



World Institute
for Engineering
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Education (WIETE)

Lampiran B-7

World Transactions on Engineering and Technology Education

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World Institute for Engineering and Technology Education (WIETE)
Melbourne, Australia

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Editorial

This year's concluding issue of the World Transactions on Engineering and Technology Education (WTE&TE), designated as Vol.11, No.4, includes 44 highly revealing and educational articles coming from authors based in 11 countries worldwide. The majority of articles come from engineering and technology academics affiliated with higher education institutions in the People's Republic of China. The other contributions come from Australia, Germany, Greece, the Kingdom of Saudi Arabia, Indonesia, Lithuania, Slovenia, Thailand, Taiwan and the United States of America, and most of this group's articles will be presented at the forthcoming 5th WIETE Annual Conference on Engineering and Technology Education, to be held in Bangkok, Thailand, between 17 and 21 February, 2014.

The 5th WIETE Annual Conference on Engineering and Technology Education, under the theme *Student-centred Engineering and Technology Education*, is being organised at the Cinnamon Residence in Bangkok, which is under the management of Mr Virat Praprueetdee a highly experienced colleague with whom we have organised close to ten very successful international conferences over the last 15 or so years. It is envisaged that apart from an interesting academic programme, the Conference will provide the setting for useful and friendly interactions, as well as an occasion for enjoyment at a range of social events and tourist attractions. WIETE members, associates and sympathisers not yet registered should consider taking advantage of this excellent opportunity to attend the Conference.

This present issue of the WTE&TE commences with an article entitled: *The niche institute strategy - the way out of economic crisis for Greek higher educational institutions: the case of the Technological Educational Institute of Western Greece*, authored by Professor Georgios C. Kabouridis, Head of the Department of Mechanical Engineering at the newly formed Technological Educational Institute of Western Greece in Patras, Greece. In his article, the author states that his goal is:

...to analyse and evaluate the effects of the current economic and social crisis in public tertiary education in Greece. It concentrates on the opportunities and challenges that might arise from the complicated situation for the sector within the framework of a vulnerable economy, taking into account the recent restructuring initiatives that have been instigated by the Greek government. To repay its debt, Greece must succeed on two fronts: the country must become more competitive and more productive. To cope with the above targets, it is imperative that it proceed rapidly with structural changes, which are expected to bring back the country to sustainable development. Within these changes, public tertiary education has a unique opportunity to re-establish its role of forging a link between academia and industry, and to re-position tertiary education in the new environment. The article analyses the case study of the newly founded the Technological Educational Institute of Western Greece, established by merging the Patras and Messologi technological institutes.

The reading of this article is a must for all colleagues involved in higher education, as Greece is no exception to the impact of the recent GFC on academic institutions, and should be taken as an interesting case study.

Readers will observe that after a few years' interval, global engineering and technology educators will have the opportunity to meet again at the 3rd World Conference on Technology and Engineering Education, to be held at the Technological Education Institute of Piraeus, Piraeus-Athens, Greece, between 8 and 11 September 2014, with the Mediterranean Centre for Engineering and Technology Education (MCETE) and the World Institute for Engineering and Technology Education (WIETE) jointly providing the organisational support.

In making this issue available to the international public, I would like to express my cordial thanks to the referees for their timely reviews. I would also like to offer my heartfelt gratitude to our Associate Editors, Dr Dianne Q. Nguyen, Ms Krystyna B. Wareing and Dr Ian R. Dobson, for their invaluable assistance in the preparation of this issue for publication.

Zenon J. Pudlowski

Predicting students' final passing results using the Apriori Algorithm

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ABSTRACT: The studies discussed form part of a programme, other aspects of which have been previously considered [1][2]. The ultimate objective is to facilitate a lecturer in helping students to predict their final passing results based on their performance in several subjects in the first four semesters of their study period. In previous research, this aim was achieved through two techniques: discriminant analysis [1] and the Classification and Regression Trees (CART) algorithm [2]. Those two techniques resulted in a diagramme-based relationship. In this research, a rule-based relationship of the form *IF - THEN* is introduced and subsequently applied using software based on the Apriori Algorithm.

INTRODUCTION

This research project continues a theme that was considered in previous studies [1][2], the objective of which was to facilitate a lecturer in helping students to predict their final passing results based on their performance in several subjects in the first four semesters during their study period. The arguments for why this kind of prediction is considered important were discussed in [2] and are rewritten in the Appendix. The passing results in the Indonesian education system are classified into three grades: Extraordinary (Cum Laude), Very Satisfactory and Satisfactory [3].

The research was undertaken in the same institution, the Faculty of Information Technology, a university in Bandung, West Java, Indonesia. For reasons of confidentiality, the full name of the institution has not been included. In the two previous works, it was demonstrated that discriminant analysis [1] and the Classification and Regression Trees (CART) algorithm [2] helped academic advisors in this faculty to predict the final passing results of a student based on his/her grade in some subjects during the first four semesters during their undergraduate programme. This sort of facility enables academic advisors to assist students in setting up their study plans each semester in order for them to perform to their full potential [1][2]. Moreover, this work aims at helping the academic advisors with a more practical way of predicting the final passing results of a student.

In this research, a data mining task called an *association* was employed. Association is performed through a technique called the Apriori Algorithm. This algorithm produces some rule-based relationships in the form *IF- THEN* statements. This kind of statement serves in a more *ready to read* feature compared to the territorial map or decision tree employed in the previous work in [1] and [2], respectively.

OVERVIEW OF BACKGROUND THEORY

David Hand et al define data mining as *the analysis of (often large) observational data sets to find unsuspected relationships and to summarize the data in novel ways that are both understandable and useful to the data owner* [4]. The observational data or the data to be summarised are often called the *training data*. Data mining has six tasks: description, estimation, prediction, classification, clustering and association [4]. Association is based on affinity analysis, the study of attributes or characteristics that *go together*. One amongst several methods for affinity analysis is market basket analysis, which tries to discover associations among these attributes with the aim to discover association rules for quantifying the relationship between two or more attributes.

The association rule takes the form *If antecedent, then consequent*, which for reasons of simplicity often desires a single consequent [4]. The performance measures of this rule are the *support, confidence, rule support, lift and deployability* outcomes. With the assistance of the SPSS Clementine 10.1 software package, these measures are first defined by the