineering Education submission. Herewith, I would like to attach my article along with the submission and payment form.

I am looking forward to your consideration of including my article to be submitted to Global Journal of Engineering Education

Best regards,

Heri Yudiono

On Tue, Sep 12, 2017 at 11:08 PM, zenon.pudlowski zenon.pudlowski <zenon.pudlowski@wiete.com.au> wrote:

Dear Mr Yudiono

Attached, please find a kit for authors. This should assist you in the preparation of your article.

In preparing your article, you should not make any changes to the template, and strictly follow the Instruction for Authors. Please do not use bold faces in the article nor in the figures! The abstract must not exceed 12 lines. Also please note that a single line space must be placed between the paragraphs, figure, captures, equations, formulas, etc. Further, would you please supply us with the original, unsaved figures, so that we can access them and make necessary

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579574809942611665&simpl=msg-f%3A15795748099... 2/3

12/2/21, 12:19 PM

UNNES Mail - Receipt of Paper

corrections if required? We accept figures generated in Ms Word, Excel and Visio. More information can be found at the journal's site:

www.wiete.com.au

Also, please note that submitted articles must be accompanied by the fully filled in and signed Submission Form & Payment Details. However, you do not need to pay the publication fee at this stage. You will be asked to do so, when the article has been refereed positively.

I look forward to receiving your contribution to the GJEE journal.

Kindest regards

Zenon J. Pudlowski

> On 12 September 2017 at 16:38 Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

> wrote:

> >

>

\*\*\*\*

> Dear Editor of Global Journal of Engineering Education

> I hope this email finds you in a good health

> Herewith, I would like to indicate my interest to submit my article to

> Global Journal of Engineering Education. Therefore, I hope I could receive
 > a kit for authors from the Global Journal of Engineering Education.

> Your warm reply would be very much appreciated

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579574809942611865&simpl=msg-f%3A15795748099... 3/3

## Lampiran 9. Konfirmasi satu referensi tidak sesuai dengan URL dan pengertian dari

"sney" pada Tabel 2

12/2/21, 11:45 AM



UNNES Mail - request for author kit from Global Journal of Engineering Education

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

## request for author kit from Global Journal of Engineering Education

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> Tue, Sep 26, 2017 at 1:49 PM

Dear Mr Yudiono

The quality of reference presentation in your paper is really poor. We had to spend a lot of this to put them into the WIEWTE style.

There is one reference that we cannot find or determined:

Waugh, Toni, Patern of Works, http://www.myfuture.edu.au/ (2004).

There is NO such reference at the given URL!

Would you please give the full bibliographic data concerning this reference?

In Table 2, you have a word "sney". What does it mean?

4¤	Electrical welding work
<b>5</b> ¤	Change and snev <sup>a</sup>
<b>6</b> ¤	Sawing¤
<b>7</b> ¤	Drillinga

I look forward to hearing from you at your earliest convenience.

Regards

[Quoted text hidden]

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579583888942071890&simpl=msg-f%3A15795838889... 1/1

## Lampiran 10. Mengubah referensi yang dirujuk dan konfirmasi pengertian kata "sney" dari Tabel 2.

12/2/21, 11:46 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

## request for author kit from Global Journal of Engineering Education

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> To: Zenon Pudlowski <zenon.pudlowski@wiete.com.au> Thu, Sep 28, 2017 at 8:09 AM

Dear Dr. Zenon Pudlowski

Thank you for your feed backs, I have changed the reference and the the line that it refers to. In addition, I have also clarifed the "change and sney", they are supposed to be the taps and dies operation.

Best regards

100

[Quoted text hidden]

WTE&TE submission Hery Yudiono.doc
98K

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579743671211694337&simpl=msg-f%3A15797436712... 1/1

## The Alignment of Productive Competence on Machinery between Vocational Education Institutions and Industry

## Heri Yudiono

Universitas Negeri Semarang Semarang, Central Java, Indonesia

ABSTRACT: This study was aimed to analyse the alignment performance of vocational education and industry on productive competence on machinery. This study employed concurrent triangulation. The subjects of the study were vocational education institutions, Education Department, partners in industrial field and professional association. The data of this study were validated using triangulation. The results showed that the alignment performance of productive competence on machinery between industry and vocational education did not result in the expected outcome. Academically, the overall productive competence on machinery has not been implemented in the industry and the results of alignment evaluation were still low. Institutionally, the role of industrial sector in the implementation of competence alignment was still low, the rate of employment of vocational school graduate in the industry showed decreasing trend, and the collaboration between industry and vocational school stakeholders has not been maximized.

## INTRODUCTION

Vocational education is an education which prepares students to work in a certain field. Vocational education is also required to have a function of economic and strategic role in increasing the economic growth. Therefore, its implementation should be *pro-jobs*, *pro-activity*, *pro-growth*, *pro-distribution*, and *pro-prosperity*. The basic concept of vocational education should have different characteristics with other education in general in terms of education criteria, the substantive of learning, and graduates. Vocational education lesson in choosing the learning substantive must always follow the development of technology, the needs of society, the needs of individuals, and field of employment [1]. The implementation of the production-based learning assists the students to prepare before joining the occupational world, to develop critical thinking, to have good moral attitudes, and to motivate students to be active in learning [2]. The content of vocational education should focus on adjusting to the requirements of the labour market [3].

The vocational education is oriented on these following aspects: the performance of individuals in the occupational world, justification on the real needs in the field, the focus of the curriculum on psycho motoric, affective, and cognitive aspects, the measure of success beyond schools, sensitivity to the development of the occupational work, adequate practice facilities, and community support [4]. Vocational education plays an important role in reducing unemployment [5]. However, there are graduates of vocational education who did not get a proper job and are not satisfied with their jobs because of the unavailability of laboratory and technical equipment to develop their competence in school [6]. The conditions of vocational education indicate these following matters: 1) most vocational education institutions currently only prepare students to work on specific areas of expertise as employees, 2) vocational education institutions are less responsive to the demands of local, national, regional, and international economic development [7]. It is contradictory the expectation of the industry that the vocational school graduate must take part in the dynamic effects to the economic development [8].

One of the efforts which has been taken by the vocational education institutions to address competency gaps is by conducting the alignment of productive competence with industrial sector. Management of alignment must be conducted through institutional establishment in a planned, integrated and sustainable manner by involving stakeholders. The alignment of productive competence on machinery between vocational education and industrial sector in quantity, quality, location, and time dimensions has not been formally organized [7]. The alignment could benefit both the vocational education institutions and industry because engineering education also has pivotal role in industry [16].

The formal organization bridging vocational education and industry is not present, there is only Indonesian Presidential Regulation Number 8 Year 2012 on Indonesian National Qualifications Framework (KKNI). In 1994 there was a formal organization which bridged vocational education and industry, the National Vocational Education Council. The

National Vocational Education Council was established through the Joint Decree of the Ministry of Education and Culture and the Indonesian Chamber of Commerce and Industry on the establishment of the Vocational Education Assembly Number 0217 / U / 1994 and 044 / SKEP / KU / VIII / 94. However, now the Institute is inactive. One of the success indicators in the implementation of alignment in productive competence of vocational education with industry is the reinforcement of the institutional role [9]. Comprehensive collaboration between stakeholders in industrial sector and vocational education institutions is absolutely necessary as a key indicator on quality and quantity aspects of vocational education implementation [10].

## METHOD

The concurrent triangulation method was used in this study. The subjects in the study were Vocational education institutions, Department of Education, industry partners and professional association. The study was conducted at SMK N 1, 4, 5, 7 in Semarang City and their partners in industry. The data were gathered from the principal, task force, chairman of the competency group, the head of secondary education at the Department of Education, school inspectors, partners in industry and professional associations. The validity of data was achieved using triangulation approach.

## RESEARCH RESULT

The results showed that the industry only served as a place of internship program and only a small part of the partnership has Memorandum of Understanding, while the role as validator competency, assessors, and me to accept graduates relatively low, as shown in Table 1.

No	The Role of Industry	Percentage (%)
1	The Validator of Productive Competence	3.8
2	The Assessor of Productive Competence	3.8
	Test	
3	Manpower Recruitment	9.54
4	Providing a place for Internship	100
5	Having MoU for Industry Internship	30.60

Table 1.	The Role	of Industry	in Com	petence Alignment

Table 2 shows that only few machinery competence in the industry is practiced by the students of vocational education during internship. Conventional lathing and milling competence were mostly practiced by the students during their internship in the industry, while lathing and milling competence using CNC were not conducted. Electrical and acetylene welding works were conducted during the internship. However, they were not included into productive competence of machinery.

Table 2.	Students	Competence	e during	Internship	in	Industry

No	Competence of Internship Industry	Percentage (%)
1	Conventional Lathe	89.58
2	Milling	72.92
3	Acetylene Welding Work	64.58
4	Electrical Welding Work	58.33
5	Operating taps and dies	56.25
6	Sawing	50.00
7	Drilling	52.08
8	Honing	54.17

Table 3. The Competence of Vocational Teacher with Machinery Expertise

No	Vocational Teacher Competence	Percentage (%)
1	On The Job Training	54.05
2	The Competence Test Assessor	22.14

Table 3 shows that the development of teacher productive competence in machinery is achieved through on-the-job training amounted to 54.05% and 22.14% of a machinery competence test assessor. Table 4 shows that the results of machinery competence test shows that learners have a good qualification. However, the scores of the students fluctuated annually.

