ICIET 2021
2021 9th International Conference on Information and Education Technology

ICKE 2021
2021 7th International Conference on Knowledge Engineering

Okayama, Japan | March 27-29, 2021
Welcome Address

Dear All,

Welcome to attend the 2021 9th International Conference on Information and Education Technology (ICIET 2021) and 2021 7th International Conference on Knowledge Engineering (ICKE 2021).

This year, the world is fighting against the outbreak of COVID-19. There is no doubt that the safety and well-being of our participants is of paramount importance to the conference organizing committee. In consideration of the health and safety of everyone, pervasive travel restrictions as well as most author's appeals, we had to make a tough decision and convert ICIET 2021 & ICKE 2021 into an onsite conference blended with virtual mode. We were looking forward to seeing everyone in Okayama, but we are excited for the opportunity to innovate by creating an engaging virtual conference that will be rewarding for both presenters and attendees.

The objective of the conference is to provide a premium platform to bring together researchers, scientists, engineers, academics and graduate students to share up-to-date research results. We are confident that during this time you will get the theoretical grounding, practical knowledge, and personal contacts that will help you build a long term, profitable and sustainable communication among researchers and practitioners in the related scientific areas.

We would like to express our gratitude to the distinguished speakers: Prof. Hai Jin (China), Prof. Akihiko Sugiyama (Japan), Prof. Yoshiaki Kakuda (Japan), Prof. Masahito Hirakawa (Japan), and other distinguished scholars for sharing their deep insights on future challenges and trends in the conferences. Special thanks to our committee members, all the reviewers, session chairs, presenters and listener attendees, researchers and students who participate in the conference. Hope you could enjoy the conference and have an unforgettable experience!

Let us also look forward to meeting each other in a physically face-to-face conference 2022.

With Warmest Regards,
Conference Organizing Committee
ICIET 2021 & ICKE 2021
Agenda Overview

01. Zoom Guidance & Test Timetable p.4

02. Meeting Agenda of March 28-29 p.7

03. Introduction of Keynote Speakers p.10

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05. Conference Committee of ICIET 2021&ICKE 2021 p.44

06. Conference Venue in Okayama, Japan p.46
01 Zoom Guidance
UTC/GMT+9 | March 27-29

Essential Information
Please make sure you are aware of the following details before the conference.

Meeting ID
ML: 672 9642 2454 (Room A)
MI: 679 3127 2224 (Room B)
Room will be open 30 mins in advance.

Testing Time
Check details of the testing time on Saturday, March 27, 2021, and please make sure to show up on time.

Name Setting

Time Zone
UTC/GMT+9:00
Time in Japan
Please be aware of time difference between this and your region/country.

Keynote Speaker: Keynote-Name
Committee: Position-Name
Author: Paper ID-Name
Listener: Listener-Name
Each meeting has a unique 9, 10, or 11-digit number called a meeting ID that will be required to join a Zoom meeting.

Audio muted and video off (both indicated by a red slash).

Click to open the Participants box. This will allow you to “Raise Hand”.

To share screen or contents.

Click to open the Chat box. This will allow you to chat with Hosts and Participants.

Download URL: https://zoom.us/download

Assistant 1
For any questions on the meeting day, you can text privately to “Assistant 1” for help.
# Zoom Test Timetable

**Room A: 672 9642 2454**

Meeting Link: [https://zoom.com.cn/j/67296422454](https://zoom.com.cn/j/67296422454)

<table>
<thead>
<tr>
<th>Time</th>
<th>Room A</th>
<th>Meeting Link</th>
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<tbody>
<tr>
<td>09:30-10:20</td>
<td>C007, C010</td>
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<tr>
<td>10:20-11:10</td>
<td>C003, C103</td>
<td></td>
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<tr>
<td>11:10-12:00</td>
<td>C109, C026</td>
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<tr>
<td>13:30-14:20</td>
<td>C099, C054</td>
<td>C015</td>
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<tr>
<td>14:20-15:10</td>
<td>C1016, C104</td>
<td>C003, C059</td>
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<tr>
<td>15:10-16:00</td>
<td>C116, C112</td>
<td>C014, C004</td>
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<tr>
<td>16:00-16:50</td>
<td>C120, C066</td>
<td>C096</td>
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<tr>
<td>16:50-17:40</td>
<td>C108, C075</td>
<td>C002, C008</td>
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<tr>
<td>17:40-18:40</td>
<td>C009, C068</td>
<td>C066</td>
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</tbody>
</table>

**Note**

a) **17:40-18:40** alternative time for participants who are unavailable at allocated time.

b) We will test screen sharing, audio, video, and how to “Raise Hand” in Zoom. Please get your presentation slides and computer equipment prepared beforehand.

c) All the presenters are required to join the Zoom test on March 27, to ensure the next two-day meeting runs smoothly.
<table>
<thead>
<tr>
<th>TIME</th>
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<tbody>
<tr>
<td></td>
<td>Each talk including 3-5min for Q&amp;A</td>
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<tr>
<td>09:00-09:10</td>
<td><strong>Opening Remarks</strong></td>
<td>Conference Local Chair: Prof. Nobuo Funabiki</td>
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<td></td>
<td>Okayama University, Japan</td>
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<tr>
<td>09:10-09:55</td>
<td><strong>Keynote Speech I</strong></td>
<td>Prof. Hai Jin</td>
</tr>
<tr>
<td></td>
<td>Towards the Practical Blockchain System: Challenges and Practices</td>
<td>Fellow of IEEE and CCF, and Life Member of ACM, Huazhong University of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Science and Technology, China</td>
</tr>
<tr>
<td>09:55-10:40</td>
<td><strong>Keynote Speech II</strong></td>
<td>Prof. Akihiko Sugiyama</td>
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<tr>
<td></td>
<td>Be Kind to the Reviewers and They will Reward You</td>
<td>Fellow of IEEE and IEICE, Yahoo Japan Corporation, Japan</td>
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<tr>
<td>10:40-11:00</td>
<td><strong>Group Photo / Break Time</strong></td>
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<tr>
<td>11:00-11:45</td>
<td><strong>Keynote Speech III</strong></td>
<td>Prof. Yoshiaki Kakuda</td>
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<tr>
<td></td>
<td>University Education Based on Research Activities and Academic Activities</td>
<td>Member of IEEE (U.S.A.), IEICE (Japan) and IPSJ (Japan), Hiroshima City</td>
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<tr>
<td></td>
<td>--- Global and Innovative Human Resource Development ---</td>
<td>University, Japan</td>
</tr>
<tr>
<td>11:45-12:20</td>
<td><strong>Plenary Speech I</strong></td>
<td>Prof. Masahito Hirakawa</td>
</tr>
<tr>
<td></td>
<td>Computer should make someone happy!</td>
<td>Shimane University, Japan</td>
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<tr>
<td>12:20-13:30</td>
<td><strong>Break Time</strong></td>
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<tr>
<td>13:30-15:45</td>
<td>[Workshop at Okayama, Japan], Onsite Presentation</td>
<td>C094, C086, C098, C035, C045, C058, C093, C0004, C0005</td>
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<td></td>
<td>Venue: MEETING ROOM KAKUMEI (鶴鳴の間), Okayama Koraku Hotel</td>
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<tr>
<td>16:15-18:45</td>
<td>Online Session 2: Intelligent Education System and Education Informatization</td>
<td>C010, C017, C022, C063, C089, C1001, C114, C084, C060, C061</td>
</tr>
<tr>
<td>13:30-15:45</td>
<td>Online Session 1: Online Learning and Assessment</td>
<td>C007, C108, C039, C041, C056, C069, C097, C032, C073</td>
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<td></td>
<td><strong>Break Time to 16:15</strong></td>
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<tr>
<td>16:15-18:30</td>
<td>Online Session 3: Blended Teaching and Game-Based Learning</td>
<td>C003, C020, C029, C075, C115, C072, C037, C040, C031</td>
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**Room A: 672 9642 2454** Meeting Link: [https://zoom.com.cn/j/67296422454](https://zoom.com.cn/j/67296422454)

**Room B: 679 3127 2224** Meeting Link: [https://zoom.com.cn/j/67931272224](https://zoom.com.cn/j/67931272224)
# 02 Meeting Agenda

