Editorial: Exploring Computing's Impact on Design and Creativity in MST Education

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For the past decade, we have witnessed two emerging trends in the academic world: Open Access and Interdisciplinary Research (OAIR). The Open Access movement aims at freeing published research output to be accessed and used by anyone in the world without any restrictions, while interdisciplinary research tries to eliminate man-made disciplinary boundaries to make scientific investigations more dynamic and integrated. The call for paper of this special issue attempts to echo OAIR by soliciting studies, which are more interdisciplinary in nature, to be published in this high-impact open access journal in our field.

The special issue entitled "Exploring Computing's Impact on Design and Creativity in MST Education" invites papers investigating how interactive computing systems and socio-technical processes affect design and creativity, specifically in the areas of Mathematics, Science, & Technology Education. We cherish design and creativity as a wonderful aspect of human experience. Creativity is the partner of inspiration, of moments when we seem to go beyond ourselves to reach new heights. Creativity is the forefront of innovation. The papers presented in this special issue also address the impact of computing on individual design and creative experiences, as well as social and collaborative contexts. The topics of this special issue include (1) creativity support environments (Virtual vs. Physical; Online vs. Offline), (2) studies of technology, people, and creativity, and cognition (3) creative works that utilize computing to engage, stimulate, and provoke human experience. We see research, investigating the impact of computing on design and creativity, not as a fledgling field, in which methodologies are unknown and uncertain, but rather as having reached a relatively mature state, in which various diverse methodologies have been developed and applied. Methodologies and theories, while perpetually under development, are already quite viable.

This special issue selects 25 papers from Taiwan, Turkey and Poland about following topics in MST Education:

(1) Mathematical and Scientific Methods on Design:

Hsieh presents a paper entitled "Online Learning Era: Exploring the Most Decisive Determinants of MOOCs in Taiwanese Higher Education". This research employs a series of analytical cross-measurements of Quality Function Deployment method of House of Quality (QFD-HOQ) model and Multiple Criteria Decision Making (MCDM) methodology to cross-evaluate the weighted questionnaire results based on three major analytical perspectives (higher education student's desires, online-learning technological functions and online-education scholar's considerations) to assess the interplays between the WHATs (students' online-learning interests) and the HOWs (the technological online-education measures), based on the higher research reliability and validity. Liang et al. present a paper entitled "A Study on Design-oriented Demands of VR via ZMET-QFD Model for Industrial Design Education and Students' Learning". The findings of this study are the creation of a concept of a designer-oriented virtual reality system that can truly help industrial design education and students' learning. Tran et al. present a paper entitled "Design Genetic Algorithm Optimization Education Software based Fuzzy Controller for a Tricopter Fly Path Planning". In this paper, the feasibility of a Genetic Algorithm Optimization (GAO) education software based Fuzzy Logic Controller (GAO-FLC) for simulating the flight motion control of Unmanned Aerial Vehicles (UAVs) is designed. Su et al. present a paper entitled "Developing and Evaluating Creativity Gamification Rehabilitation System: The Application of PCA-ANFIS Based Emotions Model". This study aims to explore the factors in a patient's rehabilitation achievement, after utilizing total knee replacement (TKR) patient exercises, using a PCA-ANFIS emotion model-based game rehabilitation system, which combines virtual reality (VR) and motion capture technology. Hsu et al. present a paper entitled "Application of the Environmental Sensation Learning Vehicle Simulation Platform in Virtual Reality". In this study, a vehicle driving simulation system was developed to support novice drivers in practicing their skills. Specifically, the vehicle driving simulation system was designed according to various driving environmental factors that may be encountered while traveling, including roads, time, weather, ambient scenery, traffic flow, and vehicle of the driver.

(2) Human-Computer Interactions:

Chang et al. present a paper entitled "Efficacy of Supplementary Image Schemes on Reading Motivation and Comprehension". This study examines the efficacy of three teaching methods, namely: passive supported image pedagogy, active supported image pedagogy, and traditional instruction, in increasing the reading motivation and comprehension of students. Gliniecka presents a paper entitled "Creative Process? Study on Future Creative Professionals". The aim of the study was to evaluate and observe proficiency in talking about one's ideas and communicate about creative process that led to them. The study has shown that creative process is identified only with its final phase – ideation. Tu et al. present a paper entitled "The Influence of Design Strategy of Peer Learning on 3-D Software Learning". The study aimed to develop "design strategy of peer learning" and to conduct observation in the classroom. The researcher took an "observation survey" as a research method and utilized it to design teaching methods, hoping to improve class learning atmosphere and learning attitude. Chai et al. present a paper entitled "Mobile Inverted Constructivism: Education of Interaction Technology in Social Media". In this paper,

based on the theory of constructivism learning, a model named Mobile Inverted Constructivism (MIC) is provided. Moreover, in view of the functional quality of social media in China, the Mobile Inverted Constructivism system (MICs) is designed on the platforms of WeChat and Baidu Post Bar. Lee presents a paper entitled "Primary Study of Attitudes of Schoolchildren in Rural and Remote Areas Toward Digital Imaging Learning—Taking Film-Making Summer Camp as an Example". This study aims to understand the schoolchildren's capability in digital imaging, and to discuss their learning attitude towards educational activities and feelings during filming.