No	Academic year	Score
1	2011/2012	85.30
2	2012/2013	89.80
3	2013/2014	91.41
4	2014/2015	89.36
5	2015/2016	89.40

The employment of graduates from Mechanical Engineering program as industrial workers, as students in higher education, and entrepreneurs showed a declining trend, as shown in Table 5.

No	Academic year	Percentage (%)
1	2011/2012	82.00
2	2012/2013	73.45
3	2013/2014	71.46
4	2014/2015	66.34
5	2015/2016	70.05

Table 5. The Employment of the Graduate	Table 5.	The Em	ployment	of the	Graduate
---	----------	--------	----------	--------	----------

## DISCUSSION

The results of the study showed that the alignment of productive competence on machinery between industry and vocational education institution did not yield outcomes as expected. Academically, overall machinery competence of graduates did not suit the needs of industry. Therefore, the evaluation of learning process in vocational education should not only cover the in class learning process but also competence from the alignment with the industrial sector. The management of vocational training should include pre-entering behaviour, entering behaviour, learning process, assessment, evaluation and output [11]. The important role of soft skills and hard skills are critical to success in the work [12]. Institutionally, the role of the partner from industrial sector was still low in terms of the implementation of competence alignment with vocational high school, the rate of employment of the vocational school graduates in industry showed a declining trend and the partnership between vocational high school and industrial sector must be improved.

The results of this study indicated the need of institutional management by formulating a framework of productive competence management in a more productive, integrated and sustainable manner by involving stakeholders in both vocational education institutions and industry. One of the integrated and sustainable productive competence alignment is The Engineers in Residence program in Northern Illinois University's (NIU) College of Engineering and Engineering Technology (CEET). The students of Northern Illinois University was provided with experiential learning in industry due to the support of the College stakeholders, government, industries, students and alumni [17]

The process of alignment as the work of *"outside in"* must also consider the elements outside the organization [13]. The alignment process must be conducted at the same time in a predetermined order [14]. Comprehensive collaboration between stakeholders in industrial sector and vocational education institutions is absolutely necessary as a key indicator on quality and quantity aspects of vocational education implementation [10].

The concept of institutional framework of competence alignment should pay attention to three main components, namely the demand, the supply and the alignment mechanism. The formulation of the comprehensive alignment program requires visions of some relevant dimensions. The projection of the future needs of the competence required by industrial sector and its numbers for every business / industry is indispensable and should refer to the special characteristics and potential of the industry.

The alignment of productive competence mechanism must be designed to ensure the implementation of the programs. Alignment mechanism includes three main aspects: (1) the mechanism must be associated with a number of required activities and programs that the information needs of the demand side can be obtained accurately and sustainably; (2) the mechanism must be associated with the activities and programs needed for the availability of employable graduates and create employment (entrepreneurship) and (3) the mechanism must ensure the communication of the needs for information from demand side to the supply side.

## CONCLUSION

It can be concluded from the study that:

1. The alignment of the productive competence on machinery between industry and vocational school was still problematic. The problems were centralized on the competence of the graduate which did not suit the needs of industry, the role of the partner from industrial sector was still low in terms of the implementation of competence

alignment with vocational high school, the rate of employment of the vocational school graduates in industry showed a declining trend, institutional reinforcement for the productive competence alignment must absolutely be improved, and the productive competence alignment evaluation in vocational education should not only cover the conventional learning process in the class but also focus on the evaluation of the competence from the alignment with the industrial sector.

2. The institutional reinforcement is required to improve the performance of productive competence alignment of vocational education with industry. The aim is to develop institutional management framework with advanced aspects such as competence alignment, optimization of the role of industry and stakeholders, empowerment of resources, integration of curriculum and learning, and performance evaluation of the alignment.

## REFERENCE

- 1. Nolker, Helmut & Schoenfeldt, Eberhard, *Pendidikan Kejuruan: Pengajaran, Kurikulum, Perencanaan*, Jakarta: PT. Gramedia, (1983) (in Indonesian).
- 2. Ganefri, and Hendra Hidayat, Production Based Learning: An Instructional Design Model in the Context of Vocational Education and Training (VET). *Procedia Social and Behavioral Sciences*, 204 (2015) 206 211.
- 3. Aleksandra Kulpa-Puczyńska, Teachers of Polish Vocational Schools vs. Changes in the Model of Employment and Organization of Work, *Procedia Social and Behavioral Sciences*, 141 969 975 (2015).
- 4. Finch, Curtis R., and Crunkilton, John R., *Curriculum Development in Vocational and Technical Education: Planning, Content, and Implementation,* Allyn and Bacon, Inc., Boston (1979).
- 5. Tatiana Blinova, *at. al.*, Vocational Education in the System of Determinants of Reducing Youth Unemployment: Interregional Comparisons, *Procedia Social and Behavioral Sciences*, 214 526 534 (2015).
- 6. Behroozi, Mohammad, A Survey About The Function Of Technical And VocationalEducation: An Empirical Study In Bushehr City, *Procedia Social and Behavioral Sciences*, 143 265 269 (2014).
- 7. Slamet, PH., Pengembangan Sekolah Menengah Kejuruan Model untuk Masa Depan. *Jurnal Cakrawala Pendidikan*, Februari 2013, Th. XXXII, No. 1: 14 26 (2013) (in Indonesian).
- 8. Uzmanoğlu, S., İşgören, N. Ç., Çınar, A., Tektaş, N., Oral, B., Büyükpehlivan, G., ... & Polat, Z. (2010). Evaluation of educational and technical structure at vocational schools. Procedia-Social and Behavioral Sciences, 2(2), 3447-3451.
- 9. Heri Yudiono, Model Manajemen Sinkronisasi Kompetensi Lulusan Sekolah Menengah Kejuruan Berbasis Industri pada Kelompok Mata Pelajaran Produktif Program Keahlian Permesina, Laporan Penelitian (tidak dipublikasikan), Semarang: LP2M Unnes (2015) (in Indonesian).
- Julia Yeleneva, *et al.*, Analysis and Organizational Model for Monitoring of the Training of Workers and Specialists with Secondary Vocational Education for Innovation-Oriented Enterprises of Russia, *Procedia -Social and Behavioral Sciences*, 214 779 – 787 (2015).
- 11. Erni Munastiwi, The Management Model of Vocational Education Quality Assurance Using 'Holistic Skills Education (Holsked), *Procedia Social and Behavioral Sciences* 204 218 230 (2015).
- 12. Anna Volodina, *et al.*, Success in the first phase of the vocational career: The role of cognitive and scholastic abilities, personality factors, and vocational interests. *Journal of Vocational Behavior*, 91 11–22 (2015).
- 13. Goldstein, S., *Timeless Principles for Organizational Success: The Power of Wisdom and Human Values*, *Videoconference Series*, International Training Center (2007).
- 14. Krishnamoorthy M., Cardenas MA. and Kumar R., The Development of An ETK Methodology to Measure Organizational Synchronization, *International Journal of Technology, Knowledge and Society*, Vol. 2: 61-70 (2005).
- 15. Krishnamoorthy M., Cardenas MA. and Kumar R., The Development of An ETK Methodology to Measure Organizational Synchronization, *International Journal of Technology, Knowledge and Society*, Vol. 2: 61-70 (2005).
- 16. Valiulis, A. V., & Valiulis, D. (2010). Reforms of higher education and current engineering education developments in Lithuania. *Global Journal of Engineering Education*, 12(1), 38-44.
- 17. Ghrayeb, O., & Vohra, P. (2011). Experential learning in engineering education: a case study at NIU. *Global Journal of Engineering Education*, 13(2).

## Lampiran 11. Konfirmasi akronim CNC dan penjelasan Tabel 2.

12/2/21, 11:51 AM

UNNES Mail - request for author kit from Global Journal of Engineering Education



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### request for author kit from Global Journal of Engineering Education

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> Thu, Sep 28, 2017 at 8:55 AM

Dear Mr Yudiono

On Page 2, there is a paragraph in which you use an acronym CNC, what does it stand for, please spell it out.

Table 2 shows that only few machinery competence in the industry is practiced by the students of vocational education during internship. Conventional lathing and milling competence were mostly practiced by the students during their internship in the industry, while lathing and milling competence using CNC were not conducted. Electrical and acetylene welding works were conducted during the internship. However, they were not included into productive competence of machinery.

Please note that paper, once submitted is the only version we work on, and we do not accept "a new version". So, please answer the questions and do not sent a whole paper.

[Quoted text hidden]

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579746549095953794&simpl=msg-f%3A15797465490... 1/1

## Lampiran 12. Artikel sudah dinilai tiga reviewer internasional untuk dipublikasikan ke

WTE&TE, Vol.15, No.3.