**UTC/GMT+9 | Monday, March 29**

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<tr>
<th>TIME</th>
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<td><strong>Room A: 672 9642 2454</strong> Meeting Link: <a href="https://zoom.com.cn/j/67296422454">https://zoom.com.cn/j/67296422454</a></td>
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<tr>
<td>09:30-12:15</td>
<td><strong>Online Session 4:</strong> Artificial Intelligence in Education and Educational Information Technology</td>
<td>C103, C1016, C116, C002, C009, C043, C048-A, C067, C077, C095-A, C107</td>
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<tr>
<td>Break Time to 13:30</td>
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<tr>
<td>13:30-15:45</td>
<td><strong>Online Session 6:</strong> Information Communication Technology and Computer Application</td>
<td>C026, C0003, C014, C068, C070, C078, C088, C033, C071</td>
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<tr>
<td>Break Time to 16:15</td>
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<tr>
<td>16:15-18:15</td>
<td><strong>Online Session 8:</strong> Subject Education and Talent Cultivation</td>
<td>C015, C036, C042, C096, C105, C110, C111, C083</td>
</tr>
<tr>
<td><strong>Room B: 679 3127 2224</strong> Meeting Link: <a href="https://zoom.com.cn/j/67931272224">https://zoom.com.cn/j/67931272224</a></td>
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<tr>
<td>09:30-12:15</td>
<td><strong>Online Session 5:</strong> Higher Education and Educational Research</td>
<td>C099, C104, C112, C008, C024, C034, C044, C081, C118, C120, C065</td>
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<tr>
<td>Break Time to 13:30</td>
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<tr>
<td>13:30-16:00</td>
<td><strong>Online Session 7:</strong> Digital Society and Knowledge Engineering</td>
<td>C054, C059, C004, C066, C030, C1012, C091, C0002, C100, C102</td>
</tr>
</tbody>
</table>

**Note:** In parallel sessions, each presenter will have 15 minutes to give an online presentation, including 2-3 minutes of Q&A. Please join the meeting room at least 10 minutes before the meeting begins.
Speech Title: Towards the Practical Blockchain System: Challenges and Practices

Abstract: Blockchain is the fascinating distributed ledger technology, which holds out the promise of disintermediation, transparency, and openness. An increasing number of businesses, academics and even governments are starting to view blockchain systems as the cornerstone of trust the Web 3.0 era (next generation value Internet). This presentation will first trace the source and the current development status of blockchain systems in various application areas. Secondly, a roadmap of the major theoretical and practical challenging issues faced by these blockchain systems will be laid out. Finally, I will give a glimpse of harnessing the super-abundant opportunities of blockchain systems in the future landscape.

Bio: Hai Jin received the PhD degree in computer engineering from Huazhong University of Science and Technology, in 1994. He is a Cheung Kung scholars chair professor of computer science and engineering with Huazhong University of Science and Technology. In 1996, he was awarded a German Academic Exchange Service fellowship to visit the Technical University of Chemnitz in Germany. He worked with The University of Hong Kong between 1998 and 2000, and as a visiting scholar with the University of Southern California between 1999 and 2000. His research interests include computer architecture, virtualization technology, cluster computing and cloud computing, peer-to-peer computing, network storage, and network security. He was awarded Excellent Youth Award from the National Science Foundation of China in 2001. He is the chief scientist of ChinaGrid, the largest grid computing project in China, and the chief scientists of National 973 Basic Research Program Project of Virtualization Technology of Computing System, and Cloud Security. He has co-authored 22 books and published more than 700 research papers. He is a fellow IEEE, CCF, and a life member of the ACM.
Speech Title: Be Kind to the Reviewers and Rhey will Reward You

Abstract: This talk presents how one can be kind to the reviewers to have a paper accepted. It is first clarified from typical behaviors of reviewers that they try to find novelty, originality, and convincing evaluation results. In order for the author to identify the novelty and originality, a three point analysis, for which templates are provided, to clarify the value, the trick, and the solved problem is introduced. Novelty is based on the value and originality comes from the trick to enable the value. The solved problem is opposite to the value which directly relates to a user benefit. The identified value, trick, and the problem instantly lead you to a good paper title and the topic sentence of the abstract which appears at its top. The entire paper story or logical structure can be easily established using slides for presentation before drafting the manuscript. For convincing evaluation results, an introduction to figure design is finally touched. The author will never get lost by following the steps presented in this unique talk.

Bio: Akihiko Sugiyama (a.k.a. Ken Sugiyama), affiliated with Yahoo! JAPAN Research after 38 years at NEC Corporation, has been engaged in a wide variety of research projects in signal processing such as audio coding and interference/noise control. His team in NEC developed the Silicon Audio, the world’s first all solid-state audio player and a precursor of iPod, in 1994. He served as the Chair of Audio and Acoustic Signal Processing Technical Committee, IEEE Signal Processing Society (SPS) [2011-2012], as associate editors for several journals such as IEEE Trans. Signal Processing [1994-1996], as the Secretary and a Member at Large to the Conference Board of SPS [2010-2011], as a member of the Awards Board of SPS [2015-2017], as the Chair of Japan Chapter of SPS [2010-2011], and serves as a member of IEEE Fellow Committee. He was a Technical Program Chair for ICASSP2012. He has contributed to 17 chapters of books and is the inventor of 217 registered patents with more pending applications in the field of signal processing in Japan and overseas. He received 19 awards such as the 2002 IEICE Best Paper Award, the 2006 and the 2018 IEICE Achievement Award, and the 2013 Ichimura Industry Award. He has delivered 141 invited talks in 74 cities of 27 countries. He is Fellow of IEEE and IEICE, a Distinguished Industry Speaker for IEEE SPS [2020-2021], and a past Distinguished Lecturer for IEEE SPS [2014-2015] and for IEEE CES (Consumer Electronics Society) [2017-2018].
Speech Title: University Education Based on Research Activities and Academic Activities
--- Global and Innovative Human Resource Development ---

Abstract: The unique elements for university education are research activities and academic activities. This speech will introduce the following my experiences on: (1) International exchange through research activities and academic activities, (2) IEEE Hiroshima Section Student Symposium as an example of university education based on academic activities, (3) Field experiments on two kinds of systems of mobile ad hoc networks, that is, Hiroshima City Children Tracking System and World-of-Mouth Information Propagation System as two examples of university education based on research activities. On the basis of the above experiences, this speech will discuss global and innovative human resource development, and present a new education program for innovative human resource development, which will start from April, 2021 in Hiroshima City University.

Bio: Dr. Kakuda received the B.E., M.Sc., and Ph.D. degrees from Hiroshima University, Japan, in 1978, 1980 and 1983, respectively. From 1983 to 1991, he was with Research and Development Laboratories, Kokusai Denshin Denwa Co., Ltd. (KDD, currently KDDI). He joined Osaka University from 1991 to 1998 as an Associate Professor. He is currently a Professor in the Graduate School of Information Sciences, Hiroshima City University, since 1998. He served as a Dean of the Graduate School of Information Sciences and Faculty of Information Sciences, Hiroshima City University, from 2016 to 2020. He founded the International Workshop on Assurance in Distributed Systems and Networks (ADSN) in 2002 and has organized ADSN from 2002 to 2019 every year. He proposed a new concept, “assurance network” at the Keynote Speech of the Second International Symposium on Multidisciplinary Emerging Networks and Systems (MENS) in 2010. He served as a General Chair, a Program Chair and a Program Committee member for various International Conferences, Symposia and Workshops. His current research interests include network software engineering and mobile ad hoc networks. He is a member of IEEE (U.S.A.), IEICE (Japan) and IPSJ (Japan).
Speech Title: Computer should make someone happy!

Abstract: Thanks to the ubiquity of computer equipment, it becomes possible to acquire people's behavior and infer what they are going to do. The more we know about a person, the more we can provide a comfortable service to him/her. Advances in AI technology has been accelerating it. But, what will happen after this movement? Computers will know you better than you know yourself, resulting that the day may come when our task is just to press the “Yes” button. Are we happy with such situation? Computer should be the machine that makes our lives happy. Computer engineers have responsibility of creating a sound future.

Bio: Dr. Masahito Hirakawa graduated from Hiroshima Institute of Technology, Japan in 1979, and received his M.E. and D.E. degrees from Hiroshima University, Japan in 1981 and 1984, respectively. He became a Research Associate of Information Systems Laboratory (ISL) at Hiroshima University on completion of his doctoral study, and an Associate Professor in 1991. He has been a professor at Shimane University since 2002. From 2004 through 2007, he was a director of the General Information Processing Center of Shimane University. He was a director of the Shimane University Library and a council member of the university from 2007 to 2011.

He joined the Information Systems Research Project at the Computer Science Department of the University of Illinois at Chicago Circle in summer of 1982. He was a visiting researcher at FOA (National Defense Research Institute), Linkoping, Sweden, in summer of 1990. From September 1999 to March 2000, he visited the VIP (Visual Information Processing) laboratory at University of Florence, as a Monbusho (Japanese Ministry of Education) research scholar....

More information, please chick: [http://www.iciet.org/plenary.html](http://www.iciet.org/plenary.html)
04 Parallel Sessions - Introduction

01 No-Show Policy
A paper not presented or presented by a non-author without prior written approval by the Conference TPC will be removed from the final conference proceedings. No refund will be approved to authors of those papers.

02 Duration of Presentation
A 15-minute report online, 2-3 min for question & answer is included. Presenter’s certificate will be sent out by email, normally a week after the meeting.

03 Report File
One out of three
i. PowerPoint file
ii. PDF file
iii. Pre-recorded video
Please join the meeting at least 10min before your session starts and get your presentation prepared beforehand.

04 “Best Presentation” Award
It will be selected from each session by the session chair. Please visit our official website a week after the meeting for the updates. The presenter will receive a certificate of “Best Presentation”.

