Editorial

Selected Papers from the Eurasian Conference on Educational Innovation 2019

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Abstract: The Second Eurasian Conference on Educational Innovation 2019 (ECEI 2019) was held in Singapore, 25–27 January 2019, and provided a communication platform for researchers on the topic of educational innovations. This conference aims to enable interdisciplinary collaboration between educators and experts from other areas in the academic and industrial fields, as well as international networking. Sustainability is an international and cross-disciplinary scholarly, open access journal on environmental, cultural, economic and social sustainability of human beings, which provides an advanced forum for studies related to sustainability and sustainable development. It encourages researchers to publish their experimental and theoretical research relating to natural sciences, social sciences and humanities in as much detail as possible in order to promote scientific predictions and impact assessments of global change and development. This Special Issue, "Selected Papers from the 2nd Eurasian Conference on Educational Innovation 2019", aims to invite excellent papers from ECEI 2019 about the topics of education and awareness of sustainability. The aim is to encourage the attendees of ECEI 2019 to publish their experimental and theoretical research relating to educational innovation.

Keywords: educational innovation; sustainability; cultural or social sustainability

1. Introduction

The Second Eurasian Conference on Educational Innovation 2019 (ECEI 2019) was held in Singapore, 25–27 January 2019, and provided a communication platform for researchers on the topic of educational innovations. This conference aims to enable interdisciplinary collaboration between educators and experts from other areas in the academic and industrial fields, as well as international networking. *Sustainability* is an international and cross-disciplinary scholarly, open access journal on the environmental, cultural, economic and social sustainability of human beings, which provides an advanced forum for studies related to sustainability and sustainable development. It encourages researchers to publish their experimental and theoretical research relating to natural sciences, social sciences and humanities in as much detail as possible in order to promote scientific predictions and impact assessments of global change and development. This Special Issue, "Selected Papers from the 2nd Eurasian Conference on Educational Innovation 2019", aims to invite excellent papers from ECEI 2019 about the topics of education and awareness of sustainability. The aim is to encourage the attendees of ECEI 2019 to publish their experimental and theoretical research relating to educational innovation.

2. The Topics of Educational Innovations on Sustainability

This special issue selected 38 excellent papers from 220 papers presented in ECEI 2019. The published papers are introduced as follows:

Kim et al. reported "Utility of Digital Technologies for the Sustainability of Intangible Cultural Heritage (ICH) in Korea" [1]. This paper concludes with tentative questionnaires for ICH holders and successors, engineers and technicians, and the general public who would have experienced the virtual reality (VR) programmes. The questions are designed to evaluate the "educational", "technical", and "inducing" effects of the programmes. The ultimate aim of this article is to suggest the potential utility of digital technologies for safeguarding ICH and to encourage an interdisciplinary conversation on the topic.

Wang et al. reported "Research on the Sustainable Development of Traditional Dwellings" [2]. This paper investigated plane layout, space structure, and materials of Dai dwellings, and found that traditional Dai dwellings are wooden-frame structures with wood and bamboo; the roof has two layers and long overhang eaves, which is good for diverting rain water, shading and shelter, and integrating the building with the natural landscape as well. Analyzing the spatial characteristics and problems of Dai dwellings at present, discussing the sustainable development ideas of Dai dwellings, constructing Dai dwellings with low-energy consumption and high quality of life, combining traditional culture with ecological technology, and designing a sustainable new green living model are beneficial to the inheritance of Dai residence culture.

Lan et al. reported "Influences of Transformational Leadership, Transactional Leadership, and Patriarchal Leadership on Job Satisfaction of Cram School Faculty Members" [3]. In this study, 400 New Taipei City cram school faculties were invited to be the research objects to study the influences of transformational leadership, transactional leadership, and patriarchal leadership on job satisfaction. This study adopted the method of intentional sampling to conduct a questionnaire survey. After collecting data, SPSS 12.0 software was used to analyze the descriptive statistics, reliability analysis, description of statistics, *t*-test method of single-factor analysis of variance, and regression. This study aimed to provide suggestions and references for the cram schools' leaders to change their leadership styles and improve their employees' job satisfaction. Cram schools that take the suggestions and references could improve their working environment and become more competitive in the education industry.