12/2/21, 11:53 AM



UNNES Mail - WTE&TE, Vol.15, No.3 - Article Acceptance

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### WTE&TE, Vol.15, No.3 - Article Acceptance

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Zenon Pudlowski <zenon.pudlowski@wiete.com.au> Cc: Dr Di Nguyen <dianne.nguyen@wiete.com.au>, dorota.pudlowski@wiete.com.au Thu, Sep 28, 2017 at 2:36 PM

Dear Colleague

I wish to inform you that your article submitted to the World Transactions on Engineering and Technology (WTE&TE) has now been assessed by three international referees and, as such, has been accepted for inclusion in the WTE&TE, Vol.15, No.3.

Please observe that should we not receive the transfer of funds (as per your Submission Form & Payment Details) by **Tuesday, 3 October 2017 at 17.00** (Australian Eastern Standard Time), your article will not be included in this issue.

Also, please note that the WTE&TE, Vol.15, No.4, is entirely reserved for articles to be presented at the 9th WIETE Annual Conference on Engineering and Technology Education, to be held in Bangkok, Thailand in February 2018.

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579768046936554290&simpl=msg-f%3A15797680469... 1/1

I look forward to hearing from you at your earliest convenience.

Kindest regards

Zenon J. Pudlowski

## Lampiran 13. Konfirmasi akan melakukan pembayaran dan mengirim tanda pembayaran

12/2/21, 11:54 AM

UNNES Mail - WTE&TE, Vol.15, No.3 - Article Acceptance



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

## WTE&TE, Vol.15, No.3 - Article Acceptance

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> To: Zenon Pudlowski <zenon.pudlowski@wiete.com.au> Thu, Sep 28, 2017 at 3:59 PM

Dear Dr. Zenon Pudlowski

Thank you for the inclusion of my article in "World Transactions on Engineering and Technology (WTE&TE)" I will transfer the fund and email the receipt of payment to you soon.

Best regards,

Heri [Quoted text hidden]

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579773246598181385&simpl=msg-f%3A15797732465... 1/1

## Lampiran 14. Mengirimkan tanda pembayaran ke publisher

12/2/21, 11:56 AM

UNNES Mail - WTE&TE, Vol.15, No.3 - Article Acceptance



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

#### WTE&TE, Vol.15, No.3 - Article Acceptance

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> To: Zenon Pudlowski <zenon.pudlowski@wiete.com.au> Fri, Sep 29, 2017 at 11:33 AM

Dear Dr. Zenon Pudlowski

I hope this email finds you in a great health. Thank you for the acceptance of my manuscript to the World Transactions on Engineering and Technology. Attached is the proof of payment to the journal. I am looking forward to hearing from you soon.

Best regards,

On Thu, Sep 28, 2017 at 2:36 PM, Zenon Pudlowski <zenon.pudlowski@wiete.com.au> wrote: [Ouoted text hidden]

Proof of Payment WTE TE Dr Heri Yudiono.pdf 9278K

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579847117092444848&simpl=msg-f%3A15798471170... 1/1

# 

Targgal Date: 29 /9/2017 Formulir Kiriman Uang Remittance Application

enerima/ 8eneficia	y Penduduk/ Resident	Bukan Penduduk/ Non Resident	Type of Trans	er RTCS	uter and a second	SWIFT		department.
Nama/ Name : <b>Wi</b> Namat/ Address : Felepon/ Phone :	TECHNOLOG	FOR ENGINEERN Y EIRICATION (WIB	Sumber Dana TE Sumber Dana Tunai/ C Debit R	/ Source of fund : Cash ek.) Debit Arc . No.	Cek/80	6561.44	19	
Kota/ City :	Negara/ Country	AUSTRACIA	Mata Ilangi		R	USD	V	AUD
Bank Penerima/ Be	neficiary Bank : COMA AUS	low wealth BAAR	Iumiah Dana	vana dikirim/ Amo	unt Transfer	500 A	up	
Kota/ City :	Negara/ G	ountry: AUSTRALIA	jun	Nah / Amount	T	Kurs/ Rate	Nilai/7	otal Amoun
No. Rek./ Acc. No.	10368799		- Kirim :	: 500	AUD	10.696	Rp. 5.	348.00
Pengirim/ Remitter	V Penduduk	Bukan Penduduk/	BY DBK	- 25	AUD	10-6 96	Rp	267.40
Nama/ Nome :	-, HEPLI TUDIO Jamie : HELL	WO, BPL., MT.	B	iayal Chorge D. Mb. 23	-	idal Anger II Antry Dilloga	, forti deman	100 JR
No. ID KTP/ <u>S/LI/ Powport</u> Alamati Address	N CIMANDIA	607670001 72/9 1925	Korņis/ Com Peņgiriman/ Bank Korespt	nission by 10000 Handling Inden / Correspond	ent Bank		κφ	39.00
Telepon! Phone :	08164251208		Jumlah Biaya	/ Amount Charge	cunt.		20. 5	650.0
Kotal City SEA	AP-AABegara/ Countr	y: INDONE814	total yang da	Dayarkany rotor no	cum		17 .	
Tujuan Transaksi Berita (Messoge )	Transaction Purpose )	32. TARAW JOUR	-NAC (ina ji	uta enam r it tatos	ahus U Rupiak	imo pul	uh Nb	4
		A STATE STATE	18 20.	+	BAU	the be	HERI Y	J DIONW
Consideration of the second se	n a sectores de transmung d'un a vel a a clip 150 de transmung d'un a va d'un totte da visante velo een	ebase in a bit one of here a comparison a shorp is a sign on gat best the XXI the a here LUV / Newstand by the output amount a here LUV /	Pejabat Bar Pejabat Bar Ing or 23. 5 1201 – 1 microsoft To	k/ Bank Office	VETOS Tertero	Lember 1 X I	Pernohon/ 	Appikcant mar 1 ta Na
BEFFOFNOF SID	анализина индексионализи основани индексионализии индексионализии силософиясы силософиясы порово 113000466	Advances of the second se	Pejabat Bar anno de a deservatives anno de a	ik/ Bank Office		Lenter (X)	Pernohon/	EB
An experience on an and induction of the second se	она академи индексионалисти от 2.2.2.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5	таки и и и и и и и и и и и и и и и и и и	Pejabat Bar mono de Alfonder any part of Calmon monoting careful service de 1 (Calmon el monoting careful serv	k/ Bank Office		Lenter (K)	Pemohan/	EB1
Designation of the second seco	SHE60245217 51668 920094 96562 0100000 13000446 0100000 13000446 0100 52	Taque 29/09/2017 10: Stinsform 20/09/2017 10: Stinsform 20/09/2017 10: Stinsform 21/09/2017 10: Stinsform 21/09/2017 10: Taque 29/09/2017 10: XII YALTR AUT Stin 1568	Pejabat Bar menor de Alfonde and Alfonde			Lenter ( 8 )	Pemohan/	
bit de la de	SHC60245217 51658 920094 96562 01303420 11300446 11300446 11300446 11300446 11303420 11303420110101 113 1168 920094 96962 01303420841001 013034270841001	таем 29/09/2017 10: 1988 29/00 2000 2000 2000 2000 2000 2000 200	Pejabat Bar 2007 - 200 252:20 252:20 252:20 162 2017 - 2017 2017 - 2017 201	9 SEP 2017		Lenter 18.	Pemohon/	EB
REFFERENCE : \$10           NA           TEX           NO           TEX           TIM           TEX           TEX           TEX           TEX           TEX	SHC60245217 SHC60245217 SIG602452017 SIG602452017 SIG6024520010001 SIG6024520010001 SIG6024520010001 SIG6024520010000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG602452000000 SIG6024520000000 SIG602452000000 SIG602452000000 SIG6024520000000 SIG6024520000000 SIG6024520000000000000000000000000000000000	таем 29/09/2017 10: 1988 29/09/2017 10: 20 1568 29/09/2017 10: 20 1568 29/09/2017 10: 21 1569	52:20 552:20 552:20 52:20	9 SEP 2017		Lenter 18.	Semitaria	EB)
ВЕ СТАВИТИ С СТАВИТИ ВЕ СТАВИТИ С СТАВИТИ ВО СТАВИТИ С СТАВИТИСТИКИ ВО СТАВИТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИ	SHEG0/25217 SIAG0/	TBAN 79(09/2017 10: STHEFN STR. 100/2007 10: STHEFN STR. 101/2007 R.27-1568 TFAN 29/09/2017 10: FFN: 2010/588 TFAN 29/09/2017 10: DFN: 2010/2017 1	52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 53:20 54:20 55	9 SEP 2017		Lenter 18.	Semitian La Semitian	EB)
ВЕРГОРИСТИК МОДИНИИ И ВОЛИКИ ВЕРГОРИСТИК ВОЛИТИИ ВОЛИТИ ВОЛИТИ ВОЛИТИИ ВОЛИ	SHEG0/25917 SILG0/25917 SILG0/25917 SILGR 920094 94567 01305420011300445 013054200101001 013054200101001 013054200841001 01305420841001 01305420841001 01305420841001	TBAN 79(09/2017 10: STHEFN STR. WIFEND STHEFN STR. WIFEND R.27- 1568 TFAN 29/09/2017 10: STR. 2010 STR. 20	52:20 552:20 552:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 52:20 53:20 53:20 54:20 55:20	9 SEP 2017		Lenter 18.	Fernandani	EB)

PT. RANK NEGARA INDONESTA (Dersero), The CARANG : SEMARANG TROC - Maintenance (S10) Teller TD Date Time : 51668 : 29/09/2017 : 11:01:50 t 4 Marrie 1 Dr. HEPH TUD WWW, BR. MT. 6 BNI



## Lampiran 15. Konfirmasi telah melakukan pembayaran

12/2/21, 11:59 AM

UNNES Mail - WTE&TE, Vol.15, No.3 - Article Acceptance



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

## WTE&TE, Vol.15, No.3 - Article Acceptance

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

Fri, Sep 29, 2017 at 12:50 PM

Dear Mr Yudiono

Thank you for letting me know it.

