Conference Program

February 25-27, 2019

Fukuoka, Japan

ICNSE

International Congress on Natural Sciences and Engineering

APCBSS

Asia-Pacific Conference on Business and Social Science

ISLLLE

International Symposium on Language, Linguistics, Literature and Education

ICNSE

International Congress on Natural Sciences and Engineering

ISBN 978-986-87417-8-2

APCBSS

Asia-Pacific Conference on Business and Social Science

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ISLLLE

International Symposium on Language, Linguistics, Literature and Education

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Content

Welcome Message

Local Host

Dr. Keith H. Sakuda

The University of Hawaii – West Oahu

Fukuoka e Yōkoso! Welcome to Fukuoka!

It is my pleasure to welcome you to the **The Joint Conference of APCBSS, ISLLLE and ICNSE** in **Fukuoka, Japan.** As local host for the conference, I encourage all delegates to enjoy the wonders of Fukuoka while engaging in our exchange of scholarship and research.
Fukuoka is Japan's gateway to Asia. Its ideal location, excellent transportation networks, multilingual resources, and incredible people have made Fukuoka a true international city. The endless opportunities for international business, study abroad programs, tourism, and other exchanges keeps Fukuoka moving forward in its embrace of all things international and multicultural.

Fukuoka also has a tremendous sense of history and tradition. The Fukuoka City Museum is located just minutes from our conference venue. It exhibits the history of the prefecture and proudly displays the King of Na gold seal, a national cultural treasure. Dazaifu Tenmangū, a shrine associated with academic success, and the neighboring Kyushu National Museum, Japan's newest national museum, both offer opportunities to learn about Japan's history and culture.

If experiencing the modern day excitements and adventures of Fukuoka is more of a priority, the city has plenty to offer. MARK IS FUKUOKA MOMOCHI, a 163-store shopping center is right next-door to our conference venue. Other great shopping and dining areas, like CANAL CITY and JR CITY HAKATA can be easily accessed via Fukuoka's convenient subway system.

Fukuoka, like our Asia-Pacific Conference on Business and Social Science is all about international exchange and experiencing the diversities of cultures, thoughts, and people. During the conference, make the most of the opportunity to learn from our colleagues in our formal academic environment. In the evenings and during the socializing event, make the most of the opportunity to learn from our colleagues in a more relaxed environment. Together we can make it a successful conference.

Enjoy!

General Information for Participants

■ Registration

The registration desk will be situated on the **3F** at the **Hilton Fukuoka Sea Hawk** during the following time:

10:00-10:30 Monday, February 25, 2019

08:30-15:00 Tuesday, February 26, 2019

08:30-15:00 Wednesday, February 27, 2019

■ A Polite Request to All Participants

Participants are requested to arrive in a timely fashion for all addresses. Presenters are reminded that the time slots should be divided fairly and equally by the number of presentations, and that they should not overrun. The session chair is asked to assume this timekeeping role and to summarize key issues in each topic.

■ Certificate

Certificate of Presentation or Certificate of Attendance

A certificate of attendance includes participant's name and affiliation, certifying the participation in the conference. A certificate of presentation indicates a presenter's name, affiliation and the paper title that is presented in the scheduled session.

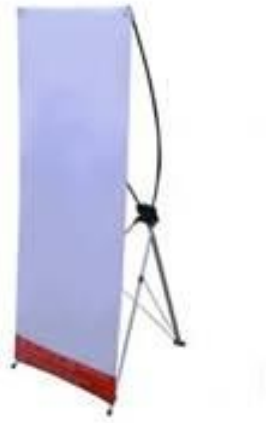
Certificate Distribution

Oral presenters will receive a certificate of presentation from the session chair after their presentations or at the end of the session. Poster presenters will receive a certificate of presentation from the conference staff at the end of their poster session.

The certificate of presentation will not be issued, either at or after the conference, to authors whose papers are registered but not presented. Instead, the certificate of attendance will be provided after the conference.

■ Preparation for Oral Presentations

All presentation rooms are equipped with a screen, an LCD projector, and a laptop computer installed with Microsoft PowerPoint. You will be able to insert your USB flash drive into the computer and double check your file in PowerPoint. We recommend you to bring two copies of the file in case that one fails. You may also connect your own laptop to the provided projector; however please ensure you have the requisite connector.



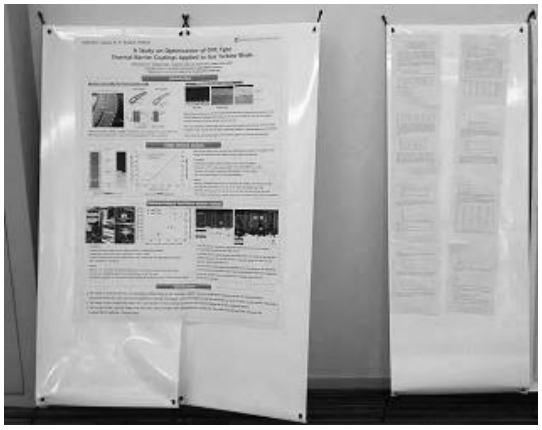
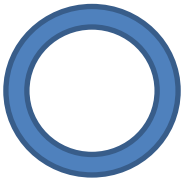
Preparation for Poster Presentation

Materials Provided by the Conference Organizer:

1. X-frame display & base fabric canvases (60cm×160cm)
2. Adhesive tapes or binder clips

Materials Prepared by the Presenters:

3. Home-made poster(s)
4. Material: not limited, can be posted on the canvases
5. Recommended poster size: 60cm*160cm

	
A 60cm*160cm poster illustrates the research findings.	1. Wider than 60cm (left) 2. Copy of PowerPoint slides in A4 papers (right)
	

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Hossein Ganjidoust	*Tarbiat Modares University*
Keith H. Sakuda	*The University of Hawaii*
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Marine Levidze	*American University of the Middle East*
John F. Maune	*Hokusei Gakuen University*
Hossein Ganjidoust	*Tarbiat Modares University*
Juhng-Perng Su	National *Dong-Hwa University*
Tawarat Treeamnuk	*Suranaree University of Technology*
Young-Fo Chang	*National Chung Cheng University*

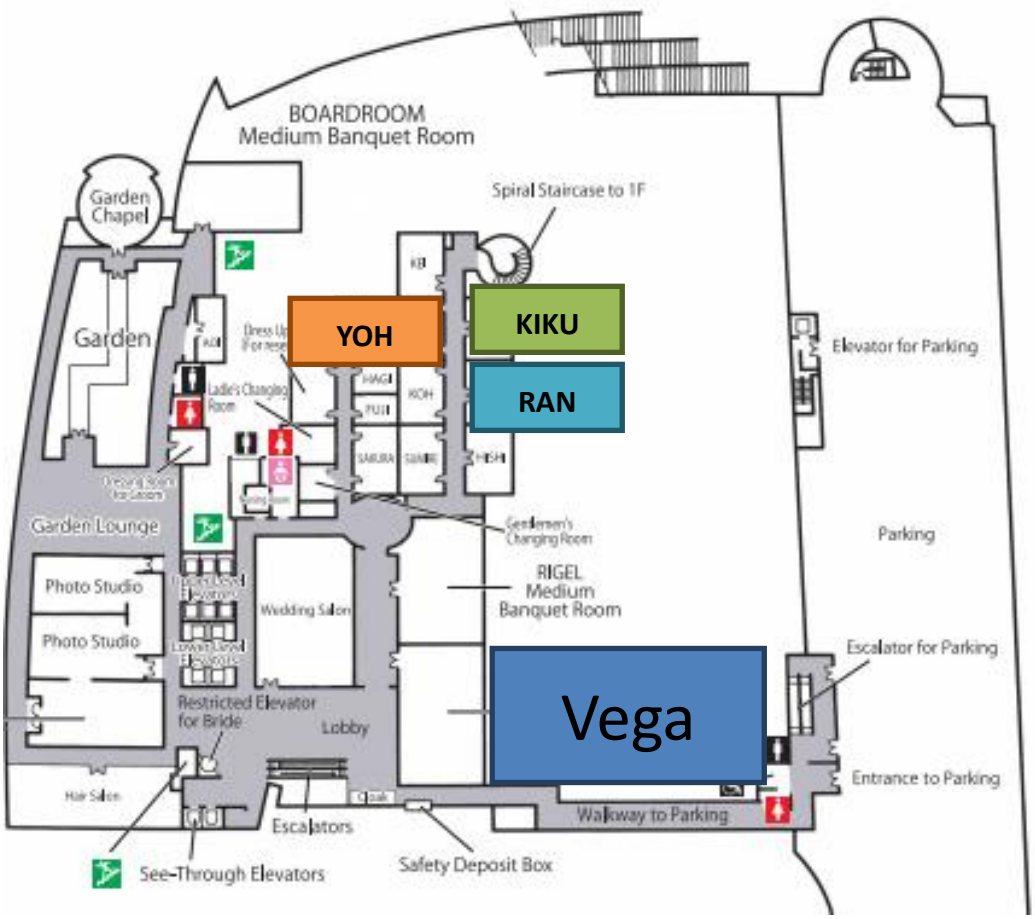
Conference Venue Information

Hilton Fukuoka Sea Hawk

810-8650, FUKUOKA-SHI, 2-2-3 JIGYOHAMA, CHUO-KU, JAPAN

TEL: +81-92-8448111 FAX: +81-92-8447887

The 3rd Floor Plan



Registration: Pre-Function Area, 3F

Oral Session: Kiku, Yoh, Ran, 3rd Floor

Poster Session: Ran, 3rd Floor

Tea Break & Networking: Ran, 3rd Floor

Lunch: Vega, 3rd Floor

Transportation

Aiport to Subway Station, Tojinmachi

1. Take the Fukuoka City Subway **(Kuko Line)**, getting off at **K05 Tojinmachi Station**. Approximately 15 minute subway ride from the airport.
2. The hotel is a 19-minute walk from the station
3. You can connect the **free shuttle bus.**
4. **Free shuttle bus for hotel guests** :

Hilton Fukuoka Sea Hawk <=> the nearest **subway station, Tojinmachi.**

Running every 20 minutes on weekends and holidays, between 10:00am and 7:00pm

Conference Schedule

Monday February 25, 2019		
Time	**Schedule**	**Venue**
10:00-10:30	**Pre-Registration**	Lobby, 1F
10:00-10:30	**Gathering for Socializing Event**	Lobby, 1F
10:30- 17:00	**Welcome Socializing Event**	

Tuesday February 26, 2019		
Oral Session **Hilton Fukuoka Sea Hawks**		
Time	**Schedule**	**Venue**
08:30-15:00	**Registration**	Pre-Function Area, 3F
09:00-10:30	Business and Management (1)/ Psychology/ Communication	YOH, 3F
10:30-10:45	**Tea Break & Networking**	RAN, 3F
10:45-12:15	**Natural Sciences Keynote Address** **[1] Prof. John F. Maune** *Topic: A Mirror Reflecting Human Nature: Shakespeare's Romeo and Juliet*	KIKU, 3F
	Social Sciences Keynote Address **[1] Dr. Keith H. Sakuda** *Topic: Inspiring Students to be Change Agents through Social Entrepreneurship*	YOH, 3F
12:15-13:15	**Lunch Time**	VEGA, 3F
13:15-14:45	Environmental Engineering/ Material Science and Engineering/ Biology	KIKU, 3F
	Business and Management (2)	YOH, 3F
14:45-15:00	**Tea Break & Networking**	RAN, 3F
15:00-16:30	Computer Engineering and Technology/ Electrical and Electronic Engineering/ Information Engineering and Technology	KIKU, 3F
	Education (1)	YOH, 3F

Tuesday February 26, 2019		
Poster Presentation		
Time	**Schedule**	Venue
09:50- 10:40	**Poster Session (1)** Business and Management/ Economics/ Psychology/ Communication/ Social Studies, Politics and Law/ ducation/ Language/ Linguistics	RAN, 3F
13:30-14:20	**Poster Session (2)** Biology/ Biological Engineering/ Earth Sciences/ Environmental Engineering	RAN, 3F
14:30-15:20	**Poster Session (3)** Computer Engineering and Technology/ Electrical and Electronic Engineering/ Informational Engineering and Technology/ Power& Engery Engineering/ Civil Engineering	RAN, 3F
15:30-16:20	**Poster Session (4)** Mechanical Engineering and Techology/ Aernautics& Aerospace Engineering/ Material Science and Engineering/ Chemical Engineering/ Chemistry	RAN, 3F

Wednesday, February 27, 2019		
Oral Session **Hilton Fukuoka Sea Hawks**		
Time	**Schedule**	Venue
08:30-15:00	**Registration**	Foyer Area, 3F
09:00-10:30	Mechanical Engineering and Technology	KIKU, 3F
	Finance	RAN, 3F
10:30-10:45	**Tea Break & Networking**	
10:45-12:15	Civil Engineering	KIKU, 3F
	Communication/ Economics/ Literature/ Social Studies, Politics and Law	RAN, 3F
12:15-13:15	**Lunch Time**	VEGA, 3F
13:15-14:45	Education (2)/ Linguistics	KIKU, 3F
14:45-15:00	**Tea Break & Networking**	
15:00-16:30	Education (3)	KIKU, 3F

Natural Sciences Keynote Address

KIKU, 3F
10:45-12:15, Tuesday, February 26, 2019

Topic:

A Mirror Reflecting Human Nature: Shakespeare's Romeo and Juliet

Prof. John F. Maune

Hokusei Gakuen University

Abstract

Various biological concepts are illustrated through Shakespeare's *Romeo and Juliet*. Love comes to mind first, but the story is full of examples that touch on aggression, mate and kin selection, parental investment and more. This talk will highlight many such examples as well as also delving into the still extant nature/nurture issue.

Short Bio

John Maune is a professor in the Hokusei Gakuen University Junior College English Department, Sapporo, Japan, where he teaches content-based courses in both biology and literature. His early research involved isolating the Drosophila calmodulin gene, expressing the protein and site-specific mutants, and performing a wide range of physical studies on the produced proteins. His research focus shifted dramatically when entering an English department in Japan where he now studies literary Darwinism and Shakespeare among other interests.

Social Sciences Keynote Address

YOH, 3F
10:45-12:15, Tuesday, February 26, 2019

Topic:

Inspiring Students to be Change Agents through Social Entrepreneurship

Dr. Keith H. Sakuda

The University of Hawaii – West Oahu

Abstract

Social entrepreneurship is one of fastest growing disciplines in American higher education. Unofficially defined as the use of business tools and techniques to address social problems, social entrepreneurship can inspire students to effect social change through a blend of compassionate capitalism and business management. However, its interdisciplinary nature and unique position between the academic and practical worlds makes it a challenging discipline for educators and administrators.

This presentation will introduce the concept of social entrepreneurship and provide a brief overview of how educators can encourage students to pursue their own paths towards creating change in the world. Examples from the presenters' experiences, including his award-winning work to promote food sovereignty in the Pacific Islands; will be shared to demonstrate the potentials and pitfalls of social entrepreneurship. Recommendations will also be provided on how to motivate and support students to reshape their world as social entrepreneurs.

Business and Management (1)/ Psychology/ Communication

Tuesday, February 26, 2019 09:00-10:30 YOH, 3F

Session Chair: Chih-Ping Chen

APCBSS-0122

On Hypothesis Tests of Normal Percentiles

Gwowen Shieh｜*National Chiao Tung University*
Show-Li Jan｜*Chung Yuan Christian University*

APCBSS-0094

The Relationship between Manager Emotional Blackmail, Social Support and Work Stress

Yi-Yin Chen｜*Yuan Ze University*
Hung-Hui Li｜*Yuan Ze University*

APCBSS-0124

The Relationship between Need for Cognitive Closure and Aggressive Tactic Adaption within Baseball Player: The Individualism as a Moderator

Xiu-Yi He｜*Yuan Ze University*
Chiung-Yi Huang｜*Yuan Ze University*

APCBSS-0125

How and Why Guilt-Proneness Employee can Tolerate under Unfair or High Stress Condition in Team Working Environment

Chia-Hsuan Lu｜*Yuan Ze University*
Chiung-Yi Huang｜*Yuan Ze University*

APCBSS-0126

The Relationship between Paternalistic Leadership and Employees' Outcomes: Two Paths Mediating Roles of Justice and Care Moral Ethics

Chia-Ying Li｜*Yuan Ze University*
Chiung-Yi Huang｜*Yuan Ze University*

APCBSS-0106

Social Activity in AR Game: Focusing on Middle-Aged Male Pokémon Go! Users

Seunghee Lee｜*EWHA Womans University*
Hyewon Kang｜*EWHA Womans University*
Yoojin Chung｜*EWHA Womans University*

APCBSS-0122
On Hypothesis Tests of Normal Percentiles

Gwowen Shieh[a], Show-Li Jan[b]

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1. Background/ Objectives and Goals

Percentiles are widely used in education and psychology research for determining the relative magnitude and substantial importance of quantitative measurements. The investigations of point and interval estimation of normal percentiles are well documented in the literature. However, the corresponding problem of hypothesis testing of percentile has received relatively little attention.

2. Expected Results/ Conclusion/ Contribution

Numerical illustrations are provided to demonstrate the usefulness of the described exact approaches and the deficiency of simplified methods. Computer algorithms are available to implement the suggested procedures for the analysis of percentiles.

Keywords: Power, Quantile, Sample size

APCBSS-0094
The Relationship between Manager Emotional Blackmail, Social Support and Work Stress

Yi-Yin Chen [a], Hung-Hui Li [b]

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1. Background/ Objectives and Goals

The words "emotional blackmail" was first used by American psychologist Susan Forward in 1997. In recent years, this word has once again caught everyone's attention because of the publication of the book "Emotional Blackmail" by the psychological counselor Zhou Mu-Zi. The book shows that emotional blackmail comes from family, workplace, and personal relationships, it also mentioned that the rate of workplace emotional blackmail (15%) is second only to the family (25%). The most notable is that only 15% of people feel that they have never been emotionally extorted by their managers. Therefore, through this research, I would like to know the influence between manager emotional blackmail and employee's work stress. Furthermore, I want to know if family members, colleagues or friends can give supports or can share the pressure of works, is it possible to reduce the pressure on work?

2. Expected Results/ Conclusion/ Contribution

The research result has shown the emotional blackmail, social support and work stress that influence each other. The higher level of manager emotional blackmail, the employee's work stress will become higher. However, through the adjustment of social support, the work stress can be reduced. The research results can help managers to better understand the impact of employees when they face emotional blackmail, as well as the factors that can reduce employees' stress. Then managers can adjust and improve their management on subordinates to promote organization efficiency.

Keywords: Emotional Blackmail, Work Stress, Social Support

APCBSS-0124
The Relationship between Need for Cognitive Closure and Aggressive Tactic Adaption within Baseball Player: The Individualism as a Moderator

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The past decades has seen increasing interest in the role of need for cognitive closure in the workplace. The construct of need for cognitive closure reflects the desire for "an answer on a given topic, any answer, as compared to confusion and ambiguity" (Kruglanski, 1990, P.337)". Such need was referred to as "nonspecific" and was contrasted with need for "specific closure", that is, for particular (e.g., ego-protective or enhancing) answers to one's question (Webster & Kruglanski, 1994, p. 1049). Past researches have accumulated lots of evidences that ones' with high need for cognitive closure influence his/her social cognitions, attitudes, and behaviors, including as they are tend to make more stereotypic judgments of groups (Dijksterhuis, Van Knippenberg, Kruglanski & Schaper, 1996), have greater preference for prototypic information (Kruglanski & Mayseless, 1988), have increased tendency to reject deviating opinion (Kruglanski & Webster, 1996); and in terms of value tendency, people who have high need for cognitive closure would support go for a war or conflict to against out-groups(Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J, 2003) and exert pressures toward conformity upon one another and preference in-group favoritism (Shah, et. al., 1998; De Grada, et al., 1999). Furthermore, various situations (contextual factors) may induce the need for closure to motivate individual to decision quickly and desire to acquire a sense they understand, the factors such as time pressure (Kruglanski & Freund, 1983), environmental noise (Kruglanski, Webster, & Klem, 1993), and mental fatigue (Webster, Richter, & Kruglanski, 1996).

However, the linkage in the relationship between need for cognitive closure and tactic adaption preference in the baseball games is rare concerned. The study aims to explore and assume the person who has high need for cognitive closure will tends to use aggressive or striking tactics, in the contrary, person with low need for cognitive closure will tends to use conservative tactic (Hypothesis 1). The study stands on the past research have suggested that high need for cognitive closure are preference for aggressive action among groups to eliminate unambiguous feelings. (De Zavala, A. G., Cislak, A., & Wesolowska, E, 2010) . Further, need for cognitive closure is a relative stable trait that will be influenced by some contextual factors (Kruglanski & Freund, 1983). Hence, the study also propose collectivism or individualism will be a moderator in the relationship between the need for cognitive closure and tactics preference. On the other words, the values of individualism will stronger the positive relationship between need for cognitive closure and aggressive tactics (Hypothesis 2).
To test our hypotheses, the sample in this study consisted of baseball players after formal games. All the participants will be college and high school baseball players, and these athletes will be divided into two levels of open and general groups according to the level of the event. The study plans collect more than 250 players from 10 baseball teams. The survey now is on collection and will have findings on February 2019. We believe this research contribute to literature in the theory of need for cognitive closure.

Keywords: Need For Cognitive Closure, Collectivism & Individualism, Baseball Strategy

APCBSS-0125
How and Why Guilt-Proneness Employee can Tolerate under Unfair or High Stress Condition in Team Working Environment

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1. Background/ Objectives and Goals

The construct of guilt proneness is a relatively new trait construct; more studies on guilt proneness are needed to be able to make this construct to generalization. Guilt proneness is referring to a personality trait - one that is indicative of the tendency to feel guilty about committing transgressions, even if those transgressions are not observed by other people (Cohen, Wolf, Panter, & Insko, 2011). According to a few past empirical evidences suggested that highly guilt-prone persons who tend to avoid to cooperation with others people who have more competent than themselves, because when their contribution is lower than their partners, this condition would further trigger their feelings of guilt (Taya & Cohen, 2014). Further, peoples with high guilt-prone tendency are easy to feeling about altruistic（Wildschut, 2012）, therefore, they are try to contribute their effort to others and avoid to become a burden with others. Moreover, rare studies also demonstrated that guilt-proneness members exert greater effort to achieve their goal under task given than other team members, and easily become an effectiveness leadership(Flynn & Schaumberg, 2012), and have higher ability of tolerance of inequity condition（Taya & Cohen, 2014）. In fact, all evidences demonstrated high guilt-prone peoples would work hard and involve deeply in teams even if the condition is unfair.

Standing on above evidences, and the study extending it to teams condition, if guilt-proneness members who don't have any chance to choose their team members, what will happen when they are forced to cooperate with different ability composition of team members, and when they are under fair or unfair situation what their behaviors outcomes would be, including as other-orientation tendency, organizational citizenship behavior and work stress? Hence, the study standing on past few evidences further develops an empirical framework.

2. Expected Results/ Conclusion/ Contribution

To test our hypotheses, we conducted a survey of a sample in Taiwan. We will use snow-balling method to collect data in two stages. First, the survey by mailing to sought approval for participation in the survey. Before the survey, we explained the survey procedures detail to make sure these agents understanding. Second, the agents identified the number of participants after one week and then the study based the surveys packing of questionnaires material. We sent questionnaires to company agent who was asked to distribute the questionnaires to participants randomly. The survey now is on collection. We believe this research contribute to literature in individual trait of guilt-proneness and OCB theories.

Keyword：Guilt proneness, Altruistic, Equity theory, Organizational citizenship behavior, Work stress

APCBSS-0126

The Relationship between Paternalistic Leadership and Employees' Outcomes: Two Paths Mediating Roles of Justice and Care Moral Ethics

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Background

The past decades has seen increasing interest in the role of paternalistic leadership in the workplace under Chinese culture environment. Paternalistic leadership refers to "the leadership style under the rule of human, manifest a kind of kindness and majesty as a father" which including as authoritarian leadership and benevolent leadership (Farh & Cheng, 2000). The former means "the leadership style focus on authority, strict control, and obey the rule completely to employee", and the latter means "the leadership style emphasis on individualized consideration, comprehensive care and inspirational motivation to employee" (Farh & Cheng, 2000).

Past researchers have been interested in comparing these two types of leadership in terms of outcomes in various indicators, such as authoritarian leadership will increase positive effect on self determination. (Chou, Chou, Cheng, & Jen, 2010) and decrease the satisfaction about employees to their boss (Cheng et al., 2000), whereas benevolent leadership will increase the trust about employees to their boss(Cheng et al., 2000) and decrease personal privacy when the boss excessive concern to their employees (Farh & Cheng, 2000). However, the linkage between paternalistic leadership and moral ethics is limited. Moreover, recently researchers particularly interesting aim to explore the mediating mechanism to elaborate the model of how and why paternalistic leadership related to final outcomes. Hence, the study explores the relationship between paternalistic leadership and employee outcomes, and proposes two moral ethics of justice and care ethics will act significant mediating roles.

Justice moral ethic is referring as "the actions of principles will obey the rules and morals to judge the legitimacy of the action". This perspective is suitable for male trait, emphasize on intangible, principles and empathic neutrality attitude as a bystander." Care moral ethic is referring as "it should not apply universal principles to all people and all situations, because each individual consider the principles above every circumstances, they will have different kind of action in different situations." As female moral development, moral universalism cannot resolve the problems, should balance every conflicts and interest, find a best resolution" (Gilligan, 1982). The study proposed these two ethics act mediating roles.

The study propose that authoritarian leadership would positive related to justice moral ethic (Hypothesis 1a), whereas benevolent leadership would positive related to care moral ethic (Hypothesis 1b). Further, justice moral ethic is positive associated to employee task performance (Hypothesis 2a) and care moral ethic is positive associated to employees' trust to their supervisor (Hypothesis 2b). Further, the study also examine the mediating role of justice moral ethic in the relationship between authoritarian leadership and employees' task performance (Hypothesis 3a), and care moral ethic in the relationship between benevolent leadership, care moral ethic and employees' trust to their supervisor (Hypothesis 3b).

Expected Results

Subordinates' questionnaires contain with our main predictor variables, including paternalistic leadership, two moral ethics of justice moral ethic and care moral ethic, and trust to their supervisor, while supervisor evaluates all their subordinates' task performance respectively. The survey now is on collection. We believe this research contribute to literature in paternalistic leadership and moral ethics theories.

Keywords: Paternalistic leadership, Authoritarian leadership, Benevolent leadership, Ethics of justice, Ethics of care

APCBSS-0106
Social Activity in AR Game
: Focusing on Middle-Aged Male Pokémon Go! Users

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1. Background/ Objectives and Goals

Computer and mobile games such as 'Legue of Legend' and 'Classy of Clan' have become so common that they will be tested at the 2018 Asian Games. In addition, as technology advances and smart devices become more popular, digital games have also expanded to mobile foundations. Among the many mobile-based games, the study focuses on Pokemon Go and explores how it operates.

Pokemon Go, which was released on July 16, 2016, caused a syndrome by combining AR technology based on mobile devices. It is a game in which users of Pokemon, which used to be an animation, actually capture it and use it to conquer the gym. Based on a familiar world view, it is implemented by becoming a Pokemon trainer and traveling. Also, 'Pocamongo' increased sense of reality by applying AR technology. AR technology refers to 'complex virtual reality' that combines real and virtual environments using technologies that show three-dimensional virtual objects in the real world. Pokemon Go organizes the screen so that Pokemon, which appears in the game world, feels as if it were from the real world. These technologies are controlled by users and can be controlled as much as individual users want at any time. That's why a game called 'Pocamongo' doesn't exist in the world in the game, but penetrates into the lives of real users. In addition, users can properly control the world of 'Pokemon' and the real world in that games are played by visiting the site directly using architectural constructions that exist in the real world.

"Pocketmongo" is the first game with AR technology, and the main user can expect to be a generation familiar with digital technology. Today's younger generation of media users are familiar with digital technology to the point of being called 'digital native' and have no resistance to accepting new technology. On the contrary, there are people who find it difficult to learn new skills. This difference is said to be a 'digital divide'. "Digital devide" means an unbalanced approach to knowledge or information according to economic class, gender, generation or region (Hoffman & Novak, 1998; Katz & Aspair, 1997;

In this context, the present study focuses on middle-aged men who routinely use Pokemon Go. Pokemon Go utilizes relatively new technologies and operates based on animated stories aimed at children. Still, middle-aged men in Korea are making regular use of 'Pokemon' and forming a new online community. 'Pocketmongo' users share and interact with information through Instant Messaging (IM). Those who are generations who were considered distant from the game and are familiar with the vertical organizational life, play Pokemon games analytically and share information equally. Online communities for information

sharing purposes extend to offline communities because Pokemon is a regional based game. They enjoy Pokemon as a life, not as a game as a life, but as a concentration of technology and storytelling. The study explores how middle-aged men use Pokemon Go communicate and how they form their own communities.

2. Expected Results/ Conclusion/ Contribution

"Pocket Montego" is based on an animation based on the original animation "Pocket Monster" and is powered by smart devices such as smartphones and tablet PCs. The animation "Pocket Monster" began airing in 1997, and the main concept is for the main characters to travel around the world holding Pokémon together. The users of Pokemon Go are satisfied that they have shifted this concept to a game. Its characteristic is that it feels close and can accept it quickly because what was seen through animation has become a reality. AR technology also helps users feel more realistic because it helps them experience the appearance of Pokemon in the real world. Users who have experienced Pokemon through watching animation are expected to feel satisfied with the fact that they can practice the world by catching Pokemon and beating the gym. AR technology is unfamiliar to middle-aged men, but it was enough to overcome it in that it amplifies reality. In addition, the user-centered UI, which allows users to easily capture Pokemon by not using AR technology, is expected to satisfy users.

Middle-aged men are not familiar with the worldview of 'Pocket Monster.' As mentioned earlier, animation first appeared in 1997. The worldview of animation is complex and there are also many generations of Pokemon. However, Pokemon Go is the introduction of only three generations of Pokémon as of 2018 so that middle-aged men with little understanding of the story can enjoy the game. While maintaining the worldview of animation, the speed of Pokemon Go matches the level of users. Therefore, the entry barrier has a low advantage. Also, middle-aged men in Korea are more likely to go to and from public transportation. It is appropriate to enjoy location-based games because the Internet can be used on the go while on the road. Every day, you can meet new Pokemon so you can enjoy the fun of using it on a regular basis. Middle-aged Korean men tend to value authority and neglect leisure activities such as sports because they are addicted to work. Therefore, it is meaningful in itself to analyze what conversations a large number of middle-aged men gather and enjoy playing games. Their conversation patterns value efficiency. They tend to share the information they need to enjoy games with minimal dialogue. In order to boost the morale of the members, the government seems to be encouraging and praising them.

The chat rooms of 'Pocketmongo' users noted in this study are centered on residents in a particular area. Since it is necessary to meet offline in order to enjoy the game, it seems to be organized around those who live nearby. In order to enjoy the game, only local residents, such as parking information and the location of the sculpture, need to share the information they know. This information tends to be more easily disclosed because it lives in the same area.

Keywords: Pokémon Go, online community, social gaming, Middle-aged male culture

Environmental Engineering/ Material Science and Engineering/

Biology

Tuesday, February 26, 2019 13:15-14:45 KIKU, 3F

Session Chair: *Prof. Hossein Ganjidoust*

ICNSE-0075

Use of Electro-Fenton Process in Petroleum Wastewater Treatment

Bita Ayati | *Tarbiat Modares University*

Mirmehdi Seyyedi | *Tarbiat Modares University*

ICNSE-0091

Kuwait Environmental Remediation Program (KERP): Bioremediation in South East Kuwait

Nada Al-Qallaf | *Kuwait Oil Company*

Aisha Al-baroud | *Kuwait Oil Company*

Hussain Al-Kandari | *Kuwait Oil Company*

ICNSE-0125

The Formulation and Verification of Middle School Student's Environmental Literacy Scale

Sheng Miao | *East China Normal University*

Yushan Duan | *East China Normal University*

ICNSE-0165

The Formulation and Verification of Middle School Stu-dent's Environmental literacy Scale

Sheng Miao | *East China Normal University*

Yushan Duan | *East China Normal University*

ICNSE-0179

Fabrication and Evaluation of Electroplated Ni-B-Diamond Milling Tools

Ching An Huang | *Chang Gung University*

ICNSE-0146

Study on the Mechanical Properties of Styrene-Butadiene Rubber Reinforced with Hybrids of Chitosan and Bamboo Charcoal/Silica

Xiangxu Li｜*Korea University of Technology and Education*
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ICNSE-0080

Color Responses of German Cockroaches (Dictyoptera: Blattellidae) under Laboratory Conditions

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ICNSE-0075
Use of Electro-Fenton Process in Petroleum Wastewater Treatment

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1. Background/ Objectives and Goals

Petroleum industry is the most important industry in Iran. The wastewater generated in different units would include many various compounds depending on reactions complexity and refined materials. Application of electrochemical reactors, Electro-Flotation, adsorption, microwave-assisted oxidation and biologic methods for treatment of petroleum wastewater encounters with different operational issues and problems like incomplete remediation and sidelong generation of toxic compounds. Moreover, biological treatment methods used for industrial wastewater treatment are usually less robust systems in comparison to electrochemical methods with special regards to toxicity usually found in petroleum wastewater and the risk of odor problems exists as well. Advanced oxidation treatment methods have drawn great attention for their great potential in different industrial wastewater treatment. Hydroxyl radical is produced in all advanced oxidation processes, and although unselective this radical is able to degrade organics in a short time. H_2O_2 and ferrous ions released by iron electrodes corrosion are used to generate hydroxyl radicals in Electro-Fenton method. The aim of this study is application of Electro-Fenton to treat petroleum wastewater and optimization of its effective factors by the OFAT method.