Xiong et al. reported "A Qualitative-Quantitative Evaluation Model for Systematically Improving the Creativity of Students' Design Scheme" [4]. This study attempted to integrate cross-disciplinary research methods and analytical techniques for the construction of a reasonable and highly effective evaluation model for ranking the creativity performance in students' practice assignments and further promote the continuous improvement of each design scheme. The complementarity and congruence of both research methods will then be investigated, which is followed by the construction of a new evaluation model that combines both qualitative and quantitative analytical techniques. Furthermore, it will demonstrate the research stages and procedures by applying this evaluation method to empirical research. Lastly, the results of the research will be used to understand the positive impacts of this evaluation method on the sustainable development of design education.

Lee et al. reported "Service Effectiveness of the Nature Centers for Sustainability of Environmental Education and Forest Policy Implications" [5]. The purpose of this study was to explore the relationship between service effectiveness of the Nature Centers of Forest Bauru of Executive Yuan in Taiwan (Nature Centers) and sustainability of environmental education and forest policy implications. The participants (n = 1520) were selected through purposive and quota sampling, and the questionnaires were divided into four categories: potential target customer groups, potential operators, the public, and website users from 1 July to 31 August 2017. Canonical correlation analyses were used to explore the relationship between two variables. The study results revealed the significant relationships between service effectiveness and forest policy implications, and two canonical factors were extracted. The implication for further research and practical applications in terms of cultural and creative research is suggested.

Tu et al. reported "A Study on the Preference of Healing Products for Single Office Workers of Various Lifestyles" [6]. The purpose of this study is to determine the preference of single office workers with different lifestyles regarding healing products. The lifestyle characteristics and preferences of single office workers were investigated via a questionnaire survey. Through SPSS statistical software, the preference factors of single office workers of different groups regarding different healing products were analyzed, and the lifestyle characteristics and preferences of each group were subsequently obtained. The results show that the lifestyle of single office workers could be divided into three groups. On the whole, single office workers considered healing products to be interesting and impressive with attractive and charming appearances, as well as offer the function of transforming negative emotions. This study hopes that the design principles obtained can provide an important reference for product designers to design relevant healing products for single office workers.

Lee et al. reported "Effects of Sports Activity on Sustainable Social Environment and Juvenile Aggression" [7]. This research used the Korean Children and Youth Panel Survey (KCYPS) which surveyed 2378 adolescents by multi-stage stratified cluster sampling from 98 schools across South Korea. The data was analyzed by reliability analysis, correlation analysis, exploratory factor analysis, multiple regression, and path analysis with SPSS ver. 23.0 program for Windows. The results were as follows: Firstly, sports activity had a statistically significant effect on the sustainable social environmental factors, and teacher and friend relationships. Secondly, it was found that sustainable social environment had a statistically significant effect on juvenile aggression toward others and oneself. Lastly, sports activity also showed an indirect effect on juvenile aggression toward others and oneself. This means that sports activity affects juvenile aggression through a sustainable social environment. In detail, more sports activity could positively improve one's relationships with teachers and friends and then reduce aggression toward both others and oneself.

Fan et al. reported "Application of Information Technology in Preschool Aesthetic Teaching from the Perspective of Sustainable Management" [8]. This study investigates the current status of aesthetic education as implemented in information technology by preschool teachers in New Taipei City. To that end, stratified random sampling of preschool teachers in New Taipei City was conducted, and the selected teachers, 235 in total, then answered a questionnaire developed specifically for the study. The survey results indicated that "teacher" was the job title/position of most of the respondents, the largest percentage of whom were more than 41 years of age and had an education level consisting of a qualification received from a teacher's college or university of education. Moreover, the results indicated that the teaching models employed by the majority of respondents focused on "thematic teaching." With regard to their integration of information technology in their teaching of aesthetic education, the survey results indicated that the teachers obtained the highest average score for the "knowledge of information technology" dimension.

Tu et al. reported "Consumer Needs for Hand-Touch Product Designs Based on the Experience Economy" [9]. This study adopted the experience economy perspective to investigate the development of hand-touch products. To gain further insight into consumers' product needs and place the focus of product development on the most important aspects, this study primarily adopted a questionnaire survey and Kano's two-dimensional model to classify quality factors. In addition, the relative majority method was used to classify quality factors into five major categories: Attractive quality, One-dimensional quality, Must-be quality, Indifferent quality, Reverse quality. The study results showed that: (1) consumers valued the sense marketing of hand-touch products; (2) timely use of other marketing approaches enables a product to effectively meet customers' needs; (3) use of Cross Analysis to Identify Top-Priority Factors. This study's findings on the true needs of consumers for hand-touch products can enhance and improve product life cycle, thereby achieving the sustainable development of products.