[Quoted text hidden]

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1579851991634089226&simpl=msg-f%3A15798519916... 1/1

## Lampiran 16. Konfirmasi telah melakukan pembayaran

12/2/21, 12:30 PM

UNNES Mail - WTE&TE, Vol.5, No.3 - Receipt



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

## WTE&TE, Vol.5, No.3 - Receipt

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> Sun, Oct 1, 2017 at 4:13 PM

Dear Dr Yudiono

Attached, please find a receipt.

You will soon receive the proofs of your article.

Kindest regards

Zenon J. Pudlowski

22-Yudiono-D-WT-12.pdf 53K

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=p1&search=all&permmsgid=msg-f%3A1580045897442991991&simpl=msg-f%3A15800458974... 1/1

## World Institute for Engineering and Technology Education (WIETE)



## Receipt

Invoice Number	WT-12
Date	30.09.2017

Name:	Dr Heri Yudiono
Company:	Universitas Negeri Semarang
Address:	Semarang,
State/Province	Central Java
Zip/Postal Code	
Country	Indonesia
E-mail Address	

Item	Description	Quantity	Unit Price \$	GST \$	Amount \$
1	The publication fee for one article to be included in the World Transactions on Engineering & Technology Education, Vol.15, No.3	1	500.00	0	500.00
				Total \$A	500.00

## Thank you.

## We appreciate your business.

Zenon J. Pudlowski

ZJPudlowski

Office Use Only

Amount Paid	
Date	

## Lampiran 17. Artikel telah dikoreksi dan diformat sesuai gaya WIETE untuk publikasi di

WTE&TE, Vol.15, No.3.

12/2/21, 12:01 PM



UNNES Mail - WTE&TE, Vol.15, No.3 - Proofs of your article

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

## WTE&TE, Vol.15, No.3 - Proofs of your article

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> Fri, Oct 20, 2017 at 6:33 AM

Dear Mr Yudiono

Attached, please find the proofs of your articles corrected and formatted by us in accordance with the WIETE style, to be included in the WTE&TE, Vol.15, No.3. Please read the articles carefully and note that **only spelling mistakes and simple typos can be corrected** at this stage.

I look forward to hearing from you by Monday, 23 October 2017 at the latest. Should we not hear from you by the due day, we will assume that you are happy with the article in its present form and that the corrections done by us are OK.

Please spell out the acronym CNC that is marked in red on Page 2.

Kindest regards

Zenon J. Pudlowski

22-Yudiono-H-XX.pdf

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1581730791938629311&simpl=msg-f%3A15817307919... 1/1

## The alignment of productive competence on machinery between vocational education institutions and industry

## Heri Yudiono

Universitas Negeri Semarang Semarang, Central Java, Indonesia

ABSTRACT: The aim of this study was to analyse the alignment performance of vocational education and industry and its impact on productive competence in machinery. This study employed concurrent triangulation and the subjects of the study were vocational education institutions, the Education Department, partners in the industrial field and the professional association. The data used in this study were validated using triangulation. The results showed that the alignment performance of productive competence in machinery between industry and vocational education did not result in the expected outcome. Academically, the overall productive competence in machinery has not been implemented in the industry and the results of alignment evaluation were still low. Institutionally, the role of the industrial sector in the industry showed a decreasing trend. The collaboration between industry and vocational school stakeholders has not been maximised.

## INTRODUCTION

Vocational education is an education, which prepares students to work in a specific field. Vocational education is also required to have an economic and strategic role in increasing economic growth. Therefore, its implementation should be *pro-jobs*, *pro-activity*, *pro-growth*, *pro-distribution* and *pro-prosperity*. The basic concept of vocational education should have characteristics that differ from other education in general in terms of educational criteria, substantive learning and graduates. The vocational education lesson in choosing the substantive learning must always follow the development of technology, the needs of society, the needs of individuals and the field of employment [1].

The implementation of production-based learning assists the students to prepare before joining the occupational world, to develop critical thinking, to have good moral attitudes and to motivate students to be active in learning [2]. The content of vocational education should focus on adjusting to the requirements of the labour market [3].

Vocational education is oriented to these following aspects: the performance of individuals in the occupational world; focus on the real needs in the field; the focus of the curriculum on psycho-motoric, affective and cognitive aspects; the measure of success beyond schools; sensitivity to the development of the occupational work; adequate practice facilities; and community support [4]. Vocational education plays an important role in reducing unemployment [5]. However, there are graduates of vocational education who do not get a proper job and are not satisfied with the jobs that they have, because of the unavailability of laboratory and technical equipment to develop their competence at school [6].

The conditions of vocational education indicate these following matters: 1) most vocational education institutions currently only prepare students to work in specific areas of expertise as employees; and 2) vocational education institutions are less responsive to the demands of local, national, regional and international economic development [7]. The vocational education institutions are still preoccupied with the methods and the development of learning, which may have implications on the quality of graduates who have not been able to respond to the challenges of the industrial sectors; if it is continuously carried out by the school, then, the school would be left behind [8].

One of the efforts, which has been taken by the vocational education institutions to address competency gaps is an attempt to align productive competence with the industrial sector. Management of this alignment must be conducted through an institutional establishment in a planned, integrated and sustainable manner by involving stakeholders. However, the alignment of productive competence in machinery between vocational education and the industrial sector in quantity, quality, location and time dimensions has not been formally organised [7]. The alignment could benefit both the vocational education institutions and industry, because engineering and technology education also has a pivotal role in industry [9]. The formal organisation bridging vocational education and industry is not present, and there is only one Indonesian Presidential Regulation Number 8 Year 2012 on the Indonesian National Qualifications Framework (KKNI). In 1994, there was a formal organisation, which bridged vocational education and industry, the National Vocational Education Council.

This Council was established through the Joint Decree of the Ministry of Education and Culture and the Indonesian Chamber of Commerce and Industry on the establishment of the Vocational Education Assembly, Number 0217/U/1994 and 044/SKEP/KU/VIII/94. However, now the Council is inactive. One of the success indicators in the implementation of alignment in productive competence of vocational education with industry is the reinforcement of the institutional role, hence the need for revitalising the Council's function [10].

Comprehensive collaboration between stakeholders in the industrial sector and vocational education institutions is absolutely necessary as a key indicator on quality and quantity aspects of vocational education implementation [11].

## METHOD

The concurrent triangulation method was used in this study. The subjects in the study were vocational education institutions, the Department of Education, industry partners and the professional association. The study was conducted at SMK N 1, 4, 5 and 7 in Semarang City and jointly with their partners in industry. The data were gathered from the principal, task force, chairman of the competency group, the Head of Secondary Education at the Department of Education, school inspectors, partners in industry and professional associations. The validity of data was achieved by using the triangulation approach.

## RESEARCH RESULTS

The results showed that industry served only as a place of an internship programme and only a small part of the partnership has a memorandum of understanding, while the role as validator competency, assessors and the authors to accept graduates is relatively low, as shown in Table 1.

No	Role of industry	Percentage (%)
1	Validator of productive competence	3.8
2	Assessor of productive competence test	3.8
3	Manpower recruitment	9.54
4	Providing a place for internship	100
5	Having MoU for industry internship	30.60

Table 1: Role of industry in competence alignment.

Table 2 shows that only a few aspects of machinery competence in the industry were practised by the vocational education students during their internship. Conventional lathing and milling competence were most often practised by the students during their internship in the industry, while lathing and milling competence using CNC were not conducted. Electrical and acetylene welding works were conducted during the internship. However, they were not included into productive competence with machinery.

Table 2: Students'	competence	during	internshir	o in	industry.
1 4010 -1 5004001105	e o mperene e				ind dioti j.

No	Competence of internship industry	Percentage (%)
1	Conventional lathe	89.58
2	Milling	72.92
3	Acetylene welding work	64.58
4	Electrical welding work	58.33
5	Operating taps and dies	56.25
6	Sawing	50.00
7	Drilling	52.08
8	Honing	54.17

Table 3: Competence of vocational teacher with machinery expertise.

No	Vocational teacher competence	Percentage (%)
1	On-the-job training	54.05
2	Test assessor	22.14

Table 3 shows that the development of teacher productive competence in machinery is achieved through on-the-job training that amounts to 54.05%, and machinery test assessments, which amounts to 22.14%.

Table 4 shows that the results of the machinery competence test indicate that learners have a good score. However, the scores of the students fluctuate annually.