2. Expected Results/ Conclusion/ Contribution

For indication of pH effect, experiments were conducted in 5 levels. COD removal efficiencies after 75 minutes while pH was 3, 5, 7, 9 and 11 were 78.64, 81.38, 82.36, 84.03 and 86.10 percent, respectively. For determining the optimum value of H_2O_2:Fe, the amount of released ions was calculated by Faraday law and confirmed by electrodes weighing. The released amount of ions was 0.78 grams or 0.014 mole of it while the current was 0.6 A. Proportionate volume of H_2O_2 was then added to wastewater before the treatment process. Considering the density (1.45 gr/cm^3), molar weight (34 gr/mole) and the product purity (33%) of H_2O_2, 1.77, 3.54 and 4.72 ml of it was added to wastewater in order to provide 1.8, 3.6 and 4.8 ratios, respectively. The mentioned volumes were added to 750 ml of wastewater and COD removal results demonstrated that the maximum removal efficiency was achieved while the ratio was 3.6. Once determining the optimum initial COD of wastewater, the COD removal diagrams in conditions with different initial CODs demonstrated that the maximum COD removal efficiency of 90.08 percent was achieved in 75 minutes while the initial COD was 375 mg/L. While having a certain concentration of hydroxyl radicals, an increase in initial COD or concentration of pollutant would lead to a decrease in collusion probability between hydroxyl radicals and other molecules.

Therefore the treatment efficiency decreases. Considering the importance of energy consumption, the amount of energy consumed for removal of each mg/L of COD was calculated in each condition and the according to drawn results, least amount of consumed energy for removal of each mg/L of COD was 77.67 J and it was achieved while the initial COD was 375 mg/L. In this condition, final COD of the treated wastewater was reduced to 36.08 mg/L after 75 minutes and it was allowed to be discharged into environment according to environmental protection regulations. Considering the mentioned experiments, initial COD of 375 mg/L was considered as the optimum value for this parameter. For optimizing the current, experiments were conducted in five levels with currents of 0.1, 0.2, 0.35, 0.5 and 0.65 ampere and the achieved efficiencies were 60.10, 68.60, 75.42, 89.73 and 92.04 percent, respectively. Therefore 0.5 A of current was considered as the optimum value for this parameter. Experiments were conducted in three levels of electrolyte concentrations and COD removal efficiency results demonstrated once the electrolyte concentration was 0.03, 0.05 and 0.07 molar, COD removal efficiencies of 92.04, 89.73 and 87.01 percent were achieved. 0.35 molar of electrolyte was considered as the optimum value for this parameter. Inter-electrode distance effect was evaluated conducting experiments in four levels and conditions with 3.5, 5.5 and 7.5 cm of distance between electrodes were tested. As the drawn results demonstrated, the maximum efficiency achieved when the inter-electrode distance was 3.5 cm and 92.78 percent of COD removal yielded in this condition. According to drawn results, Electro-Fenton method would be appropriately used for treatment of petroleum industry wastewater for its rapid treatment process and high efficiency indeed.

Keywords: advance oxidation, electro-Fenton, petroleum wastewater, energy consumption

ICNSE-0091
Kuwait Environmental Remediation Program (KERP): Bioremediation in South East Kuwait

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Abstract

The United Nations Compensation Commission (UNCC), Kuwait National Focal Point (KNFP) and Kuwait Oil Company (KOC) cooperated in a joint project to undertake comprehensive and collaborative efforts to remediate approximately 26 million m^3 of contaminated soil that had resulted from the Gulf War. The damage caused by the war includes features such as wet and dry oil lakes, contaminated piles, coastal deposits, oil-filled trenches, and wellhead pits. This contaminated soil has altered the desert soil's properties and ecological landscape, causing the deaths of plants and animals; the contamination has also penetrated deeper into the subsurface soil layers and threatened to pollute precious fresh-groundwater resources. UNCC initially recommended to construct engineered landfills to encompass the contaminated soil. KOC developed construction-type contracts on a re-measurable basis to construct 2 million cubic meters of landfill. Under the Kuwait Environmental Remediation Program (KERP), Kuwait Oil Company is fully responsible for planning and executing remediation and restoration projects in KOC oil field areas. Moreover, KOC in conjunction with KNFP has obtained UNCC approval to revise KERP program by incorporating the Total Remediation Strategy (TRS), which provides a number of tools to address the legacy of contamination. The TRS comprises various elements: Risk-Based Approach, Site Soil Characterization, Unexploded Ordnance Program, Remediation Treatment Technologies, and Sludge Disposal through beneficial reuse and containment in engineered landfills of untreatable wastes. As part of KERP program, bioremediation project will be implemented within selected areas in KOC's operational area (South East Kuwait oil field). The bioremediation project is the first project under KERP, which utilize treatment processes to address the contaminated soil features. The purpose of this paper is to demonstrate one such type of technology, known as bioremediation treatment for contaminated soil in three different zones in SEK area known as Zone 2, Zone 6, and Zone 7. The project is separated into three areas and each will approximately contain 170,000 tonnes of contaminated soil. The TPH level of the contaminated soil, for the three zones, is less than 7%. In addition, 500 tonnes of contaminated soil with TPH level vary from 7% to 10% will be treated using enhanced bioremediation techniques for trial purpose only.

Keywords: Kuwait Environment Remediation Program (KERP), Oil-Contaminated Soil, Total Petroleum Hydrocarbon Bioremediation, and Total Remediation Strategy (TRS).

ICNSE-0125
The Formulation and Verification of Middle School Student's Environmental Literacy Scale

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Abstract

Though environmental literacy (EL) has been a focus of many studies in the field of environmental education, very few scales have been developed to assess middle school students EL. In this regard, based on the literature review, this article focuses on the development and validation of Middle School Student's Environmental Literacy Scale. The research seeks to construct the evaluation index system of environmental literacy for middle school students in accordance with the current situation of environmental education in China. The items in the MSSELS were developed initially from the responses to four open-ended items by 189 eleventh and twelfth grade students. This initial form was pilot tested with 218 eleventh and twelfth grade students. Later, the revised version of the scale was administrated to 1000 eleventh and twelfth grade students, and those results were subjected to confirmatory factor analysis and reliability analysis, which is proved that all indexes of this model meet the requirements, and the overall fitting degree is well.

Study results indicate that MSSELS can be measured by "Environmental Attitudes", "Environmental Behaviors" and "Environmental Skills". The "Environmental Attitudes" of middle school students can be measured by "Limits to Growth", "Anthropocentrism", "Fragility of Nature's Balance", "Human Exemptionalism", "Possibility of Eco-Crisis". "Environmental Behaviors" can be measured by "Behaviors Related to Ecomanagement", "Behaviors Related to Consumer/Economic Action", "Behaviors Related to Persuasion". "Environmental Skills" can be measured by "Perceived Skills in Investigating & Evaluating Problems/Issues" and "Perceived Skills in Using Citizen Participation Strategies". This study contributes a valid and reliable instrument for use in future studies of this kind.

Keywords: Environmental Literacy; Environmental Attitudes; Environmental Behaviors; Environmental Skills

ICNSE-0165
The Formulation and Verification of Middle School Stu-dent's Environmental Literacy Scale

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Abstract

Though environmental literacy (EL) has been a focus of many studies in the field of environmental education, very few scales have been developed to assess middle school students EL. In this regard, based on the literature review, this article focuses on the development and validation of Middle School Student's Environmental Literacy Scale. The research seeks to construct the evaluation index system of environmental literacy for middle school students in accordance with the current situation of environmental education in China. The items in the MSSELS were developed initially from the responses to four open-ended items by 189 eleventh and twelfth grade students. This initial form was pilot tested with 218 eleventh and twelfth grade students. Later, the revised version of the scale was administrated to 1000 eleventh and twelfth grade students, and those results were subjected to confirmatory factor analysis and reliability analysis, which is proved that all indexes of this model meet the requirements, and the overall fitting degree is well.

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Keywords: Environmental Literacy; Environmental Attitudes; Environmental Behaviors; Environmental Skills

ICNSE-0179
Fabrication and Evaluation of Electroplated Ni-B-Diamond Milling Tools

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1. Background/ Objectives and Goals

Electroplated diamond tools are suitable to cut or milling hard-to cut materials, such as Al_2O_3 and SiC, because of containing diamond particles with extremely high hardness. Normally, an electroplated diamond tool is fabricated through metal-diamond composite electroplating on a suitable tool substrate, such as medium carbon steel and martensitic stainless steel. Some advantages of convenient for fabrication, low temperature and cost process, are recognized from electroplated diamond tools. Therefore, electroplated diamond tools are widely used for cutting applications.

Fabrication and evaluation of electroplated Ni-B-diamond milling tools were presented in this study. During Ni-B-diamond composite electroplating, intermittent stirring with different on and off periods, ton and toff, was conducted to recognize the effect of stirring cycles on the diamond density and diamond distribution in the composite deposit. The milling ability of a prepared electroplated diamond milling tool will be evaluated through its milling length in Al_2O_3 plates. A suitable fabricating process for the electroplated Ni-B-diamond milling tool will be proposed.

2. Conclusion

The diamond density and distribution in a prepared composite deposit were strongly affected by the diamond content in the plating bath and the applied stirring cycle. A relatively high diamond density of 829 particles/mm^2 in the surface of composite deposit can be achieved with a stirring cycle of t_{on}: 5 s and t_{off}: 60 s in the Ni-B plating bath containing 150 g/L diamond particles. These parameters of composite electroplating were be used to fabricate electroplated diamond milling tools. The milled width in Al_2O_3 plates decreases within 120 μm after milling test with prepared electroplated diamond milling tools. Electroplated Ni-B-diamond milling tool with a relatively high milling ability was evidenced after annealing at 500^oC.

Keywords: Electroplated diamond tool, Ni-B-diamond deposit, milling ability, fabrication

ICNSE-0146

Study on the Mechanical Properties of Styrene-Butadiene Rubber Reinforced with Hybrids of Chitosan and Bamboo Charcoal/Silica

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1. Background

In recent years, polymer blending has become one of the effective methods for providing new desirable polymeric materials for practical applications. Chitosan blended with poly (vinyl alcohol) (PVA) has been reported to have good mechanical and chemical properties. PVA is a nontoxic, water soluble, biocompatible and biodegradable synthetic polymer, which offers good tensile strength, flexibility and barrier properties to oxygen and aroma. As a topic of great interest, PVA has widely been used in biomedical and biochemical applications. Chitosan/PVA has been used in the removal of lead ions from aqueous solution due to the adsorption properties. Also, some researchers found formaldehyde or glutaraldehyde have been used as crosslink agent to crosslink chitosan and PVA which could make better interpenetrating polymer network and provide better mechanical properties for the chitosan-PVA hydro-gel, due to the adsorption force (hydrogen bonds) with filler particles, which also could increase the application of this material, such as the fillers.

In this research, styrene-butadiene rubber latex composites compatibilized with bamboo charcoal/silica-chitosan-polyvinyl alcohol hybrids by interpenetrating polymer network method reported previously, and neat SBR, BC-SBR and SI-SBR composites were also synthesized as control group, and then get the vulcanizates during the curing processes. Finally, the mechanical and viscoelastic properties with various methods were characterized, such as tensile strength, hardness, swelling ratio, storage modulus, loss modulus and tan delta.

2. Expected Results/ Conclusion/ Contribution

In this work, the chitosan-PVA-bamboo charcoal/silica (BC/SI-CS-PVA) hybrid fillers compatibilized styrene-butadiene rubber composites were successfully prepared by interpenetrating polymer network (IPN) method. And from the results of all the characterization methods, it can be found BC-CS-PVA-SBR has the most compact matrix structure. And it will be make contribution of rubber industry.

Keywords: Chitosan, Bamboo Charcoal, Hybrid, Silica, Styrene-butadiene rubber

ICNSE-0080
Color Responses of German Cockroaches (Dictyoptera: Blattellidae) under Laboratory Conditions

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1. Background/ Objectives and Goals

Colors are the most important clues for many insects especially for thrips, fruitflies, housefiles and others. Some specific colors are being used to attract insects and also being used in traps to control or monitor the population dynamics as well. However, very limited studies are reported on the effects of colors on German cockroaches, *Blatella germanica* L., (Dictyoptera: Blattellidae), the most important urban pest. Studies reported that the German cockroaches followed scotophase and photophase under natural light conditions due to the presence of light detection organs in German cockoraches. Therefore, objectives of the study were to observe the color responses of German cockroaches and their foraging behaviors.

2. Methods

We prepared six different colored foods (blue, lemon yellow, red, green, violet, and natural color) separately and offered to the adult (male and female) German cockroaches. Each treatments consists of thirty German cockroaches and replicated into four times. Observation was done for their colored food detection time and amount of food consumed.

3. Expected Results/ Conclusion/ Contribution

Results reported that German cockroach detected blue colored food significantly faster than other colored foods. Similarly, the amount of blue colored food consumed was significantly higher than other colored foods offered. This study concluded that German cockroach also has color responses under the laboratory conditions. This result will further applicable to improve the current cockroach baits used to manage cockroach populations.

Keywords: German cockroach, scotophase, photophase, colors response, colored food

Business and Management (2)

Tuesday, February 26, 2019 13:15-14:45 YOH, 3F

Session Chair: *Dr. Keith H. Sakuda*

APCBSS-0086

Self-Marketing with Line's Sticker

Chih-Ping Chen | *Yuan Ze University*

APCBSS-0095

An Investigation of Social Media Effects on Viewing Others' Posts

Pei-Yi Ou | *Yuan Ze University*

Hung-Hui Li | *Yuan Ze University*

APCBSS-0097

Exploring the Relationship between Workplace Friendship and Work Commitment- The Mediated Effect of Job Engagement

Yi-Hua Tsai | *Yuan Ze University*

Hung-Hui Li | *Yuan Ze University*

APCBSS-0099

An Investigation of User Behaviors of Instant Messaging in Different Age Group

Chia Hsun Hsieh | *Yuan Ze University*

Hung-Hui Li | *Yuan Ze University*

APCBSS-0100

Explore the Semiotics Persuasion on Social Media Advertising in Hong Kong

Wun-Han, Jannel Chan | *The Open University of Hong Kong*

APCBSS-0086
Self-Marketing with Line's Sticker

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Abstract

Self-marketing or self-branding is now a rapidly growing business in its own right. Line, designed in Korea and launched in 2011, is one of popular social messaging applications for young consumers to market themselves with virtual stickers in social relations, particularly friendships. This paper attempts to understand how young consumers market themselves with virtual stickers in Line. The methodological approach to this research followed an interpretive phenomenology. To some extent, the results demonstrated that virtual stickers bounce the idea of creating new metaphors, liberating young consumers from gender beliefs to virtual imagination.

Keywords: Emotion, Gender role, Self-marketing, Sticker, Self-expression

APCBSS-0095
An Investigation of Social Media Effects on Viewing Others' Posts

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1. Background/ Objectives and Goals

In recent years, social media has become ubiquitous for social networking. Everyone can share one's life and opinions publicly and see others' post as well. However, some people may have positive or negative feelings by viewing other people's posts on social media. The study mainly explores how users would feel by seeing other people's posts, which relates to users' social media usage, work conditions, and well-being. In addition, the research investigates whether the well-being of users will increase or decrease after using social media.

2. Expected Results/ Conclusion/ Contribution

The results show that the higher the frequency of use, the more tendency it is to generate a competitive mentality, and most of the feeling is negative. Additionally, those who have better work conditions are less likely to be affected when viewing other people's posts. Moreover, about 60% of people think they become happier after using social media; about 40% of people feel less happiness after using social media. The result of the research can help people understand that the usage of social media would influence one's well-being, so it could remind them the attitude and usage on using social media.

Keywords: Social media behavior, well-being, self-disclosure, competitive mentality

APCBSS-0097
Exploring the Relationship between Workplace Friendship and Work Commitment- The Mediated Effect of Job Engagement

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1. Background/ Objectives and Goals

As time goes by, people spend more and more time on work. Therefore, the relationship between co-workers is getting more important in our life. People who build friendship in their workplace we called “Workplace Friendship”, at the meanwhile; it is also the way people deal with their pressure. According to some researches, as the Workplace Friendship developing, it could help workers to increase Organizational Identification, and help the staffs create a positive emotion when they are working, and share their weal and woe with the company, increasing the thought of going to the further future with the company.

2. Expected Results/ Conclusion/ Contribution

The results of the study show that Workplace Friendship has a positive impact on Organizational Identity and further positively impacts Job Engagement. The results of this study will help the organization understand the impact of interpersonal interactions between employees on Organizational Identity and Job Engagement. Managers of organizations can promote the development of Workplace Friendships among employees, so the members of the organization can emotionally identify their colleagues and organizations. Increasing the level of Job Engagement of the organization members will help improve the overall performance of the organization and have a positive effect on the organization.

Keywords: Workplace Friendship, Organizational Identity, Job Engagement

APCBSS-0099
An Investigation of User Behaviors of Instant Messaging in Different Age Group

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1. Background/ Objectives and Goals

The universal development of instant messaging (IM) has made it an important information transmission channel for users. In addition to social communication purposes, it has also been widely used in work communication. With the popularity and usability of IM, users' age distributions and objects are becoming more widespread. This study will take “LINE” as a research subject, which is the most commonly used IM application for Taiwanese. This research explores the differences in the user behavior for different age groups. Furthermore, this study uses their horoscope element as an important indicator to predict user behavior.

2. Expected Results/ Conclusion/ Contribution

The results of the research show that time spending on IM and happiness are presented as the inverted U curve. In addition, users over the age of 40 are directly proportional to the relationship between the frequency of use and the interaction object. That is, they pay more attention to the interaction between family members. For users under 20, their usage frequency toward close friends is the highest. However, they only choose the massage which they are interested in. Most middle-aged and elder users who see groups in IM as a traditional social relationship. Compared to other age groups, they pay more attention to each other's reciprocity. Finally, this study finds that water element users are susceptible to emotions caused by the message; users of the fire element usually decide whether to respond according to the current mood.

Keywords: Instant Messaging, Happiness, Horoscope, Age

APCBSS-0100

Explore the Semiotics Persuasion on Social Media Advertising in Hong Kong

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Abstract

1. Background

Social media advertising emerges as an important communication channel for augmenting advertising effectiveness. An effective social media advertising should lead users to favourably respond to the ad. How we can advertise in the social media platform in order to persuade users to take action? There are researches investigated on certain customers' behaviour on social media advertising. However, few researches would focus on the semiotics persuasion to find out the effective strategies of social media advertising for a specific market.

1.1 Objectives and Goals

The aim of applying semiotics in the analysis of social media advertising is to unmask the arrays of hidden meaning or factors affected its effectiveness. Based on the semiotics analysis, the writer tends to find out the adults' attitude on social media advertising through an experimental process. The research has been motivated by two research questions: (1) what are the visual or textual components effectively driven customers' interest. (2) what is the new sign representation in social media advertising? The finding of this research will benefit firms to play a sizeable role in response to customers' interests; and to have favourable investments from their advertisements.

2. Methods

Since celebrities may signify different cultural meaning, the writer did not use celebrities' icons as stimulus in this stage. In order to have more accurate results, the writer focuses on still images to test the Hong Kong people' interests in facebook. The method includes three parts: (1) The researchers collect 580 ads in facebook and analyse the design approaches. (2) Based on the analysis and synthesis, they create six different advertisements of a brand as stimulus. (3) The stimulus has been presented to the experimental participants as a treatment and a survey has been used to collect on the participants' interest and response. The survey includes the ranking of the advertisements. The reasons of selection the most and less interests of ad are the main focus in this survey. The factors driven participants' interests and behavioural responses are the last part of the survey. The stimulus should be neutral that has no particular gender impacts or interests is the advertisement of a steak bar. The survey is conducted to collect data for empirical analysis. The participants consists of 118 people; 71 female and 44 male, age from 22-35,. Most of them have university educational background and a few have master degree level. Ten participants are selected for the focus group interview.

3. Results

After the analysis of 580 ads in Facebook, the writer summarizes them into six categories. The advertisement formats are to: 1. offer discount for viewers to share with friends. 2. indicate on the no. of people liking pages. 3. display descriptive content and items from product catalogue. 4. create curiosity by asking questions that viewers will inbox to get answers. 5. use text to create gameplay experience that viewers will get answers/awards. 6. use photos to create gameplay experience that viewers will play the game to get answers/awards.

The results reveal that 39.1% of participants prefer the advertisement with descriptive content and some relative photos of the product (category 3). Participants love to view photos and read the text (content story) simultaneously and they prefer to find out information about different steak menus. In this case, the text becomes an indexical sign of the photos. It involves some kind of 'existential contiguity between the sign itself and its objects'. (eg. fire and smoke) (Mcquarrie & Mick 1999). The sense of seeing is aroused unwittingly. The perception blends into an unconscious desire for a product by sensory association (Barthes 1967). They don't feel boring while viewing the photos continuously. Advertisers tend to keep the product in glittery imagery should lead customer to an unconscious desire.

The second and the third rank is very close which is the category 2 (26.1%) and category 6 (21.7%). The no. of 'Like' indication (category 2) should persuade participants' interests. It represents the calibration of signifier for people to understand a fact. People believe it as a fact and take action directly. The scholars, Beasley, Danesl & Gruyter (2002), mention people tend to develop short attention spans and habituate to a large doses of information. They are embedded into a kind of social consciousness. People are influenced by what others do. It may be argued that they only pay attention on a signifier level of sign and get the message rapidly. For the game approach ad (category 6), the meaning of 'game' indicates people can take action and get awards. It projects the relations of symbol and a kind of interactivity; the result of uncertainty drives participants' interests. On the other hand, some participants do not feel interests on this uncertainty. Some explained that they didn't feel interested to get the answer and preferred to get the information right away. Thus the symbol (ad) has an arbitrary relation to some referent. Participants have different interpretations to response. Some participants mentioned once they read the word, 'inbox', they would not click (category 4). With the consideration on their own images in the social media platform, they didn't prefer their friends to know the message they left. Some are also afraid of receiving massive promotional messages afterwards. In certain extent, the sign of 'inbox' will cause annoying result and it causes participants' disinterest.

Advertisement like the discount offer and the use of humor to generate feeling or content will persuade people's interests (Beasley, Danesl & Gruyter, 2002). Many participants has given 6 points category 3 (with story-like content and photos). Unlike traditional narratives (novels), people won't spend long time to process the meaning that the ads should be highly visual and synesthetic. Most of the participants reflected the photos are important for eye-catching them to view and read the content simultaneously. Thus the photo image is also the substitution of text (content). The less reflective sign and less time for processing the information are the favourable factors to lead people to feel interested. In this sense, participants feel boring on only using text to indicate a game play content (category 5). 45% of participants selected this kind of ad as the most disinteresting one. Although this research is not focused on the psychological factors, the last part of result has proved participants have emotional driven to click like of the ad they feel most interested.

The results of this paper reveal two significant of analysis of semiotics persuasion on people's interest in the social media advertising. First, visual image is sophisticated to persuade people's interest. It can substitute text but text is also an index of visual image. Less text and time for processing the information in the ad, more interest people will have. People also prefer to read more direct meaning of sign (the signifier level) in social media platform. Second, advertising as a form of discourse combines with language and the modality of lifestyle and culture. We may recognize today in social media advertising a simple meaning and expressive content should be more convincing to get people' interest and response. A sign representation becomes less reflective and the content of text can be substitutional.

Keywords: Social media advertising, Semiotics persuasion, Semiotics, Social media

Computer Engineering and Technology/ Electrical and Electronic Engineering/ Information Engineering and Technology

Tuesday, February 26, 2019 15:00-16:30 KIKU, 3F

Session Chair: *Juhng-Perng Su*

ICNSE-0141

Trajectory Following Control for Quadcopters Using a Modified Quaternion Representation of Attitude

Juhng-Perng Su｜National *Dong-Hwa University*
Wei-Chin Tseng｜National *Dong-Hwa University*
Wei-Chung Chi｜National *Dong-Hwa University*
Yu Siang Wang｜National *Dong-Hwa University*

ICNSE-0101

Characteristics of Supercapacitor Using Carbon Electrodes with Reduced Graphene Oxide Coated Mesocarbon Microbeads

Chih-Ming Wang｜*Cheng Shiu University*
Chih-Huai Hsu｜*National Sun Yat-Sen University*
Ying-Chung Chen｜*National Sun Yat-Sen University*
Jui-Yang Chang｜*National Sun Yat-Sen University*
Sin-Jhih Lin｜*Cheng Shiu University*

ICNSE-0110

Fault Variable Identification for High Dimensional Data Based on Support Vector Data Description

Young-Seon Jeong｜*Chonnam National University*

ICNSE-0153

Accessible Multi-View Symbols for Software UI

Naoyuki Murata｜*University of Aizu*
Rentaro Yoshioka｜*University of Aizu*

ICNSE-0172

Design and Control Method for Reaction Force Series Elastic Actuator

Kyeongmin Kim｜*Inha University*
Young Sam Lee｜*Inha University*

ICNSE-0141
Trajectory Following Control for Quadcopters Using a Modified Quaternion Representation of Attitude

Juhng-Perng Su*, Wei-Chin Tseng, Wei-Chung Chi, Yu Siang Wang
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1. Background/ Objectives and Goals

The lift generated from each propeller of a fixed-pitch *quadcoptor* is directly proportional to the square of rotor speed. No aerodynamic force from varying the pitch angle of blades is involved; therefore, the quadrotor craft can be viewed as a rigid body. As a result, a mathematical model [1-5] will be coming in handy and a high-performance flight controller can be attainable to meet the design specifications. In recent years, the flight control of quadcoptors has drawn much attention in academic society as well as industries. Many stabilizing control algorithms have been developed for quadrotors, as can be found in literature, such as the path planning and control [6-7], PID control and LOR optimal control [8], robust tracking control [9], nonlinear control [10], nonlinear adaptive control [11], sliding mode control [12], feedback linearization control [13-14] and vision-based tracking control [15], etc. One may consult [16] for a comprehensive description of multirotor craft system. Most of which are based on roll-pitch-yaw (RPY) or Euler angle/axis representation of attitude while some papers present quaternion approach to attitude representation and attitude control. Despite the advantages of using quaternion as attitude representation over Euler angle or RPY representations, there are two quaternions corresponds to an attitude. This problem of two-to-one correspondence can be resolved by means of a *modified quaternion* representation, called *Rodrigues parameterization*, which is employed in this paper to develop an effective robust *attitude control*. Specifically, given a desired trajectory, a PID control is firstly proposed for the trajectory tracking control, from which a desired attitude of the quadrotor is determined and then a *sliding mode control* based on Rodrigues parametrization is derived accordingly to deal with the attitude control. In particular, the sliding mode control is known as quite robust against the parameter variation of the vehicles and output disturbances, which is quite desirable due to inaccuracy or difficulty in determination of plant parameters as well as wind disturbances. Finally, we implement the flight control law on an embedded control board to accomplish basic flight control modes.

2. Expected Results/ Conclusion/ Contribution

We performed practical tests for attitude control in an experiment setup shown in Figure 3-1. Table 1 indicates system parameters of the quadrotor used in the experiment and Figure 6-9 depict the roll and pitch responses corresponding to the regulation and set point controls, respectively. The results clearly demonstrate the effectiveness of the attitude control proposed in this paper.

Keywords: quadcoptor, modified quaternion, Rodrigues parameterization, attitude control, sliding mode control, flight control board

ICNSE-0101
Characteristics of Supercapacitor Using Carbon Electrodes with Reduced Graphene Oxide Coated Mesocarbon Microbeads

Chih-Ming Wang [a,*], Chih-Huai Hsu[b], Ying-Chung Chen[b], Jui-Yang Chang[b], Sin-Jhih Lin[a]

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1. Background

With the rapid expand upon science and technology, people are projected to develop new energy sources, and effective methods must be established for energy-stored systems. Supercapacitor (SC) is a new charge storage device positioned between traditional capacitors and batteries, which use electrochemical activated materials or porous materials for storage. The advantages of supercapacitors are high power density, high energy density, good cycle life, and fast charge/discharge times. Therefore, supercapacitors could improve the disadvantages of the traditional batteries and capacitors.

In this study, the mesocarbon microbeads (MCMB) are mixed with various content of reduced graphene oxide (rGO), and the influence on characteristics of supercapacitors are discussed.

2. Results/ Conclusion

This study focuses on the investigation of addition of rGO, to obtain the optimum compositions of composite carbon electrode. When 3 wt.% rGO is added to the carbon electrode, the optimized specific capacitance of 246 F/g can be obtained. Figure 1 presents SEM micrographs of the MCMB with 3 wt.% rGO electrode. It is showed that the surface of the composite powder was covered with graphene and the granule of MCMB became unobvious. The CV results of adding various graphene contents are shown in Fig. 2. The hysteresis area obviously increased when the graphene content increased. However, when the amount of rGO is increased further, the specific capacitance decreases to 230 F/g. The reason should be attributed to the overlying of rGO on the activated carbon surface, which will decrease the specific surface area and capacitance characteristic. In conclusion, adding of 3 w.t.% rGO to the carbon electrode will improve electrode conductivity and result in enhanced capacitance.

Keywords: supercapacitor, mesocarbon microbeads, reduced graphene oxide, cyclic voltammetry

ICNSE-0110
Fault Variable Identification for High Dimensional Data Based on Support Vector Data Description

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1. Background/ Objectives and Goals

In quality control area, multivariate statistical process control (MSPC) chart is the primarily used technique to monitor product quality in high-dimensional processes and detect process mean shift or variance change. Even though MSPC charts take advantage of monitoring several process variables simultaneously by considering the correlation among the multiple variables, it has a limited ability to identify the variables causing the out-of-control (OC) signal. To overcome this limitation, several researchers have developed approaches for identifying faulty variables when the process shift occurs. However, existing approaches follow under normality assumption and there has been an increasing concern about the normality assumption, which is impractical.

Therefore, in this paper, we propose a new fault variable identification method that does not assume any specific distribution of observations. The proposed procedure based on one class classification method identifies the changed variables by identifying unchanged variables at each step using the information obtained from the previous steps. This strategy can reduce computational times when a few variables are changed in a high-dimensional process. In addition, the proposed procedure is robust to the correlations between variables, resulting in stable performance regardless of the number of changed variables. The experiment results with diverse dataset demonstrate superiority of the proposed distribution-free procedure.

2. Expected Results/ Conclusion/ Contribution

In this paper, we propose a novel fault variable identification procedure by combining a support vector data description (SVDD)-based test statistic with an adaptive step-down procedure. The proposed procedure identifies unchanged variables step by step under no significant evidence of a change and eventually obtains the changed variables by considering at most $\frac{p\times(p+1)}{2}$ decompositions in which p means the number variables. In addition, the proposed procedure is not sensitive to the correlation between variables, leading to stable performance regardless with the number of changed variables. The experiment results with different distribution datasets demonstrate that the proposed procedure outperforms existing distribution free methods such as K^2 decomposition and HNS decomposition method when the number of shifted variable is more than one.

Keywords: Fault variable identification, Support vector data description, High dimensional data, Non-normal distribution

ICNSE-0153
Accessible Multi-View Symbols for Software UI

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1. Background/ Objectives and Goals

Designing a good user interface (UI) is crucial in software development, especially to reduce unintended input and erroneous operations based on misconceptions. To encourage better design, various design standards and guidelines have been published to enforce uniform and well-informed symbology and layouts. Prescribed designs in form of customizable templates and ready-to-use components and design styles have also contributed to improving modern software through standardization. While these improvements focus on form and style of UI elements, no such approaches have been made for words and symbols used within them, such as the specific terms used in a list box, labels of select boxes, and context related button labels. The goal of this research is to develop a generic method to unify the symbology (or terms) used in UI elements and to provide multi-view explanation of them to support correct understanding.

2. Expected Results/ Conclusion/ Contribution

As one of the results of this research, a data format for multi-view symbols has been developed. In that format, a symbol consists of a representative icon, short explanation in words, and a set of multiple view pictures. Each multiple view picture can be annotated with “clarifiers” to limit a meaning of a picture. This is useful since each picture can be an image, photo, or any form of graphics, the added clarifiers help to narrow down and emphasize the intended interpretation. There are four clarifier types, “who”, “why”, “how”, “when” that are used to narrow the context that is implied by a picture. A classification of clarifiers for each type and corresponding icons have been developed.

The multi-view symbols server is designed as an extendable database that allows administrators to add and edit the symbols. Once registered symbols may also be updated by adding additional pictures corresponding to new perspectives that will further enhance understandability. On the other hand, ineffective or confusing pictures may be removed or replaced. The accumulation of multi-view symbols is a continuous effort in building knowledge and so the database is designed to support it.

The multi-view symbols are made accessible through a REST API server to application clients. It is designed to be integrated into various applications by simply making API calls to the server over a network. Currently, its use is limited to network connected applications by design.

In conclusion, this paper presents a design of a new paradigm of standardizing symbology and terms used in UI’s to improve understandability and hence increase quality of user decisions and data collected through them. The paper will also present several concrete examples of multi-view symbols and their integration in an actual application. The full paper will include evaluation results based on user impressions of multi-view symbols in the application.

The main contribution of this paper is a novel and feasible method to improve understandability of UI’s using multi-view symbols.

Keywords: Multi-view symbols, unified symbology, UI design, software engineering

ICNSE-0172
Design and Control Method for Reaction Force Series Elastic Actuator

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1. Background

Currently developed active prostheses cannot be made small because they use big actuators and sensors to exert strong power and measure the force. For this reason, active prostheses for children have not yet been developed successfully. In order to solve this problem, we design a series elastic actuator with compact Size and propose a position and force control using a disturbance observer(DOB) to control the angle of the knee. SEA(Series Elastic Actuator) is categorized into RFSEA(Reaction Force-sensing SEA) and FSEA(Force-sensing SEA) depending on the positions of motor, gear, and spring. In this paper, we choose RFSEA structure with smaller size but wider operating range than FSEA. Since RFSEA can measure the reaction force against external force through the spring displacement, it can reduce space occupied by sensor in prosthesis. Because of these advantages, RFSEA is now used for pedestrian assistance for stroke patients and paraplegic patients. Developing an active prosthesis will enable more freedom and stable walking for people small in height.