Fan et al. reported "Discussion on Sustainable Development Strategies of the Traditional Handicraft Industry Based on Su-Style Furniture in the Ming Dynasty" [10]. This study first sorts out and summarizes the historical experience of the industry's successful development. Next, sustainable

development strategies for the contemporary traditional handicraft industry are explored, and opinions on the inheritance and development of the traditional handicraft industry at the present stage are put forward. Based on the diamond model, this study of Su-style furniture in the Ming Dynasty shows that its competitive advantages in this period included style, material, and skill, and the contributions of the government and consumer demand played important roles in these competitive advantages. Therefore, the current development of the traditional handicraft industry requires both external heritage protection of the government and the internal transformation and innovation of the industry.

Chi et al. reported "A Post-Training Study on the Budgeting Criteria Set and Priority for MALE UAS Design" [11]. This study fills the gap by providing the "second application" of budgeting knowledge discovery educational framework (BKDEF), which is to support another similar decision for designing the medium-altitude long-endurance unmanned aerial system (MALE UAS). This paper verified the effectiveness of the framework through an empirical application and obtained the knowledge required to allocate a budget for MALE UAS design following the group-opinion basis. In addition, the original analytical style for the last "decision analysis" phase of BKDEF, which included pure quantitative analytical items in order to understand the similarities and diversities in the individual opinions, was replaced by a comparative study to discover the homogeneity and heterogeneity between the two budgeting decisions in a larger scope. The results pave a way for future studies on how other military aircrafts are designed, as more confidence about the use of a BKDEF can be gained from increasing applications, thus more insightful aerospace knowledge can be exploited in comparisons with these works.

Hsu et al. reported "Discussion on the Reinforcement of Reinforced Concrete Slab Structures" [12]. This study proposes an improved repair and retrofit technique that includes the removal of rust from oxidated rebar parts, by applying low viscosity epoxy resin to the slab base and allowing it to fully penetrate the concrete cracks and surface of the rebars inside, thus producing a protective layer and repairing the bond. Additionally, carbon-fiber reinforced plastic (CFRP) patches were adopted as repair materials and attached to the beams and slab (ceiling) surfaces. Angle steels were used at the edges and installed to connect the beams to the slab with chemical anchors. The gaps between the angle steels and the slab were filled with epoxy resin grout. On the short side of the slab, small steel H-beams were installed 1 m apart as a means of retrofit. Because the epoxy resin expands by 8% after undergoing chemical reactions, it bonds perfectly with concrete, CFRP patches, and steel materials. Approximately 10 years have elapsed since the case-study was repaired using the proposed technique, and the retrofit effect has yielded excellent results to the present day, with no occurrence of internal swelling or spalling from rebar oxidation. The proposed retrofit technique can reduce construction costs, while ensuring effective repair and maintenance of structural safety, and extend the service life of structures.

Tan reported "An Empirical Study of How the Learning Attitudes of College Students toward English E-Tutoring Websites Affect Site Sustainability" [13]. This study utilized the Technology Acceptance Model (TAM 3) to explore the learning attitudes of college students with respect to English e-tutoring websites, an approach that has rarely been employed from the perspective of information technology and the global e-digital market. More specifically, the study used college students' assessments of self-paced business English e-learning websites to investigate the adoption of those sites. Using simple linear regression analysis, the research explored the question of whether engagement in e-learning was able to enhance the students' willingness to learn. The results of the analysis indicated that the majority of English e-tutoring users felt that online sources for learning English offer greater convenience and are more effective than non-internet resources. This finding suggests, in turn, that the web designers of business English e-learning websites could maintain and enhance the loyalty of site users by taking care to ensure the quality of the sites' content.