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<thead>
<tr>
<th>Time &amp; ID</th>
<th>Presentation</th>
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<tbody>
<tr>
<td>C094</td>
<td>13:30-13:45</td>
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<td></td>
<td>In-advance Deployment of Shared Content Replicas over Hybrid Peer-to-Peer Network Using Linear Popularity Prediction Shinji Sugawara, Chiba Institute of Technology, Japan</td>
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<td></td>
<td>Abstract—This paper proposes an efficient content deployment method over a Peer-to-Peer network in advance, before issuing content retrieval requests from the users, according to the users' location and whose content preferences. In that situation, the proposed method predicts the temporal alteration of each content items' popularity using simple linear approximation and deploys each item to its appropriate place. As a result, the method can be expected that the network load, content loss, and storage cost required for redundant replica deployment will be reduced. On top of that, the proposal is evaluated by computer simulations from the viewpoint of those three costs mentioned above, and from the results, the effectiveness of the proposed method is finally discussed.</td>
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<td>C086</td>
<td>13:45-14:00</td>
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<td>Accuracy Improvement by Training Data Selection in Automatic Test Cases Generation Method Kiyoshi Ueda, Nihon University, Japan</td>
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<td>Abstract—The development and maintenance costs of the high-quality communication software tend to remain high because the telephone services must be reliable and secure as they are valuable social infrastructure. Previous studies formulated the description style of the requirements specification in a form with which a machine could deal and had customers use this style to describe the requirements specification. However, no method has been developed to generate test cases from natural language documents. The method for automatically generating the test cases of system testing and acceptance testing from the requirement specification is studied. We propose training data selection quality improvement technique in the cosine similarity with the test data. We confirmed the effectiveness of the methods. We also proposed second method adding the application judgment technique by the standard deviation value. We confirmed usefulness of the proposed methods that obtain the maximum value of accuracy with less training data.</td>
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<td>C098</td>
<td>14:00-14:15</td>
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<td>A Study on Development of Effective Training Procedures for First Year Training Course Kazuyuki Kojima, Shonan Institute of Technology, Japan</td>
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<td>Abstract—The purpose of this study is to develop an effective teaching material for the practical training of disassembling and assembling pocket bikes in the course of &quot;Mechanical Engineering Literacy B&quot; for first-year students in the Department of Mechanical Engineering, and to discuss points for improvement based on the results of a questionnaire survey. In this paper, we discuss the questionnaire method, the interpretation of the results, and the points of the three improvements.</td>
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<td>C035</td>
<td>14:15-14:30</td>
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| Effect of Robot Position Control Using Force Information: Human versus Robot with Force Sensor  
*Yutaka Ishibashi*, Nagoya Institute of Technology, Japan |
| Abstract—This paper investigates the effect of the robot position control using force information, which finely adjusts the robot position to reduce the force applied to an object, for cooperative work between two remote robot systems with force feedback by experiment. As cooperative work in our experiment, an object is carried together by using the two robots each of which has a force sensor without communicating with each other. We also make a comparison between the case in which the two robots work together and the case in which one robot works with a human instead of the other robot. We further examine the influence of the movement velocity of the object on the control. |
| C045      | 14:30-14:45  |
| A Proposal of Static Job Scheduling Algorithm Considering CPU Core Utilization for User-PC Computing System  
*Ariel Kamoyedji*, Okayama University, Japan |
| Abstract—The User-PC computing system (UPC) has been devised to provide a very low-cost distributed computing platform to members of a group, using idling resources of their personal computers (PCs). Based on the master-worker model, the master PC accepts jobs from users and assigns them to available worker PCs. Unfortunately, an efficient job assignment method has not been implemented yet. In this paper, we propose a static job scheduling algorithm considering the CPU core utilization, for the UPC system. Given a set of independent jobs, this two-stage heuristic algorithm finds an assigned worker for each job in order to minimize the makespan. To efficiently utilize CPU cores in worker PCs, the first stage groups workers and jobs into several classes according to the number of available cores or threads. It then greedily sets up job-worker assignments in each class independently. The second stage improves the assignments with a local search method by randomly moving job-worker assignments between different classes. For evaluation, we conducted experiments using six worker PCs and up to 27 jobs. Our algorithm could reduce the makespan by up to 60% compared to three baseline scheduling algorithms. However, its performance gradually decreases as the number of jobs significantly increases. |
| C058      | 14:45-15:00  |
| An Implementation of Multiple Activities Topic for Learning Intent and Fragment in Android Programming Learning Assistance System  
*Yan Watequlis Syaifudin*, Okayama University, Japan |
<p>| Abstract—Android application programming has become one of the most important subjects that students should learn in professional schools and universities in IT departments. To provide a self-learning platform for the Android programming course, we developed an Android Programming Learning Assistance System (APLAS). The learning materials in APLAS consist of four stages where each stage has several topics. In this paper, we implement Multiple Activities materials for learning Intent and Fragment as the third topic in the Interactive Application stage and evaluate them through applications to 50 university students in an IT department in Indonesia. The results show that all the students correctly solved the assignments and gave positive comments on them, which confirmed the effectiveness of our proposal. |</p>
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| **C0005** 15:30-15:45 | Applicability of Generative Adversarial Networks in Fluorescent Cell Images Augmentation  
Asaad M. Ànäam, Okayama University, Japan  
  
Abstract—The Indirect Immunofluorescence (IIF) on Human Epithelial (HEp-2) cell-substrate is considered the hallmark protocol of the Anti-Nuclear Antibodies (ANAs) test which is the primary serological diagnosis screening test of the autoimmune diseases. Due to the low throughput and high variability of the manual protocol of this test, there are ongoing efforts to develop efficient Computer-Aided Diagnosis systems (CADs). Recently, many Convolutional Neural Networks (CNNs) based approaches achieved promising results in the task of classifying HEp-2 cell patterns. However, the lack of labeled large datasets is one of the main challenges in this task. To address this issue, this work studies in detail using different types of the recently developed generative adversarial networks (GANs) algorithms to synthesize Hep-2 cell images for augmentation purposes. Quantitative GANs’ metrics were used to evaluate the different GANs’ performances and assess their capabilities to approximate the real data distribution. Our results demonstrated that despite generating images with reasonable visual similarity with the real images, GANs tend to drop modes of the real data distribution which found to be of a crucial impact for their performances as a data augmentation method. |
| **C0004** 15:15-15:30 | Analysis on Factors Related to the Subjective Productivity of Working from Home  
Daisuke NISHOJI, Tokyo Institute of Technology, Japan  
  
Abstract—Telework has hardly taken root in Japan. However, the Japanese government’s declaration of a state of emergency in light of COVID-19 has forced many workers into teleworking. Several surveys have examined the “productivity” of such workers, but results have varied. This paper examines and analyzes 567 samples of workers who teleworked during the state of emergency, as well as investigates the situation and related factors of “subjective productivity,” which is found through self-evaluation by workers regarding the productivity of teleworking. Age, being with or without children, and readiness for working from home were factors found to be related to subjective productivity. The frequency of teleworking after the state of emergency was lifted, as well as desire and possibility, were found to be related to subjective productivity. |
| **C093** 15:00-15:15 | A Code Completion Problem in C Programming Learning Assistant System  
Htoo Htoo Sandi Kyaw, Okayama University, Japan  
  
Abstract—C programming has been the fundamental subject to a lot of university students for studying programming languages, algorithms, and computer architecture. Currently, we are developing C programming learning assistant system (CPLAS) for its self-study by extending our works of JPLAS for Java programming. JPLAS provides the code completion problem (CCP) to offer practical programming exercises. A CCP instance asks the completion of the given source code by filling in the missing elements. The correctness of the answer is marked through string matching by comparing each answer statement with the correct one. In this paper, we present the CCP by extending our works of the element fill-in-blank problem (EFP) in CPLAS. For evaluations, we generated 10 CCP instances and assigned them to 54 undergraduate students in Myanmar and Japan. Their solution results show that the CCP instances are generally suitable for C programming study by novice students, but those on pointer need improvements for better solutions. |
### Online Session 1: Online Learning and Assessment