(3) Educational Aspects on Design:

Wu et al. present a paper entitled "A Concept Transformation Learning Model for Architectural Design Learning Process". This study aims to propose a concept transformation learning model to achieve the learning objective via the input-process-output learning process, which focuses on: (1) the information transmission of the concept (or conceptual frame); (2) the students' simulation, analogy, analysis, and innovation; and (3) the works output (or learning output). Pan et al. present a paper entitled "Design and Implementation of Marine Information System, and Analysis of Learner's Intention Toward. The goal of this study is to conduct further research and discussion on applying the Internet on marine education, utilizing existing technologies such as cloud service, social network, data collection analysis, etc. to construct a marine environment education information system. Chang et al. present a paper entitled "Yet another adaptive learning management system based on Felder and Silverman's learning styles and Mashup". This study designs and implements an adaptive learning management system based on Felder and Silverman's Learning Style Model and the Mash up technology. In this system, Felder and Silverman's Learning Style model is used to assess students' learning styles, in order to provide adaptive learning to leverage learners' learning preferences. Hsieh et al. present a paper entitled "Is Online Learning Able to Effectively Decrease Tuition and Miscellaneous Fees Debt of Higher Education in Taiwan". This research utilizes Factor Analysis (FA) approach to analyze the weight-questionnaire of random Taiwanese college students and furthermore, employ Technology Acceptance Model (TAM) and Analytical Network Process (ANP) model to verify interplays and correlations between online learning and Tuition and Miscellaneous Fee Debt (TMFD) through a series of assessed weight-measurements of higher-education students' and experts' questionnaires. Akgunduz presents a paper entitled "A Research about the Placement of the Top Thousand Students in STEM Fields in Turkey between 2000 and 2014". This research was carried out to investigate the STEM fields' placement of the top thousand students placed in science and mathematics fields in universities, the Student Selection and Placement Center (ÖSYM) university placement data as a basis. Chen et al. present a paper entitled "The Effects of Game-Based Learning and Anticipation of a Test on the Learning Outcomes of 10th Grade Geology Students". This study examines whether a Role Play Game (RPG) with embedded geological contents and students' anticipation of an upcoming posttest significantly affect high school students' achievements of and attitudes toward geology.

(4) Design on Internet Technology and Application:

Shen presents a paper entitled "Lexicon Sextant: Modeling a Mnemonic System for Customizable Browser Information Organization and Management". This paper presents an ongoing study of the development of a customizable web browser information organization and management system, which the author has named Lexicon Sextant (LS). LS is a user friendly, graphical web based add-on to the latest generation of web browsers, such as Google Chrome, making it easier and more

intuitive to store and retrieve favorites (bookmarks) since it only uses two levels (six main headings & 12 sub-headings). Tsai et al. present a paper entitled "An Intelligent Recommendation System for Animation Scriptwriters Education". This research takes the script and analyzes the structure of the text in a structured way, and defines scenes, characters, positions, dialogue, etc. by drama attributes. Then these attributes are corresponded to the "Animated behavior by Understanding the Script Module" designed by this research, and calls on the Institute of Design for scenes, props and role-related databases, resulting in a corresponding picture. Yeh et al. present a paper entitled "Computing Technologies and Smart Mobile Devices". This study applied cloud computing technology and smart mobile devices combined with a streaming server for parking lots to plan a city parking integration system. Chang et al. present a paper entitled "A Multi Criteria Group Decision-making Model for Teacher Evaluation in Higher Education Based on Cloud Model and Decision Tree". This paper proposes a cloud multi-criteria group decision-making model for teacher evaluation in higher education, which is involving subjectivity, imprecision and fuzziness.

(5) Innovations on Design and Technologies:

Huang et al. present a paper entitled "Developing a Decision Model of Sustainable Product Design and Development from Product Servicizing in Taiwan". The purpose of this study was to construct a decision model for sustainable product design and development from product servicing in Taiwan. The study used the grounded theory to extract the results of the expert interviews to analyze factors of sustainable product design and development under principles of product servicing. Tu et al. present a paper entitled "Analyzing Key Success Factors of Green Brands for Enterprises in Taiwan". This study identified how enterprises can successfully operate green brands, and focused on enterprises manufacturing daily necessities. Through a literature review, rules and an operational strategy were derived. Wu et al. present a paper entitled "An Integrated BIM and cost estimating blended learning model – acceptance differences between experts and novice". This study proposes a blended learning environment which can provide students with support for their face-to-face learning activities in the classroom and also give them the opportunity of "learning by doing" through their practice with online construction projects in the web-based BIM (building information modeling) & cost estimating system. Zhong et al. present a paper entitled "A New Perspective on Design Education: A "Creative Production-Manufacturing Model" in "The Maker Movement" Context". The aim of this article is to establish a "creative production-manufacturing" process based on "The Maker Movement" context along with the relationship between "media-as-tools" and "creative production- manufacturing". The article also discusses how the media impact the "creative production-manufacturing" process as tools. Lo presents a paper entitled "Building a Relationship between Elements of Product Form Features and Vocabulary Assessment Models". In this study, a product-shape design method was proposed. With this method, designers are able to communicate with their clients via the Internet and develop more suitable products for consumers by evaluating their impressions with the assistive system.

We wish for this special issue to enable interdisciplinary collaboration between science, design technologists and educator in the academic and industrial fields as well as networking internationally. It's our hope to facilitate more collaboration around the world through these OAIR studies published in Eurasia Journal of Mathematics, Science & Technology Education.