Ho et al. reported "Research on 3D Painting in Virtual Reality to Improve Students' Motivation of 3D Animation Learning" [14]. The purpose of this study was to investigate the use of 6-DoF high immersive virtual reality for stereoscopic spatial mapping to assess the impact of perceived spatial

capabilities on 3D software learning motivation. This study was not a bound course with mandatory participation, and students were free to participate in the trial, and employed HTC VIVE (a virtual reality headset developed by HTC and Valve), which provides highly immersive experiences, to elicit strong emotional responses. A total of 111 students from a university digital media department were invited to participate in a three-dimensional virtual reality (3D VR) painting experiment in which students created paintings using Google Tilt Brush. A 5-point scale based on the attention, relevance, confidence, satisfaction (ARCS) learning motivation model was adopted to collect student data. Perform a factor analysis of the data twice to select the appropriate factor ($p = 0.000 < 0.05$). Specifically, exploratory factor analysis was used to classify factors based on four constructs. The Cronbach alpha values of ARCS were 0.920, 0.929, 0.693 and 0.664, respectively, both > 0.6, which still indicate favorable reliability. The results show that immersive VR can promote students' motivation and interest in learning 3D animation.

Kim et al. reported "Designing an Efficient Cloud Management Architecture for Sustainable Online Lifelong Education" [15]. In this paper, the authors design a cloud-based information system architecture for online lifelong education. Since a cloud system is based on virtualization technology, the authors propose a virtual resource management scheme—virtual machine allocation and monitoring nodes assignment. With the proposed cloud-based architecture, an e-learning information system can be built and operated for online lifelong education, which requires efficiency, reliability, and persistence. The evaluation results show that our proposed method can deal with more tasks for e-learning (requests for learning management system (LMS) navigations, text learning contents, text and media learning contents, and video learning contents) while introducing 48× fewer service level agreement (SLA) violations than the existing method.

Hwang et al. reported "Cultural Ecosystem of the Seediq's Traditional Weaving Techniques—A Comparison of the Learning Differences Between Urban and Indigenous Communities" [16]. This study focuses on the interaction and feeling of students during the weaving courses given in two communities, analyzes how the differences of feeling and cultural background influence the learning perceptions of the students of the two communities, and examines the significance and functions of rebuilding the cultural ecosystem for the sustainable inheritance of skills. The conclusion of this study is that urban communities learn weaving purposefully because they have no cultural or technical background, while the courses for indigenous communities feature the frequent recurrence of traditional "old value". The different learning motivations, feelings, and perceptions of the two communities can be complementary and mutually supportive to each other. After exploring the cultural context, this study finds that the cultural ecosystem generated by indigenous weavers includes Gaya belief, natural knowledge, indigenous languages, personal practice, generational links, and social interaction, which are strongly bound to each other. The analysis of this study provides an important reference for the feasible routes of carrying forward indigenous techniques on the brink of disappearing in the current society of cultural initiative, and provides the opportunity for reconnecting cultural ecosystem through technique acquisition.

Cheng et al. reported "Development of an Issue-Situation-Based Board Game: A Systemic Learning Environment for Water Resource Adaptation Education" [17]. This study developed an issue-situation-based board game, namely Water Ark, to enhance participants' water resource (WR) knowledge. In this study, participants were divided into four groups with each playing the role of a WR-related organization: the government, agricultural sector, industrial sector and public guild. Scales and interviews were used to assess participants' performance. The findings revealed that during the game, participants gradually changed from profit-oriented self-interest strategies to altruistic strategies based on social public benefit. Furthermore, after playing Water Ark, participants' cross-oriented system knowledge (COSK), responsibility for WR environment (RWRE), value of public benefits (VPB), and empathy and negotiating thinking (EaNT) were found to have improved substantially. Thus, Water Ark is believed to be a useful tool for assisting WRA education.

Su et al. reported "A Sustainability Innovation Experiential Learning Model for Virtual Reality Chemistry Laboratory: An Empirical Study with PLS-SEM and IPMA" [18]. This study focuses on serious virtual reality games, and how users can increase their understanding of the sustainable innovation learning (SIL) model and their familiarity with sustainable development strategies. "Users" of serious games consist of all possible target groups that are interested in attaining knowledge of sustainability through the use of games that are designed for a purpose beyond entertainment, in this case, for sustainable education. This research investigates the sustainable innovation experiential learning model by using a virtual chemistry laboratory to affect academic achievement. A questionnaire was completed by students who had used the virtual lab, and structural equation modeling (SEM) was applied for analysis. Importance-performance matrix analysis (IPMA) was able to help expand the basic partial least square (PLS)-SEM result with the fraction. The results show that experiential learning significantly affects learning motivation and academic achievement. Cognitive load and self-efficacy significantly affect learning motivation. Involvement significantly affects academic achievement.