**Session Chair: TBA**  
**Time: 13:30-15:45 | Room B: 679 3127 2224 | Meeting Link: https://zoom.com.cn/j/67931272224**

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| C007 13:30-13:45 | Design of EFL Learning Videos: Strategies and Verification from Multiple Perspectives  
*Jun Ge*, National University of Defense Technology, China  
Abstract—In a time when information and communication technologies are widely applied for educational purposes, developing high-quality online learning videos has become a crucial work to successfully run a Massive Open Online Course (MOOC). This study takes MOOC videos developed by the National University of Defense Technology as a case to investigate the design of learning videos for English as a Foreign Language. The paper generalizes the design strategies embodied in the development process of the MOOC videos from the perspectives of content, cognitive load, visual attention, and social presence. A quasi-experiment study was conducted to examine the efficacy of the videos. Data were collected through a questionnaire survey and interview. The results show that the videos could provide more favorable content, help enhance perceived social presence and better direct visual attention, but might not lower cognitive load. Implications are further discussed for better learning outcomes with the videos. |
| C108 13:45-14:00 | Investigation and Analysis of Online Teaching in Higher Vocational Colleges during the COVID-19 Epidemic  
*Juan Ang*, Maanshan Teachers’ College, China  
Abstract—Affected by the COVID-19 epidemic in 2020, in response to the call of the Ministry of Education to “suspension of class without suspension of school”, schools at all levels and types in China had launched online teaching. This paper takes 210 teachers and 3952 students in a local higher vocational college in Anhui Province as the research objects, and investigates from two perspectives of online teaching and learning. The results show that there were some problems in online teaching, such as network jam, interference with home learning and lack of learning monitoring, however, timely online training, abundant online resources, convenient live broadcast tools and stable teaching platform had ensured online teaching was carried out in an orderly manner. The diverse content of online activities, interactions and all-round procedural evaluation had shown initial results. Teachers and students were highly satisfied with online teaching. In the post-epidemic era, online teaching will be integrated with offline teaching to become “normalized”. Therefore, this research proposes that it is necessary to make more in-depth exploration and efforts in strengthening network technology support and guarantee, improving teachers’ and students’ information literacy, enhancing teachers’ informatization resources construction ability and teaching design ability, and so on. |
| C039 14:00-14:15 | Analyzing College Students’ Social Cognitive Construction and Emotion in Different Types of Online Synchronous Collaborations of a Creative Task  
*Dongmin Chen*, Central China Normal University, China  
Abstract—Cognition and emotion in online collaboration play an important role in achieving high-quality collaboration performance. Especially in the online synchronous collaborative environment, the limited time and place require higher language instantaneousness and flexibility of thinking, which brings great challenges to students’ high cognitive behavior and emotional experience. However, few empirical studies have focused on the cognition and emotion of students in online synchronous collaboration. Therefore, a quasi-experimental study was conducted based on a creative synchronous collaboration task to explore the effects, social knowledge construction and emotional experience of Multi-Input and One-Output(MIOO) collaboration and Multi-Input and Multi-Output(MIMO) collaboration. The findings indicated that the MIMO collaboration groups performed better than the MIOO collaboration groups in creative achievements, but were more affected by technology. Besides, the MIOO collaboration groups had a higher degree of social knowledge construction and more positive emotional experiences. |
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| C041 14:15-14:30 | The Impact of Online Learners' Social Interaction on Learning Achievement Based on Social Network Analysis  
Ting Xu, South China Normal University, China  
Abstract—This study investigated the problems of low course completion rate, rarely participation, and insufficient interaction in online learning community through literature analysis. Then analyzing social interaction characteristics of online learners through Social Network Analysis (SNA) methods. This study analyzed 97 students who participated in the "Organizational Behavior" online course and 2,423 posts chosen in the discussion forum from the Massive Open Online Course (MOOC) online platform, exploring the influence of their social interaction network characteristics on learning achievement. As a results, there is a correlation between social interaction network characteristics and performance. Teachers were encouraged to use the location of the network center to optimize topic proposal and interactive design, and discuss the different role and impacts of teachers in social interactive networks. |
| C056 14:30-14:45 | Research on the Promotion of Students’ Online Learning Engagement Based on Association Cluster Analysis  
Liang Yuwen, Shanxi University of Finance and Economics, China  
Abstract—By comparing the effect of online and offline class of students of all ages in Linfen City and their satisfaction with online class, this paper finds that the learning engagement of students in the learning process has a great impact on the learning effect. Generally, learning engagement is divided into behavioral engagement, cognitive engagement and emotional engagement. This paper designs a questionnaire from these three aspects to analyze the learning behavior of students in Linfen City, and discusses the relationship between learning engagement and learning effect through association analysis and clustering method. The analysis results show that the more positive correlation on learning effect. Although emotional engagement has a positive impact on learning effect, it is not completely positive correlation with learning effect. Finally, through association analysis and density analysis, this paper discusses the main factors affecting behavior engagement. Teachers and parents can give students targeted attention according to the founded main factors, so as to help students improve their online learning engagement. |
| C069 14:45-15:00 | Models of Adaptive Learning System in MOOC: A Systematic Literature Review  
Dwi Listriana Kusumastuti, Bina Nusantara University, Indonesia  
Abstract—In the current era, many sectors have changed, including the education sector. With the support of the development of technology and information, it has resulted in changes in business processes in the world of education. Switch from traditional learning models to electronic learning models. Providing learning with the same learning method mechanism for all individuals will reduce the individual's right to receive learning. So that the electronic learning model has shifted to a personal and open learning system, namely learning with the Massive Open Online Course (MOOC). Based on these conditions, appropriate models and techniques are needed to achieve student-oriented learning. The purpose of this study is to identify and classify general criteria for adaptive learning system models in the MOOC system. The method used in this research is through literature studies on papers published in the last five years (2016-2020). The results showed a general model that is often used as a basis for developing adaptive learning, so that it can be used for further research and development. |
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| **C097** 15:00-15:15 | Online Instruction and Offline Classroom Teaching: A Study on Parallel Education Systems  
**Jing Chang**, South China Business College Guangdong University of Foreign Studies, Institute of Intelligent Information Processing, China  
Abstract—The outbreak of the COVID-19 pandemic has brought online education under the spotlight. Universities have resorted to online education practices, including online instruction and learning, to achieve outcomes that are essentially comparable with offline classroom teaching. In this paper, an analysis was conducted to identify the impact of parallel online education on instructors and students, and relevant aspects were discussed. This study was aimed at obtaining a deeper understanding of the nature of online education so as to facilitate its long-term growth. This paper suggests that instructors should consider the particularity of online education when completing their pre-class, in-class and after-class instructional design, with a special focus on enhancing the learning outcomes of students. |
| **C032** 15:15-15:30 | Linking Formative and Summative Performance in an online L2 module: Insights from Learning Analytics  
**Shamila Naidoo**, University of KwaZulu-Natal, South Africa  
Abstract—The Covid-19 pandemic created a unique teaching and learning situation for South African universities with a sudden migration to the online platform. This exploratory study reports on Basic IsiZulu, a compulsory second-language module at the University of KwaZulu-Natal, South Africa. The focus is on student summative performance. Extracting data from the Moodle Activity logs the study investigates the impact of four variables, academic discipline, age, gender and year of study on formative engagement and summative performance. Findings from the learning analytics data indicate that higher formative assessment scores have a small but highly significant impact on the module’s final summative assessment scores. Correlation tests indicate a weak relationship between academic discipline, age and year of study with engagement in formative activity, and the gender variable indicates that male students display lower levels of engagement with formative activities. |
| **C073** 15:30-15:45 | IT Teaching Labs: Innovations in a Distance Education Era  
**Mohammad Amin Kuhaili**, Zayed University, United Arab Emirates  
Abstract—Computer laboratories, or simply labs, are crucial in many fields including Information Technologies (IT), Management Information Systems (MIS), Computer Science (CS) and Software Engineering (SE). Labs play a vital role in helping students achieve the know-how and develop problem solving, communication and collaboration skills. Traditional labs comprising desktop computers organized into lines or U shapes have been around for almost forty years. Many of the contemporary labs look very different from their ancestors. They are designed to facilitate a myriad of learning activities including solo learning, testing and perhaps foremost, collaborative group work. This paper reviews some ergonomics issues and investigates examples of innovative labs being developed nowadays. We elaborate on the innovative labs’ powerfulness in addressing the drawbacks of traditional labs as well in supporting innovative teaching methods, student creativity and interactions, and the education eco-system engagement. Further, we present several ergonomic tips as a lab proposal for Zayed University (ZU) and under the computing education research umbrella. |
# Parallel Online Session 2

**Online Session 2: Intelligent Education System and Education Informatization**  
**Session Chair: TBA**  
**Time: 16:15-18:45 | Room A: 672 9642 2454 | Meeting Link: https://zoom.com.cn/j/67296422454**

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| **C010 16:15-16:30** | EduEasy – Smart Learning Assistant System  
Tharindu Jayasuriya, Sri Lanka Institute of Information Technology, Sri Lanka |
| **C017 16:30-16:45** | Research of Combining Blockchain in the Course Reform of Cryptography by Experiential Teaching  
Li Shan, North China University of Technology, China |
| **C022 16:45-17:00** | Improving The Performance of Virtual Labs Bubble Sort Experiment  
Krutam Hathi, International Institute of Information Technology Hyderabad, India |

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**Abstract**—Usage of smart learning concepts have increased rapidly recently as better teaching and learning methods. Smart learning concepts are especially useful for students to learn better in large classes. In large classes, the lecture method is the most popular method of teaching. In the lecture method, the lecturer presents the content mostly using lecture slides and the students make their own notes based on the content presented. However, some students may find difficulties with the above method due to various issues such as speed in delivery. The purpose of this research is to assist students in large classes in the following content. The research proposes a solution with four components namely note taker, slide matcher, reference finder, and question presenter which are helpful for the students to obtain a summarized version of the lecture note, easily navigate to the content and find resources, and revise content using questions.