No	Academic year	Score
1	2011/2012	85.30
2	2012/2013	89.80
3	2013/2014	91.41
4	2014/2015	89.36
5	2015/2016	89.40

Table 4: Competency test results of machinery expertise.

The employment of graduates from the mechanical engineering programme as industrial workers, as workers in higher education and entrepreneurs showed a declining trend, as shown in Table 5.

Table 5: Employment of graduates.

No	Academic year	Percentage (%)
1	2011/2012	82.00
2	2012/2013	73.45
3	2013/2014	71.46
4	2014/2015	66.34
5	2015/2016	70.05

## DISCUSSION

The results of the study showed that the alignment of productive competence on machinery between industry and vocational education institutions did not yield outcomes as expected. Academically, overall machinery competence of graduates did not suit the needs of industry. Therefore, the evaluation of the learning process in vocational education should not only be covered in the class learning process, but also should include competence from the alignment with the industrial sector. The management of vocational training should include pre-entering behaviour, entering behaviour, the learning process, assessment, evaluation and output [12].

The important roles of soft skills and hard skills are critical to success in the workplace [13]. Institutionally, the role of the partner from the industrial sector was still low in terms of the implementation of competence alignment with vocational high school. The rate of employment of the vocational school graduates in industry showed a declining trend and the partnership between the vocational high school and the industrial sector must be improved.

The results of this study indicated the needs of institutional management by formulating a framework of productive competence management in a more efficient, integrated and sustainable manner by involving stakeholders in both vocational education institutions and industry. One of the integrated and sustainable productive competence alignments is the *Engineers in Residence* programme at the College of Engineering and Engineering Technology (CEET) at Northern Illinois University (NIU). The students of Northern Illinois University were provided with experiential learning in industry due to the support of the College stakeholders, government, industries, students and alumni [14].

The process of alignment of *outside in* must also consider the elements outside the organisation [15]. The alignment process must be conducted at the same time in a predetermined order [16]. Comprehensive collaboration between stakeholders in the industrial sector and vocational education institutions is absolutely necessary as a key indicator of quality and quantity aspects of vocational education implementation [11].

The concept of the institutional framework of competence alignment should pay attention to three main components; namely, the demand, the supply and the alignment mechanism. The formulation of the comprehensive alignment programme requires visions of relevant dimensions. The projection of the future needs of the competence required by the industrial sector and its numbers for every business/industry is indispensable and should refer to the special characteristics and potential of the industry.

The alignment of the productive competence mechanism must be designed to ensure the implementation of the programmes. The alignment mechanism includes three main aspects:

- 1. the mechanism must be associated with a number of required activities and programmes that the information needs on the demand side can be obtained accurately and sustainably;
- 2. the mechanism must be associated with the activities and programmes needed for the availability of employable graduates and create employment (entrepreneurship);
- 3. the mechanism must ensure communication of the needs for information from the demand side to the supply side.

## CONCLUSIONS

It can be concluded from the study that:

- 1. The alignment of the productive competence on machinery between industry and vocational school was still problematic. The problems were centralised on the competence of the graduate, which did not suit the needs of industry. The role of the partners from the industrial sector was still low in terms of the implementation of competence alignment with vocational high schools. The rate of employment of the vocational school graduates in industry showed a declining trend, institutional reinforcement of the productive competence alignment must absolutely be improved, and the productive competence alignment evaluation in vocational education should not only cover the conventional learning process in the class, but also focus on the evaluation of the competence from the alignment with the industrial sector.
- 2. The institutional reinforcement is required to improve the performance of productive competence alignment of vocational education with industry. The aim is to develop an institutional management framework with advanced aspects, such as competence alignment, optimisation of the role of industry and stakeholders, empowerment of resources, integration of curriculum and learning and performance evaluation of the alignment.

## REFERENCES

- 1. Nolker, H. and Schoenfeldt, E., *Pendidikan Kejuruan: Pengajaran, Kurikulum, Perencanaan*, Jakarta: PT. Gramedia (1983) (in Indonesian).
- 2. Ganefri and Hidayat, H., Production based learning: an instructional design model in the context of vocational education and training (VET). *Procedia Social and Behavioral Sciences*, 204, 206-211 (2015).
- 3. Kulpa-Puczyńska, A., Teachers of Polish vocational schools vs. changes in the model of employment and organization of work. *Procedia Social and Behavioral Sciences*, 141, 969-975 (2015).
- 4. Finch, C.R. and Crunkilton, J.R., *Curriculum Development in Vocational and Technical Education: Planning, Content, and Implementation.* Allyn and Bacon, Inc., Boston (1979).
- 5. Blinova, T., Bylina, S. and Rusanovskiy, V., Vocational education in the system of determinants of reducing youth unemployment: interregional comparisons. *Procedia Social and Behavioral Sciences*, 214, 526-534 (2015).
- 6. Behroozi, M., A survey about the function of technical and vocational education: an empirical study in Bushehr City. *Procedia Social and Behavioral Sciences*, 143, 265-269 (2014).
- 7. Slamet, P.H., Pengembangan Sekolah Menengah Kejuruan Model untuk Masa Depan. *Jurnal Cakrawala Pendidikan*, Februari 2013, Th. XXXII, **1**: 14-26 (2013) (in Indonesian).
- 8. Uzmanoğlu, S., İşgören, N.C., AyşeÇınar, A., Tektaş, N., Oral, B., Büyükpehlivan, G., Ulusman, L., Öznaz, D. and Polat, Z., Evaluation of educational and technical structure at vocational schools. *Procedia-Social and Behavioral Sciences*, 2, **2**, 3447-3451 (2010).
- 9. Valiulis, A.V. and Valiulis, D., Reforms of higher education and current engineering education developments in Lithuania. *Global J. of Engng. Educ.*, 12, **1**, 38-44 (2010).
- 10. Yudiono, H., Model Manajemen Sinkronisasi Kompetensi Lulusan Sekolah Menengah Kejuruan Berbasis Industri pada Kelompok Mata Pelajaran Produktif Program Keahlian Permesina, Laporan Penelitian (tidak dipublikasikan), Semarang: LP2M Unnes (2015) (in Indonesian).
- 11. Yeleneva, J., Prosvirina, M., Golovenchenko, A. and Andreev, V., Analysis and organizational model for monitoring of the training of workers and specialists with secondary vocational education for innovation-oriented enterprises of Russia. *Procedia Social and Behavioral Sciences*, 214, 779-787 (2015).
- 12. Munastiwi, E., The management model of vocational education quality assurance using holistic skills education (Holsked). *Procedia Social and Behavioral Sciences* 204, 218-230 (2015).
- 13. Volodina, A., Nagy, G. and Köller, O., Success in the first phase of the vocational career: the role of cognitive and scholastic abilities, personality factors, and vocational interests. *J. of Vocational Behavior*, 91, 11-22 (2015).
- 14. Ghrayeb, O. and Vohra, P., Experiential learning in engineering education: a case study at NIU. *Global J. of Engng. Educ.*, 13, **2**, 82-89 (2011).
- 15. Goldstein, S., *Timeless Principles for Organizational Success: the Power of Wisdom and Human Values*, *Videoconference Series*. International Training Center (2007).
- 16. Krishnamoorthy, M., Cardenas, M.A. and Kumar, R., The development of an ETK methodology to measure organizational synchronization. *Inter. J. of Technol., Knowledge and Society*, 2, 61-70 (2005).

## Lampiran 18. Menginformasikan akronim CNC (Computer Numerical Control.)

12/2/21, 12:04 PM

UNNES Mail - WTE&TE, Vol.15, No.3 - Proofs of your article



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

Fri, Oct 20, 2017 at 8:18 AM

## WTE&TE, Vol.15, No.3 - Proofs of your article

Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> To: Zenon Pudlowski <zenon.pudlowski@wiete.com.au>

Dear Dr. Zenon Pudlowski

Thank you for your email. Here is the spelling for CNC. CNC stands for computer numerical control.

Your information is highly appreciated.

Best regards

Heri Y

100

[Quoted text hidden]

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1581737363577357211&simpl=msg-f%3A15817373635... 1/1

## Lampiran 19. Menginformasikan artikel versi final

12/2/21, 12:05 PM

UNNES Mail - WTE&TE, Vol.15, No.3 - Proofs of your article



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

## WTE&TE, Vol.15, No.3 - Proofs of your article

Zenon Pudlowski <zenon.pudlowski@wiete.com.au> To: Heri Yudiono <heri\_yudiono@mail.unnes.ac.id> Fri, Oct 20, 2017 at 8:26 AM

Dear Dr Yudiono

Attached, please find your final version of the article.