Tseng et al. reported "A Smart, Caring, Interactive Chair Designed for Improving Emotional Support and Parent-Child Interactions to Promote Sustainable Relationships Between Elderly and Other Family Members" [19]. In this study, the authors implemented a four-stage service design process to analyze the home-based interaction behavior between elderly and other family members to identify hidden needs for strengthening inter-generational relationships and creating harmony as a turning point for new product innovations in home-based interactive devices. In the demand exploration stage and demand definition stage, context inquiry and service modeling were applied to understand the intergenerational relationship between the elderly and other family members and the potential needs and expectations of family interactions. The results of the verification experiment show that the smart care interactive chair (SCIC) can significantly help the elderly with intergenerational relationships in terms of emotional support and parent-child interactions. The family emotional support and parent–child interactions are the foundation of the sustainability of family relationships and the cornerstone of social stability.

Wahono et al. reported "Assessing Teacher's Attitude, Knowledge, and Application (AKA) on STEM: An Effort to Foster the Sustainable Development of STEM Education" [20]. This study focuses on assessing the growth of the latest developments of science, technology, engineering, and mathematics (STEM) as part of an effort to maintain the progress of STEM education. The assessment, within this study, includes three domains, namely attitudes, knowledge, and applications (AKA) regarding STEM education. The comparison of these three domains based on demographic data, teachers' difficulties perception, and its contribution to the sustainable development of STEM education is, likewise, discussed. This type of research is a mix of both qualitative and quantitative research methodology. The quantitative analysis method was performed to address the level position and the comparative value of the three domains. In comparison, the qualitative analysis method was employed to strengthen the quantitative result analysis, as well as to deal with the teachers' perception. The results of this study suggest that knowledge and attitudes are fundamental domains for the proper implementation, as well as sustainability, of STEM education (especially in Indonesia).

Ouyang et al. reported "System-Based Coaching Technology Mechanism for the Development of Educational Systems" [21]. This paper applies the idea of system theory to deconstruct the five key elements and their interaction relations in the education system which affects the effect of education and training objectives. Meanwhile, the present situation and existing problems of each element are discussed including their influences for the system goal. The key analysis and exposition are made with the input and output of the core elements of the system to promote the overall coordinated development of the education system and improve the effectiveness. Based on the system theory, we could conclude that this paper is of practical guiding value to promote the coordinated development of the key elements of the education system by using coaching technology, to promote the overall evolution of the educational system, and to promote the effective promotion of the overall goal of education and educating people.

Tu et al. reported "Key Factors of Sustainability for Smartphones Based on Taiwanese Consumers' Perceived Values" [22]. The main aim of this study was to clarify the key factor of sustainability for smartphones based on Taiwanese consumers' perceived values. Apple's iPhone was taken as an example. The results were as follows: (1) the key factors were "recognition", "brand advantage", "service quality", "usage period", and "perceived price"; (2) there was a significant difference between genders on the key factors of perceived value ("recognition", "brand advantage", and "perceived price"). Specifically, females have higher perceived values of "recognition", "brand advantage", and "perceived price" than males; (3) there was a significant effect of income level on the key factor ("perceived price") of perceived value. Specifically, respondents with an income level of NTD15,001–30,000 had a higher perceived value of "perceived price" than respondents earning NTD30,001–45,000. Among the five key factors, "recognition" and "brand advantage" are primary factors influencing purchase motivation; "recognition", "brand advantage", and "service quality" are primary factors that could influence brand loyalty; "perceived price" is the primary factor that affects purchase intention. This study contributes to the green market segmentation of smartphones. The limitations of the study relate to the size and distribution of the samples.

Lin et al. reported "On Protection of Intangible Cultural Heritage in China from the Intellectual Property Rights Perspective" [23]. This paper examines China's current state of intellectual property (IPR) protection for ICH and proposes that ICH be placed under China's legislative protection as intellectual property. Due to the immense diversity and complexity of ICH and the difficulty in reconciling various interests involved, the existing IPR protection mode faces many obstacles in practice. The authors present two case studies and three sets of recommendations on improving the protection of ICH in China. The first set relies on improving copyright protection for ICH, the second set relies on improving trademark and geographical protection for ICH, and the third set relies on improving patent protection for ICH.