**Abstract**—Cryptography is the core of information security. Cryptography course is the central course in the construction of information security major. However, cryptography has a lot of theoretical knowledge, making students feel abstract and boring, and there is no suitable practical application, which leads to unsatisfactory learning effects. As the current advanced technology, blockchain is the perfect combination of cryptography and digital technology, but it is not integrated into the cryptography teaching. Therefore, in order to strengthen the training of information security talents, improve the effect of cryptography, and enhance students' interest in learning cryptography, this paper proposes a combination of blockchain technology for cryptography reform by experiential teaching, and the knowledge points in cryptography courses are targeted in learning in the blockchain. Taking the hash function in cryptography as an example, the "mining" of blockchain is experienced, and the important properties of the hash function, such as the antigenic image (unidirectional) and anti-collision, can deeply understood. At last, I hope to provide reference and new ideas for the construction of information security majors and training talent.

**Abstract**—Online education has witnessed a spike during the COVID-19 pandemic[19], due to which it is important to be performance efficient and serve the content in a reasonable time. In this case study of Virtual Labs, an e-learning platform we analyse and propose a set of approaches which helps in improving the website’s performance. Virtual Labs is an e-learning website for virtual experiments in topics on science and engineering. These experiments are in the form of static webpages. This paper delineates the steps we followed to improve the performance of the static e-learning website. It shares insights into some of the concepts which can help improve the website performance.
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| C063 17:00-17:15 | A Self-paced Tutoring System, ILSA: Which System Utilization aligned with Learners' Goal Orientations?  
Cesar A. Tecson, Ateneo de Manila University, Philippines  
Abstract—For several decades, the role of computers has been appreciated in achieving various educational goals. Computer-assisted instructions become very popular in educational settings nowadays. Various intelligent tutoring systems have been developed to support learning in different contexts. This work investigates a tutoring system for learning Finite State Machines (FSM), one of the models of computation in Automata Theory, called ILSA. ILSA was deliberately developed to appeal to learners’ achievement goal orientations. Achievement Goal Orientation theory suggests that learners could be mastery-oriented or performance-oriented. Hence, the specific aim of this investigation is to examine if there is evidence of alignment between system utilization and achievement goal orientations of learners. In other words, did the learners use the features of ILSA according to their respective orientation? Results showed that the goal orientations in Post-ILSA 1 have high manifestations of alignment between utilization and achievement goal orientations. |
| C089 17:15-17:30 | Blending Android Programming Learning Assistance System into Online Android Programming Course  
Siti Rohani, State Polytechnic of Malang, Indonesia  
Abstract—Effective learning method is essential for the attainment of the learning objectives. In pandemic situation when courses are conducted online, creativity and innovation in designing learning methods become more imperative. Learning Android programming via online course is much harder for students and teacher. Without a real face-to-face meeting, their interactions become limited and this condition produces several prominent issues. This paper presents the implementation of Android Programming Learning Assistance System (APLAS) as a self-learning tool to address the issues in online Android programming course. APLAS is blended into the course that used two tools, Learning Management System (LMS) and online meeting tool. Findings reveal that the blending of APLAS into an online course of Android programming is effective to improve students’ achievement and more ease to learn Android programming. Students also show their high enthusiasm and attractiveness to the course. Preference for being collectivist learners was also evident. |
| C1001 17:30-17:45 | Study on Learning Strategies of College English Writing Based on Online Automatic Evaluation System  
Wenna Dou, Beijing University of Civil Engineering and Architecture, China  
Abstract—With the development of information technology and promotion of college English teaching reformation, English writing online courses have been adjusted and improved continuously. This article aims to introduce the development background of online English writing courses in Chinese universities, illustrate the application of online writing courses and analyze the problems of online writing courses. And then through sorting out learning strategies for English writing courses, this paper intends to propose the optimization of those learning strategies based on the online automatic evaluation system. |
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| C114 17:45-18:00 | Design of an Interactive Classroom with Bullet Screen Function in University Teaching  
**Rui Yang**, Xi'an Jiaotong-Liverpool University, China  
Abstract—Classroom interaction is an important part of teaching which can greatly enhance the learning performance of students. However, the following problems still exist in conducting interactive teaching in conventional classroom, such as limited interaction format, lack of enthusiasm and unequal interaction frequency. As a widely adopted interactive tool in online video websites, the bullet screen is instant and convenient with high interactivity, which is extremely popular among the young generation such as university undergraduate students. In this paper, a software platform is designed to collect the bullet screen messages generated by students in classroom and display them instantly together with teaching materials such as lecture slides via projector, which can be later collected for teaching and learning performance analysis. This paper aims to propose a possible solution of the mentioned problems to construct a convenient and efficient interactive classroom to improve the teaching quality. |
| C084 18:00-18:15 | Construction of an Educational Device for Real Time Data Acquisition Based on Arduino for a Calorimetric Study  
**Rachid Essaadaoui**, OAPM group, Laboratory of Materials, Waves, Energy and Environment, Department of Physics. Faculty of Sciences, Mohammed I University, Morocco  
Abstract—The general idea is to measure the heat increase of a liquid due to a quantity of electrical energy, by heating a mass of cold water with a heating resistor carrying an electric current. We used a platform based on Arduino and a DS18B20 temperature sensor to automatically collect temperature data, and the Data Streamer add-in to display them in real time on the computer. The system presented has the potential to teach several experiments in thermodynamics thanks to its reliability in measurements, low cost and a good level of accuracy. It is therefore an innovative, modern and affordable teaching tool that offers students the possibility to reduce the duration of the experiment much more than the traditional method. |
| C060 18:15-18:30 | SATA: A New Students Attendance Tracking Application  
**TBA**, The University of Jordan, Jordan  
Abstract—The number of smartphone users has rapidly increased in the last decade due to their attractive features and useful applications (apps). Accordingly, we have created a new Students Attendance Tracking Application (SATA). This app aims to enhance the process of tracking attendance in terms of time and effort in large universities. A course instructor generates a Quick Response (QR) code during a lecture and views it for a short time to the students who in turn scan the code and send back attendance requests to the instructor’s device. Actually, a fingerprint authentication is required among other restrictions to prevent any possible manipulations. Moreover, SATA allows both instructors and students to show different types of reports and get useful notifications. Our app was practically tested where it showed efficiency and credibility based on the outcomes of an evaluation survey filled by users. |
**TBA**, The University of Jordan, Jordan  
Abstract—Most of the applications (apps) used in different universities are limited in their features and not very popular among students. However, the importance of these apps has remarkably increased due to the covid-19 pandemic. In this paper, we present a Student Electronic Guide within Covid-19 pandemic (SEG-COVID) which is basically a personal electronic guide that is used by students to get instant information about various academic areas. The app has a number of useful features, and most importantly, a highly trained built in chatbot that responses to both Arabic and English written queries and cover a wide range of academic topics ranging from basic to complex. Moreover, SEG-COVID was practically tested by a group of the University of Jordan students during the pandemic and the feedbacks were very promising based on the outcomes of an evaluation survey filled by them. |
### Parallel Online Session 3