Kindest regards

Zenon J. Pudlowski

[Quoted text hidden]

100

Page 22-Yudiono-H.pdf

https://mail.google.com/mail/u/0/?ik=1a2a0f6430&view=pt&search=all&permmsgid=msg-f%3A1581737869184188518&simpl=msg-f%3A15817378691... 1/1

## The alignment of productive competence on machinery between vocational education institutions and industry

## Heri Yudiono

Universitas Negeri Semarang Semarang, Central Java, Indonesia

ABSTRACT: The aim of this study was to analyse the alignment performance of vocational education and industry and its impact on productive competence in machinery. This study employed concurrent triangulation and the subjects of the study were vocational education institutions, the Education Department, partners in the industrial field and the professional association. The data used in this study were validated using triangulation. The results showed that the alignment performance of productive competence in machinery between industry and vocational education did not result in the expected outcome. Academically, the overall productive competence in machinery has not been implemented in the industry and the results of alignment evaluation were still low. Institutionally, the role of the industrial sector in the industry showed a decreasing trend. The collaboration between industry and vocational school stakeholders has not been maximised.

## INTRODUCTION

Vocational education is an education, which prepares students to work in a specific field. Vocational education is also required to have an economic and strategic role in increasing economic growth. Therefore, its implementation should be *pro-jobs*, *pro-activity*, *pro-growth*, *pro-distribution* and *pro-prosperity*. The basic concept of vocational education should have characteristics that differ from other education in general in terms of educational criteria, substantive learning and graduates. The vocational education lesson in choosing the substantive learning must always follow the development of technology, the needs of society, the needs of individuals and the field of employment [1].

The implementation of production-based learning assists the students to prepare before joining the occupational world, to develop critical thinking, to have good moral attitudes and to motivate students to be active in learning [2]. The content of vocational education should focus on adjusting to the requirements of the labour market [3].

Vocational education is oriented to these following aspects: the performance of individuals in the occupational world; focus on the real needs in the field; the focus of the curriculum on psycho-motoric, affective and cognitive aspects; the measure of success beyond schools; sensitivity to the development of the occupational work; adequate practice facilities; and community support [4]. Vocational education plays an important role in reducing unemployment [5]. However, there are graduates of vocational education who do not get a proper job and are not satisfied with the jobs that they have, because of the unavailability of laboratory and technical equipment to develop their competence at school [6].

The conditions of vocational education indicate these following matters: 1) most vocational education institutions currently only prepare students to work in specific areas of expertise as employees; and 2) vocational education institutions are less responsive to the demands of local, national, regional and international economic development [7]. The vocational education institutions are still preoccupied with the methods and the development of learning, which may have implications on the quality of graduates who have not been able to respond to the challenges of the industrial sectors; if it is continuously carried out by the school, then, the school would be left behind [8].

One of the efforts, which has been taken by the vocational education institutions to address competency gaps is an attempt to align productive competence with the industrial sector. Management of this alignment must be conducted through an institutional establishment in a planned, integrated and sustainable manner by involving stakeholders. However, the alignment of productive competence in machinery between vocational education and the industrial sector in quantity, quality, location and time dimensions has not been formally organised [7]. The alignment could benefit both the vocational education institutions and industry, because engineering and technology education also has a pivotal role in industry [9]. The formal organisation bridging vocational education and industry is not present, and there is only one Indonesian Presidential Regulation Number 8 Year 2012 on the Indonesian National Qualifications Framework (KKNI). In 1994, there was a formal organisation, which bridged vocational education and industry, the National Vocational Education Council.

This Council was established through the Joint Decree of the Ministry of Education and Culture and the Indonesian Chamber of Commerce and Industry on the establishment of the Vocational Education Assembly, Number 0217/U/1994 and 044/SKEP/KU/VIII/94. However, now the Council is inactive. One of the success indicators in the implementation of alignment in productive competence of vocational education with industry is the reinforcement of the institutional role, hence the need for revitalising the Council's function [10].

Comprehensive collaboration between stakeholders in the industrial sector and vocational education institutions is absolutely necessary as a key indicator on quality and quantity aspects of vocational education implementation [11].

## METHOD

The concurrent triangulation method was used in this study. The subjects in the study were vocational education institutions, the Department of Education, industry partners and the professional association. The study was conducted at SMK N 1, 4, 5 and 7 in Semarang City and jointly with their partners in industry. The data were gathered from the principal, task force, chairman of the competency group, the Head of Secondary Education at the Department of Education, school inspectors, partners in industry and professional associations. The validity of data was achieved by using the triangulation approach.

## RESEARCH RESULTS

The results showed that industry served only as a place of an internship programme and only a small part of the partnership has a memorandum of understanding, while the role as validator competency, assessors and the authors to accept graduates is relatively low, as shown in Table 1.

No	Role of industry	Percentage (%)
1	Validator of productive competence	3.8
2	Assessor of productive competence test	3.8
3	Manpower recruitment	9.54
4	Providing a place for internship	100
5	Having MoU for industry internship	30.60

Table 1: Role of industry in competence alignment.

Table 2 shows that only a few aspects of machinery competence in the industry were practised by the vocational education students during their internship. Conventional lathing and milling competence were most often practised by the students during their internship in the industry, while lathing and milling competence using computer numerical control (CNC) were not conducted. Electrical and acetylene welding works were conducted during the internship. However, they were not included into productive competence with machinery.

Table 2: Students' competence during internship in industry.

No	Competence of internship industry	Percentage (%)
1	Conventional lathe	89.58
2	Milling	72.92
3	Acetylene welding work	64.58
4	Electrical welding work	58.33
5	Operating taps and dies	56.25
6	Sawing	50.00
7	Drilling	52.08
8	Honing	54.17

Table 3: Competence of vocational teacher with machinery expertise.

No	Vocational teacher competence	Percentage (%)
1	On-the-job training	54.05
2	Test assessor	22.14

Table 3 shows that the development of teacher productive competence in machinery is achieved through on-the-job training that amounts to 54.05%, and machinery test assessments, which amounts to 22.14%.

Table 4 shows that the results of the machinery competence test indicate that learners have a good score. However, the scores of the students fluctuate annually.

No	Academic year	Score
1	2011/2012	85.30
2	2012/2013	89.80
3	2013/2014	91.41
4	2014/2015	89.36
5	2015/2016	89.40

Table 4: Competency test results of machinery expertise.

The employment of graduates from the mechanical engineering programme as industrial workers, as workers in higher education and entrepreneurs showed a declining trend, as shown in Table 5.

Table 5: Employment of graduates.

No	Academic year	Percentage (%)
1	2011/2012	82.00
2	2012/2013	73.45
3	2013/2014	71.46
4	2014/2015	66.34
5	2015/2016	70.05

## DISCUSSION

The results of the study showed that the alignment of productive competence on machinery between industry and vocational education institutions did not yield outcomes as expected. Academically, overall machinery competence of graduates did not suit the needs of industry. Therefore, the evaluation of the learning process in vocational education should not only be covered in the class learning process, but also should include competence from the alignment with the industrial sector. The management of vocational training should include pre-entering behaviour, entering behaviour, the learning process, assessment, evaluation and output [12].

The important roles of soft skills and hard skills are critical to success in the workplace [13]. Institutionally, the role of the partner from the industrial sector was still low in terms of the implementation of competence alignment with vocational high school. The rate of employment of the vocational school graduates in industry showed a declining trend and the partnership between the vocational high school and the industrial sector must be improved.

The results of this study indicated the needs of institutional management by formulating a framework of productive competence management in a more efficient, integrated and sustainable manner by involving stakeholders in both vocational education institutions and industry. One of the integrated and sustainable productive competence alignments is the *Engineers in Residence* programme at the College of Engineering and Engineering Technology (CEET) at Northern Illinois University (NIU). The students of Northern Illinois University were provided with experiential learning in industry due to the support of the College stakeholders, government, industries, students and alumni [14].

The process of alignment of *outside in* must also consider the elements outside the organisation [15]. The alignment process must be conducted at the same time in a predetermined order [16]. Comprehensive collaboration between stakeholders in the industrial sector and vocational education institutions is absolutely necessary as a key indicator of quality and quantity aspects of vocational education implementation [11].

The concept of the institutional framework of competence alignment should pay attention to three main components; namely, the demand, the supply and the alignment mechanism. The formulation of the comprehensive alignment programme requires visions of relevant dimensions. The projection of the future needs of the competence required by the industrial sector and its numbers for every business/industry is indispensable and should refer to the special characteristics and potential of the industry.

The alignment of the productive competence mechanism must be designed to ensure the implementation of the programmes. The alignment mechanism includes three main aspects:

- 1. the mechanism must be associated with a number of required activities and programmes that the information needs on the demand side can be obtained accurately and sustainably;
- 2. the mechanism must be associated with the activities and programmes needed for the availability of employable graduates and create employment (entrepreneurship);
- 3. the mechanism must ensure communication of the needs for information from the demand side to the supply side.

## CONCLUSIONS

It can be concluded from the study that:

- 1. The alignment of the productive competence on machinery between industry and vocational school was still problematic. The problems were centralised on the competence of the graduate, which did not suit the needs of industry. The role of the partners from the industrial sector was still low in terms of the implementation of competence alignment with vocational high schools. The rate of employment of the vocational school graduates in industry showed a declining trend, institutional reinforcement of the productive competence alignment must absolutely be improved, and the productive competence alignment evaluation in vocational education should not only cover the conventional learning process in the class, but also focus on the evaluation of the competence from the alignment with the industrial sector.
- 2. The institutional reinforcement is required to improve the performance of productive competence alignment of vocational education with industry. The aim is to develop an institutional management framework with advanced aspects, such as competence alignment, optimisation of the role of industry and stakeholders, empowerment of resources, integration of curriculum and learning and performance evaluation of the alignment.

