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## Editorial

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**Biographical notes:** Adhi Kusumastuti is a Lecturer in Faculty of Engineering Universitas Negeri Semarang. She works in the field of separation and purification processes under liquid membrane technology. She holds a PhD in Chemical Engineering from Universiti Sains Malaysia. Her Master's degree was obtained from Institut Teknologi Bandung. She has published articles in some international indexed journals. She has also been receiving some research grants related to her field of interest.

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## 1 Introduction

In order to regionally or internationally compete, an industry must be supported by productive labours. Labour productivity is determined by their competences which in overall would enhance the competitiveness. The implementation of vocational education in high school level is to improve the knowledge and skills of students, to prepare them to be skilled, educated, and professional labours and able to develop themselves in line with the development of science, technology and art. Teacher of vocational school is graduated from vocational education degree program.

Vocational education should be able to ensure the students in getting decent work and economic growth. The guarantee for this achievement involves many parties. However, to ensure that graduates able to immediately get their first job could be done through high quality learning process that relevant to the needs of work world. Vocational education must be pro-job, pro-activity, pro-distribution, and pro-prosperity.

Paradigm of vocational education learning are transformations of long life learning, education for all, life-based learning, and workplace learning by means of work experiences. Vocational education learning acquires adequate life skills and career skills from one phase to another. It is therefore, the learning approach of vocational education should include pedagogy, andragogy and heutagogy.

Concept of vocational education learning which leads to the development of creative problem solving skills need should be emphasised that in the future vocational education learning becomes more relevant to the development of science and technology. The effective vocational education learning is the actual and contextual learning based on work world and work competence which is convenient and feasible.

To facilitate the accumulation of knowledge on the topic of vocational education, we organised this EIC conference. The goal of these conferences was to discuss a set of papers about vocational education from a variety of disciplines and using a range of

methodologies. We brought together researchers from academicians from university and high school levels, research institutions, and government agencies. The papers presented by these researchers employed a variety of methodologies from quantitative and qualitative techniques to sophisticated vocational education analyses. By exchanging ideas and shaping these papers, we have been able to generate this volume, which provides the state-of-the-art of understanding of vocational education. We hope that the volume will further our understanding of this important topic.

## **2 Themes among the papers**

The articles in this volume investigate some themes include the compatibility of graduate competence to the business and industry requirement, the development of learning media in vocational education in line with the business and industry requirement, and actualisation of vocational education development.

The first theme – the compatibility of graduate competence to the business and industry requirement is represented by article of Sudana et al. ('The analysis of gaps in the implementation of process standard on the supervision of productive learning aspect in vocational school') that reports the evaluation of process standard in vocational school. The second theme – the development of learning media in vocational education in line with the business and industry requirement are represented by Jalinus and Nabawi ('The instructional media development of welding practice course based on PjBL model: enhancing student engagement and student competences'), Agustin et al. ('Implementation of monitoring system in facial acupressure learning media') and Widjanarko et al. ('LdesV, computer-operated video: overcoming students' difficulties in understanding automotive starting system'). While the third theme – actualisation of vocational education development are represented by Hidayah et al. ('Enhancing student clustering to generate adaptive metacognitive instructions in learning system for vocational high school'), Pribadi et al. ('Short answer scoring using W-Bleu for regular assessment in vocational high school') and Wahyuningsih et al. ('Model of local excellence-based on entrepreneurship education management for prospective vocational school teachers').

## **3 Implications of the articles**

As a group, these articles demonstrate several important themes in vocational education. The articles reveal the gaps of process standard in vocational schools. The minimum process standards have not been met by the schools. There should be further actions to minimise the gaps in the implementation of process standard.

Instructional media should be properly selected and developed based on the subjects. It was found that PjBL-model succeeds in improving learning achievements of students in the welding practice course. The difficulty of teacher in determining accurate position for facial acupressure could be solved by application of mannequin head prototype-assisted smartphone. The media provides monitoring system of facial acupressure. The accuracy of facial acupressure increased from 61.12% to be 95.23%. Limited duration electrical system video (LdesV) was used as a medium of learning to help students understand how the automotive electrical system works. The video was

effective in increasing mastery of the starting system. LdesV gave satisfactory results for significantly improved the students' learning outcomes.

Job-related knowledge and skills as well as ICT literacy of vocational students could be boosted-up by application of educational software. The development of adaptive educational software must be started by students modelling. Students clustering as a method of students modelling are used to find student groups, usually to facilitate cluster-based educational systems. The article reporting the development of a new approach to the ordinal-numerical transformation of Likert scale categories. Compared to previous clustering methods, the proposed method successfully improved the quality of student clustering product. The enhancement is indicated by higher silhouette index, strong correlation with students' work readiness score, and positive impact on students' learning gain when the method is implemented in a real class situation. The increase in average silhouette index is an outcome of a better positioning of the instances in the space.

W-Bleu similarity method was applied to measure the similarity between student answer and reference answers. The proposed method is able to overcome the problems of diversity in sentence length which have identical meaning. In addition, besides the practicality of the proposed method, the proposed method does not require any training process when applied to automatic scoring systems. The proposed method can also be applied to measure the similarity of sentences in different languages and domains. Moreover, the proposed method can generate final score directly, with interval form, as rewards for students.

A model has been developed to describe the needs of entrepreneurship education management. The final model of entrepreneurship-based entrepreneurship education management can be used effectively so as to enhance the entrepreneurial character, knowledge and skills of prospective teachers of fashion.

### **Acknowledgements**

I would like to thank the Dean of the Faculty of Engineering Universitas Negeri Semarang for hosting the 6th Engineering International Conference at October 2017 in which the original versions of some of these papers were presented and discussed. I am grateful to Universitas Negeri Semarang and ADHI Karya for providing support for this conference. I am very thankful to our committee members who generously gave their time to evaluate the manuscripts submitted to the conferences and special issue.