**Online Session 3: Blended Teaching and Game-Based Learning**

**Session Chair: TBA**

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| C003 16:15-16:30 | Using Project-based Inquired Quality Talk to Enhance the Effectiveness of Flipped Classes  
**Tina Pingting Tsai**, Center for General Education, National Taipei University of Education, Taiwan  
Abstract—In our previous work, we presented an inquiry-based quality talk method in flipped classes to provide students in their group discussions with an inquiry-based series of steps to discover the problem solutions where quality talk-specific types of questions/ responses are executed in each step. In general, the inquiry-based steps that this method employs are those in the problem-based mode of inquiry learning. In this paper, we explore the use of the other project-based mode of inquiry learning to present a new project-based inquired quality talk method that supports as well students’ learning effects in flipped classes. For illustration, the new method is applied to an academic ‘Reading & Writing’ class where a quasi-experimental study on the comparative analysis of experimental and controlled groups is conducted to verify its validity. |
| C020 16:30-16:45 | Investigating responsible factors for interaction between learners and instructors in the discussion forum of MOOC  
**Neha**, Japan Advance Institute of Science and Technology (JAIST), Japan  
Abstract—An interactive educational tool is a necessity for the dialogical learning process in online learning. Numerous studies have been conducted to develop an effective interactive educational tool for online learning. However, almost all of them were limited in calculating performance analysis of learning and enhancing interaction on the discussion forum. The responsible factors for interaction are one of the tasks in designing the interactive discussion forum in massive open online courses. In this study, we analyzed the queries for identifying the responsible factors for interactions between learners and instructors to suggest a designing method of discussion forum. We conducted a comparative study on the interactions between learners and instructors in a theoretical as well as a practical course. In this research, we found a couple of key responsible factors such as the structure of the discussion forum based on the analysis of queries and responses generated by learners and instructors. |
| C029 16:45-17:00 | Applying Gamification in Portuguese Learning  
**Ka Ian Chan**, School of Applied Sciences, Macao Polytechnic Institute, Macao SAR, China  
Abstract—With the rapid development of mobile technology, teaching and learning become location-less and time-less. The increasing popularity of mobile technologies provides more opportunities for educators and developers to create a wider range of educational tools. Gamification in the field of education is to motivate students to enjoy learning by applying game design. This project seeks to apply gamification techniques in Portuguese learning for Chinese learners using mobile technology. Gamification elements, progression and leaderboard are used to encourage and motivate students to achieve better results. Finally, an evaluation survey was conducted to verify the effectiveness of beginners’ language learning and building their confidence. Further studies could design experimental studies and adopt more qualitative research methods. Some different individual characters of students, like confidence level and cognitive style, could be considered in the future research. An idea to increase the interests and motivation of Portuguese learning is worth studying. |
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| **C075** 17:00-17:15 | Exploration and Practice of Blended Teaching of "Inorganic Chemistry"  
**Hongguang Zhang**, Qiqihar Medical University, China  
Abstract—In the inorganic chemistry courses of medical universities, the Moso Teach software is used to carry out the design of online and offline blended teaching combined with case discussions. The results show that compared with the control group, the students in the experimental group interspersed with case discussions are more interested in learning, their final grades are significantly improved. Students have a deeper understanding and mastery of knowledge, can apply what they have learned. Practical results show that the blended teaching has achieved satisfactory teaching results. |
| **C115** 17:15-17:30 | Educational Game Design Based on Experiential Learning Theory  
**Yatao Li**, School of Information Yunnan Normal University, Kunming, China  
Abstract—With the rapid development of information technology, educational games are becoming more and more popular among learners. Based on the characteristics of the experiential learning model and the analysis of the principles of educational game design, this thesis analyze the process of educational game design, and propose four modules of experiential educational game design—introduction module, demonstration module, operation module and verification module. The design of the game provides operations that can be used in practice. This study applied the four modules of experiential instructional design in the course of "Educational Game Design and Development" for undergraduates majoring in Educational Technology of the School of Information of Yunnan Normal University, achieved good learning results. Through questionnaire surveys and interviews, students Learning motivation and interest in learning have been greatly improved, and the ability to deal with difficult problems has also been greatly improved. |
| **C072** 17:30-17:45 | Digital Distance and Blended Learning Quality Assessment In Oriental And European Languages University Programs: Regions Of Ukraine Survey Study  
**Rusudan Makhachashvili**, Ivan Semenist, Borys Grinchenko Kyiv University, Ukraine  
Abstract—The global pandemic and subsequent quarantine measures and restrictions have posed an array of challenges to the structure and procedure of higher education workflow, which influenced significantly the scope of individual experiences, projected outcomes and estimated quality of higher education in countries across the world. This study focus is the in-depth assessment of individual digital distance and blended learning experiences by relevant groups of stakeholders in Oriental (Mandarin Chinese, Japanese) and European (French, Italian, Spanish, English, German) Languages university level programs in regions of Ukraine through the span of educational activities in the time-frame of COVID-19 quarantine measures of March 2020 to January 2021. The survey and analysis of different ICT tools is used to assess the parameters and challenges of individual quality and efficiency of translation of the real life Foreign Languages Acquisition practices into digital blended format, involving activation of interdisciplinary skills and cross-sectorial activities, assisted by ICT tools. The online survey of 14 universities in regional centers of Ukraine provides for disclosure of individual experiences and quality estimation of e-learning and hybrid learning in the framework of COVID-19 lockdown; assessment of individual experiences and quality of e-learning and hybrid learning in the framework of COVID-19 lockdown as compared to traditional, face-to-face learning formats for foreign languages; individual quality assessment of learning process design, programmed learning outcomes and projected competences for university programs of Oriental and European languages in the framework of COVID-19 lockdown and quarantine measures. |
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| C037       | Designing Narratively Driven Learning Activities for Blended Learning Experiences  
**Moritz Philip Recke**, University of Naples Federico II, Naples, Italy |
| Abstract—University of Naples Federico II (Italy) conducts a formative software development training program for the Apple technology ecosystem using the Challenge Based Learning (CBL) methodology. To overcome shortcomings of spiral curriculum principles, the course design adopts a Narrative Experience Design approach to let the learning progression be driven by learners as co-authors and support unscripted, emergent narratives for experiential education to foster learners’ engagement, agency, and creativity. In considerations for synchronous and asynchronous learning modalities, the authors developed a systematic approach for narratively driven learning activity design for application in blended or remote learning scenarios. In this paper, the authors present their activity design process to compose learning activities with narratively sequenced atomic elements to address different learning dimensions. Through a collaboration tool-based Learning Activity Design Canvas for blended or remote learning, the authors further contribute towards a comprehensive framework for designing educational experiences for project-based education. |
| C041      | 18:00-18:15  |
| C041       | Refined metric interpretation in natural language for educational videogames using fuzzy logic  
**Diego Carrera**, UPM Polytechnic University, Universidad Politécnica de Madrid, Spain |
| Abstract—With digital gaming’s increasing popularity, Educational Digital Games (EDG) are being more commonly used to complement children's early education. Controlled EDG provides educators a way to observe progress. Many existing applications fail to generate automatic data collection to provide reliable information for feedback on academic aspects needed. This paper describes the usefulness of MIDI-AM, a series of EDG, to link a dashboard, including informative outcomes about use and Playability. It explains how rules of fuzzy logic and Natural Language (NL) can provide consumable feedback. The research objective provides a new component in a longitudinal study to identify a more efficient process for developing and implementing a module to refine the dashboard metrics and outcomes of MIDI-AM EDG. The initial platform was redundant and created inconsistent results. Using Artificial Intelligence (AI) generates valuable information to refine the process of generating feedback reports using detailed data interpretations in NL. |
| C031      | 18:15-18:30  |
| C031       | Would Flipped Classroom be my approach in teaching computing courses: Literature Review  
**Eman Madani Bakheet**, University of Southampton, United Kingdom |
| Abstract—Adopting technology in education has been introduced in different models. Flipped classroom as one of the blended learning approach was tested and applied in teaching computing courses. This approach shows promising evidence that it is efficient through research evaluating it. This paper aims to review the research conducted in the flipped classroom, and in particular from computer science education perspective. The study involved a review of 20 studies that applied the flipped classroom in teaching computing courses. These studies involved experiments varying from longitudinal to a single semester evaluation. Indeed, the majority of these reports concerned a CS1 course (introductory programming course). Therefore, this paper discusses and reviews the current literature reporting research conducted on flipped classroom from computer science perspectives. |
## Online Session 4: Artificial Intelligence in Education and Educational Information Technology

**Session Chair:** TBA  
**Time:** 09:30-12:15 | **Room A:** 672 9642 2454 | **Meeting Link:** https://zoom.com.cn/j/67296422454