2. Conclusion

In this paper, we design SEA to overcome the limitations of the existing active prosthesis and check the control characteristics of RFSEA. We derive a mathematical model by Lagrangian mechanics and obtain a nominal model for using DOB. When performing a position control, the measured reaction force includes the vibration of the spring if DOB is not applied. Therefore, the resultant control also includes unnecessary vibration component. As a result, it tracks the desired position with some vibration. When DOB is applied, however, since the spring vibration is removed from the feedback component, the control input is generated irrespective of vibration. As a result, the arm can stably track the desired position. For force control, the desired output force acting on the arm is set to zero. In case of ramp input with gentle slope, with-DOB and without-DOB do not show difference. However, in the case of rectangular pulse input, even if the force applied to the contact end disappears, it senses that there is an external force due to remaining the vibration of the spring. If DOB is used, it was confirmed in the same situation that the position of the arm is fixed regardless of the spring vibration by removing the reaction force from the feedback input. As a result, RFSEA can be used to overcome the structural limitations of the currently designed active prosthesis, so that limb amputees of children can wear prosthesis. And by using DOB it compensates for the disadvantage of force sensing through the spring, thus allowing normal walking which can cope with the external environment.

Keywords: Series elastic actuator, Disturbance observer, Force control

Education (1)

Tuesday, February 26, 2019 15:00-16:30 YOH, 3F

Session Chair: *Yuanshan Cheng*

APCBSS-0088

Values of Youths: A Cross-Cultural Study

Yuanshan Cheng｜*National Institute of Education, Nanyang Technological University*

APCBSS-0110

Diet and Agriculture Education in the Middle Ages Grade

Fei-Yu Hsu｜*Taipei Municipal Yi-Xian Elementary School*

ISLLLE-0055

Principal Leadership and Shaping School Culture for Teaching and Learning Rooting on School Governance: Mission, Strategies and Accountability

Ching-Hsun Chang｜*National Pingtung University*

ISLLLE-0068

Flip or Sleep? Non-English Majors' Perceptions and Satisfaction in a Flipped General English Classroom in Taiwan

Wei-Yu Chang｜*National I-Lan University*
Caroline Walker-Gleaves｜*Newcaslte University*

ISLLLE-0091

Use of Languages in Mathematics Assesment to Deaf High School Special Needs Education (SMALB)

Sri Wuryanti ｜ *Educational Assessment Center, Research and Development Agency, Ministry of Education and Culture Republic of Indonesia*
Zul Arsiah｜ *Educational Assessment Center, Research and Development Agency, Ministry of Education and Culture Republic of Indonesia*
Wenny Saraswaty｜ *Educational Assessment Center , Research and Development Agency, Ministry of Education and Culture Republic of Indonesia*

APCBSS-0088
Values of Youths: A Cross-Cultural Study

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1. Background

Values are general beliefs about desirable and undesirable ways of behaving in everyday life (Corey, Corey, & Challahan, 2003). In Singapore, the Ministry of Education has clearly defined six core values or value components as the required outcome for students. They are "respect", "responsibility", "resilience", "integrity", "care" and "harmony" (2011). Researchers, educators and even political leaders have proposed other value components. For example, in an international youth survey conducted by Ho and Yip (2003), "attitudes towards dating and marriage" was listed as one important value component. Another value component was materialism, the "attitude towards money". In history, many arguments and debates on the components that make up Asian values have been involved (Englehart, 2000; Gopinathan, 1988; Han, 2007). For example, some components are related to individual values such as "hard work" and "sacrifice "; while the others are related to attitudes towards ideal relationship or social system, such as "strong family ties and filial piety" and "an ordered society" (Xu, 2005). Political values such as "nation" and "citizenship" are concepts and values that influence the establishment of an ordered society. In the Information Age, youths have become highly mobile. Many of them have travelled to other countries for education and leisure. All these exert very strong influences on their values, and possibly modify or even shift their values. The present study's main objectives to learn where Singapore youths stand in terms of some important value components.

Since Confucian values have its root in China, most researchers believed that these are the dominant values in China. It will be interesting to include Chinese youths as a data point for comparison with Singapore youths.

2. Results

Since huge data were obtained. The present presentation will only focus on some interesting value components. Generally, the Singapore youths did not show "big" differences from Chinese youths in their similar response patterns for different value components although quite a few significant differences were identified. For example, there is almost not differences in response patterns related to the attitudes towards happiness, but interesting pattern differences related to dating target were found. Through the results, a better understanding of where Singapore youths and Chinese youths stand and their perceptions pertaining to different value components.

Keywords: Values, Youths, Singapore and Chinese students

APCBSS-0110
Diet and Agriculture Education in the Middle Ages Grade

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1. Background/ Objectives and Goals

Quality of Taiwanese food is unstable and food problem is becoming more and more serious. The curriculum incorporates with implementation of the Taipei policy - The pastoral.

Start with the film, let students think and discuss about the story of the film, understand what is friendly agriculture, learn to coexist with the ecology, and take care of all things on the earth. Then close to the land by learning how to grow crops. Treat the environment and take responsibility for the vegetables you grow, giving it love and care every day.

Healthy diet and agricultural education are also particularly important, so let the children start, children will realize that is hard work. By making breakfast, lunch and dinner, let the children know how to be grateful, and learn to care for the family.

"Each and every grain of rice in bowl is the fruit of the toiling farmers."Cherish every meals and cherish what you have.Take care of the disadvantaged groups and let love spread.

2. Expected Results/ Conclusion/ Contribution

(1) Results

After the implementation of education of diet and agriculture by the teachers on classes, We hope the result can help us to realize and identify the performance of promoting the education of diet and agriculture on children. We believe it will be helpful to give the right direction for the teachers to refine the education. The conclusions of this research are as follows:

i. Let children get close to food and know what is "fresh, natural, local and seasonal food" and understand the impact of healthy food on the body.

ii. Being a person with a "hand down" makes the society full of love and warmth.

(2) Suggestions

If everyone can care about the environment, and protect it,cherish these natural treasures, and they will continue to develop and survive.

Keywords: Diet and agricultural education

ISLLLE-0055
Principal Leadership and Shaping School Culture for Teaching and Learning Rooting on School Governance: Mission, Strategies and Accountability

Ching-Hsun Chang
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Abstract

Background

Rooting on constructing the global core competence framework to cultivate holistic people for the better world, we have to think and reflect the school principal role to shape core competence orientation's school culture for teaching and learning quality. Based on the special school mission (ideal schools, experimental education, diet education, etc.,) this study is to relate the strategies to the accountability of school governance. As a result, the purposes of this study are developed as mentioned below.

Conclusion

Based on the background, research purposes, literature review, research results and discussions, the researcher proposes the conclusions as follows:

1. School governance is a continuing process that integrates the internal mechanism into the external support system in order to assure teaching and learning quality and its sustainable development.
2. The strategies of shaping competence campus culture include (1) constructing internal and external school support systems; (2) constructing school-based curriculums; (3) Flipping teachers' professional competence; (4) shaping school as a learning organization.
3. The school culture of core competence orientation is based on the students-center and get-together community. Meanwhile, it possesses the following characteristics: (1) cooperation and learning; (2) practice; (3) processional dialogue; (4) educational effectiveness orientation; (5) trustworthy culture.
4. Constructing the accountability and evaluation mechanism is very important for shaping core competence orientation culture and assuring teaching and learning quality. But we still have to strengthen the operative mechanism and framework.
5. How to measure the student learning achievement is the most difficult issue in teaching design for the sake of core competence. In addition, how to construct school-based curriculum is also a tough problem. However, each of the schools was able to overcome the problems through practice in teaching design and reflection in professional learning.

Keywords: principal leadership, school culture, core competence, school governance, accountability

ISLLLE-0068
Flip or Sleep? Non-English Majors' Perceptions and Satisfaction in a Flipped General English Classroom in Taiwan

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1. Background

In this age of technology explosion, the use of computer technology has become commonplace and unavoidable due to its convenience, rapidness, and effectiveness which has also much influenced the EFL education in which the learning of knowledge is jointly created and constructed by the way of developing students' online communication and collaboration (Azevedo, Delgado, Silva, 2017). However, using computer technology in General English education stagnates at initial stage in Taiwanese context except for some basic applications, such as, the use of PowerPoint as an aid to deliver courses, Internet connection to the online resource retrieval and so on. Its further employment (e.g. flipped classroom, MOOCs…etc.) is relatively limited. Therefore, this study tried to infuse a new element – flipped education – in a General English classroom in a Taiwanese university to investigate its effects on non-English majors' English performance and understand their perceptions and satisfaction toward this new approach. Two research questions, *were there any statistically significant differences on the non-English majors' English performance after the treatments?* and *how did the non-English majors perceive the affordance of flipped education in their General English classroom?*, were proposed.

2. Results, Conclusion, and Contribution

The quantitative results in the paired-sampled *t* test indicated the students' English proficiency improved significantly in terms of their listening performance with $p = .017$, reading performance with $p = .000$, and overall performance with $p = .000$. As for the students' perceptions and satisfaction toward the flipped education, the participants agreed with spending more time in a flipped classroom (80%), being more active in participating class activities (83.3%), having more positive affections toward flipped education (83.3%), gaining better learning outcomes (70%), improving learning motivation more (76.7%), and increasing overall learning satisfaction (90%). After having quite positive quantitative results, the qualitative results of learning in a more interesting classroom, engaging more in class activities, having more effective learning outcomes, and nurturing learning autonomy were also coded from the qualitative data.

To respond to the research questions, the students' English proficiency improved significantly because they not only had to watch the instructional videos before the class but needed to participate in a series of in-class activities. After class, the students might prepare for the irregular quizzes. Therefore, the flipped education increased the students' exposure to the target language before, in, and after class. In addition, this approach developed the participants' positive perceptions and strengthened their satisfaction because the students usually had fun and felt relaxed as well as interacted with both the instructor and peers more than before in the classroom. More importantly, quite a few responses related to the improvement of learning autonomy were found. Therefore, not only did the non-English majors' language proficiency be enhanced but their affective factors were also concerned in a flipped General English classroom.

English is often considered as a nightmare to many non-English majors, students in engineering departments in particular, in Taiwan. According to the results in this study, however, the affordance of flipped education was successfully ingrained in the participants' minds which resulted in both the significant learning outcomes and positive learning perceptions and satisfaction. Consequently, the use of flipped education in non-English majors' classrooms in EFL contexts is highly recommended.

Keywords: flipped classrooms, non-English majors, perceptions, satisfaction

ISLLLE-0091

Use of Languages in Mathematics Assesment to Deaf High School Special Needs Education (SMALB)

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Puspendik Balitbang Kemdikbud

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Abstract

The 2013 curriculum was implemented in Indonesia from the 2013-2014 academic year, the former previous curriculum namely KTSP (curriculum 2006). The 2013 curriculum aims to encourage students to understand, ask, reason, and communicate or present the learning outcomes that they have obtained or know. The objects of learning are natural phenomena, social phenomena, and cultural phenomena. Whatever learning, the object must be three things. While the thematic-integrative approach. Just observing is not enough, students must develop their ability to ask questions. Because of the question arises intellectual curiosity. That alone is not enough, students need to teach to be able to present, communicate something, whether written or oral. All humans have the right to learn, as well as children with special needs who experience obstacles in hearing or hearing in special needs school (special need education hight schools to deaf). Deaf students have a very limited vocabulary compared to students who have normal hearing function. In accordance with the opinion of Huda (2018) the ability of SMALB (special need education high school to deaf) students in mastering a foreign language or Indonesian language is a lack of vocabulary, grammar, and difficulty in expressing ideas. For children with special needs, hearing impairment is a major obstacle because language is a tool for communicating with other human beings, expressing feelings, regulating, giving information, and gaining knowledge. Thus students who have language skills will be able to develop their social, emotional, and intellectual abilities to the fullest. While for students with hearing impairments or total deafness it is not possible to have mastery of language through hearing, but maximize the mastery of the language with vision and utilize other senses. Communication media for deaf students have two possibilities, namely using writing media and reading or using sign language. In the context of national standard assessment for children with special needs also follow the national examination. Since the implementation of the 2013 curriculum SMALB (special needs education of high school to deaf) or department PKLK (special education and special services) of unit ministry in Indonesia also uses the new curriculum. The subjects tested for SMALB are; math, Indonesian, and English. In accordance with the 2013 curriculum philosophy, for all subjects based on contextual or text with cultural, natural and social phenomena. Likewise for mathematics subjects using mathematical literacy, where students learn practical skills to find concrete solutions to numerical literacy, spatial literacy, and statistical literacy. Deaf students have a very limited vocabulary compared to students who have normal hearing function. Why the

language of study is very important, because the language for deaf learners is very influential in understanding the meaning of a word or sentence, the more students understand the meaning of the sentence well then it will reduce the bias in the items of mathematical questions presented. In the 2013 curriculum the national exam questions in all subjects use texts or genres mandated according to natural, social, and cultural phenomena that are closer to the school environment. Deaf students of SMALB who say UN (national assesment) mathematics, may get an assessment or bias without bias that requires good specifications and genre or text. From this study there are four things from;

(1) Questions with concrete media; concrete questions in this case are selected and simple keywords, so students are able to understand the word well, (example; Tools to realize effective teaching teaching situations, an integral part of the overall teaching situation, lay concrete foundations and abstract concepts so that they can reduce verbalism, develop learners' motivation, and enhance the learning quality of learning assessment),

(2) problems with visual media visual media are media that can be used by the senses of vision the form of still images, (example: maps, images and diagrams or projection media in the form of slides, films and ohps, students understand better using real objects or pictures in understanding the meaning or concept, description of description or abstract narrative),

(3) meaningful numerical quantitative questions using basic mathematical concepts is good for deaf students, but quantitative numeric texts will be more meaningful when using genres that are in accordance with the closest life context of students, as summarized (example; green school, painting, stories telling, making cakes, making deliveries, making recycles, making clothes, making salted eggs, making prayer beads or, rosary, washing vehicles), and

(4) Questions with sign language, reading texts will work independently without the help of instructions from the teacher, because the background is read by the examiner / teacher, there will be bias, it can be that students will have difficulty clarifying questions or the supervisor will direct the correct or blame answer.

Keywords; Deaf, language, mathematics, concrete media, visual media, concrete media, precise quantitative numerical questions, and sign language.

Mechanical Engineering and Technology

Wednesday, February 27, 2019 09:00-10:30 KIKU, 3F

Session Chair: *Tawarat Treeamnuk*

ICNSE-0149

Evaluating of Carbamate Residue in Grape Washed with Ultrasonic by Image Processing Technique

Tiwa Saipradit | *Suranaree University of Technology*
Tawarat Treeamnuk | *Suranaree University of Technology*
Krawee Treeamnuk | *Suranaree University of Technology*

ICNSE-0152

Design of Semi-Automatic Rambutan Peeling and Seed Removing Machine

Krawee Treeamnuk | *Suranaree University of Technology*
Anusara Tidtaram | *Suranaree University of Technology*
Tawarat Treeamnuk | *Suranaree University of Technology*

ICNSE-0166

Process Analysis and Performance Evaluation for Remanufacturing of Hydraulic Pump

Woo Hyun Son | *Pusan National University*
Kyu Chang Lee | *GOTs Co., Ltd*
Sang Jin Park | *Pusan National University*
Gwang Uk Han | *Pusan National University*
Hak Soo Mok | *Pusan National University*

ICNSE-0160

Metal Nanowire Percolation Network Based Sensor and Actuator

Seung Hwan Ko | *Seoul National University*

ICNSE-0149
Evaluating of Carbamate Residue in Grape Washed with Ultrasonic by Image Processing Technique

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Abstract

The Objective of this research was to evaluate the Carbamate residue in grape from a ultrasonic washer by image processing technique. Ultrasonic washer at frequencies of 28.9, 40.3 and 120.3 kHz and period time of 5, 10 and 15 minutes was used to clean the grape sample. The residue monitoring kit in agricultural crops called GT- Test kit that can detect toxic residues in Organophosphate and Carbamate group was used to measure Carbamate residue in the grape samples. The color of the samples was observed and then compare with control and critical color if the sample contains with toxic residues the color of the sample will darker than control and fruits or vegetable will dangerous for consumer if the color of the sample darker than the critical. For reduce error of color observation by human eye, so the image analysis was used to evaluate the color value of the samples in this research. The result was found that when the concentration of Carbamate increased the L* a* b* values will decrease or a darker color. The ultrasonic frequency and period time of grape washing affect to Carbamate residue in grape samples. The period time of ultrasonic grape washing at 15 minutes can reduce the toxic residue better than washing at 5 and 10 minutes because the L* value was the highest when compared to washing at 5 and 10 minutes. The ultrasonic frequency at 120.3 kHz is the best frequency because after washing the sample for 15 minutes make the L * value increased from non-washing sample by 45.36% while the frequencies of 40.3 and 28.9 kHz the L* values are increased to 9.39% and 6.93%, respectively.

Keywords: Grape, Ultrasonic, GT-Test kit, Image processing

ICNSE-0152
Design of Semi-Automatic Rambutan Peeling and Seed Removing Machine

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Abstract

This research objective was to design, fabricate and preliminary test the prototype of semi-automatic Rambutan peeling and seed removing machine. Mechanical and physical properties of Rambutan fruit were studied and the important resulted were used to determine the dimension, shape of mechanism and their necessary force in the prototype machine. Electro-pneumatic power and programable logic control (PLC) were selected to use in this design. The study result found the diameter of fruit holder, diameter of crescent peeling knife and diameter of seed puncher could be 40 mm, 30 mm and 18 mm respectively. Designed result found the proper peeling mechanism is a double knifes equipped on the horizontal of the machine. It uses to hold and peel the Rambutan fruit at the same time. For the seed remover a stainless steel tube was used as a seed puncher and installed in the vertical of the machine. The proper compressed air pressure in pneumatic system is 6 bars. The test results shown that the proper speed of feed mechanism, peeling mechanism, seed puncher and fruit removing mechanism are 1 m/s, 1.67 m/s, 5 m/s and 5 m/s respectively.

Keywords: Rambutan Fruit, Fruit Peeling Machine, Fruit Seed Removing Machine

ICNSE-0166
Process Analysis and Performance Evaluation for Remanufacturing of Hydraulic Pump

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1. Background

There are many studies to solve environmental problems that are emerging all over the world. Among them, remanufacturing is a method of resource recycling, in which a product that has a problem of failure and aging due to long use is rebuilt as a new product through a special process different from the general manufacturing process. Currently, remanufacturing has been actively researched and sold in the field of automobile parts, and it can be applied in many fields in the future. In this study, the remanufacturing process analysis and performance test of the hydraulic pump mounted on the manufacturing machine were carried out in order to widen and revitalize the field of remanufacturing research.

2. Results

The fault types of the selected hydraulic pumps were classified into 8types of faults: piston rod internal leakage increase, shaft seal pump external leakage, etc.

We have been able to propose solutions for fault types with an RPN value of more than 100 through FMEA analysis. Through analysis of the disassembly and reassembly process, we found some process problems and suggested the improvement of design tool for the cylinder block parts with long working time.

The performance evaluation was conducted on five hydraulic pumps which were remanufactured. The performance evaluation items were based on RS B 0151, Korea's evaluation standard. All of these hydraulic pumps were satisfied the test criteria of a rated pressure of 210 bar or more, a discharge flow rate of 28.224 (L / min) or more, and a drain flow rate of 1.2 or less (L / min). Finally, we completed the standard process of remanufacturing of hydraulic pump through fault type analysis, disassembly and reassembly experiment, suggestion of improvement, and performance test.

Keywords: Remanufacturing, Hydraulic pump, Performance Evaluation, Fault type

ICNSE-0160
Metal Nanowire Percolation Network Based Sensor and Actuator

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1. Background/ Objectives and Goals

Wearable skin-like strain sensors are becoming essential in diverse future applications, such as motion detection, soft robotics and various biomedical applications. Among numerous nanomaterials and structures used to achieve novel flexible strain sensors, those based on carbon tend to exhibit greater mechanical performance and gains unique potential of transparency, but also suffer from a low gauge factor and electrical conductivity. Similarly, sensors built with capacitive structures demonstrate excellent linearity and low hysteresis but due to the theoretical limitations, also possess poor GFs (maximum of 1). Of this latter type, sensors based on silver nanowires (Ag NWs) are suggested as the most promising candidate based on their excellent electrical and mechanical properties.

2. Expected Results/ Conclusion/ Contribution

To address the shortcomings of conventional single axis-strain sensor and to develop a novel scheme to detect random strain vector, this paper presents a highly stretchable and sensitive multi-dimensional strain sensor capable of detecting in real-time ‘skin-like’ multi-dimensional strain loadings using pre-strained Ag NW percolation networks. This relies on two pre-strained percolation network layers intersecting each other, with decoupled electrical resistance change to the major axis of the principal strain and perpendicular direction and thus independently detecting the x and y axis of the surface strain environment.

Keywords: Ag nanowire, percolation network, strain sensor, actuator

Finance

Wednesday, February 27, 2019 09:00-10:30 RAN, 3F

Session Chair: *Anlin Chen*

APCBSS-0090

Partial Adjustment of Hybrid Book-building IPOs with a pre-IPO Market

Lanfeng Kao｜*National University of Kaohsiung*
Anlin Chen｜*National Sun Yat-Sen University*

APCBSS-0101

Will Google Trends Search Queries Affect the Volatilities of Gold and Oil Prices?

Jhao-Yu Wu｜*National Kaohsiung University of Science and Technology*
Mei-Se Chien｜*National Kaohsiung University of Science and Technology*

APCBSS-0102

How Does Global Liquidity Affect Financial Development?

Pei-Xuan Cai｜*National Kaohsiung University of Science and Technology*
Mei-Se Chien｜*National Kaohsiung University of Science and Technology*

APCBSS-0103

The Relationship between Liquidity Risk and Credit Risk: Evidence from Taiwanese Banks

Han-Zhe Chen｜*National Kaohsiung University of Science and Technology*
Chia-Chien Chang｜*National Kaohsiung University of Science and Technology*

APCBSS-0118

Leverage, Investment, and the Ultimate Ownership under Reforms of Banking System in China

Yintian Wang｜*Tsinghua University*
LuPing Wang｜*Xi'an Jiaotong University*
Wayne Yu｜*The Hong Kong Polytechnic University*

APCBSS-0090
Partial Adjustment of Hybrid Book-building IPOs with a pre-IPO Market

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1. Background

Partial adjustment of book-building IPOs is to compensate bidders for their revealing positive information and is well documented in the U.S. pure book-building IPOs. We find that partial adjustment does not exist in Taiwanese hybrid dual-tranche book-building with a clawback provision and a pre-IPO market. In Taiwanese book-building, underwriters collect demand information during the pre-marketing period to set a price range and collect retail subscribers' interests during the pre-selling period and trading information in the pre-IPO market to set a final offer price. The dual-tranche with a clawback provision hinders bidders from divulging positive information during the pre-selling period. Attracting retail subscription in the dual-tranche hybrid book-building process hurts underwriters' information acquisition from the bidders. Underwriters set the final offer price based on the free information of retail subscription and the trading information in the pre-IPO market rather than bidders' private information.

2. Conclusion

The book-building method is designed to collect information from investors so that underwriters can price IPOs more precisely. Partial adjustment is to compensate bidders for their positive information revelation. Without partial adjustment, bidders have no incentive to reveal their private information. The dual-tranche book-building mechanism with a clawback provision and trading information in a pre-IPO market change bidders' information revelation and thus change the partial adjustment phenomenon. Bidders of Taiwanese IPOs suffer from the decrease of allocation if they provide positive information. Therefore, bidders are reluctant to reveal their positive information under hybrid book-building with a clawback provision.

We report that IPO subscription and price discount relative to trading price in ESM are the major causes for IPO underpricing. We observe that retail subscription increases the distribution of public offer tranche and decreases the distribution of book-building tranche in the dual-tranche book-building with a clawback provision. The restrictions on discretionary allocations of hybrid dual-tranche book-building with a clawback provision in Taiwanese IPOs deter bidders' from disclosing positive information during the pre-selling period. U.S. underwriters collect bidders' information during the pre-selling period and compensate bidders' positive information by partial adjustment, whereas Taiwanese underwriters collect subscribers' demand information and the trading information in ESM other than bidders' demand information during the pre-selling period. In Taiwanese hybrid book-building process, bidders' and subscribers' demand information disclosed during the pre-selling period is not compensated. Partial adjustment phenomenon during the pre-selling period does not exist in Taiwanese hybrid book-building with a clawback provision and a pre-IPO market. Subscription information during the pre-selling period and the trading information in ESM is more influential than the bidding information for underwriters to set the final offer price for hybrid dual-tranche book-building IPOs with a clawback provision. Attracting the retail subscribers through hybrid book-building with a clawback provision deters regular bidders' information revelation.

APCBSS-0101
Will Google Trends Search Queries Affect the Volatilities of Gold and Oil Prices?

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Abstract

Many relative papers examine volatility-spillover of gold or oil markets, and some other papers investigate the relationship between gold or oil prices and macroeconomic variables. Considering a growing literature on internet search queries, the aim of this study is to investigate the effects of Google trends search queries on the volatilities of gold and oil prices. To improve the forecasting performance of the volatilities of gold and oil prices, we set up an empirical model which includes macroeconomic variables and an aggregate index of Google trends search queries to be the proxy of retail investors' attention. Moreover, because of the fast growth of the commodity ETFs, the sample data covers not only gold and oil prices, bust also gold and oil ETFs, and the sample period is from Jan. 1th, 2008 to Dec. 31th, 2017.

The empirical steps are as the following: Firstly, we calculate the volatilities of all variables by the GARCH (1,1) model. Secondly, we adopt OLS and vector autoregression model (VAR) to estimate two different models for each independent variable, the basic model (without the variable of search queries) and the modified model (with the variable of search queries). Thirdly, the out-sample forecast of different models from Jan. 1th, 2017 to Dec. 31th, 2017 are executed, and we compare the forecasting performance of different models based on the root mean square. The empirical results are as the followings:

Firstly, the OLS results of the modified model show the coefficient of the variable of Google trends search queries is positive for all volatilities of gold prices, gold ETF, oil prices, and Oil ETF, implying that higher Google trends search queries can increase the volatilities of these four variables. Comparing the adjust R^2 of the basic and the modified models by applying OLS, the adjust R^2 of the modified model is higher for these four variables, that is, the model covers the variable of search queries can have better estimating performance. Next, the out-sample forecasting results of the volatilities of gold prices and gold ETF, the VAR model with the variable of search queries show the best performance for one-year forecast, but the forecasting performance of AR model is the best for one-month and one-week forecast. Furthermore, the out-sample forecasting results of the volatilities of oil prices and oil ETF, the VAR model with the variable of search queries show the best performance no matter for long-run forecast (one-year forecast) or short-run forecast (one-month and one-week forecast). Hence, the index of Google trend search queries is useful to predict the volatilities of oil market no matter in short or long run, but it is useful for gold market only in the long run.

Keywords: Google Trends Search Queries, Gold Prices, Oil Prices, ETF, Forecast

APCBSS-0102
How Does Global Liquidity Affect Financial Development?

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Abstract

This study explores the effect of global liquidity on the financial development. Based on the model of Asongu (2017), we examine the effect by applying different financial dimensions, including financial depth, efficiency, activity, and size. The sample data covers 74 countries, including 21 OECD countries and 53 Non-OECD countries, from 1994 to 2016, and the generalized method of moment (GMM) and quantile regression are employed to examine the effect. The empirical results as follows:

First, the results of GMM show that the coefficient of global liquidity is significantly positive for all financial dimensions in the Non-OECD countries, implying higher global liquidity can rise financial development for all dimensions, including financial depth, efficiency, activity, and size, in the Non-OECD countries. Second, in the OECD countries, the coefficient of global liquidity is significantly positive for financial system efficiency, banking system activity, and financial size, but it is significantly negative for financial system depth. Generally, in the OECD countries, higher global liquidity cannot increase financial depth, but it can positively affect financial efficiency, activity, and size. Third, comparing the coefficient's value of global liquidity in the OECD and Non-OECD countries, except for financial system depth and banking system efficiency, all of them are higher in the OECD countries, which displays global liquidity causing higher effect on financial development in the OECD countries. Finally, focusing on the coefficient of global liquidity based on the results of quantile regression, it is significant only for the two upper quantiles of the 75th and 90th in most of financial dimensions, no matter for the OECD or Non-OECD countries. In the OECD countries, higher global liquidity could significantly reduce financial depth and activity in the higher stage of financial development. Conversely, in the Non-OECD countries, increasing global liquidity would significantly rise financial efficiency and activity in the higher stage of financial development. However, global liquidity cannot significantly affect financial development if financial development is under lower stage.

Keywords: global liquidity, financial development, Generalized method of moments, Quantile regression.

APCBSS-0103
The Relationship between Liquidity Risk and Credit Risk: Evidence from Taiwanese Banks

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1. Background/ Objectives and GoalsBackground/ Objectives and Goals

In this paper, we study the changes of banks' liquidity risk and credit risk during the financial crisis. Furthermore, we investigate the relationship between the commercial banks' liquidity risk and credit risk. According to the past literature, some studies (e.g., Dermine(1986), Acharya and Naqvi (2012)) indicate that there is a close relationship between liquidity risk and credit risk, whereas it is unclear that there is positive or negative effect.

2. Expected Results

Based on the research period including the financial crisis and the European debt crisis, it can be concluded whether the changes of banks' liquidity risk and credit risk in the two crises are consistent. Before the crisis is happened, whether the bank can judge from the changes of the financial crisis and the European debt crisis.

This study expect that the liquidity risk leads the credit risk before occurring finance crisis and conversely. We hope the result, which above situation is more significant in finance tsunami than European debt crisis

Keywords: Liquidity risk, Credit risk, KMV, Financial crisis, Vector Autoregression model

APCBSS-0118
Leverage, Investment, and the Ultimate Ownership under Reforms of Banking System in China

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Abstract

This study discusses the relationship between financial leverage and corporate investment behavior by incorporating salient features for companies in China as an emerging economy. Panel data of listed companies during 1991-2014 and cross-sectional data by the end of 2014 are applied to support the study. We obtain the following major findings. First, there is marked increase in overinvestment disciplining as the banks in China have become less dominated by the state during the reforms; Second, although the disciplining role served by debt is weaker for state-owned enterprises than for non-state firms, overall SOEs have become more focused on shareholder economic value maximization; Third, debts from non-state banks tend to insert greater disciplinary effect than that from state-owned banks.

Keywords: reform of banking system; leverage; investment; state-owned enterprises; state-owned banks

Civil Engineering

Wednesday, February 27, 2019 10:45-12:15 KIKU, 3F

Session Chair: *Young-Fo Chang*

ICNSE-0092

Ultrasonic Nondestructive Testing of Concrete

Young-Fo Chang｜*National Chung Cheng University*

ICNSE-0133

Effects of Oblique Weir with an Opening on Bed Configuration and Flow Structure

Hirotaka Une｜*Kumamoto University*

Terunori Ohmoto｜*Kumamoto University*

Kanji Adachi｜*Kumamoto University*

Hiroto Kondo｜*Kumamoto University*

ICNSE-0138

Effects of Hyper-Concentrated Sediment on Resistance Characteristics and Flow Pattern in an Open Channel with Three-Dimensional Square Ribs

Hiroto Kondo｜*Kumamoto University*

Terunori Ohmoto｜*Kumamoto University*

Kanji Adachi｜*Kumamoto University*

Hirotaka Une｜*Kumamoto University*

ICNSE-0092
Ultrasonic Nondestructive Testing of Concrete

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Abstract

Concrete is a composite material mainly composed of water, sand, aggregate, and cement. Due to the complexity of concrete material and high energy loss for high frequency ultrasonic waves propagation in concrete, small flaws, defects and cracks in the concrete structure can't be easily estimated precisely. In this study, a multi-source and multi-receiver method for imaging the surface opening cracks and pulse compression technique, reflection seismology, total focusing method (TFM) and phased array technique (PA) for detecting the flaws in concrete are reviewed.

The multi-source and multi-receiver method can locate the 3-D image of the tip of the surface opening crack successfully. For the pulse compression technique, the resolution of the ultrasonic image of concrete can be enhanced since the ultrasonic energy is increased and the frequency band of the signal is broadened. Appling the reflection seismology to detect the cracks in concrete shows that stacking reflection echoes is a useful method for imaging cracks. TFM and PA are always better than traditional (B-scan and synthetic aperture focusing technique) methods. For detecting a small target at a specific depth in concrete, the PA technique is recommended. Otherwise, for detecting a large target in concrete, the TFM is a better choice. Based on these study results, the technique of ultrasonic nondestructive testing of concrete is evolving from single element to multi-element of sources and receivers, and incorporating with pre-processing and post-processing of the ultrasonic signals is required for further improving the detection capability.

Keywords: Ultrasonic, NDT, concrete

ICNSE-0133
Effects of Oblique Weir with an Opening on Bed Configuration and Flow Structure

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Abstract

This paper presents the experimental study on the downstream channel bed due to an oblique weir with an opening, paying attention to the effects of relative overflow depth on local scouring, sand bars and three-dimensional flow patterns. The experiments were conducted under the clear-water scour condition for an equilibrium scour hole. The experimental results show that local scouring and sand bar development downstream of the submerged oblique weirs decreased with relative overflow depth and turned out strongly paired cellular secondary currents. In addition, the opening changed the place of strong local scouring from the channel side to the central region.

Keywords: oblique weir with an opening, river bed morphology, local Scouring, sand bar, three-dimensional turbulent flow, cellular secondary currents

ICNSE-0138
Effects of Hyper-Concentrated Sediment on Resistance Characteristics and Flow Pattern in an Open Channel with Three-Dimensional Square Ribs

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1. Background/ Objectives and Goals

Hyper-concentrated sediment flow containing a large amount of fine sediment such as clay and silt has been observed under various conditions, it was reported that the volume concentration of sediment showed 10% due to flood disaster on June 26, 1951. Wang et al. (1998) varied the clay concentration of kaolin suspension flow over smooth, gravel and stone beds within a clay concentration by volume of 9%, and showed that as the sediment concentration increased, the resistance coefficient clearly tended to decrease over the gravel and stone beds within the sediment concentration range of 3% to 9% and it tended to increase slightly over the smooth bed. In high sediment concentration flow, however, suspended kaolin particles might be deposited in the spaces between roughness elements, and their paper did not mention the influence of changes in boundary conditions on resistance.