Ko et al. reported "Influence of Personality Traits on Consumer Preferences: The Case of Office Chair Selection by Attractiveness" [24]. With increasing living standards, a modern product is required to provide emotional links between a user's personality and their work environment, in addition to satisfying functional and physiological needs. Since office workers in Taiwan have average daily working hours of over 8 h, they spend lots of time on office chairs, and nowadays more companies are willing to buy good chairs so that their employees can deliver higher efficiency in a more comfortable office environment. After interviewing a group of experts, office chairs are classified into 7 types, and the participants' personality traits are classified into 4 categories. The influence of different personality traits on the evaluation of office chairs by attractiveness is analyzed by quantification theory type I. Design elements that can better deliver an office chair's attractiveness are determined. The results of this study allow future designers to improve their designs by identifying the preferences of target users under difference office scenarios.

Tu et al. reported "A Study on the Factors Affecting Consumers' Willingness to Accept Clothing Rentals" [25]. This study adopts the technology acceptance model (TAM), the innovation diffusion theory (IDT), the structural equation model (SEM), and the collected information to develop a research methodology that is both theoretical and practical. According to the research results, compatibility matters the most in driving consumers to have a positive assessment and perception of online clothes renting in terms of behavior and attitude. Additionally, personal innovativeness has significant effects and can help relevant enterprises find their target markets. In terms of subjective norm, interpersonal relationship also has a significant influence, showing that consumers today pay much more attention to friends' information sources. The self-efficacy of the perceived behavioral control also has a noticeable impact. Therefore, relevant enterprises need to consider the operability of online clothes renting to prevent consumers from feeling frustrated in their ability to use it, thus reducing their use intention.

Wang et al. reported "An Analysis of the Sustainable Development of Environmental Education Provided by Museums" [26]. This study takes environmental education in the protection of Taiwan's Tamsui cultural assets as its case study, and uses gradual regression analysis as a method to explore the

potential factors of audience cognition resulting from the channels of museum environmental education, and to grasp the possibility of implementation. The results show that the reliability coefficient of this study is 0.908, and the internal consistency of the representative scale is high. The overall satisfaction with environmental education of audiences is above 4.24 in the five-level subscale. Further gradual regression analysis shows that positive and negative explanatory power can be used to examine the environmental education programs of museums. Therefore, according to data analysis, the findings can serve as a basis for promoting social environmental education goals, as well as a field for cross-cultural learning, to achieve a people-oriented sustainable development strategy.

Tu et al. reported "An Investigation of the Effects of Infographics and Green Messages on the Environmental Attitudes of Taiwanese Online Shoppers" [27]. To address this understudied issue, this study examined the effects of attaching green messages about environmental attitudes in the form of infographics on postal packaging. To improve the understanding of consumer preferences with respect to green messages, first, a questionnaire survey of online shoppers was conducted. Based on a statistical analysis of the results, it was found that green messages require excellent infographics in order to deliver environmental knowledge. Graphical information was considered superior to text-only information in the presentation of green messages and the visualization of green information by online shoppers. This result indicates that infographics have emerged as a better visual approach to deliver green messages. The authors hope that these findings will serve as a reference in the design of environmentally-friendly postal packaging.

Liu et al. reported "Effects of Using Task-Driven Classroom Teaching on Students' Learning Attitudes and Learning Effectiveness in an Information Technology Course" [28]. From the theoretical knowledge teaching and the comprehensive operational practice teaching, the authors explore the effect of using the task-driven classroom learning method on students' learning attitudes and learning effectiveness in an information technology course. The experimental results show that using the task-driven classroom teaching method has significant positive correlation on student learning performance, learning interest, and creative thinking. This idea can stimulate interest in learning and improve the comprehensive quality of students; thus, it can promote the reform of information technology education and curriculums. For a more detailed discussion, the results will be discussed in this paper.

Chang et al. reported "An Assessment Tool Predicts Learning Effectiveness for Project-Based Learning in Enhancing Education of Sustainability" [29]. The purpose of this study was to establish an assessment tool for the learning effectiveness of project-based learning (PBL) in scientific and technological education. The methods include literature review, focus groups, and survey research. After the literature review, a draft of the scale was established, and the content validity of the scale was verified by 8 experts before being pre-tested. A total of 232 copies of valid official scales were issued and recovered. The research obtained produced subscales for "Flow experience perception", "Self-efficacy", "Product evaluation" and "Learning motivation", which can be used to evaluate the learning effectiveness of the PBL in curricula of science and technology.