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| **C103** 09:30-09:45 | Policies selection for pedagogical agent based on the roulette wheel algorithm  
*Carlos Eduardo Atencio-Torres*, Universidad Nacional de San Agustín de Arequipa, Peru  
Abstract—Pedagogical agents are computational entities that interact with users and facilitate learning opportunities. They usually need to be programmed to follow a set of commands for an effective personalized exchange of knowledge and tasks. In this study, we evaluate the effectiveness of a policy-based model and its level of satisfaction about the interaction without and with the pedagogical agent using the bio-inspired roulette selection algorithm. The approach is quantitative, with an exploratory and descriptive study. The results revealed that our agent achieved great acceptance among the users who rated it as intelligent, friendly, and reliable. It is evidenced that the agent can influence the attitude, perception, and behavior of the user to reach better self-regulated learning. |
| **C1016** 09:45-10:00 | Retrospective analysis of the performance of students from a public university in pre-COVID time due to the use of information and communication technology  
*Edwin Delgado*, Universidad Nacional San Luis Gonzaga Ica, Peru  
Abstract—The present research was carried out in order to determine the influence that the use of information and communication technologies has on the academic performance of students in the subject Image Theory of the Professional Academic School of Communication Sciences of the UNICA School of Communication Sciences, Tourism and Archeology during 2010. The research is of an applied or technological type of explanatory level and a non-equivalent control group design that established the causal relationship between the study variables, in a sample of 54 students.  
To collect the information, the verification test was applied, which consisted of the pre-test and post-test tests, the control card and the research card were also used. Between the variables use of tics and academic performance, it was determined that there is a highly significant dependency relationship according to the statistical test applied in the contrasting of the hypotheses between the experimental group. |
| **C116** 10:00-10:15 | E-learning system customized in the integral process of teaching learning of engineering students  
*Carmen Cuba Cornejo*, Universidad Tecnologica del Peru, Peru  
Abstract—The objective of this research work is to determine the incidence of application of the personalized e-learning system in the achievement of the integral teaching-learning process of the students of Electrical Mechanical Engineering of the National University San Luis Gonzaga 2019; basic type research, non-experimental design, causal explanatory level, quantitative approach, non-probabilistic sample, for convenience; the instrument applied was the survey, using the inductive deductive method; With a non-probabilistic sample made up of enrolled students, the results made it possible to deduce and explain the facts or phenomena that influenced the improvement of the teaching-learning process. It was concluded that e-learning platforms increase technological speed, allowing the creation of learning spaces (LE) on the Internet, with a wide range of functionalities at the service of different types of teaching and learning. |
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| **C002** 10:15-10:30 | A Novel Learning Early-Warning Model Based on Knowledge Points and Question Types  
*Yuhang Zou*, School of Software and Microelectronics, Peking University, Beijing, China  
Abstract—Learning early-warning is of great importance to many educational domains, such as adaptive learning and personalized teaching, and has drawn numerous research attention in recent decades. In order to solve the problem of large prediction granularity in previous study. In this study, we seek to construct two novel features, including knowledge points and question types, and predict students’ performance based on the two types of information. According to the predicted results, we divide the early-warning into 3 levels, and provide different levels of guidance and reminders for different warning levels of students. We did experiments based on the two types data of 141 students in Peking University. The result shows that our method has been significantly improved compared with Linear regression, RF and Adaboost. The experiment shows that the model’s predicted grades and the real data Pearson correlation coefficient is 0.890568, and the accuracy of predicting warning levels is 85.81%. |
| **C009** 10:30-10:45 | Comparison of The Effectiveness of Using Online and Offline Communication Techniques to Build Human Relations with Students in Learning at Schools  
*BAMBANG BUDI Wiyono*, Universitas Negeri Malang, Indonesia  
Abstract—The Covid-19 virus outbreak has changed the interaction of life in all fields, including in the fields of education and learning. Most of the communication process with students is done online. However, how effective online communication is, has not been known. Therefore, this study aims to describe the communication techniques applied by the teacher and compare the effectiveness of online and offline techniques in interactions with students. This research was conducted in Batu City, with samples of 57 elementary school teachers who were taken using cluster random sampling technique. The data collection technique used a questionnaire and analyzed using descriptive statistics, t-test, and Analysis of variance. The results showed that offline communication techniques were considered more effective than online communication techniques. There is no difference in the effectiveness of communication techniques in terms of gender, education level, rank, and teacher work duration. There are differences in the frequency of using techniques in terms of education level and teacher work duration. |
| **C043** 10:45-11:00 | Text mining assessment of sustainability learning topics at higher education in Japan  
*Andrea Urushima*, Kyoto University, Japan  
Abstract—Higher education has a central role for nurturing sustainable mindsets for the future well-being of society and the environment. That is why knowledge generation, teaching, and social innovation are the main components of sustainable development goals. In this light, recent research that aims to search for best content and practices in education for sustainability has increasingly focused on the analysis of sustainability coursework, programs, and projects. However, several studies demonstrate the low occurrence of sustainability contents in higher education curriculum across the world, pointing to an urgent need to integrate sustainability in its varied dimensions (ecological, economic, and social) into the curriculum. In order to address the issues above, this paper aims to assess the correspondence of sustainability topics of interest for society at large and for university students through the use of text mining techniques. For this analysis two types of textual data were used. The first was extracted from newspaper’s articles from the Asahi Shimbun, which is a reference that largely reflects the sustainability views of society. The second was extracted from students’ reports written about sustainability during the courses of interdisciplinary sciences of the Liberal Arts and General Education of Kyoto University. Both types of textual data were analyzed and the results were visualized according to the frequency and co-occurrence of appearance of words. The results demonstrate that, after university learning, students became aware of their own individual role in nearby spheres of action. Moreover, the results show that the sustainability views of students and the society partially overlap with different degrees of intensity, from dissimilar contextual backgrounds. Comprehensively, while the university courses further emphasize biocentric and ecocentric views, in contrast, society’s views tend to focus on topics related to policy making and the role of enterprises. |
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| **C048-A** 11:00 - 11:15 | Transforming Educational Assessment: Assuring Quality in Measuring via Rasch Model Technology  
*Phillip Rowles*, Tokyo University of Science, Japan  
Abstract—The educational assessment field still allows researchers to conflate the meanings of the terms counting and measuring. The result is widespread confusion. However, their meanings are distinct and of profound importance. In educational settings, young children are encouraged to discover fundamental differences between counting and measuring from primary school age. They eventually realize that counting precedes measuring and it is an essential preliminary step on a developmental pathway. Furthermore, measurements must be constructed through transforming numbers onto an invariant unit scale. However, often the same educators who instill these basic distinctions on the next generation are among those educators who ignore these definitions in their own classroom assessment practices. The classical test theory approach of merely counting (summing) raw scores and which is very commonly presented in introductory statistics textbooks is largely responsible for this continuing problem. A solution to this assessment conundrum is Rasch measurement model technology. |
| **C067** 11:15 - 11:30 | Sentiment Analysis of China’s Education Policy Online Opinion Based on Text Mining  
*Danchen Zhang*, China University of Petroleum, Beijing, China  
Abstract—With the in-depth development of China’s education reform, the combination of educational public opinion and emotion analysis is conducive to the discovery of the evolution law of public sentiment and related factors, and provides ideas for the guidance of public opinion of relevant government departments. In the context of COVID-19, the postponement of the college entrance examination caused a huge impact on online public opinion. This paper proposes an analysis model of public opinion on the education policy network based on text mining, obtains network comment contents through Python crawler, preprocesses the data, and introduces the calculation formula of emotion heat, on which the evolution process of public opinion is divided into incubation period, outbreak period, spreading period and decline period. Combined with visualization, word cloud pictures and emotional heat maps of provinces and ages are constructed, so as to grasp the spatial-temporal evolution law of educational public opinions. Taking the postponement of the college entrance examination in 2020 as an example, the empirical analysis proves that the online public opinion analysis model of education policy can reflect the evolution law. |
| **C077** 11:35 - 11:45 | Construction of Heterogeneous Dynamic Grouping Pattern Based on Neural Network  
*Yigang Ding*, South China Normal University, China  
Abstract—Regardless of online or offline learning, there are operational difficulties in “facing all students”, and it is very difficult to pay attention to the “individual differences” between students. As we all know, students are developing people. During the teaching process, students’ mentality, knowledge, and abilities will change, which may shouldn't be taken into account by static grouping. In this study, neural network model was used to construct the mapping relationship between students’ characteristics and heterogeneous grouping, and the trained model was used to predict the grouping position at the next moment. This dynamic grouping algorithm can ensure that every student is in a heterogeneous group for a long time. Finally, we propose a heterogeneous dynamic grouping teaching pattern. |
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| C095-A 11:45-12:00 | A machine learning approach on predicting the behavior of children with profound intellectual and multiple disabilities or severe motor and intellectual disabilities  
*Von Ralph Dane Herbuela*, Ehime University, Japan  
Abstract—While there may be substantial evidence on the relationship between weather parameters and behaviors among typically-developing children across settings, studies involving children with neurological functioning impairments that affect communication or those who have physical and/or motor disabilities are unexpectedly scarce. Recently, the importance of weather parameters and location information to better understand the context of the communication of children with profound intellectual and multiple disabilities or severe motor and intellectual disorders has been proposed through the development of ChildSIDE, an app that collects behaviors, location, and environment data. However, an investigation on whether these data can be used to classify and predict behavior has not been done. Thus, this study investigates whether location and environment data would allow more accurate classification of behavior by evaluating the performance of different machine learning algorithms (random forest, support vector machine, XGBoost, and neural networks) using critical metrics to identify the best predictive model. |
| C107 12:00-12:15 | Parametrization of Statistical Models in three-layer neural networks  
*Tadashi Takahashi*, Konan University, Japan  
Abstract—In a hierarchical structure models which is neural networks, a set of true parameters consists of not one point but a union of several manifolds and contains complicated singularities. It is difficult to analyze its behavior and discuss theoretically. First, we consider that the set of true parameters which is realizable by a statistical model with a hyperbolic tangent as an activation function is algebraic sets defined by finite polynomials. The main purpose of this paper is parametrization of algebraic sets containing complicated singularities in three-layer neural networks by using technique of Gröbner basis of the finitely generated ideals. |
## Online Session 5: Higher Education and Educational Research

**Session Chair:** TBA  
**Time:** 09:30-12:15  
**Room:** 679 3127 2224  
**Meeting Link:** https://zoom.com.cn/j/67931272224