2. Experimental Results

Figure 1 and Figure 2 show the relationship between the total drag coefficient and the volume concentration of kaolin suspended flow and PSA solution flow over the two-dimensional square ribs and the three-dimensional square ribs. The drag coefficient in the 3D square ribs between the concentrations C_v = 2 and 8% are smaller clearly smaller than that of the clear water. When the sediment concentration exceeds 6%, the drag coefficient increases as the sediment concentration increases. The resistance coefficient at k = 5 mm takes a minimum value between C_v = 4 and 6%, which is about 50% of the resistance coefficient of the clear water flow. On the other hand, the resistance coefficient at k = 10 mm takes a local minimum at C_v = 6%, which is about 63% of the resistance coefficient of the clear water flow. The drag coefficient in the PSA solution flow is similar to the trend of kaolin suspended flow. However the effect of reducing drag in the PSA solution is somewhat smaller than that in the kaolin suspended flow. By comparison of the 2D square ribs and 3D square ribs, in spite of the shielding area of the 3D square ribs flow being smaller than the 2D square ribs, it can be seen that the drag coefficients of the 3D square ribs in any cases are larger than that of the 2D square ribs. It is implied that this is due to the non-uniformity of the turbulence caused by the roughness opening.

Keywords: non-Newtonian fluids, flow resistance, PIV, three-dimensional square ribs

Communication/ Economics/ Literature/ Social Studies,

Politics and Law

Wednesday, February 27, 2019 10:45-12:15 RAN, 3F

Session Chair: *Meng-Wen Tsou*

APCBSS-0075
The Effect of Prenatal Exposure to Radiation on Birth Outcomes: Exploiting a Natural Experiment in Taiwan
Meng-Wen Tsou｜*National Central University*
Jin-Tan Liu｜*National Taiwan University*
James K. Hammitt｜*Harvard University*
Chyi-Horng Lu｜*National Taiwan University*
Szu-Yu Zoe Kao｜*University of Minnesota*

APCBSS-0084
A Public Opinion Analysis of Food Safety Issues in Social Media Communication
Min Hua Wu｜*National Pingtung University of Science and Technology*

APCBSS-0085
Welfare Hospitality: an Evaluation of Local Jail Management
Jeffrey Banal｜*Holy Angel University*

ISLLLE-0095
From International to Transnational Studies: Children Literature of the World & Comparative Literary Studies
Wen-Hui Chang｜*Chung Yuan Christian University*

APCBSS-0138
Improving Efficiency of Parent-Teacher Association (PTA) Communications
Kayo Iizuka｜*Senshu University*
Ryo Tamaki｜*Senshu University*
Taich Kurihara｜*Senshu University*
Naoki Sagawa｜*Senshu University*
Kyoko Yoshida｜*Senshu University*

APCBSS-0075
The Effect of Prenatal Exposure to Radiation on Birth Outcomes: Exploiting a Natural Experiment in Taiwan

Meng-Wen Tsou [a], Jin-Tan Liu [b], James K. Hammitt [c], Chyi-Horng Lu [b], Szu-Yu Zoe Kao [d]

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Abstract

We estimate the causal effect of prenatal exposure to radiation on infant health. By exploiting the 1983 Taiwanese radiation-contaminated buildings (RCBs) accident as a natural experiment, we compare birth outcomes between siblings and cousins exposed to different radiation levels. Given the 1983 accident was unanticipated and exposed cohorts were unaware of the risk until 1992, our design isolates the impact of radiation exposure during pregnancy from other effects. We provide the first evidence that prenatal exposure to a continuous low-level dose of radiation significantly reduces gestational length and increases the probabilities of prematurity and low birth weight.

Keywords: Radiation, Prenatal exposure, Birth weight

APCBSS-0084
A Public Opinion Analysis of Food Safety Issues in Social Media Communication

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Abstract

With the advancement of domestic inspection technology and the awareness of food safety, people have felt from the media that Taiwan's food safety problems have emerged in recent years. Therefore, in the face of food safety, how the government predicts prevention in the first time or even earlier is a major issue in risk management.

This study used the big data analysis method to analyze the food safety content discussed by the netizens on the fan page from the top 50 social media" Facebook" in Taiwan. The whole research was discussed from the new media communication mode on food safety issues. Tracking the social media discussion of 50 fan pages in the decade (2006-2016), the research found that netizens from 2013 to 2016 raised a lot of questions about food hygiene and food health and testing. Most of the news volume is concentrated on whether the food inspection is qualified.

In the discussion of FB public opinion, the topic of "food safety" mainly focuses on the food safety and food hygiene related aspects of the people, and there is a clear discussion volume after 2015. Further cross-analysis of network relationships in social media shows that food safety is highly correlated with issues of fundamental reform, organic food, and food hygiene. In the ten-year trend of news volume, in 2006, it was tested whether it was qualified. It should be from 2008 to 2012, such as the US beef, tainted milk powder and other events, causing social concern. Recently, the focus has been on the issue of black heart food. The volume of news in the past ten years has grown significantly since 2013. According to the above analysis, in recent years, netizens have begun to pay attention to food safety issues. From the network analysis diagram discussed by netizens, it can be found that in addition to food safety issues, GMO foods and organic foods are the foods that people pay attention to. Provide the competent authority with reference to food safety risk management.

Keywords: Food safety, social media, big data analysis, risk communication

APCBSS-0085
Welfare Hospitality: an Evaluation of Local Jail Management

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Abstract

The aim of the study is to evaluate the local jail management system as part of the welfare hospitality sector. It is conducted to recognise the level of welfare administration of the Bureau of Jail Management and Penology (BJMP). The research utilised a descriptive-quantitative design. The study adapted items from the published inmate orientation sheet (IOS) as part of its instrument which is clustered into three, the administration of; residents' rights, residents' privileges, and other services of the bureau. Using a non-probability purposive sampling, 357 male residents and 79 female residents were surveyed. Descriptive statistics and t-test were employed to analyse the ratings given by the respondents. Results revealed that all clusters were administered well, earning an agree rating in average. Amongst the three clusters, the administration of other services acquired the lowest score from the residents. In terms of the rating comparisons in residents' privileges, two indicators had significant difference; privilege to sport a customary hairstyle and privilege to participate in spiritual enhancement and recreational activities were rated lower by male residents. Though the tallies generally earned a positive interpretation, a number of comments from the male residents in the research instrument indicated that some of their rights as detainees were overlooked. The comments collated amassed remarks about the entry of food particularly groceries from the residents' visitors, postponement of hearing and space and ventilation of the facility.

Keywords: jail management, welfare hospitality, evaluation

ISLLLE-0095
From International to Transnational Studies: Children Literature of the World & Comparative Literary Studies

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This paper proposes to study the rise of children literature and the origin in the context of world literature as well as comparative literary studies. First, the rise of children literature and different theories in the west (particularly in the US and UK) & the non-west will be outlined as a background of the present study. Second, various anthologies of children literature of the world in different areas/stages will be compared & contrasted (e.g. from the West to the East, from the First to the "Third" World.) Third, the terms "Third World," "International," and "Transnational" studies of children literature will be particularly discussed from the perspectives of post-colonialism, and comparative literary study. Last but not the least, the problems/questions & future directions of children literature of the world in terms of comparative studies will be highlighted in the conclusion.

APCBSS-0138
Improving Efficiency of Parent-Teacher Association (PTA) Communications

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Abstract

In this paper, the authors describe the result of two projects aimed at helping to resolve issues affecting Parent-teacher Associations (PTAs). The workload of PTA tasks is starting to burden members, especially the committee members, because the number of working mothers is increasing in Japan. Most of the PTA activities are planned under the conditions precedent that most PTA members are housewives and they can spend time on PTA activities during the daytime, and this approach has not changed drastically for half a century in many cases. Considering the results of the survey that our projects conducted, we focused on a prototype system of our solution on one of the two systems we have designed.

Keywords: parent-teacher association (PTA), communication system, process improvement

Education (2)/ Linguistics

Wednesday, February 27, 2019 13:15-14:45 KIKU, 3F

Session Chair: *Marine Levidze*

ISLLLE-0067

Some Specifics and Universals of Terms of Endearments in Georgian and English Languages – Ethnolinguistic Analysis

Marine Levidze｜*American University of the Middle East*

ISLLLE-0072

Linguistic Signs in Japan – A Case Study of Shimonoseki City

Tsz Wa Mikko Fong｜*National Taiwan University of Science and Technology*

ISLLLE-0082

The Modality Features of Cebuano Verbs: Implications to Teaching Filipino Verbs to Non-Natives

Frieda Marie Bonus Adeva｜*University of Brunei Darussalam*

ISLLLE-0067
Some Specifics and Universals of Terms of Endearments in Georgian and English Languages – Ethnolinguistic Analysis

Marine Levidze
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1. Background

The 21th century has brought along the expansion of scope of human activities. Along with the scope, geography of human communication has expanded as well. Today, the knowledge of principles of how to communicate with other cultures has acquired new significance. At present, this "know-how" is the new and efficient mechanism of regulating relationships with partners. Terms of address are a starting point of verbal communication. They contain significant information about the communication norms, traditions, relationships between different social statuses, and politeness norms within a certain culture. Nowadays, an interest to study terms of address is growing. However, the categorical nature is still undiscovered. Among others, terms of endearment represent an extremely important category of terms of address. They play a significant role in regulating and harmonizing cross-cultural and interpersonal communication.

2. Conclusions:

The study revealed that both languages - Georgian and English – possess a very interesting "arsenal" of terms of endearments. The linguistic resources available to verbally express endearment in the languages in question are rather different in number. The list of terms of endearments in English is significantly longer than that in Georgian. The historical and social overview explains the reason for this. The category of nouns employed to express endearment is universal for both languages. However, the category of verbs as terms of endearment, also called "submerged predicates" in Georgian *(e.g., ჭირიმე - chirime; გეთაყვა - getakva, გენაცვალე - genats'vale*) is specific to this language.

As a rule, terms of endearments intended for "intracultural usage" consider the factor of the addressee, his/her mind-set, his/her accessibility to a certain piece of information, etc. However, during the intercultural communication, the text is redirected to the representative of another culture. This process considers his/her social, psychological and other factors.

Terms of endearment are specific markers of communication which have retained standards of values of a specific culture. They are a complex intracultural sign reflecting stereotypical views of a linguistic community. Cultural and historic realia represent a very special layer of any textual information. They require some pragmatic adaptation by the representative of another culture.

Keywords: Terms of Address; Terms of endearment; Ethnolinguistics; Georgian;

ISLLLE-0072
Linguistic Signs in Japan – A Case Study of Shimonoseki City

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1. Background

The linguistic landscape studies is considered as a relatively young sociolinguistic sub-discipline, but quickly gained attention from international scholars after Landry & Bourhis (1997) stated a detailed definition and usage in their research. Since the 2000s, more researchers have been conducting linguistic landscape studies in Tokyo, the capital of Japan. It was found that a high percentage of public signs in the target areas had more than one language being used on them. The studies became noticeable as the results successfully indicated a rising multilingualism in Tokyo, despite the fact that Japan is a monolingual country. However, most linguistic landscape studies in Japan were done in big cities, few researchers have paid attention to the language use in smaller cities. As Teroa's (2009) research in Minokamo City, claimed that smaller size of city or town may show an even result of multilingualism comparing to big cities. Furthermore, little attention has been paid to the investigation of how the local people have perceived the patterns of language use in their immediate community. In order to fill the gap in the literature, this study will investigate the frequency of and the functions expressed through the different languages used in the public signs in Shimonoseki City, a small city located at Yamaguchi prefecture. How the signs are perceived by the local people living in Shimonoseki City will also be investigated.

2. Expected Results

Based on the pilot study conducted in 2016, it was found that a considerable amount of public signs in the target area in Shimonoseki City were designed with more than one language on them. Similar to previous studies done in Tokyo, the number of multilingual signs was counted more than monolingual, Japanese-only, signs. On the other hand, it was noticed that Shimonoseki City had a different language priority comparing to what was suggested by Inoue (2000). Other than "JECK" (Japanese-English-Chinese-Korean) structure, linguistic signs in Shimonoseki City showed their preference of "JEKC" line-up.

Through exploring the linguistic landscape in Shimonoseki City, the analyzed linguistic landscape data is expected to have the following contributions: first, to indicate the present language use, frequency and functions in the target area; second, to facilitate the study's interviewees to have a better understanding of the present multilingualism in the area; third, to offer later researches an overall view of the sociolinguistic diagnostic of the particular area; fourth, to draw scholar's attentions to further conduct researches in more different places in order to construct a richer overview of linguistic landscape in Japan. By investigating local Japanese people's awareness and acceptability to the multilingual environment, as well as their attitudes towards the present linguistic landscape developed by the Japanese government and local organizations, one of the targets is to raise people's awareness to the rising multilingualism in the target city. Findings of the research may also serve as references to policy makers when developing language instruction signs policies in the future.

Keywords: linguistic landscape, multilingualism, language use, language perception, language functions

ISLLLE-0082
The Modality Features of Cebuano Verbs: Implications to Teaching Filipino Verbs to Non-Natives

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Verbs are the most complicated part of the Philippine grammar. Thus, making verbs the most difficult part to learn and teach among L2 learners. Tagalog, the basis of Filipino, has undergone a long historical process of change that it has evolved and become more simplified. On the other hand, Cebuano has maintained the original verbal meaning, syntax and morphology in main clauses compared to Tagalog. This language would therefore shed some light about some issues in L2 learning and teaching Filipino. This paper explores the poorly understood modality features of Cebuano verbs when simple and non-simple stems combine with voice and realis/irrealis affixes in clausal constructions. Employing a revised version of Hopper and Thompson's (1980) Transitivity parameters in Discourse, this paper challenges traditional claims of Luzares (1979), Bell (1976), Shibatani (1988), and Payne (1994) that realis/irrealis features are clear cut categories in explaining the choices for **mu-/mi-**, **mag-**, **mang-** and **m-** alternations and other "Actor Focus" verbs. The study will describe the Modality features of Cebuano through the correlations of form, meaning and use in written texts. Data used in this study are taken from short stories and portions of serial novels from latest *Bisaya* Magazine issues, a popular weekly magazine available throughout the Cebuano-speaking areas in the Philippines. These texts are then encoded and uploaded into a program called AntConc to provide varieties of information about the use of verbs in different contexts.

The findings in this study showed several modality features namely volitionality, effortlessness, willingness, inherent capacity, durativity, probability/possibility, singularity/plurality, distributivity and controllability. This pedagogical approach to linguistic analysis aids in describing the different functions of sentence structures through texts and provide some possible teaching implications of Filipino verbs.

Keywords: verbs, modality, discourse functions, written texts, Philippine grammar.

Education (3)

Wednesday, February 27, 2019 15:00-16:30 KIKU, 3F

Session Chair: *John F. Maune*

ISLLLE-0060

Mastery Goal Orientation via Role-Play with Children's Stories in an EFL Classroom

John F. Maune | *Hokusei Gakuen University*

ISLLLE-0073

The Development of English Paragraph Writing Skills of Mathayomsuksa 5 (Grade 11) Students through the Process Approach

Thanakorn Santanatanon | *Kasetsart University*
Suphinya Panyasi | *Kasetsart University*
Tassanee Juntiya | *Kasetsart University*
Sasithorn Sriphom | *The Secondary Educational Service Area Office 9*
Jiraporn Kakaew | *Kasetsart University*

ISLLLE-0077

The Development of Reading Comprehension for 7th-Grade Students by Using Directed Reading Thinking Activity (DR-TA)

Wipawinee Puntuta | *Kasetsart University*
Suphinya Panyasi | *Kasetsart University*
Tassanee Juntiya | *Kasetsart University*
Sasithorn Sriphom | *Kasetsart University*
Jiraporn Kakaew | *Kasetsart University*

ISLLLE-0080

Analysis of High School English Textbooks in Japan: Vocabulary, Readability and Communicative Content

Rie Sugiura | *Tokai University*
Noriko Imai | *Kochi University*
Mark Hamilton | *Tokai University*
Eric Dean | *Tokai University*

ISLLLE-0060
Mastery Goal Orientation via Role-Play with Children's Stories in an EFL Classroom

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1. Background/ Objectives and Goals

There are many benefits related to drama used for EFL. Role-play activities are a type of drama but are ad lib, not scripted dialogue, that foster creativity and reduce inhibitions. A mastery goal orientation, and intrinsic motivation too, can be viewed simply as learning for its own sake, not for good grades or other external approval. The goal of this activity is to study whether using role play can using children's books in an EFL class can instill a mastery goal orientation.

2. Conclusion

The dramatic energy at first was quite low, but after repeated interactions most students morphed into their assigned roles. Indeed one of the ideas in the design of the activity was for the child to further reinforce the parent's role as all-knowing by asking simple or even silly questions. Thus, as the dramatic output increased during each reading, so too did the ability to better identify with the concepts of what being a parent entails. This can be seen as a kind of feedback loop. As the activity progressed facial expressions and gestures were introduced for both parent and child as well as adding various situations and attitudes into the role play.

At one point students are told about Carol Dweck's work on fixed versus growth mind-set. This is used again as a way to introduce some concepts relevant to the students' thoughts on learning, but through the concept of better playing their roles as parents. They are told about that their children should be comfortable not understanding something right away and that progress requires effort and failure. They are told how to praise the effort and not the result and avoid saying how smart their child is, but rather how they took their time and worked hard at something (e.g., Instead of saying, "You found that hidden animal so quickly, you are so smart.", you should say, "You were very patient and tried hard to find that hidden animal. Way to stick with it."). Students are primed in their parent roles to learn how to better raise their children, so they focus better on learning about mindset than phrases in a standard lesson plan.

There was no quantitative study of learning efficacy, but student participation and energy levels were noticeably high. Questionnaires were used to get student feedback, and it was all very positive. For many students it was their first use of role play, but after some time, even more reserved students were becoming dramatic. For Japanese students being somewhat subdued is the norm, but for this activity they are told to overact as they imagine foreigners do. It works.

Keywords: children's stories; EFL; motivation; role-play

ISLLLE-0073
The Development of English Paragraph Writing Skills of Mathayomsuksa 5 (Grade 11) Students through the Process Approach

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Abstract

The purpose of this study was to compare Matthayomsuksa 5 students' English paragraph writing ability before and after learning through the process approach. The sample purposively selected for this study was 40 Mathayomsuksa 5 students learning English 3 (E 32101) of U-Thong School in the first semester of the academic year 2018. In this one group pretest-posttest design study, the sample group was taught through the process approach for twelve 50-minute periods. The instruments were the English Writing Ability test with one question constructed by the researcher with the reliability of 0.95. For data analysis, the t-test Dependent Samples was conducted. The result of the study indicated that the English paragraph writing ability before and after the students were taught through the process approach was significantly different at the level of .01. Therefore, this research supports the notion that the process approach is an effectively practical way to teach writing in English classes. It could be adopted in writing classes at all level.

Keywords: Teaching EFL Writing, Process Approach, Writing Skill Development

ISLLLE-0077
The Development of Reading Comprehension for 7th-Grade Students by Using Directed Reading Thinking Activity (DR-TA)

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Abstract

The purposes of this research were: 1) to inspect the efficiency of the instructional packages using Directed Reading Thinking Activity (DR-TA) for 7th grade-students, and 2) to compare students' achievement after using Directed Reading Thinking Activity (DR-TA) through pre-test and post-test. The sample was selected from a purposive sampling of 40 7th grade-students from Phothawattanasenee School in the academic year 2018. The instruments of this study were 1) five 100-minute lesson plans using Directed Reading Thinking Activity (DR-TA); 2) the five sets of instructional packages of reading comprehension, each set consists of an English passage, an exercise, and a reading comprehension test, and 3) a reading comprehension pretest and posttest. The statistics used to analyze the data were arithmetic mean **(**$\bar{x}$), percentage, standard deviation (S.D.), percentage, and dependent t-test. The results of the study were as follows;

1. The efficacy value of using the instructional packages based on Directed Reading-Thinking Activity (DA-TA) method for 7th-grade students was defined as 83/84 efficiency that was higher the expected standard of 80/80.
2. The result of students' achievement by using Directed Reading Thinking Activity (DR-TA) for 7th-grade students through the post-test scores was higher than pre-test scores at .05 level of significant.

Keywords: Action research, Directed Reading- Thinking Activity (DA-TA), Reading comprehension

ISLLLE-0080
Analysis of High School English Textbooks in Japan: Vocabulary, Readability and Communicative Content

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1. Background

This research aims to analyze government-approved English textbooks for Japanese high school students in terms of input and output, and to propose original English teaching materials with more effective activities for language learning. As Ellis (2008) states, input, output and interaction play important roles for language learning. In high schools across Japan, the use of government-approved textbooks is mandatory and most of the language input students receive is from textbooks. Thus, language resources and communication activities in the textbooks must be carefully designed, particularly in an EFL context such as Japan, where opportunities for L2 input, output and interaction are often insufficient.

2. Expected Results

This research is still a work in progress at the preliminary stage of a three-year investigation into the textbook analysis, creation and piloting of materials. However, it is anticipated that the vocabulary level and readability are level-appropriate but that the communicative activities are not engaging enough to deepen students' comprehension of the language tasks.

In the presentation, authors will discuss the characteristics of Japanese high school textbooks, and will also propose ideas to improve the communicative content. The research will be of great value to curriculum developers, teachers and students when lesson plans or activities, especially task-based activities for Japanese high school English classes, are proposed based on the research results.

Keywords: English textbooks, vocabulary, readability, communication activities

Poster Sessions (1)

Business and Management/ Economics/ Psychology/

Communication/ Social Studies, Politics and Law / Education/

Language/ Linguistics

Tuesday, February 26, 2019 09:50-10:40 RAN, 3F

APCBSS-0074

Exploring the Correlation between Provision of Friendly Medical Care and Hospitalization Satisfaction in Preschool Children

Yu Ling Ni｜*Saint Paul's Hospital*
Chun Chun Chang｜*Saint Paul's Hospital*

APCBSS-0111

Two Dimensions of Supervisory Styles of Performance Evaluation: Performance Effects of Budget Rigidity and Discretionary Adjustments

Keita Masuya｜*Keio University*
Eisuke Yoshida｜*Keio University*
Keita Iwasawa｜*Keio University*

APCBSS-0116

The Rapidly Growing Chinese Economy - Focusing on Japanese Newspaper Articles on APEC

Shurui Yu｜*East China Normal University*

APCBSS-0091

How Do Visual Stimuli Influence People's Charity Giving Behavior?

Ming-Yi Chen｜*National Chung Hsing University*

APCBSS-0131

Construction and Validation of the Maladaptive Personality Traits inventory for Korean Community Sample

Hanol Kim｜*Chungnam National University*
Sunhee Lee ｜*Chungnam National University*

APCBSS-0132

Understanding the Relationship of Innovative Climate and Job Calling on Extra Role Behaviors of Employees

Hooi Kung Tan｜*Chungnam National University*
Sunhee Lee ｜*Chungnam National University*

APCBSS-0133

The Influence of Workloads and Autonomy on Job Satisfaction and Turnover Intention: A Moderated Mediation Model

Na Kyoung Kim｜*Chungnam National University*
Sunhee Lee ｜*Chungnam National University*

APCBSS-0135

Effect of Neuroticism on HR and HRV While Seeing an Angry Film

Jin-Hun Sohn ｜*Chungnam National University*
Shigeki Watanuki ｜*Kyushu University*
Young-Ji Eum ｜*Chungnam National University*
Eun-Hye Jang ｜*Electronics and Telecommunications Research Institute*

APCBSS-0092

Improvement of Patient Identification in the Setting of Outpatient Department

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APCBSS-0134

A Comparative Study on Geriatric Service Training and General Vocational Training

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APCBSS-0109

Encountering Violence of Clients with Mental Disorders of Undergraduate Nursing Students: A Qualitative Study

Yat Kwan Alan Tsang｜*The Open University of Hong Kong*

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Conceive-Design-Implement-Operate Framework of Innovative Interdisciplinary Engineering Personnel Training Program

Chun-Wen Teng｜*National Taiwan University of Sport*
Shu-Hui Chen｜*Feng Chia University*
Chuan-Chen Chiu｜*Feng Chia University*
Yao-Chuan Lee｜*Feng Chia University*
Pei-Yin Dai｜*Feng Chia University*
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ISLLLE-0058

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Pen-Chiang Chao｜*Chung Yuan Christian University*

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Daniel Gallego-Hernández｜*University of Alicante*

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Enhancing Consecutive Interpreting Skills through Pair and Individual Practice: A Case Study of Taiwanese Undergraduate Students Receiving Training in Interpreting

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ISLLLE-0076

The Relationship between Inflectional Degree of Languages and Their Language Efficiencies

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ISLLLE-0097

Analysis of Mongolian Word Length Unit by the Quantitative Linguistics

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APCBSS-0074
Exploring the Correlation between Provision of Friendly Medical Care and Hospitalization Satisfaction in Preschool Children

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1. Background

A friendly medical environment can effectively reduce stress of sick children undergoing medical processes, increase their cooperation, reduce the number of nursing hours and shorten the length of hospital stay. It also improves the effectiveness and satisfaction of nursing care, as well as the quality of medical care. The purpose of this study is to correlate the results of the investigation on the hospitalization environment of preschool children with the provision of friendly medical care.

2. Results

In this study, a total of 100 preschool children were interviewed. The use of friendly medical care to introduce hospital environment by nursing staff increased satisfaction rate from 78.8 to 100%. Cooperation with day care ward to create a mobile shopping cart and provision of an area for children's book reading, also increased satisfaction rate of preschool children to the hospitalization environment from 66.2% to 88.3%. We deduce that the provision of a friendly medical care is related to the hospitalization satisfaction in preschool children. In addition, because of the cooperation with the day care ward, it also stabilizes the symptoms of day care patients; helps build self-worth and enhance independence.

Keywords: Hospital environment satisfaction、Friendly medical、preschool children

APCBSS-0111
Two Dimensions of Supervisory Styles of Performance Evaluation: Performance Effects of Budget Rigidity and Discretionary Adjustments

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Abstract

The purpose of this study is to clarify the performance effects of supervisory styles of performance evaluation. A great deal of studies addresses performance effects of supervisory styles of performance evaluation, however, previous studies have not yet got consensus about their performance effects. Contrary to prior studies that have focused on measurement and analytical issues, this study focuses on theoretical reconsideration of the concept. From the detailed literature review, we recognize that the concept of supervisory styles of performance evaluation is multidimensional nature. Specifically, we reveal supervisory styles of performance evaluation is composed by two dimensions, the importance of budgetary targets among performance criteria and the manner to use budgetary information ex post. In addition, this study specifies budget rigidity and discretionary adjustments which explain these two dimensions. Subsequently, we assume that congruence among the degree of budget rigidity and discretionary adjustments is determined on environmental uncertainty. The results of empirical analysis show that the combination of lower budget rigidity and higher discretionary adjustments is congruent under highly uncertain competitive environment, as expected. We also expected the combination of higher budget rigidity and lower discretionary adjustments is congruent under stable competitive environment, however, expected results cannot be gained. Nevertheless, we confirmed that active use of discretionary adjustments reinforces the positive effects of budget rigidity on organizational performance under stable environment. As described above, the results demonstrate active use of discretionary adjustments complement the positive effects of budget rigidity regardless of environmental uncertainty.

Keywords: Supervisory styles of performance evaluation, Budget rigidity, Discretionary adjustments, Organizational performance, Mail survey

APCBSS-0116
The Rapidly Growing Chinese Economy - Focusing on Japanese Newspaper Articles on APEC

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1. Background/ Objectives and Goals

Previous studies have proved that China's economic growth can be reflected in China's move in APEC. However, there are very few prior studies to consider the rapid growth of the Chinese economy from that angle in Japan and from the report of Japanese mainstream newspaper. Therefore, it seems necessary to supplement the research in this area.

2. Expected Results/ Conclusion/ Contribution

From the article of the mainstream newspaper in Japan, with the rise in economic power, the Japanese side has been increasingly attracted to China's economic growth. To the viewpoint of high economic growth in the Chinese economy, from 1991 to 2000, when China first joined APEC, Japan ignored China's economic achievements while encouraging China's economic development. China has been growing rapidly since 2000, and expectations and vigilance coexisted on the Japanese side. China's threat theory has come out. In 2010, Japan realized that the dependence on the Chinese economy was deep again, and Japan positively called for cooperation with China. Elements that influence Japanese viewpoint are mainly politics, economy and international environment. Along with the rapid growth of the Chinese economy, it seems that the influence of economic factors has increased.

At the present time of economic globalization, exchange and cooperation between Japan and China are inevitable and are considered to be consistent with the realization of the national interests of their own countries. Deepening economic cooperation will be indispensable for maintaining friendship and stability of Japan-China relations.

Keywords: High growth of the Chinese economy, Mainstream newspaper in Japan, APEC, Japan's perspective

APCBSS-0091
How Do Visual Stimuli Influence People's Charity Giving Behavior?

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Abstract

The central question of how marketers in non-profit organizations should best influence donors/consumers to help charities, and thereby gaining their support, especially in terms of money donation. Previous research has shown that temperature effects due to potential donors experiencing feelings of coldness may attenuate the effectiveness of charity appeals. However, this study suggests that incidental exposure to commonplace images that signal either coldness or warmth will change consumers' construal level mindsets, which in turn influence their charity giving behavior. Accordingly, this study proposes the importance of aligning the level of abstraction at which a charitable cause is considered, with the construal level activated by specific images featuring temperature cues (cold and warm). That is, this study predicts that when the construal level at which the consumer considers the cause is aligned (misaligned) with the image being presented, donation intentions will increase (decrease). Research on this interaction has the potential to provide a more comprehensive and meaningful account of charitable giving than currently exists. Furthermore, this theoretical framework helps with the making of novel, testable predictions. Across the preliminary study and a formal study, the results show that relative to a warm image, exposure to a cold image will activate a more abstract mindset among consumers. Meanwhile, when consumers are future-oriented, a cold image will yield more generous money donation than a warm image. To extend Choi et al.'s (2016) findings, this study proposes that images matched with psychological distance may increase charity giving behavior. This research provides guidelines on how marketers in non-profit organizations can make use of visual stimuli to optimize the persuasive effectiveness of fundraising, and the recruiting of volunteers.

Keywords: Ethical Marketing; Construal Level Theory; Cold versus Warm Visual Stimuli

APCBSS-0131
Construction and Validation of the Maladaptive Personality Traits inventory for Korean Community Sample

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Abstract

The purpose of this study was to develop a scale that can measure comprehensive maladaptive traits for the South Korean population. The preliminary items were developed based on the DSM-5 Maladaptive Trait Model (Skodol, Bender, et al., 2011). The final scale was constructed, while taking into consideration, the definition of each domain and the results of exploratory factor analysis. Validity evidences of the scale were collected in three ways. First, the internal structure of the scale was explored though the ESEM (exploratory structural equation model). The model fit index and factor coefficients of most items showed to be appropriate. The result also showed that most of the facets(subfactors) reflect the intended domains. Second, the convergence validity was examined through correlation analysis between the maladaptive personality domains and the Big Five personality traits. The result was consistent with past studies, which supports the convergence validity. The criterion validity was also examined through correlation analysis between the maladaptive personality domains and their related variables. The results supported all the hypotheses, which support criterion validity. Lastly, we explored the incremental validity of the maladaptive personality traits, beyond and above the Big Five personality traits, to predict criterion variables. Hierarchical regression analysis showed that maladaptive traits add to the prediction of criteria after the Big Five personality traits were controlled. Overall, this study showed the new developed Korean maladaptive scale to be reliable and valid. The implications, limitations and future research directions were also discussed.

Keywords: maladaptive personality, DSM-5, ESEM

APCBSS-0132
Understanding the Relationship of Innovative Climate and Job Calling on Extra Role Behaviors of Employees

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Abstract

Experiencing work as a calling has been associated with various positive work-related attitudes and outcomes. Taking into consideration of the importance of job calling, recent studies have investigated the antecedents that predict employees' job calling, especially personal variables. However, there are still gaps in our knowledge on other organizational characteristics that may also lead to the formation of employees' job calling. Among potential environmental factors, we suggest that organizational climate for innovation may act as a possible antecedent of employees' job calling in the work settings. The current study aimed to investigate the effect of innovative climate on employees' job calling and on extra role behaviors, including innovative work behavior (IWB) and organizational citizenship behavior (OCB). A total of 165 Malaysian employees from diverse occupational fields and industries participated in a self-reported online survey. The results showed that innovative climate was positively correlated with job calling of employees. Also, employees' job calling was partially mediated with IWB and was fully mediated with OCB. All together, these findings indicated the importance of innovative climate in predicting employees' job calling and in leading to greater engagement in extra-role behaviors within occupational settings. Theoretical and practical implication are further discussed.

Keywords: Innovative climate, job calling, innovative work behavior, organizational citizenship behavior

APCBSS-0133
The Influence of Workloads and Autonomy on Job Satisfaction and Turnover Intention: A Moderated Mediation Model

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Abstract

This study examined a model of predicting turnover intention of a representative sample of Korean workers. The JD-R model, a stress model, was used to verify a full-mediated model in which the workloads are predicted to reduce job satisfaction and increase turnover intention. Also, we verified a moderated mediating models in which the negative effects of workloads could be mitigated by autonomy. The study sample was Korean workers with wages sampled by the Korean Labor and Income Panel Study (KLIPS). The findings supported a full-mediated model in which the workloads reduce job satisfaction and increase turnover intentions. In addition, a moderated mediation model was also supported in which autonomy mitigates the negative effects of workload. These result predict job attitude of Korean workers using the JD-R model and importantly confirm the interaction effect between job demands and job resources.

Keywords: JDR model, Job satisfaction, Turnover intention, moderated mediation

APCBSS-0135
Effect of Neuroticism on HR and HRV While Seeing an Angry Film

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1. Background

The personality trait of neuroticism refers to the relatively stable tendency to respond with negative emotions to threat, frustration, or loss (Costa & McCrae, 1992). It is known that individuals with high neuroticism are prone to experience negative emotions such as anger, anxiety, disgust, and sadness (Goldberg, 1993). Although it was known that there is correlation between autonomic responses and anger experience, but nothing was known that the degree of level of neuroticism on psychophysiological responses during anger experience (Fredrickson & Georgiades, 1992; Schwebel & Suls, 1999). The purpose of this study was to find out the influence of level of neuroticism on sympathetic nervous system (SNS) and parasympathetic nervous system (PNA) responses to angry stimulus using several different HRV indicators. For the analysis, we used the difference-value of HR and HRV indicators between the anger and baseline conditions.

