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With this publication, the CD with all papers from the International Conference on Information Technology and Development of Education, ITRO 2014 is also published.

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INTRODUCTION

This Proceedings comprises papers from the **International conference on Information technology and development of education** that is held in the National House of Mihajlo Pupin, Idvor on June 27th 2014.

The International conference on Information technology and development of education has had a goal to contribute to the development of education in Serbia and in the region, as well as, to gather experts in natural and technical sciences' teaching fields.

The expected scientific-skilled analysis of the accomplishment in the field of the contemporary information and communication technologies, as well as analysis of state, needs and tendencies in education all around the world and in our country have been realized.

The authors and the participants of the Conference have dealt with the following thematic areas:

- Theoretical and methodological questions of contemporary pedagogy
- Personalization and learning styles
- Social networks and their influence on education
- Children security and safety on the Internet
- Curriculum of contemporary teaching
- Methodical questions of natural and technical sciences subject teaching
- Lifelong learning and teachers' professional training
- E-learning
- Education management
- Development and influence of IT on teaching
- Information communication infrastructure in teaching process

All submitted papers have been reviewed by at least two independent members of the Science Committee.

The papers presented on the Conference and published in this Proceedings can be useful for teacher while learning and teaching in the fields of informatics, techniques and other teaching subjects and activities. Contribution to science and teaching development in this region and wider has been achieved in this way.

The Organizing Committee of the Conference

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CLUSTERING OF KNOWLEDGE INNOVATION IN STANDARDIZED “HARDWARE'S” SUBFIELDS OF INFORMATION TECHNOLOGY

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Abstract – The paper describes clustering of knowledge innovation in Information technology (IT) subfields related to hardware. According to the International Classification of Standards (ICS), as IT 35th area (ICS1 = first classification level), continue classified for 12 subfields of its second level (ICS2 = 35.xy0). The original methodology is used here which is applied to ranking/clustering of standardized fields presented on examples of innovation trends in IT subfields (ICS2): 35.160 - Microprocessor systems; 35.180 - IT terminal and other peripheral equipment; 35.200 - Interface and interconnection equipment; 35.220 - Data storage devices. A multi-criteria and statistical analysis of knowledge sources was applied in the paper. The goal of the research is forming knowledge trends and their clustering at more levels, from the standpoint of innovation frequency. Results of study in IT subfields leads to the more sensitive ranking of all 40 classified fields of human endeavor (ICS1 = 1 to 99).

I. INTRODUCTION

Knowledge innovation leads to the continuous improvement of processes and products and it involves a constant systematization through clearly defined fields of work. With the standardization at a local level (Serbian standards [1], hereinafter: SRPS) and at a global level (international standards, hereinafter: ISO/IEC [2]), it directs to linking the knowledge that would lead to identifying potential differences and determining the measures to improve products and processes.

Clustering of knowledge and innovations is imposed as a potential solution at the constant growth of data available in different categories of creativity. Clustering involves the grouping a set of objects in such a way that objects in the same group (called a cluster) are more similar to each other than to those in other groups (clusters) [3].

A clustering method has been applied in many

fields, including the analysis of innovations in different fields of creativity: within the analysis of regional innovations in Canada in the field of economics [4]; measuring the importance of innovations which are the results of research at universities [5]; clustering of innovations in technical systems [6] etc.

In this paper, clustering was used in order to obtain accurate information about innovations in the subfields of Information technologies related to hardware. From the set goal, general tasks of the research follow (in PDCA spiral):

- *Plan*: data collection, resource planning,
- *Do*: data analysis, creation and analysis of trends,
- *Check*: determination of the level of innovativeness/ clustering,
- *Act*: knowledge innovation, towards the model of excellence.

II. METHODOLOGY OF WORK

In this paper, the methods of Web searches, then statistical methods with descriptions, multi-criteria analysis and clustering are used.

A. Collection and selection of data

The data were collected from the Website of the National Institute for Standardization [1] and the International Organization for Standardization [2].

The selection of the data is done in terms of clustering and determination of an innovativeness level. Here are excluded (from presentation) those subfields (or sub-groups) in which the entire sample is less than 30. The analysis is carried out with the own software [7], with a review of the data obtained in OpenOffice 4 [8]. After reviewing and sorting the data by years, diagram charts and

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