## REFERENCES

- 1. Nolker, H. and Schoenfeldt, E., *Pendidikan Kejuruan: Pengajaran, Kurikulum, Perencanaan*, Jakarta: PT. Gramedia (1983) (in Indonesian).
- 2. Ganefri and Hidayat, H., Production based learning: an instructional design model in the context of vocational education and training (VET). *Procedia Social and Behavioral Sciences*, 204, 206-211 (2015).
- 3. Kulpa-Puczyńska, A., Teachers of Polish vocational schools vs. changes in the model of employment and organization of work. *Procedia Social and Behavioral Sciences*, 141, 969-975 (2015).
- 4. Finch, C.R. and Crunkilton, J.R., *Curriculum Development in Vocational and Technical Education: Planning, Content, and Implementation.* Allyn and Bacon, Inc., Boston (1979).
- 5. Blinova, T., Bylina, S. and Rusanovskiy, V., Vocational education in the system of determinants of reducing youth unemployment: interregional comparisons. *Procedia Social and Behavioral Sciences*, 214, 526-534 (2015).
- 6. Behroozi, M., A survey about the function of technical and vocational education: an empirical study in Bushehr City. *Procedia Social and Behavioral Sciences*, 143, 265-269 (2014).
- 7. Slamet, P.H., Pengembangan Sekolah Menengah Kejuruan Model untuk Masa Depan. *Jurnal Cakrawala Pendidikan*, Februari 2013, Th. XXXII, **1**: 14-26 (2013) (in Indonesian).
- 8. Uzmanoğlu, S., İşgören, N.C., AyşeÇınar, A., Tektaş, N., Oral, B., Büyükpehlivan, G., Ulusman, L., Öznaz, D. and Polat, Z., Evaluation of educational and technical structure at vocational schools. *Procedia-Social and Behavioral Sciences*, 2, **2**, 3447-3451 (2010).
- 9. Valiulis, A.V. and Valiulis, D., Reforms of higher education and current engineering education developments in Lithuania. *Global J. of Engng. Educ.*, 12, **1**, 38-44 (2010).
- 10. Yudiono, H., Model Manajemen Sinkronisasi Kompetensi Lulusan Sekolah Menengah Kejuruan Berbasis Industri pada Kelompok Mata Pelajaran Produktif Program Keahlian Permesina, Laporan Penelitian (tidak dipublikasikan), Semarang: LP2M Unnes (2015) (in Indonesian).
- 11. Yeleneva, J., Prosvirina, M., Golovenchenko, A. and Andreev, V., Analysis and organizational model for monitoring of the training of workers and specialists with secondary vocational education for innovation-oriented enterprises of Russia. *Procedia Social and Behavioral Sciences*, 214, 779-787 (2015).
- 12. Munastiwi, E., The management model of vocational education quality assurance using holistic skills education (Holsked). *Procedia Social and Behavioral Sciences* 204, 218-230 (2015).
- 13. Volodina, A., Nagy, G. and Köller, O., Success in the first phase of the vocational career: the role of cognitive and scholastic abilities, personality factors, and vocational interests. *J. of Vocational Behavior*, 91, 11-22 (2015).
- 14. Ghrayeb, O. and Vohra, P., Experiential learning in engineering education: a case study at NIU. *Global J. of Engng. Educ.*, 13, **2**, 82-89 (2011).
- 15. Goldstein, S., *Timeless Principles for Organizational Success: the Power of Wisdom and Human Values*, *Videoconference Series*. International Training Center (2007).
- 16. Krishnamoorthy, M., Cardenas, M.A. and Kumar, R., The development of an ETK methodology to measure organizational synchronization. *Inter. J. of Technol., Knowledge and Society*, 2, 61-70 (2005).

## Lampiran 20. Menginformasikan jurnal terbit di WTE&TE, Vol.15, No.3.

12/2/21, 10:13 AM

UNNES Mail - WTE&TE, Vol.15, No.3 - on the Web



Heri Yudiono <heri\_yudiono@mail.unnes.ac.id>

Sun, Oct 29, 2017 at 4:03 PM

WTE&TE, Vol.15, No.3 - on the Web 1 message

Zenon Pudlowski <zenon.pudlowski@wiete.com.au>

To: Zenon Pudlowski <zenon.pudlowski@wiete.com.au>

Cc: "dorota.pudlowski dorota.pudlowski" <dorota.pudlowski@wiete.com.au>, Dr Dianne Nguyen <dianne.nguyen@wiete.com.au>

Dear Colleague

I am delighted to inform you that the WTE&TE, Vol.15, No.3 is on the journal's site:

http://www.wiete.com.au/journals/WTE&TE/Pages/TOC\_V15N3.html

Kindest regards

Zenon J. Pudlowski

https://mail.google.com/mail/u/0/?ik=1a2a016430 & view=pt & search=all & permthid=thread-f% 3A1582582027092420865 & simpl=msg-f% 3A15825820270... 1/1 = 1/2 = 1/

## The alignment of productive competence on machinery between vocational education institutions and industry

## Heri Yudiono

Universitas Negeri Semarang Semarang, Central Java, Indonesia

ABSTRACT: The aim of this study was to analyse the alignment performance of vocational education and industry and its impact on productive competence in machinery. This study employed concurrent triangulation and the subjects of the study were vocational education institutions, the Education Department, partners in the industrial field and the professional association. The data used in this study were validated using triangulation. The results showed that the alignment performance of productive competence in machinery between industry and vocational education did not result in the expected outcome. Academically, the overall productive competence in machinery has not been implemented in the industry and the results of alignment evaluation were still low. Institutionally, the role of the industrial sector in the implementation of competence alignment was still low, and the rate of employment of vocational school graduates in the industry showed a decreasing trend. The collaboration between industry and vocational school stakeholders has not been maximised.

## INTRODUCTION

Vocational education is an education, which prepares students to work in a specific field. Vocational education is also required to have an economic and strategic role in increasing economic growth. Therefore, its implementation should be *pro-jobs*, *pro-activity*, *pro-growth*, *pro-distribution* and *pro-prosperity*. The basic concept of vocational education should have characteristics that differ from other education in general in terms of educational criteria, substantive learning and graduates. The vocational education lesson in choosing the substantive learning must always follow the development of technology, the needs of society, the needs of individuals and the field of employment [1].

The implementation of production-based learning assists the students to prepare before joining the occupational world, to develop critical thinking, to have good moral attitudes and to motivate students to be active in learning [2]. The content of vocational education should focus on adjusting to the requirements of the labour market [3].

Vocational education is oriented to these following aspects: the performance of individuals in the occupational world; focus on the real needs in the field; the focus of the curriculum on psycho-motoric, affective and cognitive aspects; the measure of success beyond schools; sensitivity to the development of the occupational work; adequate practice facilities; and community support [4]. Vocational education plays an important role in reducing unemployment [5]. However, there are graduates of vocational education who do not get a proper job and are not satisfied with the jobs that they have, because of the unavailability of laboratory and technical equipment to develop their competence at school [6].

The conditions of vocational education indicate these following matters: 1) most vocational education institutions currently only prepare students to work in specific areas of expertise as employees; and 2) vocational education institutions are less responsive to the demands of local, national, regional and international economic development [7]. The vocational education institutions are still preoccupied with the methods and the development of learning, which may have implications on the quality of graduates who have not been able to respond to the challenges of the industrial sectors; if it is continuously carried out by the school, then, the school would be left behind [8].

One of the efforts, which has been taken by the vocational education institutions to address competency gaps is an attempt to align productive competence with the industrial sector. Management of this alignment must be conducted through an institutional establishment in a planned, integrated and sustainable manner by involving stakeholders. However, the alignment of productive competence in machinery between vocational education and the industrial sector in quantity, quality, location and time dimensions has not been formally organised [7]. The alignment could benefit both the vocational education institutions and industry, because engineering and technology education also has a pivotal role in industry [9]. The formal organisation bridging vocational education and industry is not present, and there is only one Indonesian Presidential Regulation Number 8 Year 2012 on the Indonesian National Qualifications Framework (KKNI). In 1994, there was a formal organisation, which bridged vocational education and industry, the National Vocational Education Council.

This Council was established through the Joint Decree of the Ministry of Education and Culture and the Indonesian Chamber of Commerce and Industry on the establishment of the Vocational Education Assembly, Number 0217/U/1994 and 044/SKEP/KU/VIII/94. However, now the Council is inactive. One of the success indicators in the implementation of alignment in productive competence of vocational education with industry is the reinforcement of the institutional role, hence the need for revitalising the Council's function [10].

Comprehensive collaboration between stakeholders in the industrial sector and vocational education institutions is absolutely necessary as a key indicator on quality and quantity aspects of vocational education implementation [11].

## METHOD

The concurrent triangulation method was used in this study. The subjects in the study were vocational education institutions, the Department of Education, industry partners and the professional association. The study was conducted at SMK N 1, 4, 5 and 7 in Semarang City and jointly with their partners in industry. The data were gathered from the principal, task force, chairman of the competency group, the Head of Secondary Education at the Department of Education, school inspectors, partners in industry and professional associations. The validity of data was achieved by using the triangulation approach.