2. Methods

183 participants were recruited, but only data of 40 participants who had upper about 10% and lower neuroticism score were analyzed for this study. 40 participants were divided into two groups, higher and lower neuroticism group using the neuroticism scale of the Korean version of Revised NEO personality inventory (Ahn & Chae, 1997). For participants' experiencing anger, we used the audio-visual film clip, which had theme as a male adult was abusing a bus driver physically and verbally (Park, Kim, & Sohn, 2011). Electrocardiogram (ECG) was measured for 60sec prior to the anger-evoking stimulus (baseline) and for 90sec during the presentation of the anger-evoking stimulus. We extracted frequency domain feature such as LF/HF ratio and time domain features such as standard deviation of NN interval (SDNN), root mean square of successive difference (RMSSD), and the proportion of NN50 divided by total number of NNs (pNN50) from the ECG data.

3. Results and Conclusion

There was no significant difference in the degree of psychologically experienced anger between high and low neuroticism control groups. But, we found that the higher neuroticism group had significantly higher HR than the lower group when compared to the baselines. For the analysis of HRV, no significant difference was found in the LF/HF ratio as the frequency domain index of HRV. Instead the LF/HF ratio, there were significant differences between the two groups in the time domain features, such as SDNN, RMSSD, and pNN50 when compared to the baselines. We conclude that high neuroticism group had not only much greater SNS activity, but much reduced PNS activity than the low neuroticism group. We also found that time domain HRV indicators are more sensitive and useful to identify internal changes in the heart as the heart rate changes than frequency domain LF/HF ratio indicator (Wolf, Abbott, & Kannel, 1991).

Keywords: Neuroticism, Anger, Heart rate, Heart rate variability

APCBSS-0092
Improvement of Patient Identification in the Setting of Outpatient Department

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1. Background

"Patient identification" indicates confirming patients' identity by at least two methods, such as name, medical record or birth of date. In Taiwan, patients' safety is the most important issue of the hospital service. In order to provide consummate medical care, it is necessary to establish a safe medical environment. Patient identification, by avoiding anthropic errors in serial medical processes, is the major issue in patients' safety. This study aims to discuss the way to improve the effectiveness of patient identification in the setting of outpatient department.

2. Results

46 outpatient nurses were included. The accuracy of patient identification from nurses who use standard procedure and regular-check method raised from 78.5% to 91.3%. After the education training program nurses' cognition raised from 89.2% to 100%. The result indicated patient identification was positively influenced by regularly audited and nurses' cognition.

Keywords: Outpatient nurses, Patient identification, Effectiveness

APCBSS-0134
A Comparative Study on Geriatric Service Training and General Vocational Training

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Abstract

The baby boomers progressively step to gerontism. As the result of low birthrate, global population is rapidly aging. Thus, the phenomenon of aging and low birthrate will impact population structure and economic development. According to National Development Council, Executive Yuan, Taiwan, it estimates the ratio of aging population will exceed 14% in total population of Taiwan til 2018 and will step to an aged society; it will exceed 20% till 2026 and will step to a super aged society. The needed burden of dependency population of per hundred labor population, approximate 35 people in 2012 and increase to 97 (people) in 2060.

Among them, 77% is elders. In the era of supply and demand imbalance and gradually increased in fostering proportion, labor population of elders needs to give an effort to increase for coping with and satisfying the demand of entire social laboring demand and meeting the trend of world labor force development. In order to benefit the manpower of elders to participate in labor market and elaborate labor force, it is an important way through elder's occupational training. However, the training models and types are different from general labor population because of the factors of physical ability and labor technique in elder manpower. Therefore, these are critical issues related to re-exploitation of elder manpower which are handling occupational training that needs to consider appropriate industry, category of occupation, redesign in work process, work assistive devices application, the environment and equipment of existed occupational training, and the understanding of elder manpower features and demand.

To response, this study explores the consideration points of occupational training in elder manpower, further proposes the recommendations on occupational training environment, equipment, training measures adjustment, and appropriate occupational types of re-employing of elders.

1. The physical ability of elders will reduce with the age increase. The occupational types need to consider physical load situation, the short work time and light physical load are recommended.
2. General labor and elders need to be separated in occupational training, the individualistic training for them is recommended.
3. The occupational training of elders needs to focus on the training of job itself and to increase practice and application; which is not the same as traditional, integrate, and overall training.
4. The work field of occupational training should provide with appropriate lighting, adjusting the height of training platform, shortening continued training time per day, and reduce the burden of learning new occupational technique for elders.

Keywords: Vocational Training, General Labor , Elder Manpower

APCBSS-0109
Encountering Violence of Clients with Mental Disorders of Undergraduate Nursing Students: A Qualitative Study

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Background

Evidence has shown that mental health nurses are the most frequent target of verbal and physical assaults by clients with mental disorders in the hospitals. Nursing students are more prevalent to be the victims of violence because they lack experience to identify and prevent violence, and do not possess the competent skills to manage an aggressive act (Hopkins, Fetherston & Morrison, 2014; Oh & Kim, 2015).

Conclusions

Preliminary findings showed that three categories emerged from the data. Worries for being attacked were related to the participants' preoccupation with uncertainty whether the absurd behavior of clients was warning signs of an assault. They had sense of helplessness for being left alone to take care of clients who they first met or did not familiar with. There was no immediate support from the ward staff most of the time when they faced impending violence of the clients. Frustration of indecisiveness was about the disappointment of the participants towards themselves for being unable to make judgment on what and how to act to stop the violent behavior of clients. Findings of this study will add knowledge on what have been known about the experience of exposure to violence of clients of undergraduate nursing students. It may raise the awareness of academic and clinical staff to better prepare and support the undergraduate nursing students to cope with violence.

Keywords: violence, mental disorders, undergraduate nursing students

APCBSS-0112
Conceive-Design-Implement-Operate Framework of Innovative Interdisciplinary Engineering Personnel Training Program

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Abstract

This study provides the CDIO (Conceive-Design-Implement-Operate) educational framework for interdisciplinary innovation, talent cultivation and engineering personnel training program. The interdisciplinary team includes the professors and students from the following two faculties of Feng Chia University: Department of Urban Planning and Spatial Information and Department of Architecture in Feng Chia University. The curriculum with the theme of "Smart City and Smart Life" consists Micro-credit Courses and Capstone Design Project. A coherent curriculum is developed to cultivate students' theory integration ability, practical competence and innovation ability step by step.

The CDIO-based training process were applied in Capstone Design Project. In the beginning, the conceive stage teamed up two program students to conceive the issue. Teachers guided students to converge the diverse issues into single co-issue. In the design stage, two program students start to design individual project strategies based on their own professions. The individual project strategies were implemented and integrated during the implement stage gradually. Through the interactive integration process, the project outcomes approached the practical prototypes. Finally, the workable prototypes were built and open to public for users' feedbacks.

This study have developed the micro credit-based course to achieve active learning and diversity as capstone design course's extensive studies, such as prerequisites and supplementary course to effectively improve the performance in interdisciplinary innovation process which in a short time. The course deployed some specific sub-courses to facilitate the project progress and reviewing in different stages. Some of the micro-courses were for cooperation training purpose. Several critical skills including design thinking, teamwork, and technical tools etc. were taught. Some of micro-courses were for cooperation exercise purpose. Two program students were teamed up to achieve the small project which was highly-relevant to the co-issue. It equips students interdisciplinary cooperation with project-based learning not only cultivates their ability to apply professional skills but also horizontal links. In addition, it enables students to effectively integrate learned knowledge to solve problems in the reality.

This research use the 12 CDIO standard rubric as evaluation of faculty development in teacher's teaching, learning, and assessment methods in the beginning and at the end of the semester. The pre-questionnaire and post- questionnaire were conducted to evaluate the difference when CDIO framework was adopted. The 12 CDIO Standards address program philosophy (Standard 1), curriculum development (Standards 2, 3 and 4), design-implement experiences and workspaces (Standards 5 and 6), methods of teaching and learning (Standards 7 and 8), faculty development (Standards 9 and 10), and assessment and evaluation (Standards 11 and 12).

As a result, faculty competence improve the performance individuals as well as the way teachers teach interdisciplinary course cooperation ability. As far as students are considered, these courses built up the

ability of interdisciplinary cooperation, creativity and innovation ability and problem-solving capability. By quantitative analyses and in-depth interviews conducted to explore the effects of the study, the primary analyses have confirmed that this study could be the construction of an innovative educational environment and be taken into consideration for informative sources for future higher education.

Keywords: CDIO, Interdisciplinary, Capstone design project, Micro-credit course modules

ISLLLE-0058
The Application of the Reciprocal Teaching Approach in an English Listening Course

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1. Background

From reviewed literature, most previous studies used the reciprocal teaching (RT) approach in a reading class and the results showed that students significantly improved their reading comprehension performance. However, this approach has not been widely applied to teaching English listening skill in the context where English is learned as foreign language. Both listening and reading are cognitive comprehension process. The researcher plans to integrate the RT technique into English listening class. In addition, most of the earlier research on English listening teaching focuses on training students to understand English vocabulary, phrases and sentences, the display procedure or the presentation format of listening materials. Few studies applied the four strategies (clarifying, summarizing, questioning, and predicting) together in English listening course and conduct a RT model of English education. The paper seeks to present a RT English listening curriculum and explores the participants' collaboration learning in the classroom.

2. Expected Results

Reciprocal teaching activity can be regarded as a form of peers scaffolding. At present, the researcher is working on using RT in an English listening course. Prior to the formal study, a pilot study was conducted to adjust the procedure of administering RT instructional procedure and the arrangement of small-group members. The participants joining the pilot study were asked to write self-reflections. According to the participants' written self-reflections, the participants expressed that RT could facilitate collaboration between the peers. For example, one participant expressed that the efforts of the group were mostly performed in a form of discussion through which group members exchange their opinions and completed the learning sheet. In this way, they had the opportunity to interact with each other in a group activity. In future, the formal study will analyze the self-reflections on the participants' perceptions of how to interact with their group members.

Keywords: English listening, personal interactions, reciprocal teaching approach, collaboration learning, pedagogy

ISLLLE-0086
The Relationship between Self-Determination and Transition Outcomes of Youths with Intellectual and Developmental Disabilities

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1. Background/ Objectives and Goals

In the field of special education, the self-determination and career transition of students with disabilities have received attention from numerous teachers and researchers. This is because whether students with disabilities possess sufficient self-determination ability will affect their planning for career transition, accomplishment of goals, and the quality of transition outcomes. In particular, for high school students with disabilities who are about to enter the highly competitive postsecondary stage, whether they plan to go to college or enter the workforce, possessing the knowledge and ability of self-determination are crucial factors for successfully adapting to university courses or employment. Based on the findings of previous research, this study aimed at investigating students with intellectual and developmental disabilities (IDD) in senior high schools in Taiwan to explore their degree of self-determination, transition outcomes, and the potential causal relationship between the two factors.

2. Expected Results/ Conclusion/ Contribution

Results showed that the degree of self-determination of youths with IDD in Taiwan was significantly lower than that of the comparison group consisting of youths with visual, hearing, and health impairments. Additionally, youths with LD/EBD had a higher degree of self-determination compared to those with ID/autism. After graduating from high school, approximately 70% of youths with IDD made successful career transitions, including 40.3% entering college and 29.1% entering the workforce. Thirty percent of youths could not make a career transition 6 months after graduation and stayed at home. Specifically, youths with LD/EBD were inclined to attend college, whereas youths with ID tended to enter the workforce. The number of youths with autism transferring to different fields was in line with the anticipated number. Consistent with the findings of previous research, the degree of self-determination of youths with IDD could effectively predict their transition outcomes. Implications and suggestions are provided.

Keywords: high school students, intellectual and developmental disabilities, longitudinal study, self-determination, transition outcome.

ISLLLE-0088
L2 Learners' Preferences: Listening to Background Music while Reading

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1. Background/ Objectives and Goals

Extensive reading is one approach used by teaching practitioners to build upon language learners' literacy skills and improve their reading fluency and reading speed (Day & Bamford, 2002). Research has shown that relaxation can facilitate changes in physiological states in the body that allow the brain to work more effectively (Carlson, Hoffman, Gray, & Thompson, 2004). Several studies have linked the inclusion of background music during university language learners' engagement in reading activities to learners' levels of concentration and relaxation while reading (Jones, 2010) and to their reading performance (Perham & Currie, 2014). In a Japan-based context, the use of music with Extensive reading study has not been widely studied.

2. Expected Results/ Conclusions/ Contributions

Findings indicated that the inclusion of background music during class time reading sessions can help learners to focus on their reading. The researcher suggests that a future exploration of ways to increase L2 reading motivation may benefit from the inclusion of both silent reading time and background music during reading sessions and an allowance for learners to select their own background music prior to their engagement in class time reading sessions.

Keywords: Extensive reading, background music preferences, L2 reading motivation, Japan

ISLLLE-0051
Corpus-Based Activities for Specialized Translation Training

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1. Background

Researchers claim that using corpus linguistic tools in translation training can help to improve trainees' translation quality (Sánchez, 2016: 24). There are, however, few specific studies showing what kind of activities can be implemented during a specialized translation course in order to improve translation quality (Gallego, 2015). The aim of this poster is twofold: on the one hand, to show different tasks related to corpus linguistic tools as applied to specialized translation, and, on the other hand, to analyze students' opinions about these tools.

2. Results

113 translator trainees did the exercises and completed the survey. 81 of them (72%) stated that they think they are competent or very competent in using computers (e.g., surfing the Internet, saving, compressing and decompressing files, using word processors). We call them *experts*. The other 32 students (28%) stated that they were not good at computers. We call them *non-experts*. The data obtained from the survey relating to their view on corpus linguistic tools in translation training show the following results, among others:

- 76 students (68%) state that compiling a corpus is more cumbersome than using one. For compilation, 54 students stated that finding texts on the Internet is the most difficult stage, much more than downloading (23 students) or converting files (22 students). Even if there are no significant differences between experts and non-experts, the fact that 37 students think that consulting corpora is more cumbersome that building them leads us to think that the methodology of compiling corpora should be improved and that we should develop or even systematize strategies for consulting corpora.
- After the course, 18 students (16%) (11 of them non-experts) do not think they are able to construct their own corpora.
- 114 students (96%) think that AntConc (Anthony, 2016) is a suitable tool for exploiting corpora in translation training.
- According to the students, the most useful tasks related to corpus exploitation during the training were: terminology and phraseology extraction, extraction or analysis of concepts, and textual analysis.
- 95 students (25 of them non-experts) found corpus exploitation useful or very useful. 16 students (14%) found it normal and only 2 students thought that corpus-based methodologies applied to specialized translation are useless. The fact that almost 80% of non-experts found corpus exploitation useful or very useful leads us to believe that expert computer skills do not play a significant role when consulting corpora.
- However, 20 (18%) students stated that they would not use this kind of corpus-based methodology in professional practice. The cause is unclear: 11 of them are non-experts and 7 of them do not feel able to build their own ad hoc corpora. In any case, 94 students (82%) (27 of them non-experts) stated that are ready to use corpus-based methodologies.

To sum up, a series of corpus-based activities were designed and implemented in a course of specialized translation. According to the trainees' views, they were useful but can be improved. The activities can be implemented not only in translation courses but also in the teaching of foreign languages.

Keywords: specialized translation, corpus linguistic tools, language teaching

ISLLLE-0066
Enhancing Consecutive Interpreting Skills through Pair and Individual Practice: A Case Study of Taiwanese Undergraduate Students Receiving Training in Interpreting

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1. Background

Interpreters know from the initial stages of their training that practice is essential to cultivating the required skills in interpreting. The fact that interpreting trainees must accumulate substantial amounts of out-of-class practice hours, however, is not explicitly stated in the syllabi or curricula of interpreting schools. Interpreting education also still appears to regard expert trainers as the authority and overlooks how the extensive practice students do outside the classroom can inform professional training (Wang, 2015). Since little is known about what exactly interpreting trainees gain from or how they perceive these practice sessions, done either individually or in pairs, the present study sought to investigate the effects of out-of-class practice on improving consecutive interpreting performance.

2. Results

Data of the current study were based on questionnaire responses and consecutive interpreting pre- and post-test scores of 73 student participants who had filled out all four questionnaires and completed both the pre- and post-tests. Two independent evaluators graded students' pre- and post-test audio recordings. Results from the paired-samples t-tests conducted for the pre- and post-tests showed that students made significant improvements in consecutive interpreting. Descriptive statistics from responses on the Likert-scale questions and analysis of the open-ended questions indicated that over fifty percent of the students preferred to do consecutive interpreting practice in pairs and believed that this mode of practice allowed them to learn from each other's strengths and mistakes. Most of the students agreed that their practice partners did a good job in facilitating the interpreting process by, for example, adjusting the speech delivery speed, repeating segments of speech or offering encouragement. Those who favored individual practice, on the other hand, thought that this form of practice provided them more freedom to control and manage their practice time.

Despite the fact that the majority of the students favored doing consecutive interpreting practice with a partner, the number of students who perceived pair practice to be more effective in improving interpreting skills (N=34) was only slightly higher than that who perceived individual practice to be more effective (N=32). Among the students that made better-than-average score improvement on the post-test, a roughly equal number of students thought that one mode of practice was better than the other in helping to improve their interpreting performance over the course of the semester. Interestingly, however, more students seemed to believe that pair practice would be a more effective form of practice in the training of professional interpreters although many also espoused the view that both forms of practice would be essential.

The current study's findings suggest that both individual and pair practice may be conducive to cultivating the skills needed for students who are just starting their training in consecutive interpreting. Students enrolled in consecutive interpreting courses should be informed of the importance of investing time in practice sessions outside the classroom to improve their performance.

Keywords: consecutive interpreting, individual practice, pair practice

ISLLLE-0076
The Relationship between Inflectional Degree of Languages and Their Language Efficiencies

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1. Background

Inflection refers to the modification of a word's appearance or sound so that it is obvious to the receivers, visually or phonetically, that the status of the word has changed. The purpose of inflection is to enhance the understanding between the sender and the receiver. Nevertheless, based on current knowledge, languages that are barely inflectional can carry messages as clearly as more inflectional ones. If inflectional degree doesn't affect understanding, does it influence efficiency in terms of archive size and speech speed? Though research has been conducted to measure the inflectional degree of different languages (GreenBerg, 1960; Pai, 2017), very few studies, if any, try to examine the influences of inflection on the language efficiency.

There are three purposes of this study: (1) to investigate the relationship between the inflectional degree of a language and its efficiency, (2) to discuss the need of inflection if there isn't any efficiency difference between the more and the less inflectional languages, (3) to examine if the distribution of languages based on inflectional degree across various continents is consistent with migratory routes of early humans.

2. Results

Since this is an in-progress study, only current results and hypotheses are presented in this section. Our analysis showed that the quantitative inflectional degrees of selected languages were consistent with previous research and theoretical propositions as Japanese had the highest degree and Vietnamese, the lowest. The preliminary data showed that more inflectional languages seemed to require bigger file size to save the same information coded in less inflectional ones. Final statistics will be provided as more data are collected and further analyses are conducted. We posit that the more inflectional a language is, the less its efficiency is, in terms of archive size and speech length. Though still in debate, we also believe that more inflectional languages are older languages; therefore the inflectional degrees of different languages may also depict the migratory routes of early human beings. Applying the same rationale, Japanese should be an independently developed language, thought affected by Chinese and other languages later.

Keywords: Abstract, preparing a manuscript, writing skills, Grammar

ISLLLE-0097
Analysis of Mongolian Word Length Unit by the Quantitative Linguistics

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Abstract

In this paper, based on the Mongolian Corpus and the theory of Synergetic Linguistics, attempts to reveal the best unit of measure for Mongolian word length by establishing linguistic hypotheses, so as to test whether Mongolian has commonality with other languages. In the meanwhile, analyze and test the relationship between the word length and its frequency.

Keywords: Mongolian Corpus, Synergetic Linguistics,Word Length,Word Frequency

Poster Sessions (2)

Biology/ Biological Engineering/ Earth Sciences/

Environmental Engineering

Tuesday, February 26, 2019 13:30-14:20 RAN, 3F

ICNSE-0081

Antimicrobial Activity of Guava Leaf Extract and Shelf Life Extension in Bread

Numfon Rakkhumkaew｜*Srinakharinwirot University*

Chalinan Pengsuk｜*Srinakharinwirot University*

ICNSE-0103

Self-Assessment of the Creativities in the Senior College Nursing Students via Designing Music Activities

Tien-Hui Luo｜*Mackay Junior College of Medicine, Nursing, and Management*

Chih-Hsu Hsu｜*Ching Kuo Institute of Management and Health*

ICNSE-0104

Discussions about Professional Image of Psychiatric Nursing and Nursing College Graduating Students' Employment Obtaining and Job Selecting

Tien-Yi Tsao｜*Mackay Junior College of Medicine, Nursing, and Management*

Pin-Chun Guo｜*MacKay Memorial Hospital Tamsui Branch*

Chih-Hsu Hsu｜*Ching Kuo Institute of Management and Health*

ICNSE-0129

Glass Transition and Storage Stability of Freeze-Dried Lactic Acid Bacteria

Kiyoshi Kawai｜*Hiroshima University*

Kyoya Sato｜*Hiroshima University*

Shuto Mikajiri｜*Hiroshima University*

Yoshio Hagura｜*Hiroshima University*

ICNSE-0148

Antifungal Activity of Straight and Unsaturated Chain Fatty Acids against *Rhizopus Stolonifer*

Honoka Nishimura｜*The University of Kitakyushu*
Hiroshi Morita｜*The University of Kitakyushu*

ICNSE-0151

Studies on the Culture Method of *Kloeckera Apis* / *Apiculate* Isolated from Grapes Cultivated in Kitakyushu

Misako Okamoto｜*The University of Kitakyushu*
Morita Hiroshi｜*The University of Kitakyushu*

ICNSE-0170

Stability and Solution Properties of an Infliximab

Jinku Park｜*Mokpo National University*
Soon-Jong Kim｜*Mokpo National University*

ICNSE-0157

Effect of the Differences between Massive Data Analysis and Regional Data Analysis on Assessment of Hydrocarbon-Generating Potential from Regional Coal and Carbonaceous Sediments

Hsien-Tsung Lee｜*Nan Kai University of Technology*

ICNSE-0108

Antibacterial Effect from *Igusa* against *Staphylococcus Epidermidis*

Kotomi Hayashi｜*The University of Kitakyushu*
Mariko Era｜*The University of Kitakyushu & Ikehiko Corporation Co., Ltd.*
Hiroshi Morita｜*The University of Kitakyushu*

ICNSE-0114

Manufacturing Porous Fire-Proof and Insulation Material from Alkali-Activated Ladle Slag

Pai-Haung Shih｜*Fooyin University*
Qi-Zhen Pan｜*Fooyin University*
Yi-Kuo Chang｜*Central Taiwan University of Science and Technology*
Tung-Hsuan Lu｜*National Cheng Kung University*
Juu-En Chang｜*National Cheng Kung University*

ICNSE-0132

A Study on the Thermal Durability Enhancement of VOx/W-TiO_2 NH_3-SCR Catalyst with Various Silica and Zirconia Added

Jong Min Won｜*Kyonggi University*
Jung Hun Shin｜*Kyonggi University*
Min Su Kim｜*Kyonggi University*
Sung Chang Hong｜*Kyonggi University*

ICNSE-0134

Promotional Effect of Silicon on the Selective Catalytic Oxidation of NH_3 over Ru/TiO_2

Jung Hun Shin｜*Kyonggi University*
Jong Min Won｜*Kyonggi University*
Min Su Kim｜*Kyonggi University*
Sung Chang Hong｜*Kyonggi University*

ICNSE-0140

Mite Control of C24 Iso-Alcohol and Its Fatty Acid against *Dermatophagoides Pteronyssinus*

Aki Maruoka｜*The University of Kitakyushu*
Toshinari Koda｜*Nissan Chemical Corporation*
Hiroshi Morita｜*The University of Kitakyushu*

ICNSE-0142

Environmental Characteristics of Alkali Activated Cement Mortar Blended with Desulfurization Slags

Tsung-Tseng Lin｜*National Kaohsiung University of Science and Technology*
Jhe-Yu Wu｜*National Kaohsiung University of Science and Technology*
Juu-En Chang｜*National Cheng Kung University*
Dong-Shyuan Lu｜*National Cheng Kung University*
Pai-Haung Shih｜*Fooyin University*
Yi-Kuo Chang｜*Central Taiwan University of Science and Technology*

ICNSE-0143

Study on Mite Control Effect of 2-Decyltetradecanoic Acid Potassium Salt against *Dermatophagoides Farinae*

Mioto Minamiyama｜*The University of Kitakyushu*
Toshinari Koda｜*Nissan Chemical Corporation*
Hiroshi Morita｜*The University of Kitakyushu*

ICNSE-0145

Grade of Calcined MgO on Expansion of Cement Paste

Tung-Hsuan Lu｜*National Cheng Kung University*
Pai-Haung Shih｜*Fooyin University*
Chi-Man Choi｜*National Cheng Kung University*
Ying-Liang Chen｜*National Cheng Kung University*
Yi-Kuo Chang｜*Central Taiwan University of Science and Technology*
Juu-En Chang｜*National Cheng Kung University*

ICNSE-0147

Investigation on Hydrodynamic Power Consumption of an Open Raceway Pond with a Paddle Wheel

Kyoung Won Kim｜*Kyungpook National University*
Cheol Woo Park｜*Kyungpook National University*

ICNSE-0081
Antimicrobial Activity of Guava Leaf Extract and Shelf Life Extension in Bread

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1. Background/ Objectives and Goals

Microbial contamination in food caused not only a reduction of shelf-life and food deterioration, but also leads to disease and economic loss. To resolve this problem, food additive become the major tool to maintain the quality and inhibit the growth of microbial. However, the using of synthetic additives can cause the formation of carcinogen and negative effect to consumer health. In this study, guava leaf extract was selected as desirable substance for new additive. The aim of this work was to investigate guava leaf extract in terms of phytochemicals, antimicrobial activity, and potential application in bread for microbial inhibition.

3. Expected Results/ Conclusion/ Contribution

Leaf extract from Pan Sri Thong contained highest amount of total phenolic and total flavonoid content among others. Antimicrobial assays indicated that guava leaf extract exhibited marked inhibitory activity against food-borne pathogens, spoilage bacteria, and fungal strains tested. The minimum inhibition concentration and minimum bactericidal concentration activities of guava leaf extract on *Bacillus cereus* was 75 mg/mL and 150 mg/mL respectively. The substitution of flour by guava leaf extract in bread formulation (2 g/100 g flour weight basis) showed antimicrobial effects against *Bacillus cereus* and *Rhizopus* sp. growth. The fruity odor in bread containing guava leave extract was also delayed. *Bacillus cereus* was found on the surface of bread containing guava leave extract after 4 days of incubation at 30 ℃. The results showed the potential use of guava leaf extract in bread, which presented antimicrobial activities against food-borne pathogens and *Rhizopus* sp. growth, resulting in a prolonged shelf life of the bread.

Keywords: Guava leaf extracts, foodborne pathogen, bread spoilage, shelf life

ICNSE-0103
Self-Assessment of the Creativities in the Senior College Nursing Students via Designing Music Activities

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1. Background

It is a trend of national education to cultivate the creativity. The integration into the courses of teaching is one of the four important strategies of Ministry of Education. Understanding the self assessment of nursing students' creativities via designing music activities in the course of complementary and alternative therapies.

2. Results

The results from the questionnaire showed that 78.5% students liked the music group reports in designing musical activities. There were 48.3% students mostly desired to choose music therapy in their professional group report, and 46% students have had chosen music therapy as their group works. The majority of students considered that the group reports in designing music activities were helpful for their creativities (82.7%) and learning (93.1%). There were 69% students "hope and to maintain the hours" of the music therapy's implementation during the class, and another 27.6% students wished to increase the hours of the music therapy's implementation during the class in the future. The finding will be applied to refine and design the curriculum, and improve the creativity of the lecturers' teaching skills. Moreover, the abilities of the students about utilizing the knowledge will be developed. Although several limitations have identified by the researcher, this study provides a number of implications and recommendations for future work.

Keywords: nursing students, creativity, music activities' design.

ICNSE-0104
Discussions about Professional Image of Psychiatric Nursing and Nursing College Graduating Students' Employment Obtaining and Job Selecting

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1. Background

The aim of the study is to discuss new nursing college graduates' perceptions of professional image of psychiatric nursing and the correlation of their aspiration for participating in psychiatry.

2. Results

The highest score item form the questionnaire is to "understand the meaning of clinical symptom in psychiatry," and "ability of applying foreign languages" is the lowest. The study gives three suggestions:

1. In classroom teaching, enhance students' positive way of thinking by case sharing and multimedia teaching.
2. In practice, instructors should possess the characters of competent nurses, showing professional cares and becoming models of the students.
3. Besides regular curriculum, take advantage of multimedia application and study group to enhance students' abilities of foreign languages.

With these three suggestions, the study hopes to further students' interests in psychiatric nursing and working aspiration in psychiatry.

Keywords: nursing college graduating student, psychiatric nursing, professional image of nursing.

ICNSE-0129
Glass Transition and Storage Stability of Freeze-Dried Lactic Acid Bacteria

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1. Background

Freeze-dried lactic acid bacteria (LAB) are widely used for biological, pharmaceutical, and food products. Some LAB, however, are destabilized during freeze-drying and subsequent storage. Stabilizing effect of various protectants on the freeze-dried LAB, therefore, has been investigated intensively. Some animals (e.g., tardigrade and chironomid) have a large amount of disaccharide in the dehydrated state and they can survive in dehydrated state. In addition, it is known that disaccharides (e.g., sucrose and trehalose) play a role of effective protectant for dehydrated biomaterials (enzyme and LAB). More recently, our research group found that a leech capable could survive at the extremely low temperature. Furthermore, it was confirmed that the leech has a large amount of antioxidant such as carnosine after the freeze-thawing. Taking this into account, there is a possibility that carnosine plays a role of stabilizer to freeze-dried LAB. Effect of protectants on the dehydrated biomaterials has been explained mainly by “water substitution” and “glass transition”. The purpose of this study was to understand glass transition and storage stability of freeze-dried LAB with stabilizers.

2. Results and Discussion

It was confirmed that water activity of the freeze-dried samples was lower than 0.11. This is an enough dehydrated level for freeze-dried LAB. There was no or very little reduction of survival rate for control (non-additive sample) after freeze-drying, but decreased drastically after storage. The control sample showed a relatively high survival rate at water activity = 0.11. At higher water activity, the survival rate decreased by uncountable degree. Carnosine and sucrose samples showed much higher survival rate than control at water activity = 0.11, and decreased with increase in water activity. The carnosine-sucrose sample showed the best stabilizing effect among the samples.

As mentioned above, the effect of protectants on the dehydrated biomaterials has been explained mainly by “water substitution” and “glass transition”. The protectant forms hydrogen bonds with proteins and/or cell membranes instead of water molecules in the dehydrated state (water substitution), and a hydrate structure of the biomaterials can be maintained. In addition, the dehydrated protectant turns into a glassy state (extremely high viscosity solid) through dehydration, and the biomaterials embedded into the glassy protectant are immobilized. Hydrophilic materials with hydrogen bonds can exert water substitution effect intrinsically. For glass tradition, it is required to have a higher glass transition temperature (T_g) than storage temperature. In order to confirm T_g of the freeze-dried LAB samples, DSC measurements were carried out. From the result, it was confirmed that carnosine and carnosine-sucrose have a higher T_g than storage temperature. These fundamental results provide better insights of the improvement of storage stability of freeze-dried LAB.

Keywords: Freeze-dry, Lactic acid bacteria, Water activity, Antioxidant, Storage stability

ICNSE-0148
Antifungal Activity of Straight and Unsaturated Chain Fatty Acids against *Rhizopus Stolonifer*

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1. Background

Mold exists in various environments such as the air and soil and *Rhizopus* spp. is one of them. This fungal spores are floating in the air, and the fallings of the spores cause contamination and deterioration of various materials, e.g. plants, food, feed and wood. To prevent fungal contamination, various fungicides have been developed that inhibit fungal growth. The fungicides which have high antifungal activity and safety for human are required.

In this study, we focused on straight and unsaturated chain fatty acids, which are the raw material for the production of soap. These fatty acid salts have been reported to show some antibacterial and antifungal activities. In the previous studies, we have revealed that straight-chain fatty acid salts have highly antimicrobial effects against *Penicillium pinophilum*[1)] and oral bacteria[2)]. The aim of the present study was to evaluate the antifungal activity of fatty acids against *R. stolinifer*.

2. Results

The final concentration of all fatty acids used in this study was 350mM. As a result of the antifungal test (Fig. 1), among the fatty acids studied in this study, C6 and C8 were effective to decrease survival rate of *R. stolinifer* (99.99%), while other fatty acids didn't inhibit the growth. Furthermore, since the antifungal effect was not indicated in the Tween 80 (20 %), it was revealed that this effect was due to fatty acids, not surfactant. From this result, it became clear that the length of the carbon chain could greatly affect the antifungal effect.

Moreover, the minimum inhibitory concentration (MIC) of C6 and C8 against *R. stolinifer* were 87.5 mM and 21.9 mM. These results show that C6 has a higher antifungal effect than C8. Also, we compared the MIC of alkyl benzene sulfonate (LAS), orthophenyl phenol (OPP) and orthophenyl phenol sodium salt (OPP-Na), which are mildew-proofing agents on the market. The MICs of LAS, OPP and OPP-Na were 175 mM, 5.4 mM and 10.9 mM. Although OPP and OPP-Na are more effective than C8, LAS is low.

From these results, it was suggested that caprylic acid could be used as a fungicide against *R. stolinifer*.