Fan et al. reported "Constructing an Efficient Model to Inspire Design Education Sustainability in Rural Areas" [30]. This paper constructed a central kitchen model anchored in teaching equipment of design education and designed an algorithm for supporting the operation of this model efficiently. It analyzed the core algorithm MMAFS (a memory management algorithm with fast speed) of the model and compared the MMAFS algorithm with the current popular segregated lists algorithm and the buddy algorithm by adopting the comparative analysis method, also demonstrated the feasibility of this central kitchen model through a case study. Given the large number of urgent and unresolved issues in developing countries and rural areas, it is essential to emphasize design education and encourage local design education specifically for rural communities and promoting a positive loop in the rural ecology through local designs.

Wu et al. reported "Developing a Professional Performance Evaluation System for Pre-Service Automobile Repair Vocational High School Teachers in Taiwan" [31]. In this study, developing a

performance evaluation system that contains professional standards, performance evaluation criteria, and a precise performance evaluation mechanism are seen as essential to guarantee the highest teacher quality in Taiwan. The authors designed a two-stage research effort for a professional performance evaluation system for Taiwanese pre-service teachers of automobile repair. In the first stage, the Delphi method is introduced to develop pre-service teachers' professional standards and key evaluation criteria using two iterations of Delphi processes and 14 iterations of focus group meetings based on experts' opinions. In the second stage, a professional performance evaluation and review mechanism for pre-service teachers is developed using focus group meetings to collect opinions from six vocational education experts. The final performance evaluation system will enhance the quality of pre-service teachers in vocational high schools and serve as a useful model for other countries and economies.

Su reported "Exploring Sustainability Environment Educational Design and Learning Effect Evaluation through Migration Theory: An Example of Environment Educational Serious Games" [32]. This study adopts push-pull-mooring (PPM) theory to explain the migration of human beings. Push is generated from people's dissatisfaction with their place of residence, Pull is from attractions of the new environment, and personal mooring produces the intention of switching. A set of gamification environmental education applications (GEEA) and a migration scale for such apps are developed herein to explain the state where computer gamers switch to mobile app games. The results show that all four hypotheses are supported, and the path coefficient of each hypothesis is highly significant. The R^2 values of five intrinsic constructs are Push ($R^2 = 0.321$), Mooring ($R^2 = 0.574$), Pull ($R^2 = 0.413$), Switching intention (SI) ($R^2 = 0.552$), and switching behavior (SB) ($R^2 = 0.626$), where the R^2 value of SB is quite high, indicating that the relationship between the SB and the four precursors exhibits great explanatory power. Hence, the explanatory power of this model is convincing, and the teaching materials designed through gamification education deliver better learning outcomes.

Wu et al. reported "A Systematic Initial Study of Civic Scientific Literacy in China: Cross-National Comparable Results from Scientific Cognition to Sustainable Literacy" [33]. In this study, the authors conduct the firstly systematic study of civic scientific literacy (CSL) in China based on survey data in 2013. Under the multi-dimension CSL framework and by using item response theory, we assess the CSL level in China, which can be fairly compared with that in the U.S. and Europe (US-EU). The comparable survey results provided a number of implicational findings: for example, the status of CSL of China in 2013 would have ranked as middling and poor compared to the CSL results for the various US-EU countries in 1995 and 2005, respectively. Some group-based analyses were also conducted to show how people's attitudes to the environment and socio-environmental behaviours correlate with the CSL-qualified rate in China. The empirical results provided by this study not only can serve as references for improving CSL in China or other emerging countries that also address sustainability issues during development, but could also serve as indicators for future studies (e.g., in causational modelling).

Tu et al. reported "Analysis and Research on the Key Success Factors of Marketing Ugly Fruits and Vegetables" [34]. This study first explored related topics of food waste through the literature; then it drew up an interview outline, obtained and ranked the key success factors for the evaluation indices through education and interviews with industry professionals, and summarized the key success factors of marketing ugly fruits and vegetables through questionnaire and experts interview perspectives that targeted consumer groups as the questionnaire respondents. The conclusion of the study provides suggestions for enterprises to innovate service marketing through the blueprint of service design, which hopes to reduce food waste and maintain a balance with the environment, in order to achieve the goal of environmental sustainability. The results show that if consumers understand the relevant issues and pay attention to the truth of vegetable and fruit production, they can use their consumption power to protect their own and environmental rights. However, the trust between producers and consumers requires strengthening. Reducing the unnecessary waste of food and labor is expected to create more ecological and environmental consumption patterns in the future.