## RESEARCH RESULTS

The results showed that industry served only as a place of an internship programme and only a small part of the partnership has a memorandum of understanding, while the role as validator competency, assessors and the authors to accept graduates is relatively low, as shown in Table 1.

No	Role of industry	Percentage (%)
1	Validator of productive competence	3.8
2	Assessor of productive competence test	3.8
3	Manpower recruitment	9.54
4	Providing a place for internship	100
5	Having MoU for industry internship	30.60

Table 1: Role of industry in competence alignment.

Table 2 shows that only a few aspects of machinery competence in the industry were practised by the vocational education students during their internship. Conventional lathing and milling competence were most often practised by the students during their internship in the industry, while lathing and milling competence using computer numerical control (CNC) were not conducted. Electrical and acetylene welding works were conducted during the internship. However, they were not included into productive competence with machinery.

Table 2: Students' competence during internship in industry.

No	Competence of internship industry	Percentage (%)
1	Conventional lathe	89.58
2	Milling	72.92
3	Acetylene welding work	64.58
4	Electrical welding work	58.33
5	Operating taps and dies	56.25
6	Sawing	50.00
7	Drilling	52.08
8	Honing	54.17

Table 3: Competence of vocational teacher with machinery expertise.

No	Vocational teacher competence	Percentage (%)
1	On-the-job training	54.05
2	Test assessor	22.14

Table 3 shows that the development of teacher productive competence in machinery is achieved through on-the-job training that amounts to 54.05%, and machinery test assessments, which amounts to 22.14%.

Table 4 shows that the results of the machinery competence test indicate that learners have a good score. However, the scores of the students fluctuate annually.

No	Academic year	Score
1	2011/2012	85.30
2	2012/2013	89.80
3	2013/2014	91.41
4	2014/2015	89.36
5	2015/2016	89.40

Table 4: Competency test results of machinery expertise.

The employment of graduates from the mechanical engineering programme as industrial workers, as workers in higher education and entrepreneurs showed a declining trend, as shown in Table 5.

 Table 5: Employment of graduates.

No	Academic year	Percentage (%)
1	2011/2012	82.00
2	2012/2013	73.45
3	2013/2014	71.46
4	2014/2015	66.34
5	2015/2016	70.05

## DISCUSSION

The results of the study showed that the alignment of productive competence on machinery between industry and vocational education institutions did not yield outcomes as expected. Academically, overall machinery competence of graduates did not suit the needs of industry. Therefore, the evaluation of the learning process in vocational education should not only be covered in the class learning process, but also should include competence from the alignment with the industrial sector. The management of vocational training should include pre-entering behaviour, entering behaviour, the learning process, assessment, evaluation and output [12].

The important roles of soft skills and hard skills are critical to success in the workplace [13]. Institutionally, the role of the partner from the industrial sector was still low in terms of the implementation of competence alignment with vocational high school. The rate of employment of the vocational school graduates in industry showed a declining trend and the partnership between the vocational high school and the industrial sector must be improved.

The results of this study indicated the needs of institutional management by formulating a framework of productive competence management in a more efficient, integrated and sustainable manner by involving stakeholders in both vocational education institutions and industry. One of the integrated and sustainable productive competence alignments is the *Engineers in Residence* programme at the College of Engineering and Engineering Technology (CEET) at Northern Illinois University (NIU). The students of Northern Illinois University were provided with experiential learning in industry due to the support of the College stakeholders, government, industries, students and alumni [14].

The process of alignment of *outside in* must also consider the elements outside the organisation [15]. The alignment process must be conducted at the same time in a predetermined order [16]. Comprehensive collaboration between stakeholders in the industrial sector and vocational education institutions is absolutely necessary as a key indicator of quality and quantity aspects of vocational education implementation [11].

The concept of the institutional framework of competence alignment should pay attention to three main components; namely, the demand, the supply and the alignment mechanism. The formulation of the comprehensive alignment programme requires visions of relevant dimensions. The projection of the future needs of the competence required by the industrial sector and its numbers for every business/industry is indispensable and should refer to the special characteristics and potential of the industry.

The alignment of the productive competence mechanism must be designed to ensure the implementation of the programmes. The alignment mechanism includes three main aspects:

- 1. the mechanism must be associated with a number of required activities and programmes that the information needs on the demand side can be obtained accurately and sustainably;
- 2. the mechanism must be associated with the activities and programmes needed for the availability of employable graduates and create employment (entrepreneurship);
- 3. the mechanism must ensure communication of the needs for information from the demand side to the supply side.
## CONCLUSIONS

It can be concluded from the study that:

- 1. The alignment of the productive competence on machinery between industry and vocational school was still problematic. The problems were centralised on the competence of the graduate, which did not suit the needs of industry. The role of the partners from the industrial sector was still low in terms of the implementation of competence alignment with vocational high schools. The rate of employment of the vocational school graduates in industry showed a declining trend, institutional reinforcement of the productive competence alignment must absolutely be improved, and the productive competence alignment evaluation in vocational education should not only cover the conventional learning process in the class, but also focus on the evaluation of the competence from the alignment with the industrial sector.
- 2. The institutional reinforcement is required to improve the performance of productive competence alignment of vocational education with industry. The aim is to develop an institutional management framework with advanced aspects, such as competence alignment, optimisation of the role of industry and stakeholders, empowerment of resources, integration of curriculum and learning and performance evaluation of the alignment.

## REFERENCES

- 1. Nolker, H. and Schoenfeldt, E., *Pendidikan Kejuruan: Pengajaran, Kurikulum, Perencanaan*, Jakarta: PT. Gramedia (1983) (in Indonesian).
- 2. Ganefri and Hidayat, H., Production based learning: an instructional design model in the context of vocational education and training (VET). *Procedia Social and Behavioral Sciences*, 204, 206-211 (2015).
- 3. Kulpa-Puczyńska, A., Teachers of Polish vocational schools vs. changes in the model of employment and organization of work. *Procedia Social and Behavioral Sciences*, 141, 969-975 (2015).
- 4. Finch, C.R. and Crunkilton, J.R., *Curriculum Development in Vocational and Technical Education: Planning, Content, and Implementation.* Allyn and Bacon, Inc., Boston (1979).
- 5. Blinova, T., Bylina, S. and Rusanovskiy, V., Vocational education in the system of determinants of reducing youth unemployment: interregional comparisons. *Procedia Social and Behavioral Sciences*, 214, 526-534 (2015).
- 6. Behroozi, M., A survey about the function of technical and vocational education: an empirical study in Bushehr City. *Procedia Social and Behavioral Sciences*, 143, 265-269 (2014).
- 7. Slamet, P.H., Pengembangan Sekolah Menengah Kejuruan Model untuk Masa Depan. *Jurnal Cakrawala Pendidikan*, Februari 2013, Th. XXXII, **1**: 14-26 (2013) (in Indonesian).
- 8. Uzmanoğlu, S., İşgören, N.C., AyşeÇınar, A., Tektaş, N., Oral, B., Büyükpehlivan, G., Ulusman, L., Öznaz, D. and Polat, Z., Evaluation of educational and technical structure at vocational schools. *Procedia-Social and Behavioral Sciences*, 2, **2**, 3447-3451 (2010).
- 9. Valiulis, A.V. and Valiulis, D., Reforms of higher education and current engineering education developments in Lithuania. *Global J. of Engng. Educ.*, 12, **1**, 38-44 (2010).
- 10. Yudiono, H., Model Manajemen Sinkronisasi Kompetensi Lulusan Sekolah Menengah Kejuruan Berbasis Industri pada Kelompok Mata Pelajaran Produktif Program Keahlian Permesina, Laporan Penelitian (tidak dipublikasikan), Semarang: LP2M Unnes (2015) (in Indonesian).
- 11. Yeleneva, J., Prosvirina, M., Golovenchenko, A. and Andreev, V., Analysis and organizational model for monitoring of the training of workers and specialists with secondary vocational education for innovation-oriented enterprises of Russia. *Procedia Social and Behavioral Sciences*, 214, 779-787 (2015).
- 12. Munastiwi, E., The management model of vocational education quality assurance using holistic skills education (Holsked). *Procedia Social and Behavioral Sciences* 204, 218-230 (2015).
- 13. Volodina, A., Nagy, G. and Köller, O., Success in the first phase of the vocational career: the role of cognitive and scholastic abilities, personality factors, and vocational interests. *J. of Vocational Behavior*, 91, 11-22 (2015).
- 14. Ghrayeb, O. and Vohra, P., Experiential learning in engineering education: a case study at NIU. *Global J. of Engng. Educ.*, 13, **2**, 82-89 (2011).
- 15. Goldstein, S., *Timeless Principles for Organizational Success: the Power of Wisdom and Human Values*, *Videoconference Series*. International Training Center (2007).
- 16. Krishnamoorthy, M., Cardenas, M.A. and Kumar, R., The development of an ETK methodology to measure organizational synchronization. *Inter. J. of Technol., Knowledge and Society*, 2, 61-70 (2005).