Keywords: fatty acids, antifungal activity, *Rhizopus stolinifer*

ICNSE-0151
Studies on the Culture Method of *Kloeckera Apis* / *Apiculate* Isolated from Grapes Cultivated in *Kitakyushu*

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1. Background

Yeast is indispensable for fermented foods such as bread and wine. This yeast is generally *Saccharomyses cerevisiae* which is a commercially available pure culture yeast. Many indigenous bacteria other than *Saccharomyses cerevisiae* are inhabited in various places such as nature's soil, fruit and sap. In the field of winemaking, utilization of indigenous bacteria has been drawing attention in recent years for the purpose of giving the characteristics and individuality to the flavor and taste of wine. In the previous studies[1)], we attempted to isolate yeast from grapes harvested in *Kitakyushu.* Finally, 23 strains derived from the grapes with excellent gas generating ability could be separated by enrichment culture. From these isolates, 19 strains were resistant to alcohol concentration of 5% and only one strain was resistant up to an alcohol concentration of 6%. The strain was identified as *Kloeckera apis* / *apiculata* by ID 32 API (bioMérieux Japan Ltd.). There are few studies establishing cultivation of *Kloeckera apis* / *apiculate*, and in this study, the effect of pH and sugar concentration of this strain was investigated.

3. Results

3.1. Effect of Initial pH in the Growth Medium on *Kloeckera Apis* / *Apiculate*

When the initial pH was changed in 4 to 6 (Fig. 1), the cell number of the broth with initial pH 4 or 5 was about 200-300 cells/mL. In initial pH 6, pH decreased on the first day of culture. In addition, when further cultured for 72 h, the cell growth was increased about 2 times compared with pH 4 or 5. Therefore, the optimal initial pH of the culture condition seems to be pH 6.

3.2. Effect of Sugar Concentration on *Kloeckera Apis* / *Apiculate*

Amount of remaining glucose and cell growth of yeast were measured by changing the initial glucose concentration to 5 to 30 g/L with an initial pH 6. Regarding glucose consumption, the initial glucose concentration of 5 to 25 g/L steadily consumed glucose. On the other hand, a large amount of glucose remained in the initial glucose concentration of 30 g/L.

For number of cells, the maximal *Kloeckera* growth was obtained when initial glucose concentration is 25 g/L (Fig. 2). Growth inhibition by catabolite repression was observed in the initial glucose concentration of 30 g/L.

Keywords: *Kloeckera apis* / *apiculate*, Submerged culture, cell growth, glucose consumption

ICNSE-0170
Stability and Solution Properties of an Infliximab

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1. Background/ Objectives and Goals

Infliximab is a monoclonal antibody works against tumor necrosis factor alpha (TNF-a) for treatment of autoimmune diseases including rheumatoid arthritis and Crohn's diseases. Original patent of the monoclonal antibody belongs to Janssen Biotech. under the commercial name of Remicade. Recently, biosimilars of the Remicade, such as Remsima, Humira and Inflectra, are approved by FDA. Though biosimilars are expected to have similar chemical and biological properties to those of an already approved original product, information on oligomeric properties are not well compared and presented previously. Thus, we characterized stability and oligomeric natures of one of the infliximab antibody (Remsima) by tryptophan fluorescence quenching, analytical ultracentrifugation (AUC), and gel permeation chromatography (GPC) techniques and the results will be discussed.

2. Expected Results/ Conclusion/ Contribution

Though it is generally known that monoclonal antibodies exist mostly as monomers in solution with a presence of ~ 5% or lesser amount of dimeric form, in some cases, more portions of oligomers are observed. Therefore, we investigated oligomeric states and stability of an infliximab (Remsima) in solution. Based on temperature dependent studies using steady-state fluorescence and Stern-Volmer quenching, the antibody shows stability up to ~ 60^{o}C in PBS buffer as expected for monoclonal antibodies. GPC experiments carried out using samples pre-treated at 20, 35 and 50^{o}C showed similar elution profiles with a predominant peak corresponding to monomeric molecular weight and a minimal amount of minor peak (~3%) presumed to be dimers. In contrast to GPC data, AUC-VS and AUC-ES data indicated significant amount dimer presence. We will discuss the potential reasons for the discrepancy and necessity for cross-validation techniques in oligomeric states measurements in solution.

Keywords: infliximab, biosimilar, stability, oligomeric state

ICNSE-0157

Effect of the Differences between Massive Data Analysis and Regional Data Analysis on Assessment of Hydrocarbon-Generating Potential from Regional Coal and Carbonaceous Sediments

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Abstract

The samples from northwest Taiwan, China, Australia and from literature were jointly examined to explore the atomic H/C ratios of kerogen in relation to pyrolysis parameters HI, S1, S2, S1+S2, S1/(S1+S2), S1/TOC, (S1+S2)/TOC, Tmax, as well as the variations in TOC and Ro%. The total genetic potential of organic matter in the synthetic assessment of petroleum potential is according as the hydrogen index (HI, S2/TOC), the bitumen index (BI, S1/TOC), and the quality index (QI, (S1+S2)/TOC). In recent years, Rock-Eval pyrolysis and TOC analysis have been widely used to evaluate the quality of source rocks. Hydrogen index (HI) and Py-GC evaluation are also utilized to assess the oil and gas potential of source rocks. The determinations of Rock-Eval pyrolysis parameters (S_1, S_2, S_1+S_2, TOC, HI, QI, BI, PI, T_{max}), Atomic H/C ratio, R_o%, and TOC are the most widely used methods to characterize source rocks. Traditionally, the parameters (S_1, S_2, S_1+S_2, TOC, HI, QI, BI, PI, Atomic H/C ratio, R_o%, T_{max}) are used to assess the oil and gas potential of source rocks. We can use the data of Rock-Eval, Atomic H/C ratio, R_o%, Py-GC and TOC to give a rapid assessment of the average oil- and gas-producing constituents in source rocks. Therefore, the maturity parameters must be explored in order to construct the effective indices for the assessment of petroleum potential.

This study aims to investigate the impact of changes in atomic H/C ratios on the assessed parameters (S1, S2, S1+S2, HI, QI, BI, PI, Tmax, TOC, Ro%) of petroleum potential of organic matters. The samples studied include coals and coaly shales of Mushan Formation, Shihti Formation and Nanchuang Formation in NW Taiwan, coals and an oil shale from Mainland China, the well-drilled chip samples from NW Australia, in addition to the data of samples were included from literatures, and to confirm the results on comparison between grey forecast of grey relational grade and regression model forecast. Meanwhile, the purpose of this study is to establish the reliable indices of synthetic assessment of organic matter in the evaluation of petroleum potential. The scope of this study will be focused on Rock-Eval pyrolysis, vitrinite reflectance measurement, TOC measurement, maceral composition analysis, elements analysis, organic-matter analysis by py-GC, multivariate statistical analysis, regression model forecast, gray relational grade, and relative mathematical model. The parameters derived from the full dataset and its subsets were subjected to statistical analysis that included linear, nonlinear and multivariate regression as well as grey correlation analysis.

Keywords: Grey Relational Grade Analysis, Rock-Eval pyrolysis, Hydrocarbon potential, Grey model, Statistical analysis, Atomic H/C ratio, HI, QI, BI,

ICNSE-0108
Antibacterial Effect from *Igusa* against *Staphylococcus Epidermidis*

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1. Background

There are various kinds of skin bacteria on our body and *Staphylococcus epidermidis*, one of the skin bacteria, has been shown to cause a bad odor such as sweat and room dried of laundry. For that reason, we need new antimicrobial agent.

There, we focused on *Igusa* which is grown in areas with relatively high humidity mainly in Japan.

Igusa (*Juncus effusus* var. *decipiens*) has grown by separating the roots through around early December from around late November, and cultivated planting in paddy fields. After that, extended *Igusa* to 1 m or more are harvested in July. *Igusa* has been used as tatami mats in Japanese houses since at least 1300 years ago. *Igusa* has been also used to medicinal herbs such as diuresis and antiphlogistic agent. Furthermore, *Igusa* has been shown to have high antibacterial effect[1)].

From this, it is thought that bad odor can be suppressed if the *Igusa* has antibacterial effect against skin bacteria. In this study, we examined the antibacterial effect of *Igusa* against *S. epidermidis.*

2. Results

From the results, *S. epidermidis* grew on control (on agar medium not containing *Igusa*). However, on agar medium containing *Igusa*, growth of *S. epidermidis* was suppressed. Generally, tatami mats are made by dyeing with soil (dyes). For this reason, in this study, antibacterial tests were carried out using two types of *Igusa*, which was dyed with *sendo* soil and non-dyed *Igusa* (raw *Igusa*).

The MICs of *Igusa* dyed with *sendo* soil and raw *Igusa* were 5 %. Because high antibacterial effect was observed in both samples, it was suggested that *Igusa* contained substances having antibacterial effect.

In addition, after 2 weeks of culture, growth of *S. epidermidis* was observed on agar medium containing 5 % of *Igusa* dyed with *sendo* soil and raw *Igusa*. Figure 1 shows the plates after 2 weeks of culture. From this, it was suggested that the antibacterial effect of *Igusa* was bacteriostatic. In addition, the number of colonies on medium containing *Igusa* dyed with *send* soil was more than that raw *Igusa*. Therefore, it was suggested that the *sendo* soil contains a component to promote the growth of *S. epidermidis*.

Keywords: *Igusa*, Antibacterial effect, *Staphylococcus epidermidis*

ICNSE-0114
Manufacturing Porous Fire-Proof and Insulation Material from Alkali-Activated Ladle Slag

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Abstract

Electric arc furnace (EAF) factories estimates 1.6 million tons of steel per year in Taiwan. Nevertheless, the application of EAF ladle slag (LS) in cement product has been limited due to the presence of free-CaO (f-CaO). Free-CaO content in slags constrains the reuse of ladle slags due to late hydration behavior. Hydration of f-CaO might cause volume expansion and might result in volume instability of hydrated specimen. To improve the current status of LS reuse and recycling, proper interference removal and reuse technique should be developed.

To solve the volume instability dilemma of LS, alkali-activation technique is applied. LS is blended with alkaline solution and filler to form alkali-activated specimen (AALS). Compared with LS in cement system, improvement on volume stabilities was verified, in which AALS would meet the soundness criteria (CNS 1258). Further reuse application by alkali-activation technique on LS is feasible.

Recycled inorganic sludge from semi-conductor industry was used as foaming agent in AALS. To form porous AALS specimens with good compressive strength, foaming parameters including sparkling time of foaming agent, setting time of AALS paste were investigated. Results show that the sparkling time would be shortened with higher dosage of foaming agent or higher dosage of alkaline solution. Typical alkaline condition in AALS system (e.g. 3N of alkaline solution) would result in 95% sparkle efficiency within 25 min. On the other hand, setting time of AALS (by Vicat Needle) would be shortened by higher equivalent alkaline addition or lower water-to-binder ratio. Initial setting of AALS paste could be controlled within 20min (8% of equivalent alkaline addition, 0.75 alkali modulus and 0.4 water-to-binder ratio). To form well-developed porous AALS, foaming parameters were selected for foaming agent to sparkle and for AALS paste to set within the same time.

Porous AALS specimens with different densities were produced with proper foaming parameters and procedures. Sound insulation performance of porous AALS specimens were tested. Sound transmission loss (TL) of specimens were analyzed by noise spectrum analyzer. Results show specimens with higher density would perform better in low frequency noise (vibration) insulation, on the other hand, specimens with lower density would perform better in high frequency noise insulation. In summary, the insulation efficiencies of all specimens were between 30~70dB throughout the noise frequency spectrum, in which was in satisfactory for commercial use.

Performances on fire-proof of porous specimens were also tested. As the densities of specimen decreased, thermal conductivities would decrease between 0.4~0.7 W/mK. When density dropped below 400 kg/m3, thermal conductivity dropped below 0.4 W/mK, which was also competitive to commercial product such as mineral wool. Further direct firing experiments (by firing the specimens at 800℃ in air-acetylene flame) show that porous AALS specimens would posses better volume stability than cement specimens. Ordinary cement specimen would crack with firing temperature above 500℃. Porous AALS specimens would remain the integrity of specimens up to 800℃. Moreover, the temperature of reverse side of firing only raised no more than 100℃ even direct fired after 1hour duration.

To summarize, alkali-activated would conquer the volume-instability interference in ladle slag reuse. With proper selection of foaming agent and procedure, manufacturing porous materials from alkali-activated ladle slag is feasible. The produced porous AALS materials would have good sound insulation and also good fire-proof performances. The alkali-activated foaming process could manufacture commercial competitive fire-proof and insulation materials from ladle slag, which accomplish the resource recycling and waste treatment goals at the same time.

Keywords: Ladle slag, Alkali-activated technique, Porous material, Fire-proof, Insulation.

ICNSE-0132
A Study on the Thermal Durability Enhancement of VOx/W-TiO_2 NH_3-SCR Catalyst with Various Silica and Zirconia Added

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In this study, heat durability improvement study was carried out to maintain denitrification efficiency from high temperature thermal energy generated by DPF regeneration in the upstream of diesel engine SCR system. In order to improve the thermal durability of the existing VOx/W-TiO_2 catalyst, silica and zirconia were added to compare the denitrification efficiency before and after heat treatment. As a result, the catalyst prepared with DMDMS as the silica precursor exhibited the lowest denitrification efficiency at the reaction temperature of 500℃. On the other hand, catalysts using DMDMS and TEOS as precursors at 250℃ showed an increase in reaction activity but no change in colloid precursor. In order to analyze the above results, BET, XRD, Raman and XPS analysis showed that crystalline V_2O_5 and ZrO_2 were formed on the catalyst with low thermal durability.

This research was supported by the CEFV(Center for Environmentally Friendly Vehicle) as Global-Top Project of KMOE(Ministry of Environment Korea) (2016 0020 80004))

Keywords: VOx/W-TiO_2, NH_3-SCR, Ti-O-Si structure, Crystalline structure

ICNSE-0134
Promotional Effect of Silicon on the Selective Catalytic Oxidation of NH_3 over Ru/TiO_2

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Ammonia can lead to death if high concentrations of ammonia are exposed to the human body. It is also a stinking substance. In addition, ammonia reacts with nitric acid (HNO_3) in the atmosphere to produce ammonium nitrate (NH_4NO_3), which is a secondary fine dust (PM2.5). As a method of treating ammonia, a selective catalytic oxidation which can selectively convert to nitrogen by using a catalyst is effective. Among the various active metals used as catalysts, ruthenium is excellent in adsorption of ammonia and has the characteristic that NO oxidized in the catalyst reacts with NH_x to form N_2. In this study, Si, Y, and V were added as cocatalysts to enhance the reaction activity of the catalyst. Among them, the reaction activity of Si was the best. Reaction activity was correlated with DRIFT, H_2-TPR and NH_3-TPD. As a result, the conversion of Ru-Si/TiO_2 catalyst into the NO was easier and the I-SCR reaction proceeded faster.

Keywords: NH3-SCO, ammonia removal, selective catalytic oxidation, NH3

This research was supported by the CEFV(Center for Environmentally Friendly Vehicle) as Global-Top Project of KMOE(Ministry of Environment Korea) (2016 0020 80004))

ICNSE-0140
Mite Control of C24 Iso-Alcohol and Its Fatty Acid against *Dermatophagoides Pteronyssinus*

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1. Background

Among the house dust mite, *Dermatophagoides pteronyssinus* is a major type of mite allergen. Their feces, eggs, carcasses are known to be a major cause of respiratory allergy including asthma. In responding to *Dermatophagoides pteronyssinus*, synthetic acaricides (benzylbenzoate and tannic acid) have been used. However, some synthetic acaricides have undesirable effects on non-target organisms and cause environmental and human health concerns. Therefore, it is necessary to create a new mite control agent having high effect and low toxicity. In this study, we focused on the C24 iso-compounds (2-decyl-1-tetradecanol and 2-decyl-1-tetradecanoic acid) and investigated the repellent and miticidal effects on *Dermatophagoides pteronyssinus*.

2. Results

3-1. Repellent Test

From the results of the repellent test, repellent rate for live mites of 2-decyl-1-tetradecanol (100 %) was 71 % (live mites:8, dead mites:1, escaped mites:21) and repellent rate for live mites of 2-decyl tetradecanoic acid (100 %) was 54 % (live mites:13, dead mites:0, escaped mites:17) (Fig.1). In addition, 2-decyl-1-tetradecanol showed repellent effect against 50% or more live mites even when diluted to 50% concentration.

3-2. Miticidal Tests

From the results of the miticide test, corrected mortality rate of 2-decyl-1-tetradecanol (100 %) was 30 % (live mites:3, dead mites:9, escaped mites:18) and corrected mortality rate of 2-decyl tetradecanoic acid (100 %) was 5.6 % (live mites:16, dead mites:2, escaped mites:12) (Fig.2). Both compounds have two C12 in branched chains. Corrected mortality rate of C12 (350 mM) was 3.3 %. Compared to C12, 2-decyl-1-tetradecanol was 10 times, and 2-decyl tetradecanoic acid showed acaricidal effect twice as much as that of C12. From this, it was suggested that a branched compound having a highly effective structure as a branched chain may have high mite control effect.

These results revealed that 2-decyl-1-tetradecanol had better mite control effect than 2 - decyl tetradecanoic acid. However, it is thought that it is necessary to search for compounds with higher mite control effect at lower concentrations.

Keywords: *Dermatophagoides pteronyssinus*, repellent effect, miticidal effect

ICNSE-0142
Environmental Characteristics of Alkali Activated Cement Mortar Blended with Desulfurization Slags

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Abstract

Steelmaking industry is the foundation of the economic development of our nation. With the growth and development of the steelmaking industry, upstream and downstream industries are also driven to show significant growth. For the large amount of by-products generated during the manufacturing process, if no appropriate removal processes and technologies are available, they can cause a serious burden on the environment. Therefore, currently, there is an urgent need for appropriate removal processes to resolve such issue.

In this research, fine desulfurization slags (DS) from steelmaking industry were studied, and basic characteristic tests were performed. The alkali activation process and the cement hydration process were used to evaluate the potential of DS slag aggregate to be used as the construction material. Alkali activation is to use activator of high alkalinity in order to increase the Pozzolan characteristics of the material. Its reaction mechanism is mainly to use the high pH characteristic of alkali activator to provide a high alkali environment and to destroy the bonding of the glass structures in the material in order to leach out Ca ions, followed by reacting with the Si ions in the activator to form harden mortar; therefore, the alkali activation reaction can be achieved. As a result, such products can increase the strength and reduce the heavy metals leached out, heading toward the sustainable green building material. Moreover, the Tank leaching test (test method NIEA R217.10C of Taiwan EPA) was conducted to evaluated long-term leachability (100-yrs leaching simulation) of upon materials.

Results from the basic characteristic tests revealed that the composition of DS slags containing Cu 574-580 mg/kg; As 1,228-1,270 mg/kg. After the toxic characteristic leaching procedure (TCLP) tests, the results showed that only a small amount of As were leached, and the concentration was approximately 0.61-0.64 mg/L, which is far below the regulatory standard (5mg/L) in Taiwan

However, TCLP test only provided the leaching condition for 18 hours. Hence, the tank leaching tests were conducted at the cumulative periods of time of 0.25, 1, 2.25, 4, 9, 16, 36 and 64 days respectively in order to make 100-yrs leaching simulation and to determine whether the material has environmental compatibility. According to the long-term leaching test (tank leaching test) of alkali activated desulfurization slag mortar, the results revealed that no leaching amount of harmful heavy metals (Cu, Zn Cd, Cr, Ni, Pb, As) were detected, which indicated that alkali activated desulfurization slag mortar has excellent environmental compatibility.

Keywords: Desulfurization slags, Alkali activated, leaching

ICNSE-0143
Study on Mite Control Effect of 2-Decyltetradecanoic Acid Potassium Salt against *Dermatophagoides Farinae*

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1. Background

In recent years, the occurrence of ticks due to moisture and dew condensation has become a serious problem due to improvement of airtightness of houses and change of architectural style. In addition, there is a report that anaphylactic shock was caused by *Dermatophagoides farinae* which breeded extensively in the opened flour. Development of an effective control agent for *Dermatophagoides farinae* is required.
In the previous studies, we have revealed that straight-chain fatty acid salts have highly antimicrobial effects against *Penicillium pinophilum*[1)], *oral bacteria*[2)]. In addition, we investigated the effect of straight-chain fatty acid salt on *Dermatophagoides farinae* and found that C18: 1K is most effective.
From the previous studies, we examined the effect of 2-decyl-1-tetradecanol and 2-decyltetradecanoic acid potassium salt on *Dermatophagoides farinae.*

3. Results

3.1 Miticidal Effects

The miticide test results of 2-decyl-1-tetradecanol and 2-decyltetradecanoic acid potassium salt are shown in Fig. 3. At any concentration of 2-decyl-1-tetradecanol the corrected mortality rate is below 10% and there is no acaricidal effect. 2-decyltetradecanoic acid potassium salt likewise had a low corrected mortality and no acaricidal effect.

3.2 Repellent Effects

Repelling test results of 2-decyl-1-tetradecanol and 2-decyltetradecanoic acid potassium salt are shown in Fig. 4. We took 100 % and 50 % 2-decyl-1-tetradecanol data., and repellent effect can be expected. At 25 % it is considered that the repelling rate will be higher than 50 %. 2-decyltetradecanoic acid potassium salt had 6 raw mites, 0 death mites and 23 mites escaping. The repellent rate was 64 %, and 2-decyltetradecanoic acid potassium salt was found to have repellent effect.
From these results, it was suggested that 2-decyltetradecanoic acid potassium salt could be used as a mite control agent.

Keywords: *Dermatophagoides farinae*, miticidal effect, repellent effect, 2-decyltetradecanoic acid potassium salt

ICNSE-0145
Grade of Calcined MgO on Expansion of Cement Paste

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Abstract

Application of steel slag in engineering was limited due to the presence of free- CaO (f-CaO) and free-MgO (f-MgO). The quantification of f-MgO amount is hence important in the reuse of slag as cementitious materials. Nevertheless, the grade of MgO (e.g. light-burnt, hard-burnt or dead-burnt) might affect the accuracy of f-MgO analysis and also the hydration behavior of cement paste. This research is to investigate the effect of different grades of MgO on the soundness of cement paste, and on the mechanism that leads to volumetric expansion. Thereby to clarify if f-MgO content test is a reliable index to reveal the volumetric expansion of cementitious materials.

Three types of MgO were used in this research. Light-burnt (LMgO) and hard-burnt MgO (HMgO) were produced by calcining magnesium salts from 650℃ to 1000℃ and from 1150℃ to 1500℃ respectively. Dead-burnt MgO (DMgO) was prepared by sintering the light-burnt MgO at 1500℃ for two hours to simulate the refining temperature during the steel making process. Results show that increasing the calcination temperature of MgO would indicate larger particle size, larger crystal grain size but smaller specific surface area.

Citric acid reactivity test was performed by hydrate dried MgO powder in citric acid. Phenolphthalein (color indicator, turn into pink at pH>8) was added into the slurry with pH monitoring. The time needed for the slurry to change color/pH was reported as the citric acid reactivity. Results show that reactivity of MgO increases with the decrease in calcination temperature. Ratio between DMgO and LMgO is 693. Hydration test was performed by measuring the consumption rate of MgO (wt.%) in water with thermogravimetric analysis. Results indicate that hydration rate of MgO also increases with the decrease in calcination temperature. Ratio between LMgO and DMgO hydration rate is 71.

For further investigation of grades of MgO on expansion of cement paste, three grades of MgO were added to cement paste by 5% (by weight). All the specimens were autoclaved according to CNS1258 (Method of Test for Autoclave Expansion of Portland Cement). Results show that cement paste with 5 wt.% LMgO and HMgO were soundness (<0.8%). Nevertheless, cement paste with 5 wt.% DMgO was severely expanded and cracked.

Further XRD results of specimens before autoclave test indicate that the peak of periclase (MgO) would be higher with the addition change from LMgO to DMgO, which is also coincided with previous result that LMgO reacts/hydrates faster (within few minutes) than DMgO (takes hours). The XRD results of specimens after autoclave test further show that DMgO would react with the high temperature/pressure water provided by autoclave and form Brucite and Ettiringite. On the other hand, LMgO hydrated faster in the early stage and few was left behind to form Brucite under the autoclave condition. Since autoclave condition is often used as accelerated hydration simulation, it means that LMgO hydrates in the early stage and might not cause the volume instability of cement paste. However, DMgO would hydrate slowly into brucite during the hydration process. As a result, the volume expansion of cement paste with DMgO

was estimated due to the growth of brucite, growth of brucite from MgO may lead to a volumetric expansion

Since the quantification of f-MgO (ASTM C114-15) is by complexometric titration method, three grades of MgO were further tested with standard method. The added MgO amounts detected decreased as grade changes from LMgO to DMgO. It means that huge amount of MgO is not correctly quantified in the real situation (in the case, DMgO, simulate the refining temperature of steel making), and might leads to mis-evaluation or mis-reuse of the slag. A more precise quantification method on the slag should be established. Regulation therefore could be determined while applying the steel slag as engineering materials. As a result, a more sustainable reuse of industrial by-product can be achieved, which move towards a better sustainable development in resources recycling.

Keywords: f-MgO, cement paste, expansion, calcined temperature.

ICNSE-0147
Investigation on Hydrodynamic Power Consumption of an Open Raceway Pond with a Paddle Wheel

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1. Background

A tremendous increase in world energy consumption and the shortage of conventional energy resources has compelled the modern world to search for alternative energy resources such as ecofriendly and renewable energy [1]. An Open-typed raceway pond is widely employed for algae cultivation because of its effective higher biofuel production throughout rate rather than other traditional resources [2,3]. In the present study, we investigated the performance of a scaled-downed open raceway pond model with a paddle wheel by evaluating power consumption and flow velocity.

2. Results and Discussion

A paddle wheel can produce water flow movement in an open-typed raceway pond and it is generally driven by an external energy source. For better throughout of algal production, this kind of input power consumption of flow inducing paddle wheel system should be minimized. To investigate the effect of water depth of an open raceway pond, that is Reynolds number variation, the flow velocity field and hydrodynamic power consumption of driving system are measured. The velocity fields are obtained by using particle image velocimetry (PIV) and the mean velocity is in the ranges of 0.1~0.3 m/s. The hydrodynamic power consumption of paddle wheel maneuvering system is increased with increment of water depth for flow rate increase. However, as the paddle wheel is fully immersed, the power consumption nearly maintained.

Keywords: Raceway pond, power consumption, paddle wheel, velocity

Poster Sessions (3)

Computer Engineering and Technology/ Electrical and Electronic Engineering/ Information Engineering and Technology/ Power & Energy Engineering/ Civil Engineering

Tuesday, February 26, 2019 14:30-15:20 RAN, 3F

ICNSE-0099

Current Control of a Grid-Connected Inverter with Frequency Adaptation for Distributed Power Generation System

Kyeong-Hwa Kim｜*Seoul National University of Science and Technology*

Rizka Bimarta｜*Seoul National University of Science and Technology*

ICNSE-0102

Design and Implementation of Electronic-Ignition System for Dual-Cylinder Motorcycles

Jye-Chau Su｜*National Chin-Yi University of Technology*

Cheng-Tao Tsai｜*National Chin-Yi University of Technology*

Guan-Ting Hou｜*National Chin-Yi University of Technology*

Jin-Nan Chen｜*National Chin-Yi University of Technology*

ICNSE-0109

An Improved Binary Search Space-Structured VQ Search Algorithm for AMR-WB Codec

Cheng-Yu Yeh｜*National Chin-Yi University of Technology*

Hung-Hsun Huang｜*National Chin-Yi University of Technology*

ICNSE-0113

Machine Vision-Based Underwater Vehicle Navigation in Exploration Application Using Novel Corner Detection and Robust Control

Chao-Lin Kuo｜*National Kaohsiung University of Science and Technology*
Chia-Hung Lin｜*National Chin-Yi University of Technology*
Neng-Sheng Pai｜*National Chin-Yi University of Technology*
Ying-Che Kuo｜*National Chin-Yi University of Technology*
Ying-Piao Kuo｜*National Chin-Yi University of Technology*
Chin-Tsung Hsieh｜*National Chin-Yi University of Technology*

ICNSE-0135

Adaptive AM Technology for Desk-Top LCD Based 3D Printing System

Zheng-Yu Chen｜*National Taiwan University of Science and Technology*
Kai-Wei Chen｜*National Taiwan University of Science and Technology*
Shu-Hao Chuang｜*National Taiwan University of Science and Technology*
Ming-Jong Tsai｜*National Taiwan University of Science and Technology*

ICNSE-0161

Autonomous Pipeline Inspection System Design by a Multirotor

Ming-Yuan Shieh｜*Southern Taiwan University of Science and Technology*
Ping-Han Huang｜*Southern Taiwan University of Science and Technology*

ICNSE-0169

Constant Envelope Precoding With Mixed-Resolution Phase Shifters for Massive Multiuser MIMO Systems

Jung-Chieh Chen｜*National Kaohsiung Normal University*

ICNSE-0184

Design and Implementation of Lighting Network in Intelligent Space

Wen-Cheng Pu｜*National Chin-Yi University of Technology*
Yu-Dian Lin｜*National Chin-Yi University of Technology*
Long-Yi Chang｜*National Chin-Yi University of Technology*
Pi-Yun Chen｜*National Chin-Yi University of Technology*

ICNSE-0185

Flux Observer Design Sensorless Direct Torque Control Induction Motor

Yung-Chang Luo｜*National Chin-Yi University of Technology*
Chien-Hua Liao｜*National Chin-Yi University of Technology*
Kuo-Hua Huang｜*National Chin-Yi University of Technology*
Feng-Chang Gu｜*National Chin-Yi University of Technology*

ICNSE-0192

Application of Extension Neural Network Algorithm and Empirical Mode Decomposition Method to Partial Discharge Diagnosis of Power Capacitors

Meng-Hui Wang｜*National Chin-Yi University of Technology*
Shiue-Der Lu｜*National Chin-Yi University of Technology*
Kun-De Lin｜*National Chin-Yi University of Technology*
Ying-Che Kuo｜*National Chin-Yi University of Technology*

ICNSE-0139

Tests Using Certain Statistics Based on Differences among Ordered Sample Means

Tsunehisa Imada｜*Tokai University*

ICNSE-0191

Using Convolutional Neural Networks for Improving Accuracy of Hand Tracking

Tainchi Lu｜*National Chiayi University*
Chihhua Lin｜*National Chiayi University*
JunYu Huang｜*National Chiayi University*

ICNSE-0115

High-Performance Flexible Electrodes for Supercapacitors Using Silver-Plated Carbon Nanofibers via Electrospinning and Electroplating

Hyuk Jin Kwon｜*Korea University*

ICNSE-0117

The pH Control Effect of BiVO4 Nanopillars for Solar Water Splitting

Min-Woo Kim｜*Korea University*

ICNSE-0118

Substrate-Free Photoanodes Using ZnO Nanowire on Flexible Nickel Microfiber for Water Splitting

Hong Seok Jo｜*Korea University*

ICNSE-0121

Electrostatic Sprayed β-Bi_2O_3 Pillar Shape Nanostructure as Photoanodes for Solar Water Splitting

Hyunjun Seok｜*Korea University*

ICNSE-0150

Flyback Converter with Active Clamp Circuit for PFC Applications

Po-Jui Huang｜*Chang Gung University*
Geeng-Kwei Chang｜*Wufeng University*
Shu-Yuan Fan｜*Wufeng University*
Zhi-Wei Huang｜*Chang Gung University*
Sheng-Yu Tseng｜*Chang Gung University*

ICNSE-0195

Detecting Series Arc Faults on DC Circuit by Using Wavelet Transform and Decision Tree

Chi-Jui Wu｜*National Taiwan University of Science and Technology*
Shu-Chen Wang｜*Taipei University of Maritime Technology*
Kai-Hung Tai｜*National Taiwan University of Science and Technology*
Jia-Jin Tsai｜*National Taiwan University of Science and Technology*
Yi-Chiao Lin｜*National Taiwan University of Science and Technology*
Tian-Shin Chao｜*National Taiwan University of Science and Technology*

ICNSE-0194

Effect of River Improvement on Sedimentation in Shirakawa River

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Ryuichi Hirakawa｜*Maebashi Institute of Technology*
Terunori Ohmoto｜*Kumamoto University*

ICNSE-0099
Current Control of a Grid-Connected Inverter with Frequency Adaptation for Distributed Power Generation System

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Abstract

To improve the quality in grid-injected currents in the presence of both the harmonic distortion and frequency variation in the grid voltage, a current control scheme of an LCL-filtered grid-connected inverter with frequency adaptation capability is presented. The proposed control scheme is mainly achieved by the frequency detection and the realization of resonant controller based on the detected frequency information. Through simulation results under grid frequency variation, the feasibility of the proposed control scheme is verified.

Keywords: Distributed power generation system, Frequency adaptation, Grid-connected inverter, Renewable energy

ICNSE-0102
Design and Implementation of Electronic-Ignition System for Dual-Cylinder Motorcycles

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Abstract

In this paper, design and implementation of electronic-ignition system for dual-cylinder motorcycles is presented. The structure of the proposed electronic-ignition system mainly includes a flyback converter, a microcontroller, capacitor discharge circuits and over-voltage protection circuits. In comparsion with traditional contact-type of magntic-ignition system, the proposed capacitor-type of electronic-ignition system can obtain real ignition timing of the spark plugs, and reduce HC and CO exhaust of motorcycles. Therefore, air pollution and environmental quality can be improved, significantly. Finally, to verify the performance of the proposed electronic-ignition system for dual-cylinder motorcycles, a prototype of hardware circuit is created and implemented. From the experimental results, the feasibility of the proposed electronic ignition system have been verified.

Keywords: Electronic-ignition, dual-cylinder, contact-type, magntic-ignition, capacitor-type.

ICNSE-0109
An Improved Binary Search Space-Structured VQ Search Algorithm for AMR-WB Codec

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1. Background/ Objectives and Goals

The adaptive multi-rate wideband (AMR-WB) speech codec is one of the speech codecs applied to modern mobile communication systems as a way to considerably improve the speech quality on handheld devices. The AMR-WB is developed based on an algebraic code-excited linear-prediction (ACELP) coding technique, and provides nine coding modes with bitrates between 6.6–23.85 kbps. The ACELP-based technique is developed as an excellent speech coding technique, but a price paid is a high computational complexity required in an AMR-WB codec. Using an AMR-WB codec, the speech quality of a smartphone can be improved but at the cost of high battery power consumption.