Chi et al. reported "A Knowledge Discovery Education Framework Targeting the Effective Budget Use and Opinion Explorations in Designing Specific High Cost Product" [35]. This study presents a science education framework that helps to obtain such knowledge and close opinion gaps. It involves several main tutorial phases to construct and confirm the set of design criteria, to establish a decision hierarchy, to assess the preferential structures of the decision makers (DMs) (individually or on a group basis), and to perform some decision analyses that are designed to identify the homogeneity and heterogeneity of the opinions in the decision group. The entire framework has been applied in a training course hold in a large research and development (R&D) institution, while after learning the staff successfully applied these knowledge discovery processes (for planning the budget for the fighter design works and for closing the opinion gaps present). With the staffs' practical exercises, several empirical findings except for the budgeting priority (e.g., the discrimination between 'more important criteria' against the less important ones) are also interesting. For some examples (but not limited to these), it is found that the results from using two measures (statistical correlation vs. geometrical cosine similarity) to identify the opinion gaps are almost identical. It is found that DMs' considerations under various constructs are sometimes consistent, but often hard to be consistent. It is also found that the two methods (degree of divergence (DoD) vs. number of observed subgroups (NSgs)) that are used to understand the opinions' diversity under the constructs are different. The proposed education framework meets the recent trend of data-driven decision-making, and the teaching materials are also some updates to science education.

Tu et al. reported "Study on the Learning Effectiveness of Stanford Design Thinking in Integrated Design Education" [36]. In this study, Stanford Design Thinking was introduced to the integrated design curriculum education as a creativity teaching strategy, and the action research method was adopted to explore the learning effectiveness of the design thinking method. According to the findings, the design thinking method can improve teaching; it can promote student participation through interview training in class during the empathize stage; it offers substantial assistance to students in actual interviews; it reveals information about the demands of target groups, deepens students' discussions on design-related topics, and creates a favorable atmosphere for teaching; and it fosters a positive interaction between students and teachers and makes students more attentive in class. Inspired by this teaching method, students can independently seek product-testing objects to review their design concepts and develop a stronger motivation for self-learning.

Tu et al. reported "A Study on Needs for Automotive Interiors Based on Lifestyle Characteristics of Taiwanese Female Office Workers" [37]. This study adopted case interviews to determine female car-purchasing trends in best-selling automobile manufacturers, as well as their opinions on needs for automotive interiors, which were used as the basis for the questionnaire design. In the second phase, the questionnaire method was used to discuss the life characteristics and needs of female office workers for automotive interiors, and the statistical software SPSS was employed to analyze the differences in needs for automotive interiors among female office workers of different types; and finally, a design principle suitable for this consumer group was concluded. Regarding the results of this paper, automotive interiors are divided into five factors, which are functional storage, spatial aesthetics, digital devices, comfortable feeling, and safety and cleanliness. Female office workers are divided into the three groups: (1) the discerning and intellectual pleasure seekers; (2) the regular and easy-going-life seekers; and (3) the modern information seekers. The results show that there are differences in the needs for automotive interiors among female office workers of different types. To be specific, group 1, the discerning and intellectual pleasure seekers, who are engaged in the medical and electronics industries, pay the most attention to safety, cleanliness, and digital device needs. Group 2, the regular and easy-going-life seekers, who are engaged in public education, the financial industry, and traditional industries, pay most attention to the needs of comfortable feeling. Group 3, the modern information seekers, who are engaged in service and design industries, pay most attention to the needs of functional storage, spatial aesthetics, digital devices, safety, and cleanliness.

Tu et al. reported "Relationship between Green Design and Material Flow Cost Accounting in the Context of Effective Resource Utilization" [38]. This study examines material flow cost accounting in the context of grounded theory, and conducts a case study on the companies which have implemented material flow cost accounting. The purpose of this research is to identify the relationship between material flow cost accounting and green design, and to provide a reference for the production design of the enterprise. After analysis, material flow cost accounting can generate detailed waste data, and provide a green design reference in actual energy conservation. These two outcomes complement each other, and will support achievement of the goal of mutual financial and environmental protection.

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