In an AMR-WB encoder, a vector quantization (VQ) of immittance spectral frequency (ISF) coefficients occupies a significant computational load in various coding modes. The VQ structure in AMR-WB adopts a combination of a split VQ (SVQ) and a multistage VQ (MSVQ) techniques, referred to as split-multistage VQ (S-MSVQ), to quantize the ISF coefficient. Conventionally, VQ uses a full search to obtain a codeword best matched with an arbitrary input vector, but the full search requires an enormous computational load. Therefore, many studies have been made to simplify the search complexity of an encoding process in AMR-WB, including an equal-average equal-variance equal-norm nearest neighbor search (EEENNS) algorithm, a triangular inequality elimination (TIE) with a dynamic and an intersection mechanism, abbreviated as DI-TIE approach, and the binary search space-structured VQ (BSS-VQ) search algorithm.

2. Expected Results/ Conclusion/ Contribution

In this work, a performance comparison is made among the EEENNS, DI-TIE, ITIE, the original and the upgrade versions of BSS-VQ. A speech database, including one male and one female speaker, is employed in this testing. The speech database in total takes up more than 221 MB of memory, occupies more than 120 min, and covers 363,281 speech frames.

Fig. 1 gives a comparison on the overall search load reduction (LR). A high value of LR reflects a high search load reduction. As can be found therein, the upgrade version of BBS-VQ provides a minimum overall LR of 91.76% at $TQA = 0.99$, and is experimentally validated to outperform its counterparts.

In conclusion, the aim of remarkable search load reduction is achieved in this paper. Particularly, a trade-off can be made between the quantization accuracy and the search load to meet a user's need when performing a VQ encoding. Furthermore, this work can reach the energy saving requirement when implemented on an AMR-WB codec of mobile devices.

Keywords: speech codec; vector quantization (VQ); codebook search; immittance spectral frequency (ISF)

ICNSE-0113
Machine Vision-Based Underwater Vehicle Navigation in Exploration Application Using Novel Corner Detection and Robust Control

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1. Background/ Objectives and Goals

In an underwater vehicle, a sensor system, including the pressure sensors, compasses, and global positions systems (GPS), provides system status and environment conditions in its workspace. Thus, an underwater vehicle can be navigated in track tasks and exploration applications. In addition, machine vision based control technique is also to extract information from an image and use the specific target to guide the host vehicle. For a short distance, the vision based system can provide appropriate image with high speed acquisition in marine tasks, such as maintenance and inspection, object recognition, and object tracking. However, underwater visibility is poor in natural marine environment, and the optical properties of light propagation, absorption, and scattering can affect the image captured. Hence, the enhanced images are needed in real time for effective underwater vehicle navigation. This study proposes the corner detection to enhance the original image for an accurate extrapolation of the desired object. The specific object feature can be improved and then is provided to perform the object tracking.

3. Expected Results/ Conclusion/ Contribution

The experimental results was used to validate the effectiveness of the proposed methods, including (1) performing the convolution process with different masks, (2) searching the object contour, and (3) extracting the object feature using the object localization algorithm. In convolution processes, the Sobel mask, Laplacian mask, and fractional-order mask, and corner detection mask were used to move the sliding window over the original image, which performed a local operation to transform into feature maps. The novel corner detection convolution could highlight the object and filter the noises, as shown in Figure 1(d). In contrast to the Sobel and Laplacian enhancement masks, the proposed novel corner detection mask and fractional-order mask could help achieve greater results for providing enhancement images for segmentation application. They can rapidly extract object feature for on-line application. The results showed that the novel corner detection convolution was able to detect the object contour and perform the navigation stability underwater environment with poor visibility.

Keywords: Underwater Vehicle, Object Tracking, Novel Corner Detection Convolution.

ICNSE-0135
Adaptive AM Technology for Desk-Top LCD Based 3D Printing System

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1. Background/ Objectives and Goals

Since additive manufacturing technique has raised again in recent years, it has opened a new era for fabricating prototypes of consumer goods, medical implants, and patterns for casting or modeling. A high resolution LCD panel (over 2k) with LED backlight can be applied for a low cost, bottom lighting, desk-top LCD Based 3D Printing System to provide high quality of printed parts. However, such an additive manufacturing technology has some disadvantages such as low speed due to the curing time and repeated up and down control. This paper proposes a special algorithm combined with smart manufacturing concept to adjust layer thickness for a Desk-top LCD based additive manufacturing machine to increase the printing speed and improve the quality of the final printed object.

2. Expected Results/ Conclusion/ Contribution

This paper describes the implementation of adaptive AM algorithm for a Desk-top LCD Based Additive Manufacturing System. The proposed method will allow users an intuitive, yet optimal control between quality and printing time. The preliminary printing results are shown as Figure3 and Table I.

Keywords: Smart Manufacturing, Additive Manufacturing, Stereolithography(SLA), G-Code, Adaptive Slicing

ICNSE-0161
Autonomous Pipeline Inspection System Design by a Multirotor

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Abstract

The pipeline system is still the main transportation method for transporting liquids, gases, and others such as petroleum and natural gas. It is widely used in many buildings and factories. In order to maintain the safety of use, regular inspections and maintenance are indispensable. Compared with in-pipe inspection, out-pipe inspection is having the advantages of easy installation and non-destructive. However, since manual inspections will consume many workers and time costs, how to improve the efficiency of pipe maintenance and reducing the burden on operators has become an important issue in the development of automation systems in recent years. To adopt out-pipe inspection robots is a general solution especially for thickness and corrosion inspection. Since most pipelines are fixed on the walls of buildings and factories, such working situation is not suitable the out-piping mobile robot. Therefore, the out-pipe inspection with an automatic pipeline tracking system by a multirotor can perform many tasks in place of workers, more important is with features such as high security, good economy, and strong functionality.

In the process of pipeline inspection, the most critical is to achieve the automatic tracking of pipelines. Based on a monocular webcam, the detection and tracking system for an Arduino multirotor that is proposed to realize autonomous cruise of pipelines. Firstly, according to the imaging characteristics of pipe images, every image of pipeline is processing by image binarization and canny edge detection algorithm to collect the boundary information of object. Second, shape characteristics of pipeline are obtained by Hough transform; besides, the tracking of pipelines are carried out according to the feature of pipeline by Kalman filter. Finally, some experiments are executed under different scenes whose results illustrate the effectiveness of the proposed pipeline tracking system. It demonstrates that the proposed pipeline tracking algorithm has good robustness and real-time performance.

Keywords: Automatic Inspection, Multirotor, Pipeline Tracking, Hough Transform, Kalman Filter.

ICNSE-0169
Constant Envelope Precoding With Mixed-Resolution Phase Shifters for Massive Multiuser MIMO Systems

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1. Background/ Objectives and Goals

Constant envelope (CE) precoding [1], which is realized with a network of finite resolution phase shifters (PSs), has drawn considerable research attention in the context of massive multiuser multiple-input multiple-output (MIMO) downlink transmission because it can reduce the peak-to-average power ratio of a transmitted signal, thereby enabling the use of low-cost and power-efficient power amplifiers at a base station (BS). However, with the current silicon technologies, the implementation of high-resolution PSs is challenging and even impractical. Moreover, the power consumption and hardware costs of PSs depend on the resolution of the quantized phases. On this basis, low-cost and low-resolution PSs are typically adopted in practice. Different from the conventional CE precoding design with a *homogeneous* PS architecture, we propose a mixed PS architecture CE precoding design in massive multiuser MIMO systems to reduce the power consumption and hardware costs of PSs, as well as achieve acceptable performance.

2. Results

We perform simulations to evaluate the average achievable rate for a massive multiuser MIMO system with $(M, U) = (128,16)$. The percentage of low-resolution PSs in the mixed PS architecture is represented by $\varrho(\lambda_0, \lambda_1) \triangleq M_{\lambda_0}/M \times 100\%$. Fig. 2 shows the results of the average achievable rate versus the signal-to-noise ratio (SNR) of the mixed-PS architecture CE precoding design at $\lambda_0 = 1$ and $\lambda_1 = 5$. Several notable observations can be derived from the figure. First, the average achievable rate decreases with the increase in the proportion of low-resolution PSs. Second, when $\varrho(1,5) \leq 30\%$, the proposed algorithm performs nearly the same as the unquantized result. These results demonstrate that the proposed algorithm can incorporate the phases of different resolutions to obtain the desired achievable rate. Third, the proposed mixed PS architecture can reduce the power consumption. For example, Méndez-Rial et al. [3] recently reported that the power consumption for 1-, 3-, 4-, and 5-bit resolution PSs is 5, 15, 45, and 60 mW, respectively. As reported in our previous work [2], Algorithm 2 with $\lambda = 5$ in Fig. 2 of our previous work [2] and Algorithm 2 with $\varrho(1,5) = 30\%$ in the present work can yield continuous-equivalent performance. The power consumed by Algorithm 2 with $\lambda = 5$ is $128 \times 60 = 7{,}680$ mW. Meanwhile, the power consumed by Algorithm 2 with $\varrho(1,5) = 30\%$ is $\lfloor 128 \times 30\% \rfloor \times 5 + (128 - \lfloor 128 \times 30\% \rfloor) \times 60 = 5{,}590$ mW, where $\lfloor \cdot \rfloor$ is the floor operation. In this case, power consumption of a mixed PS architecture has been successfully reduced by approximately 27.21% of that of a homogeneous-PS architecture without significant loss of the average achievable rate.

Keywords: Constant envelope, finite resolution PS, massive MIMO, mixed-PS, precoding.

ICNSE-0184
Design and Implementation of Lighting Network in Intelligent Space

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Abstract

1.Background/ Objectives and Goals

The DALI(Digital Addressable Lighting Interface) protocol was widely used in European lighting applications that aimed to redefine the control architecture of luminaires mainly to simplify the hardware wiring of the lamp source. Fig.1 and figure 2 shows the system architecture and formats of packet of DALI 。

However, the DALI system integrates power cords and many control lines together called the Dali bus, which is responsible for connecting multiple lighting devices to a network to supple the power and communication. Both the weight of the cable and the noise interference of controller by the power cords were result in driving load. The use of the Manchester Code, fixed 19bits package of the transmission of messages and its communication speed is limited to 1200 bps are result in a limit on the number of connected devices, also limit the speed of control and the transmission distance

2. Contribution

In this study, it presents a novel communication technology that modified the PWM interface to transmit power and communication signals simultaneously using a set of power buses, call PKM, which let the communication speed and packet length should not be limited to solve the shortcomings of the current Dali protocol, and the number of connections is not limited to 64. Finally, the practice and theory can verify its feasibility.

Keywords: Digital Addressable Lighting Interface, DALI, PWM, PKM, Manchester Coding

ICNSE-0185
Flux Observer Design Sensorless Direct Torque Control Induction Motor

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1. Background/ Objectives and Goals

An induction motor (IM) drive based on the direct torque control (DTC) scheme comparing with the conventional vector control strategy has the advantages of simple structure, rapid response, and requires not voltage and current decoupling. The primary application of DTC scheme is electric vehicle, traction, and industrial high performance drive. Implementation of a closed-loop DTC scheme requires rotational position sensor such as a resolver or an encoder to detect rotor-shaft speed. This sensor, however, reduces the system reliability, increasing investment of the drive, and is unsuitable for hostile environment. In this system, a speed estimation scheme based on the stator flux observer was established to achieve a sensorless DTC IM drive.

2. Expected Results/ Conclusion/ Contribution

A stator flux observer speed estimation scheme was used to establish sensorless direct torque control (DTC) induction motor (IM) drive. The voltage source inverter (VSI) was established utilizing the voltage space vector pulse width modulation (VSVPWM) in place of the traditional switching table (ST) VSI to reduce the stator current ripple and the electromagnetic torque ripple. The shaft speed estimation scheme based on the stator flux observer was designed by the Lyapunov stability theory guarantees the developed system is stable and easy realization. Both simulation and experimental results (including estimated rotor speed, stator current, synchronous position angle, electromagnetic torque, and the stator flux locus) confirmed the effectiveness of the proposed system.

Keywords: sensorless, direct torque control (DTC), voltage space vector pulse width modulation (VSVPWM), induction motor drive, flux observer

ICNSE-0192
Application of Extension Neural Network Algorithm and Empirical Mode Decomposition Method to Partial Discharge Diagnosis of Power Capacitors

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1. Background/ Objectives and Goals

Power capacitors are widely used in power systems and any internal capacitor fault can affect the safe operation of the system. The most common faults include moisture, partial discharge, aging or deteriorated insulation, and structural damage. The goal of this study is to detect power capacitor fault types by using a human-machine interface diagnostic system to determine the real-time state of the power capacitor.

2. Expected Results/ Conclusion/ Contribution

The advantage of the proposed method could greatly reduce the huge measured original data and extract meaningful feature values by the EMD and the chaos synchronization detection method in order to detect the subtle voltage changes in the power capacitor discharge signals. According to the results, the ENN has higher recognition accuracy rate reaching up to 94%, as compared with the extension method and artificial neural network algorithm. Moreover, the self-developed human-machine interface diagnostic system was implemented in this study and can be used in the field of power capacitors.

Keywords: Extension neural network, empirical mode decomposition method, chaos synchronization detection, fault diagnosis, human-machine interface diagnostic system.

ICNSE-0139
Tests Using Certain Statistics Based on Differences among Ordered Sample Means

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Abstract

Assume there are several normal populations and we obtain a sample from each population. We discuss tests using certain statistics based on differences among ordered sample means. First, we formulate the probability that a specified statistic is greater than a specified positive constant. Then, we discuss tests using the statistics. First, we consider the analysis of variance for checking the differences among normal means. Next, we consider testing whether a single maximum mean exists and testing whether a single minimum mean exists. Finally, we give some numerical results and an example intended to illustrate our procedures.

Keywords: Analysis of variance, Maximum mean; Minimum mean, Power of the test

ICNSE-0191
Using Convolutional Neural Networks for Improving Accuracy of Hand Tracking

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1. Background/ Objectives and Goals

Hand Tracking has become a sophisticated research topic in recent years. In practice, tracking technologies can be classified into two types: marker and markerless. Marker-based tracking technology requires users to wear auxiliary clothing with sensors, and the tracking system takes advantage of the sensors to obtain real positions of the human joints. Obviously, the marker-based method is more accurate but more expensive. As for markerless tracking, the most representative markerless hand tracking device is Leap Motion, which is the most popular and low-cost device to capture hand gestures nowadays. It used to cooperate with virtual reality glasses to replace hand-held controllers. In this paper, we propose a flexible and feasible approach to tracking hand gestures with Leap Motion for achieving high accuracy of hand tracking.

2. Expected Results/ Conclusion/ Contribution

Experimental results show that the proposed method deals with incorrect hand gestures problems and provides accurate tracking results. We mainly conduct two experiments. The first experiment is about evaluating the PalmNet. We take the “Intersection over Union (IoU)” as an evaluation metric. This metric represents the ratio of the area of intersection over the union area occupied by the ground truth and prediction. In our training dataset, the IoU is 96%. It means that we can successfully figure out most of the cases. The second experiment is about evaluating the Tips2DNet. The goal of Tips2DNet is to find positions of fingertips. We use “Mean Square Error (MSE)” as an evaluation metric. In our training dataset, the MSE is 0.5% and we avoid less tracking errors. Finally, we compare our method with Leap Motion. In some cases, there are some incorrect tracking results in the ring finger caused by Leap Motion. In contrast, our system can track the ring finger more accurately, as shown in Fig. 2. We also used the NeuroDigital Gloveone, which is a virtual reality glove produced by NeuroDigital Technologies to compare with our system. We do not track as accurate as the Gloveone in some cases, but for most of normal gestures, we can achieve similar performance in comparison with Gloveone.

Keywords: Hand Tracking, Human-Computer Interaction, Machine Learning, Virtual Reality.

ICNSE-0115
High-Performance Flexible Electrodes for Supercapacitors Using Silver-Plated Carbon Nanofibers via Electrospinning and Electroplating

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1. Background/ Objectives and Goals

Carbon-based electrodes are extensively used as supercapacitor materials. However, carbon-based materials (e.g. graphite, carbon nanotubes, and nanofibers) have a disadvantage of low energy density. Carbon nanofibers are also brittle and thus not flexible. This shortcoming can be overcome by enclosing the nanofibers with a flexible silver shell, which can be achieved by electroplating. Here, we are first to introduce carbon nanofibers electroplated with silver to increase the energy density and flexibility for use as supercapacitors.

2. Expected Results/ Conclusion/ Contribution

High-performance flexible freestanding carbon nanofibers electroplated with silver were fabricated for supercapacitor applications. The brittle carbon nanofibers were encased with bendable silver shells, leading to superior flexibility of the supercapacitors. The enhanced electrical conductivity derived from the silver shell structure dramatically increased the capacitance of the supercapacitor. The silver shell also conferred structural stability to the carbon core, thus furnishing stable, long-term electrode performance. The electrode exhibited excellent long-term cycling performance as well as high values of the areal capacitance, energy density power density. Our facile approach that provides a highly flexible Ag/CNF composite with excellent bending capability and negligible fading of the electrochemical response of the electrode holds immense potential for the development of wearable electronic devices and self-powered systems.

Keywords: Electroplating, electrospinning, Ag, carbon nanofiber, flexible electrode, supercapacitor.

ICNSE-0117
The pH Control Effect of $BiVO_4$ Nanopillars for Solar Water Splitting

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1. Background/ Objectives and Goals

Change the physical form of monoclinic graphite $BiVO_4$ (m-$BiVO_4$) have been attempted and have been shown to effectively enhance the photocatalytic activity of $BiVO_4$. Interesting nanostructures of $BiVO_4$ in the form of spheres, sheets, dumbbells, peanuts, flowers, nanotubes, leaves, and octopods were prepared by changing the pH of the solvent during the hydrothermal reaction.

This study investigates the effect of varying the pH of the precursor solution on the shape of $BiVO_4$ and identifies the optimal conditions for maximizing PCD. The pH of the $BiVO_4$ precursor solution was increased by the addition of ammonium hydroxide (AH). ESD precursor solutions with high pH produced films of nanofern shape that affected PEC performance through changes in nanostructure surface area, light absorbance, and charge carrier transport properties.

2. Expected Results/ Conclusion/ Contribution

The pillar shaped $BiVO_4$ was formed in the absence of AH (BVO-0), which is consistent with our previous study. These $BiVO_4$ pillars (height ~ 3 μm) contain particles 200-250 nm in size arranged in a pillar. The particles were uniformly deposited on the ITO substrate. However, adding AH greatly changed the form. When 1 ml of AH is added, the $BiVO_4$ particles are released from the cone jet and deposited on the ITO substrate to a thickness of about 5 μm on the ITO substrate, forming a branched fern morphology

The precursor solution with higher pH results in a larger number of smaller crystal nuclei, simultaneously consuming protons due to the lower crystal growth rate. Thus, the increased pH decreases the amount of free Bi^{3+} in the precursor, which significantly affects the morphology of $BiVO_4$ after recrystallization during heat treatment in air at 500 ℃. Moreover, electrostatic repulsion between these particles resulted in a branched structure. BVO-1.5 shows that the particles formed branched fern and nanofern-like shapes (BVO-2.0) because the particles were better dispersed. Moreover, the thickness of the $BiVO_4$ layer on the ITO substrate increased with increasing concentrations of AH. Increasing the AH concentration escalates the thermodynamic driving force for $BiVO_4$ precipitation, resulting in a faster nucleation rate. These dynamics produce a less dense fern-like morphology rather than the nanopillar morphology formed in the absence of AH.

The PCD of the BVO-0 film was 0.82 $mA \cdot cm^{-2}$ at 1.2 V vs. Ag/AgCl, compared to PCD values of 0.95, 1.0, and 1.23 $mA \cdot cm^{-2}$ for BVO-1, BVO-1.5, and BVO-2, respectively. Three major processes, i.e., photoexcitation, surface/bulk recombination, and charge separation, are involved in the photoreaction over the photocatalytic material under consideration. During the PEC process at the photoanode, photoexcited electrons are transferred towards ITO, and the holes react at the electrode/electrolyte interface. Modifying the morphology of the $BiVO_4$ pillars to the fern-like structure improves the photocurrent and decreases bulk recombination. BVO-0 presented the lowest photocurrent, whereas the photoanodes deposited with increasing pH showed increased photocurrent density. Thus, the fern-like structure exposes more $BiVO_4$ particle surface area to the electrolyte, and consequently, the PEC performance improves.

By adjusting the pH of the $BiVO_4$ precursor solution used in ESD by adding AH, the morphology of $BiVO_4$ nanopillars was transformed from pillars into a nanofern structure with a higher overall surface area. The ferns facilitated faster water oxidation owing to the increased interfacial area between the

$BiVO_4$ electrode and electrolyte. Thus, the rate of surface reaction of holes with water/electrolyte increased, and the PEC performance of the $BiVO_4$ system improved, as confirmed by comparing the photocurrent density of the films fabricated from precursors of varying pH.

Keywords: $BiVO_4$, Varying pH, Nanofern, Solar water splitting, Photoanode

ICNSE-0118
Substrate-Free Photoanodes Using ZnO Nanowire on Flexible Nickel Microfiber for Water Splitting

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1. Background/ Objectives and Goals

The direct utilization of solar energy for water splitting to produce clean energy is attracting significant attention. Substrate-and binder-free flexible photoelectrodes are desirable in devices including solar cells, sensors, and energy storage devices. The advantages of flexible and freestanding electrodes include reduced mass, increased bendability in accordance with the applied device packaging, lack of unwanted binders, and avoidance of strain from lattice mismatches with the substrate. Binder-free photoanodes can provide enhanced active-material loading and density, thus increasing mass transport and improving the light management of the photoanode material.

2. Expected Results/ Conclusion/ Contribution

In order to fabricate and demonstrate the use of the freestanding photoanode, Ni F deposition was studied first. As t_{es} was increased, t_{ep} was also adjusted to maintain the diameter of the Ni F (D_{Ni}) approximately constant in all cases. D_{Ni} is related to the quantity of electric charge (Q) provided per unit area. As t_{es} increased, the current (I) increased from 2 to 2.4 A because of the increased surface area for deposition (A_p) of the PAN nanofiber. Because t_{ep} increases as t_{es} increases from 10 to 90 s, Q ($Q = I \cdot t_{ep}$) is also increased from 30 to 132 C, respectively. However, the quantity of electric charge per unit area (Q/A_p) is similar, near 260 C/cm^2 for all cases, and D_{Ni} of all cases is approximately 3 μm. The low-magnification TEM image shows the cross-section of a Ni F/ZnO NW structure, confirming the formation of the Ni core and ZnO NW shell. The ZnO NWs grow perpendicular to the Ni F surface to a length of 1.17 μm. The distinctive peaks of ZnO (31, 35, and 36 °) and Ni (44, 52, and 77 °) are observed in the XRD pattern.

The PCD value at t_{es} = 60 s was the highest, reaching 1.14 mA/cm^2 at 0.4 V, although the amounts of Ni F and reaction areas continue to increase with increasing t_{es}. As the t_{es} varied from 10 to 60 s, the ratio of the Ni F surface area (β) increased to 0.359, 0.673, and 1.01, because of the increased number of Ni Fs. Moreover, the PCD value also increases to 0.43, 0.57, and 1.14 mA/cm^2 with increases in t_{es} up to 60 s. However, the PCD value decreased to 0.88 mA/cm^2 at t_{es} = 90 s, despite the increased surface area ratio to 1.59. When t_{es} is low, the Ni F electrode has a single layer, and most of the light illuminated is absorbed by the ZnO NWs on the surfaces of the Ni Fs. Nevertheless, the PCD values at low t_{es} are also small because the number of Ni Fs is lower, yielding lower loading of the active material mass. In contrast, when t_{es} is too high, the electrode contains several layers of Ni Fs, and a step forms between the top and bottom layers of the Ni Fs. The resistance at the electrolyte–Ni F/ZnO NW interface, Helmholtz resistance (R_H), also varies; RH is obtained from fitting as 206, 613, 342, and 90.8 Ω for t_{es}. Because R_H is higher at 613 Ω and interface capacitance (C_H) is 7.40 × 10^{-5} F when t_{es} = 30 s, the recombination lifetime (τ_n) of the electron–hole pair is higher, and therefore the photoanode achieves longer charge-separation, thus enhancing the PEC performance. The Mott–Schottky results show different tendencies from τ_n. With increasing t_{es}, the donor density (N_d) increased to 0.151, 0.220, 1.08, and 1.70 × 1019 cm^3. The reaction area with the ZnO NW and electrolyte, related to β, increased because the amount of Ni Fs also increased with increasing t_{es}. As the area is increased, more electrons are generated in the ZnO NW, and N_d is the highest at t_{es} = 90 s.

We demonstrate a novel design of ZnO NWs over Ni Fs and the successful fabrication of a substrate-free and flexible photoanode with enhanced PEC performance. The PCD data shows that the PEC performance of the ZnO NW/Ni F is better than that of a ZnO NW/ITO. The PCD (1.14 mA/cm^2) of the

ZnO NW/Ni F was 58% higher than that of the ZnO NW/ITO (~0.72 mA/cm^2). The enhanced PEC properties of the ZnO NW/Ni F arise from the uniform growth of ZnO NW over the surfaces of the Ni Fs, as the photoanode is substrate-free. Thus, this work provides a new method for substrate-free photoelectrode design to promote PEC performance toward capturing and storing clean energy by water

Keywords: ZnO, Nickel, Microfibers, Flexible, Transparent, Substrate-free, Photoanode.

ICNSE-0121
Electrostatic Sprayed β-Bi_2O_3 Pillar Shape Nanostructure as Photoanodes for Solar Water Splitting

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1. Background/ Objectives and Goals

Here we show how to fabricate pillar shaped Bi_2O_3 nanostructures using a simple, extensible electrostatic spray deposition (ESD) technique that is not vacuum. Post-annealing treatment of electrosprayed Bi_2O_3 induces phase transition to α- or β-Bi_2O_3 depending on the annealing temperature. We focus on the formation of the β-Bi_2O_3 phase, which is known to allow the highest photocurrent density (PCD). The thickness of the film containing these nanoparticles is then adjusted by varying the electrospray time from 15 minutes to 120 minutes to confirm the optimum thickness.

2. Expected Results/ Conclusion/ Contribution

The two XRD patterns with peaks correspond to films annealed at 430 and 460 ℃, respectively, and represent β and α-Bi_2O_3 phases, respectively. The XRD pattern shows that the as-deposited film is virtually amorphous because the substrate temperature at 50 ℃ is insufficient for Bi_2O_3 crystallization. Therefore, only the peaks related to the ITO substrate are visible. The amorphous phase did not change when annealed at 370 ℃ and 400 ℃. The film annealed at a temperature of 430 ℃ or less showed no sign of crystallization. Films annealed at 430 and 460 ℃ clearly show different XRD peaks, suggesting the effect of annealing temperature on the formation of Bi_2O_3. The peaks observed for the films annealed at 430 °C can be indexed with a tetragonal crystal structure of metastable β-Bi_2O_3 (JCPDS No. 27-0050). At annealing temperature of 460 °C, restructuring occurs and β-Bi_2O_3 is transformed into a stable monoclinic α-Bi_2O_3 phase as observed by the peak corresponding to JCPDS 41-1449.

To obtain clean energy from the PEC system, the photoanode should exhibit fast charge transfer and practical electron-hole pair separation with slower electron-hole recombination rates at the surface. To realize this, the photoanode described here has a unique pillar shape that enhances the photocatalytic process by providing a shorter hole transport path to the surface for O_2 evolution. In addition, tetragonally-structured β-Bi_2O_3 with a low energy bandgap promotes electron-hole separation for improved photo-induced water splitting. Monoclinic α-Bi_2O_3 and tetragonal β-Bi_2O_3 films obtained after annealing were investigated by PCD measurements. Although both samples had a 90 min sprying time, α-Bi_2O_3 showed a PCD of 0.025 $mA{\cdot}cm^{-2}$ at 1.2 V (Ag/AgCl) and slightly increased at dark current, while β-Bi_2O_3 shows a PCD of 0.1 $mA{\cdot}cm^{-2}$, which is about four times greater than α-Bi_2O_3 in a 0.5-M Na_2SO_4 electrolyte. We show that the low PCD of α-Bi_2O_3 has a lower absorption coefficient and a higher band gap than β-Bi_2O_3. The performance of photoanode fabricated with tetrahedral β-Bi_2O_3 is superior to that of monoclinic α-Bi_2O_3. The increase in visible light accumulation by β-Bi_2O_3 promotes rapid hole transport due to the low bandgap and tetragonal structure. The potential is based on the Ag/AgCl electrode as reference.

The peak at 0.33 V during the PEC performance of tetragonal β-Bi_2O_3 can be attributed to the oxidative dissolution of Bi to Bi^{3+} in the presence of 0.5 M Na_2SO_4 electrolyte and can react with $2h^+$ to form Bi^{5+}. However, in the presence of the Na_2SO_3 electrolyte hole, the holes are removed and the formation of Bi^{5+} is alleviated. With the deposition time increasing from 15-min to 90-min, the PCD increases up to 0.1 $mA{\cdot}cm^{-2}$. However, a sample with 120-min exhibits a possible reduced PCD from the increased pillar height, which reduces the electric field and then induces faster charge recombination before the hole reaches the pillar surface.

We report the fabrication of Bi_2O_3 pillar structures by non-vacuum ESD technology. The PCD of the pillar structured Bi_2O_3 thin film was improved to 0.97 $mA{\cdot}cm^{-2}$ and the visible light harvesting was improved. In this study, we confirmed that the Bi2O3 thin film can be fabricated in several steps by controlling the annealing temperature after ESD. The PEC performance of β-Bi_2O_3 is superior to that of α-Bi_2O_3. Also, tetragonal β -Bi_2O_3 exhibits fast charge transfer capability in EIS measurements performed in Na2SO3. The pillar form of β-Bi_2O_3 delivers a shorter charge transfer path and a lower band gap (2.5 eV). Thus, this optimized optical anode, which exhibits high PCD and excellent stability, is expected to be used for water splitting and clean energy applications.

Keywords: $BiVO_4$, Varying pH, Nanofern, Solar water splitting, Photoanode

ICNSE-0150
Flyback Converter with Active Clamp Circuit for PFC Applications

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Abstract

This paper presents a bridgeless flyback converter with active clamp circuit for PFC applications. When the bridgeless flyback converter is used to achieve PFC, it needs two sets of transformers to process power during positive and negative half periods, respectively. In order to increase conversion efficiency, the flyback one can adopt two sets of active clamp circuits to recover energies stored in leakage inductances of transformers. Therefore, the proposed bridgeless flyback converter can use a set of transformer with three windings to substitute two sets of transformer in the conventional bridgeless flyback one. In addition, since power switches of the conventional bridgeless flyback converter are divided into two pairs of power switches, they are used to process power during positive or negative half period, respectively. In order to simplify the proposed bridgeless flyback converter, switches and active clamp circuit in the conventional bridgeless flyback one are integrated. With this approach, the proposed bridgeless flyback converter uses two switches, two capacitors and a transformer to implement PFC features. Its switches are operated with zero-voltage switching (ZVS) at turn-on transition. Therefore, the proposed flyback converter can increase conversion efficiency, decrease component counts, resulting in a higher conversion efficiency, lower cost and more simplicity. Finally, a prototype with a universal input voltage source (AC90V~265V) under output voltage of 200V and maximum output power of 300W has been implemented to verify the feasibility of the proposed bridgeless flyback converter.

Keywords: bridgeless; converter; PFC; active clamp circuit; ZVS.

ICNSE-0195
Detecting Series Arc Faults on DC Circuit by Using Wavelet Transform and Decision Tree

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Abstract

Because photovoltaic systems have gradually emerged in recent years, they make the use of DC power systems more and more extensive. DC arc faults on DC lines have gradually become seriously. The arcing accompanied with high thermal energy and spark is easy to cause serious fires. Taiwan has developed regulations that PV systems shall include a DC arc fault detector (AFD). In this paper, it is to establish an experiment platform to collect line current data under normal operations and series arc faults. Experiments include resistive load and inverters operating on different conditions. First of all, it is to use the discrete wavelet transform (DWT) to obtain the time-frequency domain characteristics of line current waveforms. Then the high-frequency components are used to calculate the cumulative energy for each measurement period. It then trains a suitable detection method by using the decision tree. The decision tree detecting method is applied to experiment data and the results are compared to commercial PV AFD. In this paper, the proposed method can correctly recognize normal operation sand series arc faults. It is better than the commercial AFD.

Keywords: DC power system protection, Series arc fault, Arc fault detection, Discrete wavelet transform, Decision tree.

ICNSE-0194
Effect of River Improvement on Sedimentation in Shirakawa River

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Abstract

In the Shirakawa River, remarkable deformation due to sediment deposition was observed after river channel improvement works. In this research, a model experiment and a quasi-three-dimensional numerical simulation were conducted in order to evaluate the effect of river bend curvature variation caused by improvement works on channel response and flow capacity. In the model experiment, large sandbars were formed, and the channel became narrower. In the numerical simulation, flood flew over sandbars and gravel deposited on sandbars, which caused decreasing of flow capacity. The gravel deposition was most active when the flow charge was in its peak.

Keywords: Flood disaster, Deposition, Topographical changes, Hydraulic model experiment, Quasi-3D flood flow model, Shirakawa river

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Mechanical Engineering and Technology/ Aeronautics & Aerospace Engineering/ Material Science and Engineering/ Chemical Engineering/ Chemistry

Tuesday, February 26, 2019 15:30-16:20 RAN, 3F

ICNSE-0093

Moving Object Detection in Video Sequences Using Inertial Measurement Unit

Sukwoo Jung｜*Korea University*

Minho Chang｜*Korea University*

ICNSE-0107

Enhancing Passive Stereo Matching Using Multiple Lights

Seokjung Kim｜*Korea University*

Minho Chang｜*Korea University*

ICNSE-0111

Enhancement of Registration between CT Images and 3D Scan Data Using Normal Information of 3D Scan Data in Dentistry

Taeksoo Kim｜*Korea University*

Minho Chang｜*Korea University*

ICNSE-0112

DOE-FEM Approach to Predict Thermal Errors of a Feed Drive System

Po-An Chen｜*National Taipei University of Technology*

Xin-Han Yu｜*National Chung-Cheng University*

An-Shik Yang｜*National Taipei University of Technology*

Wen-Hsin Hsieh｜*National Chung-Cheng University*

ICNSE-0128

Water Splitting of Photoanodes Using Ball-Milled Zn_2SnO_4 Nanoparticles with CNTs

Tae-Gun Kim | *Korea University*

ICNSE-0167

Design of Steering Knuckle for Electric Vehicle

Yung-Chuan Chen | *National Pingtung University of Science and Technology*
Li-Wen Chen | *National Pingtung University of Science and Technology*
Hsing-Hui Huang | *National Pingtung University of Science and Technology*

ICNSE-0168

Flow Control Using Plasma Actuator

Tetsuhiro Tsukiji | *Sophia University*
Ryosuke Minami | *Sophia University*

ICNSE-0171

Design Improvement on Structure Strength and Rigidity for a CNC Lathe with Parallel Turning

Shen-Yung Lin | *National Formosa University*
Sheng-Fong Huang | *National Formosa University*

ICNSE-0130

Study on Aerodynamics and Trajectory of Guided Mortar Projectile with Canard Wings

Chun-Chi Li | *Chung Cheng Institute of Technology, National Defense University*
Wei-Chan Hong | *Chung Cheng Institute of Technology, National Defense University*

ICNSE-0116

Compression-Induced Deformation Behaviors of GaN Nanowires with Various Defect Concentrations by Molecular Dynamics Simulations

Chieh Wang | *I-Shou University*
Sheng-Rui Jian | *I-Shou University*

ICNSE-0119

A Comparison of Corrosion Resistance and Properties of Nd:YAG Laser Welded Zr-Cu-Ag-Al and Zr-Cu-Ni-Al Bulk Metallic Glasses

Jia-Hong Pan | *I-Shou University*
Huei-Sen Wang | *I-Shou University*
Pei-Ju Hsieh | *I-Shou University*
Tsai-Hsiu Li | *I-Shou University*
Shian-Ching Jang | *National Central University*

ICNSE-0120

Investigation into the Effects of Al and Mg Additions on the Microstructure Evolution, Properties and Corrosion Resistance of the Zn-Al-Mg Alloy

Yi-Jun Shen｜*I-Shou University*
Huei-Sen Wang｜*I-Shou University*
Hou-Guang Chen｜*I-Shou University*
Sheng-Chih Lin｜*Yieh Phui Enterprise Co.*
Po-Chun Chen｜*I-Shou University*
Ying-Jin Su｜*I-Shou University*

ICNSE-0126

Aqueous Epitaxial Lateral Overgrowth of ZnO Layers with the Assistance of Colloidal Crystal Templates

Tzu-Yi Yang｜*I-Shou University*
Hou-Guang Chen｜*I-Shou University*

ICNSE-0127

Hydrophobic Thin Films Synthesis by Low Temperature Atmospheric Pressure Plasma Method

Wen-Siung Hsieh｜*I-Shou University*
Bo-Chen Chiang｜*I-Shou University*
Che-Ming Chang｜*I-Shou University*
Wen-Jen Liu｜*I-Shou University*

ICNSE-0188

Preparation and Physical Properties of Adhesives Containing Silanized Graphenes

Geon Uk Baek｜*Daegu Catholic University*
Dong Won Lee｜*PCK Co., Ltd.*
Yoon Soo Han｜*Daegu Catholic University*

ICNSE-0154

Study in Medicinal Chemistry of Receptor-Acting Drugs: Their Membrane Interactivity Specific to Chemical Structures

Hironori Tsuchiya｜*Asahi University School of Dentistry*
Maki Mizogami｜*Kizawa Memorial Hospital*

ICNSE-0173

Mechanical Properties of Nano-Toughened Epoxy Resins Containing Hydroxyl- and Methoxycarbonyl-Terminated Hyper-Branched Polymers

Hangyu Park｜*Pusan National University*
Jiyun Hu｜*Pusan National University*
Jihun Choi｜*Pusan National University*
Sangyoon Cha｜*Pusan National University*
Youngson Choe｜*Pusan National University*

ICNSE-0196

Repeated Biodiesel Production via One-step Direct Process Using a Paper-cartridge Containing Solid Catalysts Derived from Egg Shells

Sung Ho Yeom｜*Gangneung-Wonju National University*
Gahee Im｜*Gangneung-Wonju National University*

ICNSE-0093
Moving Object Detection in Video Sequences Using Inertial Measurement Unit

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1. Abstract

Proposed in this paper is a new procedure of moving object detection reducing the risk of the original algorithm using focus of expansion which the accuracy of result is affected by the outliers. To make it robust to the outliers, we used the Inertial Measurement Unit(IMU) to achieve the orientation and short-term movement of a camera. Although the IMU data has also risk of the cumulative errors and the low accuracy by noise, we compensate the defect by using the image of the camera. To generate the accurate fundamental matrix for the moving object detection, we use both the acceleration data from the IMU and the velocity data from the camera. The proposed procedure will be implemented and tested for various examples.

2. Experiment Plan

We used the USB3uEyeCP color camera for the image sensor and the LPMS-B2 for the wireless IMU sensor. The two sensors are attached with the simply designed 3D printed frame. Also, the calibration and synchronization of the two sensors are applied.

We acquire the road data from the predetermined route. We will obtain several more dataset for the experiment in the future work. The background separation will be processed with the proposed method and the previous existing method using only the image data. The algorithm is implemented with the C++ language and test runs will be made on a personal computer with an i7-7500 processor with 16GB memory and a Windows 10 operating system.

Keywords: object detection, IMU, background separation

ICNSE-0107
Enhancing Passive Stereo Matching Using Multiple Lights

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1. Background/ Objectives and Goals

Stereo vision is very common for 3D reconstruction. The photometric stereo is also known as a method of three-dimensional reconstruction by acquiring the surface normal of the object to be measured. There are pros and cons in both methods, and there have been studies to improve the measurement results by eliminating the disadvantages by complementing each other.

In this study, we construct a device and experiment environment that can use both methods, and generate additional images that can be used for matching. Using this, stereo matching is performed and the improvement of accuracy is evaluated by comparing with the ground truth.

2. Expected Results/ Conclusion/ Contribution

The reliability of the matching accuracy is enhanced by adding the intensity of the illumination condition image as a new variable in the process of finding the matching point. Comparing with the ground truth, we can prove that it has more accurate results than the previous stereo matching method. Based on this result, it can be concluded that the fusion of the proposed stereo vision result with the photometric stereo result can achieve more accurate 3D reconstruction result than that of the previous fusion result.

It is cheaper and simpler to configure the hardware than a product based on active stereo vision technology, which requires the inclusion of a projector to use structured light. Because of this, price competitiveness is strong and it is easy to miniaturize, so we expect to be able to help develop applications such as portable precision scanners such as intraoral scanners.

Keywords: Active stereo vision, Passive stereo vision, Photometric stereo, 3D reconstruction

ICNSE-0111
Enhancement of Registration between CT Images and 3D Scan Data Using Normal Information of 3D Scan Data in Dentistry

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1. Background/ Objectives and Goals

Recent years, computer-aided design (CAD) is widely being used in dental industry. In dental CAD applications which use both volumetric Computed Tomography (CT) images and 3D optical scanned surface data, registration of the two data is needed. Previous works do the registration of CT volume data and 3D scan data by using Iterative Closest Point (ICP). ICP uses only distance between points but 3D scan data has also normal information of each points.

In this study, we will propose an enhanced method of registration between CT images and 3D scan data by using normal information of 3D scan data. Moreover, we used a new method for measuring the accuracy of registration between CT images and 3D scan data.

2. Expected Results / Conclusion

Error between CT images and 3D scan data by initial positioning (3-points alignment) was 0.62mm and the error was decreased after the registration of CT volume data and 3D scan data by 0.32mm. And the proposed method using normal information was 0.3mm which is slightly smaller than just using distance between matching points. Moreover, we expect better results by optimizing variables between normal values and distances.

Actually, the 0.62mm, 0.32mm error is also acceptable in dental CAD/CAM industry, but in near future higher accuracy of registration will be required in digital implant surgery and navigation implant system.

Keywords: Registration of CT images and 3D scan data, Normal value, Digital implant

ICNSE-0112
DOE-FEM Approach to Predict Thermal Errors of a Feed Drive System

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1. Introduction

As commonly used in various kinds of machine tools, a ball screw high-speed feed drive system reduces the efforts of non-cutting time and tool replacement, making production more economical. However, it also induces more heat generations from the ball screw, bearings and motor, causing thermal deformation that will reduce the accuracy of machine tool. This study examines a high-speed feed drive system to realize rapid travel with improved precision. The FEM predictions are compared against measured temperatures and deformations to validate the thermal model, which can be used to forecast the transient thermal characteristics of feed drive system for a screw stroke length of 400 mm at the speed range of 2-8 mpm. The design of experiments (DOE) method is implemented to recognize those significant factors affecting thermal deformations. We adopt the associated boundary condition to define input variables and response factors of the feed drive system. After using the results of Pearson's correlation and collinearity analyses to screen the deeply correlated response factors to the axial thermal deformation at saddle, we further develop the regression model by the most thermal sensitive key parameters. The model is tested to assess the prediction accuracy of thermal errors.

3. Results and Conclusion

For the numerical model verification, Fig. 3 shows a comparison of the FEM predictions with the measured time histories of temperature rises at the detective point of DP1, DP2 and DP3 (the locations near bearings from the saddle, motor side and rear motor side) at 6 mpm for a high speed feed drive system. The simulated temperature rises generally agree with the measured results during thermal process. At 7200 s, the temperature rises range from 4.2─8.5 ^{o}C. The differences of the predictions with measured temperature rises are less than 1 ^{o}C at 6 mpm for a high speed feed drive system. Utilizing the first order regression model to forecast the X-axis thermal errors at the locations of MDP (motor-side detection point) and RDP (rear- motor-side detection point), Fig. 4 demonstrates a comparison of the predicted transient axial thermal deformations at (a) MDP and (b) RDP by the regression model and FEM simulated results. The computed thermal errors at MDP and RDP by the regression model are in good agreement with the FEM predictions. The corresponding discrepancies are under 2.5 μm. At 43000 s, the X-axis thermal errors at MDP and RDP are approximately 37.6 μm and -50.2 μm, showing a substantial influence of axial thermal deformation on the machining precision. To minimize the machining inaccuracy due to thermal errors, this study can transfer the real-time feedback of forecasted axial thermal deformations at MDP and RDP into the controller of a CNC machining center for potentially compensating the thermal errors up to 95.2% under present operating conditions.

Keywords: Thermal error, Feed drive system, FEM, DOE

ICNSE-0128
Water Splitting of Photoanodes Using Ball-Milled Zn_2SnO_4 Nanoparticles with CNTs

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1. Background/ Objectives and Goals

Water splitting can provide clean energy using naturally solar energy without producing greenhouse gases or utilizing fossil fuels. So we have researched in this study ball-milled Zn_2SnO_4/CNTs composites as a showing high-performance photoanodes for water splitting. It reached up to 17.2 $mA \cdot cm^{-2}$ at 0.7V of photocurrent density(PCD) with no additional catalysts or additives because of supersonic cold-spray deposition's impact. While we find no prior reports of Zn_2SnO_4/SnO_2/CNTs nanocomposites for water splitting, we improve that this combination of ball-milled Zn_2SnO_4/SnO_2 nanoparticles with CNTs is a promising candidate for high-performance solar water splitting with dramatically performance compared to previously-reported metal oxide-based photoanodes.

2. Expected Results/ Conclusion/ Contribution

Rapid deposition of Zn_2SnO_4/SnO_2/CNTs using cold spraying method provided an efficiently Mott-Schottky barrier that benefitted the swift transfer of electrons and improved charge separation in a composite photoanode. Photoanodes of Zn_2SnO_4 sample synthesized with a CNT loading of 100 mg CNT in 300 mg of Zn_2SnO_4 (1:3 CNT to metal oxide mass ratio) showed better PEC performance than those without CNT or with lower or higher CNT content. A high initial PCD of 17 $mA \cdot cm^{-2}$ was achieved at a low applied potential of 0.7 V vs. Ag/AgCl in galvanostatic scans. The PCD stabilized at a value above 6.5 mA·cm−2 at fixed voltage and remained constant. The excellent PCD suggests the immense potential of Zn_2SnO_4/SnO_2/CNT in solar water splitting. This work gives that the PEC performance can be tailored by modifying the concentration of CNT in such nanocomposite photoanode.

Keywords: metal-oxide based materials, Zn_2SnO_4, Ball-milling, Water splitting, Supersonic cold-spray deposition.

ICNSE-0167
Design of Steering Knuckle for Electric Vehicle

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1. Background/ Objectives and Goals

This article introduces the design of the chassis for five-seater electric vehicle. Refer to the specifications of commercial five-seat vehicle, we determine the design parameters including the consideration of design goals and restrictions. Firstly, the hardpoints of the chassis are built by CAD, and establish the virtual suspension model by Adams/Car. The parallel motion analysis and steering motion analysis are performed. The sensitivity analysis is performed for optimizing the wheel alignment angle to improve the design, so that the safety and function of the chassis can meet the design goals.

2. Expected Results/ Conclusion/ Contribution

This paper is mainly to establish the five-seat electric vehicle chassis and knuckle design process which contains the geometry design and static load analysis of the suspension. Using the motion simulation of the chassis to achieve the design target of suspension and steering system, the following conclusions are summarized:

This study establishes a systematic design process when developing the electric vehicle chassis. According to the parameters of the chassis, the suspension instant center and the height of the roll center, the hardpoints of the chassis is carried out. Through the analysis of the parallel and steering motion, it is confirmed that the characteristics of the suspension and the steering system conform to the design of the chassis parameters, so that the vehicle has safety and handling stability while driving.

The steering motion analysis results show that the inner wheel steering angle (δi) and the outer wheel steering angle (δo) are 37.4˚and 27.9˚, respectively, and the radius of gyration is 3.9 m, which is comparable to the commercially vehicle. The steering system has a smaller radius and meets the design goal of the steering convenience.

Keywords: Electric vehicle, parallel motion, steering

ICNSE-0168
Flow Control Using Plasma Actuator

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1. Background/ Objectives and Goals

A flow control technique using plasma actuator has become a focus of the aerodynamics field. Many researches using CFD (Computational Fluid Dynamics) to investigate the mechanism of the flow induced by a plasma actuator. Our purpose is to establish the CFD method of the analysis of plasma flow using the Townsent model in order to understand the mechanism of the flow separation control in detail.

2. Expected Results/ Conclusion/ Contribution

The main conclusions of this study are as follows:

1. The profile of the velocity vector distribution was obtained and the velocity of the center position of the vortex generated by the plasma actuator is almost correspond with a flow visualization result observed by the previous study.

2. The present numerical analysis using Townsend discharge model needs quite high computational load, however the precision of the calculated results and the reliability are excellent especially on the microsecond time scale, which can be possible to predict the flow on the macroscopic time scale.

Keywords: Fluid mechanics, Plasma actuator, Flow separation, Navier-Stokes equation, CFD

ICNSE-0171
Design Improvement on Structure Strength and Rigidity for a CNC Lathe with Parallel Turning

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1. Background/ Objectives and Goals

Because domestic and foreign machinery manufacturing industry is facing intense competition, development of the complex, parallel machining with multiple cutting-tool and intelligent machine tools has become a new trend in the global machine tool development in recent years. Simultaneous processing technique could be overlapped such that machining time of parts may be reduced and the production efficiency can be enhanced consequently. However, due to design space limitation and cost consideration, the turret is usually replaced by a multiple cutting-tool post for a small and parallel turning machine. Therefore, it is hard to cover the structure rigidity and smooth movement of feeding mechanism in this multiple cutting-tool post structure in order to satisfy the requirement of dynamic rigidity under the maximum elongation of a simultaneous turning with multiple cutting-tool.

Due to multiple cutting-tool, different processing steps may be concentrated in a same machine-tool and hence the simultaneous processing items could be overlapped. In addition, the repeated procedures and time for workpiece mounting and releasing could be reduced, and the allowance and tolerance can thus be assured due to same datum base.

Static cutting force induces static deformation and positioning error which influence the geometrical precision of the machined parts. Static rigidity is defined as the deformation per unit static cutting force while dynamic cutting force will deduce vibration waviness on machined surface. The objective of this study is to perform a design improvement for sufficient static rigidity of a lathe structure that could withstand cutting force to avoid exceeded deformation and stress concentration.

2. Expected Results/ Conclusion/ Contribution

Figure 1 shows the total displacement, effective stress and effective strain distributions under cutting load for the original lathe structure. With the modification of tool shank cross-section in consideration of cost factor at the first stage, the FEM analysis results show that the maximum total displacement, maximum equivalent stress and strain are decreased about 26%, 38%, and 35%, respectively, as shown in Figure 2. But the dynamic rigidity in contrast to static rigidity is not improved significantly. In the final design improvement (first and second stages), both the static and dynamic rigidities can be improved effectively, the maximum total displacement, maximum effective stress and strain are decreased about 30%, 38% and 35%, respectively, as shown in Figure 3. Under the maximum rotational speed of 5000rpm (83Hz) in this CNC lathe, the corresponding natural frequencies of the first-mode to third-mode were increased about 11%, 14% and 2%, respectively. Table 2 shows the comparison of static rigidity and strength of a CNC lathe with parallel turning between prototype and final design improvement

Keywords: simultaneous turning, multiple cutting-tool, static and dynamic rigidities, modal analysis

ICNSE-0130
Study on Aerodynamics and Trajectory of Guided Mortar Projectile with Canard Wings

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1. Objectives and Goals

In addition to the range considerations, precision strikes are a new trend in the development of mortar projectiles. Adding GPS or laser-guided control makes the projectiles like a small missile with the ability to accurately attacks. The difference between the traditional and the guided mortar projectiles, in addition to the warhead plus GPS or laser guidance system, the front or near the middle of the projectile is equipped with a canard or middle wing to adjust its aerodynamic characteristics. At the same time, the area and shape of the tail wing become significantly larger and different from the prototype, which will increase its lift.

Although the canard wing or the middle wing increases the drag and lift forces, the angle of the horizontal or vertical adjustable wing will control the trajectory of the projectile with the guidance signal, so that it has the function of precision strike.

In this paper, combined with computational fluid dynamics and ballistic trajectory simulation program, the guided mortar projectile with canard is simulated to adjust the angle of the canard and the influence of angle of attack on the aerodynamic characteristics of the mortar projectile.

2. Conclusion

Three models were simulated including prototype (no canard wings), model A (4 canard wings without inclination), and model B (4 canard wings with 6 tilt degrees) at an initial velocity of 0.945 Mach is shown in Fig.1. The results show that under the same Mach number and angle of attack, the addition of 4 pieces of the canard wings to the warhead increases the area of the force, and the drag and lift forces increase accordingly, with Model B being the largest. From the pressure contour, the canard wings with tilt angles will provide a rolling moment is shown in Fig.2. The simulation range of each mils of the prototype bomb is close to the measured result is shown in Fig.3, and the maximum range is up to 6,300 meters. Models A and B with canards have a range difference of about 300 meters at 800 mils, showing the aerodynamic characteristics of the adjusted tilt angle of canard wings, which can be linked the guided signal to achieve a precise attack.

Keywords: Guided mortar projectile, Canard wing, Aerodynamics, Trajectory, CFD

ICNSE-0116
Compression-Induced Deformation Behaviors of GaN Nanowires with Various Defect Concentrations by Molecular Dynamics Simulations

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Abstract

The mechanical deformation behaviors of single-crystalline GaN cylindrical nanowires with various defect concentrations under uniaxial compression are investigated by using molecular dynamics (MD) simulation based on Stillinger-Weber potential. The defect concentrations are in the range of 0.01%-5%. The results indicated that the values of Young's modulus of GaN cylindrical nanowires are decreased from 325 GPa to 168 GPa with increasing the defect concentrations from 0.01% to 5%, as well as the critical stress. In addition, the phase transformation phenomena of defective GaN nanowires are observed during the compression processes.

Keywords: Molecular dynamics simulation; GaN nanowire; Defect.

ICNSE-0119
A Comparison of Corrosion Resistance and Properties of Nd:YAG Laser Welded Zr-Cu-Ag-Al and Zr-Cu-Ni-Al Bulk Metallic Glasses

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1. Background/ Objectives and Goals

In this study, the corrosion resistance and properties of laser welded Zr-Cu-Ni-Al ($Zr_{53}Cu_{30}Ni_8Al_8$), including with and without Si additions) and Zr-Cu-Ag-Al ($Zr_{53}Cu_{30}Ag_8Al_{8)}$, including with and without Si additions) BMGs, were investigated and compared.

2. Expected Results/ Conclusion/ Contribution

The results showed that the GFAs of the BMGs (including Zr-Cu-Ni-Al and Zr-Cu-Ag-Al BMGs) were improved with the Si additions. However, after welding, that HAZ crystallization (Zr_2Cu phases) seemed unavoidable for Zr-Cu-Ni-Al BMGs (with or without Si additions) which have substantially affected their thermal and mechanical properties, and their corrosion properties.

On the other hand, no crystallization in the WFZ or HAZ of Zr-Cu-Ag-Al BMG welds (including with or without Si additions). Therefore, their thermal and mechanical properties, and corrosion resistance are not substantially different from those of the PM.

Keywords: bulk metallic glass, laser welding, corrosion resistance, thermal and mechanical properties

ICNSE-0120
Investigation into the Effects of Al and Mg Additions on the Microstructure Evolution, Properties and Corrosion Resistance of the Zn-Al-Mg Alloy

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1. Background/ Objectives and Goals

To investigate the effects of different aluminum (1.0 to 2.5wt.%) and magnesium contents (1.0 to 3.5wt.%) on the microstructure evolution and their properties, six hot-dip galvanized aluminum-magnesium (Zn-Al-Mg) alloys were designed and produced in this study.

2. Expected Results/ Conclusion/ Contribution

Based on the above results, the microstructure formation mechanism of the designed alloys was comprehensively evaluated. In additions, the relationship between the microstructure and the properties of the alloys was also fully discussed, which provides the useful information for Zn-Al-Mg alloy design.

Keywords: hot-dip galvanizing, Zn-Al-Mg alloys, microstructure, thermal and mechanical properties, corrosion resistance

ICNSE-0126
Aqueous Epitaxial Lateral Overgrowth of ZnO Layers with the Assistance of Colloidal Crystal Templates

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1. Background/ Objectives and Goals

In the past decades, epitaxial growth of ZnO layers in low temperature aqueous solution has attracted great attention, due to its cost-effective strategy for growing single-crystalline ZnO. Although aqueous lateral epitaxial growth (LEO) processes allowed to grow ZnO layers with low dislocation density under mild chemical condition, the fabrication of pre-patterned templates which was necessary for LEO processes inevitably relies on the assistance of complex patterning processes, such as photolithography or other nano-fabrication processes. In present work, facile fabrication of highly ordered, self-assembled monolayer polystyrene (PS) colloidal crystal and 2D ZnO inverse opal structures were proposed and used as templates for lateral epitaxial overgrowth of ZnO layers, respectively, without the assistance of complex patterning processes or expensive instruments.

2. Expected Results/ Conclusion/ Contribution

The highly ordered, self-assembled colloidal monolayer with hexagonal close-packed structure was utilized as template to confine the epitaxial growth of ZnO in the interstices among adjacent PS microspheres. The colloidal microspheres can be regarded as periodical masks for LEO process; hence, lateral epitaxial overgrowth of ZnO in low temperature aqueous solution was performed on the PS colloidal monolayer templates. In addition, 2D ordered porous ZnO inverse opals was also utilized as templates for LEO ZnO processes. After 24 h of LEO processing, coalescence overgrowth of ZnO resulted in the formation of continuous layers on both types of templates. Based on the preliminary results of x-ray diffraction measurement, the crystalline quality improvement and reduction of defect density in LEO-grown ZnO layers with self-assembled PS microsphere and 2D ordered porous ZnO inverse opals templates was evident, respectively. Moreover, the threading dislocation density of ZnO layer overgrown on self-assembled colloidal monolayer template was estimated to be of the order of 10^8 cm^{-2}. The characterization of microstructures of LEO-grown ZnO layers on both types of templates will be reported in the conference.

Keywords: Lateral epitaxial overgrowth, ZnO, Crystal defects, Self-assembly, Monolayer colloidal crystal

ICNSE-0127
Hydrophobic Thin Films Synthesis by Low Temperature Atmospheric Pressure Plasma Method

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Low-temperature atmospheric pressure (AP) plasma system, with its advantages of low temperature, low cost, high throughput, easy installation, in-line process capabilities, and the ability to treat substrates with large areas and various geometrical shapes, has become the most promising candidate system for replacing low-pressure plasma or wet chemical processes.

The purpose of this study was to investigate the characteristics of hydrophobic thin films synthesized by a novel and self-designed low temperature AP plasma system with a quartz tube jet-electrode. Hydrocarbon thin films were deposited on crystalline silicon, fused quartz glass, AISI 304 stainless steel and cotton substrates by low temperature atmospheric pressure (AP) plasma system under a range of operating conditions; applied voltage (7-9 KV), carrier gas flow rate (4-10slm, L min^{-1}) and reactive gas flow rate (50-200sccm, CC min^{-1}). The characteristics of hydrocarbon thin films, analyzed by scanning electron microscope (SEM), fourier transform infrared spectroscopy (FTIR), X-ray photoelectron spectroscopy (XPS) and water contact angle, shows that the deposition process is nearly close to the classical low-pressure plasma-enhanced CVD technique, resulting in films with smooth surface and good hydrophobic properties.

In this study, argon (Ar) gas with low cost performance and P-10 (90%Ar+10%CH_4) gas with less environmental detriment were used as the carrier gas and the reactive gas, respectively. A low-cost and pulsed-type alternating current (AC) generator, with a frequency of 30 KHz, was adopted for hydrocarbon thin films deposition. The results suggested that the contact angle increased with increasing voltage at the carrier gas flow rate of 6slm and reactive gas flow rate of 100sccm. The carrier gas and reactive gas existed optimal flow rates in AP plasma system to form hydrocarbon thin films with reasonable hydrophobic properties. Plasma polymerization synthesized a very smooth hydrocarbon layer which mainly consisted of CH_2 and CH_3 groups. In this study, the water contact angle of ~106^o was achieved on flat surfaces. Meanwhile, on rough surfaces such as cotton, the contact angle could reach up to 148^o.

Keywords: Hydrophobic thin film; Hydrocarbon thin film; Plasma jet; Dielectric barrier discharge; Atmospheric pressure plasma

ICNSE-0188
Preparation and Physical Properties of Adhesives Containing Silanized Graphenes

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1. Background

In the last decade, graphene, which is a two-dimensional layer of sp^2-bonded carbon atoms, came onto focus because of its fascinating properties such as superior electron mobility, extremely high thermal conductivity, extraordinary elasticity and stiffness, large surface area and high thermal stability. It is also featured with wide applications in high performance polymer adhesives, polymer composites and transparent conductive films. However, low interaction between the polymer matrix and the graphenes limits its applications. The aim of this study is to embody polymeric adhesives in which polymers and graphenes are linked by chemical bonding, enabling improved physical properties.

2. Conclusion

In this study, polymeric adhesives reinforced with silanized and non-modified graphenes were prepared and evaluated. For successful fabrication of polymeric adhesives, the specific surface modification of graphene was key issues to provide better dispersion of graphene and to obtain a higher adhesion by chemical bonding between the polymer matrix and the graphene particles. The surface hydroxyl groups of the as-received graphenes were modified via hydrolysis of 3-(trimethoxysilyl)propyl methacrylate as a surface modifier to create reactive methacrylate groups on the surface of graphene. The graphene with methacrylate-tethered surfaces was found to be effective in providing a higher thermal stability of the adhesives, due to chemical grafting to polymer matrix.

Keywords: Adhesive, graphene, silane coupling agent, silanized graphene

ICNSE-0154
Study in Medicinal Chemistry of Receptor-Acting Drugs: Their Membrane Interactivity Specific to Chemical Structures

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1. Backgrounds and Objectives

Lipids have been recognized not only as a structural component to constitute biological membranes but also as an important factor to modulate the activities of membrane-embedded proteins like receptors. In addition to receptor proteins, membrane lipid bilayers are presumed to be a common target for receptor-acting drugs because their diverse pharmacological spectra are not necessarily explained by binding to a single protein alone. We performed a study in medicinal chemistry of different classes of drugs to elucidate their structure-specific membrane interactivity. In order to obtain a novel insight into the mode of drug action, we compared the property to interact with biomimetic membranes of drugs that act on α-adrenergic, β-adrenergic, γ-aminobutyric acid type A ($GABA_A$) and *N*-methyl-D-aspartate (NMDA) receptors.

2. Results and Conclusions

DPH polarization changes indicated that all the tested drugs structure-specifically act on lipid bilayers of neuro-mimetic membranes to increase their fluidity at clinically-relevant concentrations. Compared with alkylphenolic analogs, propofol was most effective at 0.1–10 μM in fluidizing the membranes. Drug stereoisomers differently interacted with the membranes with the potency being D-medetomidine > racemic medetomidine > L-medetomidine; R(+)-propranolol > racemic propranolol > S(–)-propranolol; and S(+)-ketamine > racemic ketamine. The rank orders of membrane effects of enantiomers were consistent with those of their known pharmacological effects. With respect to medetomidine stereoisomers, D-enantiomers were discriminated from L-enantiomers by their potencies to interact with the membranes containing cholesterol, but not by those with the membranes not containing cholesterol. *n*-AS(P) polarization differences between enantiomers were larger with a decrease in "*n*". The relative membrane interactivity was reversed by replacing cholesterol with epicholesterol (3α-cholesterol). These results suggest that the superficial region of membrane lipid bilayers and the specific β-configuration of cholesterol's 3-hydroxyl group are responsible for the enantioselective interaction. The opposite configuration is considered to allow drug molecules to interact with chiral cholesterol-containing membranes enantioselectively. Different classes of drugs share the structure-specific membrane interactivity that would modify the lipid environments surrounding receptors and change the conformation of receptor proteins. The membrane interaction at least in part contributes to the pharmacological effects of receptor-acting drugs. Keywords: Receptor-acting drug, Membrane interaction, Lipid bilayer membrane, Structure-specific interactivity

ICNSE-0173

Mechanical Properties of Nano-Toughened Epoxy Resins Containing Hydroxyl- and Methoxycarbonyl-Terminated Hyper-Branched Polymers

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1. Background/ Objectives and Goals

Many efforts have been made to overcome some major disadvantages of epoxy resins such as low impact resistance and low toughness. The self-assembled nanostructures can provide improvements in fracture toughness without compromising the Tg (glass transition temperature) and tensile strength of cured epoxy resins. Hyper-branched polymers are highly branched macromolecules with three-dimensional dendritic architecture. In this paper, we investigated the effect of nano-sized HBP particles, which possess hydroxyl or carbonyl terminal groups, on the mechanical properties of cured epoxy/HBP blends such as tensile strength, elongation and fracture toughness calculated from 3-point bending test. Hydroxyl terminal groups are intended to be involved in crosslinking reactions of epoxy resins.

2. Expected Results/ Conclusion/ Contribution

The cured neat epoxy exhibits a clean-cut fracture surface and is a substantial evidence of typical brittle fracture. As the loading % of HBP in epoxy/HBP blends increases, the fractured surfaces of cured blends gradually became rough and irregular compared to those of cured neat epoxy. The density of stripes on the fractured surfaces increased with an increase of HBP contents in blends. This mechanism can be explained by the "in situ" reinforcement and reinforcement mechanism. HBP's non-cross-linkable hyper-branched structure forms intramolecular cavities that distort and form stripes upon impacting. Thus, the amount of stripes increases with increasing hyper-branched structures, which can significantly improve the toughness of cured epoxy/HBP blends.

Both HBP1 and HBP2 showed the tendency to increase tensile strength of cured epoxy/HBP blends with increasing molecular weight of HBP. In general, the incorporation of a certain amount of nano-scaled soft segment (flexible group of nano-sized HBP) into the rigid epoxy resin reduces the residual internal stress, which leads to the improvement of strength. Furthermore, lots of hydrogen bonds (from HBP1) contribute to improving the tensile strength of the cured system. However, at higher loading % of HBPs, the flexible polymer chains in the HBP molecular structure can reduce the rigidity of epoxy matrix in macro-scale, which leads to a decrease in tensile strength. In addition, according to the 3-point bending test results, fracture tougness of cured epoxy/HBP blends significantly increased with increasing molecular weight of both HBP1 and HBP2.

Keywords: hyper-branched polymer, epoxy resins, toughness, flexibility

ICNSE-0196
Repeated Biodiesel Production via One-step Direct Process Using a Paper-cartridge Containing Solid Catalysts Derived from Egg Shells

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3. Background

Unlike homogenous chemical catalysts, heterogeneous solid catalysts are known to be reused in biodiesel production, decreasing catalyst requirement and wastewater discharge substantially. However, they can be hardly reused in the one-step direct process (OSDP) although this process has many advantages over the conventional two-step process. In this study, we proposed a novel version of OSDP employing a paper-cartridge containing solid catalysts for repeated biodiesel production, and the reaction conditions were optimized with a statistical tool.

4. Methods

Waste coffee grounds (WCGs) and waste egg shells (WESs) were used as feedstock of biodiesel and solid catalysts, respectively. Biodiesel was produced via OSDP where lipid extraction from intact biomass and transesterification of the lipids occurs simultaneously in a reactor. Factorial design and analysis of data were conducted by Minitab 18.

5. Conclusions

The lipid content of WCGs used was 13.1%. The optimal calcination condition of WESs was 700℃ and 3 h, and calcium oxide occupied 97.2% of the solid catalyst. The mixture of methanol and n-hexane was the best combination for the OSDP. Catalyst concentration was the most influential factor, and unlike homogenous catalysts, temperature and agitation speed were also critical factors. Under the optimal conditions, 85.1% and 8.2% of biodiesel conversion and yield were obtained, comparable to those using homogenous catalysts. Finally, repeated batch operation was conducted. As soon as a batch operation was finished, the paper-cartridge was simply removed from a reactor and introduced to another reactor containing fresh WCGs, methanol and n-hexane. Until 7 rounds of reuse, biodiesel was stably produced without noticeable decrease of biodiesel conversion and yield.

Keywords: biodiesel, solid catalyst, paper-cartridge, reuse, batch operation