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| C099 09:30-09:45 | **Disruptive innovation based on university didactics in the development of research competences in students of public universities**  
**Mario Chauca,** Universidad Tecnologica de Lima Sur, Peru  
Abstract—Disruptive innovation in university didactics is a highly relevant pedagogical tool; Above all, when it contributes to the students developing investigative and scientific competences to learn to learn, construct and solve the problems of the diversity of the social and natural environment, dynamiting in an innovative way, the construction and generation of new learning, the understanding of the problems and alternative solutions to problems, generating transformative action in the: Problems - solutions. Research conceived in this way is one of the fundamental tasks of the contemporary university and, especially, one where future professionals are trained. The university, without the investigative component in professional training, the mission would be reduced to mere teaching, or simply the transmission of knowledge, regardless of the relevant development of the modes of action of future professionals, that is why the university has the responsibility of training professionals with the aim of addressing their deficiencies in correspondence with social needs, in addition to guaranteeing the full development of investigative skills in students reflected in the investigative attitude, scientific knowledge and scientific production). |
| C104 09:45-10:00 | **Characterization of student dropout associated with risk factors in a public university**  
**Isabel Pino-Arana,** Universidad Tecnologica de Lima Sur, Peru  
Abstract—The study aimed to determine the risk factors in tutoring and dropout in students in a public university methodology: hypothetical deductive, type and quantitative, descriptive and cross-sectional design. The sample consisted of 105 students from the 1st to the 8th semester 2018-2019. 95% female predominance, internal tutoring risk factors are present as motivation only in 48%, self-esteem 38%, food 49%, external factors such as aggression 57%, teacher support 15%, the use of the Web without filter the 85 % they are present. The results of the research led us to conclude that internal and external risk factors are present in the tutoring and dropping out of students. |
| C112 10:00-10:15 | **The research culture and the development of research ability in students of the faculty of social and health sciences of the Peninsula Santa Elena State University, Ecuador, during the period 2018-2019**  
**René Faruk Garzozi Pincay,** Universidad Estatal Península de Santa Elena, Ecuador  
Abstract—Training in the research culture of university students represents a great challenge in a social context dominated by globalization. The university student must assume an investigative and critical attitude in their training. Far from focusing on updating the latest advances in knowledge of your specific career, it must be assumed from the perspective of comprehensive, ethical, scientific and humanistic training. The objective of the study is to evaluate the influence of the research culture on the development of research skills, applying research methods, techniques and instruments, aimed at 300 students from the Faculty of Social and Health Sciences. A correlation test was applied to verify related dimensions between the variables, research culture and development of research skills. There is a direct correlation between the variables of research culture and development of research skills. It is concluded that, as long as an adequate research culture is encouraged, research skills will be developed in the UPSE university student. |
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| C008 10:15-10:30 | Strategy on the Service Mode of University Library to Help Users Cope with the False Information Under the We Media Environment  
**Qiming Shi, Xi’an Shiyou University, China**  
Abstract—By setting up the media literacy MOOC, organizing and implementing the "information falsification" practice project designed based on Laswell's "5W" communication model and critical thinking concept, establishing a scientific evaluation system of user information identification ability, the University Library provides the resources and tools for users to identify false information under the we media environment, helps users improve media information literacy to deal with false information. This paper puts forward the service mode of university library to help users cope with the false information under the we media environment. |
| C024 10:30-10:45 | Surveys for A Stakeholder-focused Model in VOD Learning  
**Shinji KATO, Japan Advanced Institute of Science and Technology, Japan**  
Abstract—This study aims to build a learning model based on a survey for the actual situation of the three stakeholders, students, faculty, and system administrator, using a VOD (Video-on-Demand) of a face-to-face lecture at two different locations for different purposes such as a supplement to the face-to-face lecture or as the primary learning material. As a result of the survey, we pointed out that there were two main styles of students, those who want to watch all videos in one way and those who want to watch only scenes of high importance through other information. We suggested a learning model for providing more realistic and concrete improvement proposals based on understanding both the faculty and the system administrator’s constraints. |
| C034 10:45-11:00 | An Empirical Study of the Influence of Empathy on Cooperative Learning from the Perspective of Social Network Analysis  
**Xiuji Jing, Central China Normal University, China**  
Abstract—in order to further improve the effect of cooperative learning and promote the discussion and interaction among group members, this paper designs and verifies a grouping strategy. This strategy elicits empathy ability on the basis of homogeneity among groups and heterogeneity within groups. The influence of empathy on cooperative learning is studied. Forty-six fourth grade students who participated in science courses are selected as the research objects. The learner with high empathy ability is chosen as the group leader in the experimental group, while the learner with low empathy ability is chosen as the group leader in the control group. At the same time, statistical analysis and social network analysis method are used to explore the influence of empathy on learning effects and group interaction. It is found that the group of high empathy ability is significantly higher than the group of low empathy ability in group discussion interaction density and learning effect. This also provides a reference to the later development of learners and the future development of cooperative learning. |
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| C044 11:00-11:15 | Investigation and Survey on the Current Conditions of Case Teaching of the Major of Business Administration in Higher Vocational Colleges  
**Jiali Jin**, Taizhou Vocational and Technical College, China  
Abstract—Due to the diversity and uncertainty of application of knowledge and complex and varied career requirements, in the traditional teaching mode, for learners of the Major of Business Administration, the content of classroom teaching may be inconsistent with actual ability demands easily. According to UNESCO, case teaching is one of the education and teaching methods most suitable for the cultivation of talents of the Major of Business Administration. However, although case teaching is a feature of the teaching of business administration, the effect of its application in China is not ideal. There are many dilemmas and questions and its unique advantages and great vitality are not shown. This paper selects 4 specialized courses. Based on indicators such as recognition of the importance of case teaching, its expected percentage of class hours, the actual implementation of teaching, and satisfaction of course teaching, through the investigation and survey on the conditions of case teaching of the Major of Business Administration in 15 higher vocational colleges in 6 provinces and cities in China, this paper summarizes the current conditions of case teaching of the Major of Business Administration in China, finds the existing problems of case teaching of the Major of Business Administration and gives corresponding improvement suggestions. |
| C081 11:15-11:30 | System Design for Static Objects Segmentation Technology Based on 3D LiDAR and Multi-View Depth Map  
**Yu-Cheng Fan**, National Taipei University of Technology, Taiwan  
Abstract—Advanced Driver Assistance System (ADAS) and Artificial Intelligent (AI) are the important issue in recent years, autonomous car plays an important role in whole ADAS. To detect the environment around the car, the sensor might be sensitive and immediate. LiDAR (Light Detection and Ranging) uses Laser to get the reflectivity from the surrounding objects. For clustering the objects with point cloud, the density of the point cloud still sparse, making the cluster result completely, we implement a system combines LiDAR and multi-view image, the depth image is generated by multi-view can help us to cluster the object in point cloud clearly. In addition, we use CORDIC (Coordinate Rotation Digital Computer) EEAS (Extended Elementary Angle Set) architecture to decode the package data that collected from Velodyne HDL-64E. By using the flow of digital chip design, we reduce the power consumption and accelerate the speed. The proposed system achieves 91.09% accuracy and the processing time is 0.757 second. |
**Chanin Tungpantong**, King Mongkut’s University of Technology North Bangkok, Bangkok, Thailand  
Abstract—Globalization and digital disruption have resulted in transformational innovation. Educational institutions need to develop quality human resources, knowledge, competencies, and skills that are relevant to various changes. Therefore, it is necessary to develop the systems and various supporting factors that are relevant at the same time. In terms of teaching and learning systems, service systems, and infrastructure, with an emphasis on improving the structure and education management system to be flexible, efficient and effective towards the quality and standards of international education. It relies on three main factors that influence the success of the information system based on the DeLone and McLean information system success model which are: 1) Digital Transformation by applying new technology to existing organizational resources in new operations to create opportunities and challenges for the organization which has 6 elements. 2) Enterprise Architecture is the design of the application of information and communication technology to be linked to a systematic work process in 5 dimensions and 3) Digital Leadership who has skills, attitudes, knowledge, and experience in both fields. Professional and personal in 7 areas. This conceptual framework of factors affecting the success of information systems in the digital transformation of this tertiary education institution. It will provide a guideline for preparing higher education institutions for digital transformation to help organizations more efficiently strategize, plan, and operate about the importance of each factor. |
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| C120 11:45-12:00 | Vocational Education Digital Enterprise Architecture Framework (VEDEAF)  
**Thanasarn Rujira**, King Mongkut’s University of Technology North Bangkok, Bangkok,  
Abstract—The purpose of this research was follows: 1) synthesis of components of enterprise architecture and 2) to develop a vocational education digital enterprise architecture framework (VEDEAF) 3) evaluate of VEDEAF. Which have been studied from theories, documents and researches related to enterprise architecture, high performance organization, digital organization and operating process within Vocational Education College. The results of the research showed that components of VEDEAF consist of six component which are 1) Business Architecture, 2) Data Architecture, 3) Application Architecture, 4) Infrastructure Architecture, 5) Security Architecture and 6) Human Capital Architecture. Each components also divided into sub-module as follows; Business Architecture divided into 2 sub-modules which are Mission and Core Processes; Data Architecture divided into 2 sub-modules which are Core Process Data and Supporting Process data; Application Architecture divided into 3 sub-modules which are Instructional Application, Process Application and Integration Application; Infrastructure Architecture divided into 8 sub-modules which are Communication Platform, Operating System, Computing Platform, Data Management Platform, Network Management Platform, Security Platform, Network and Data Communication Platform and Server Platform; Human Capital Architecture divided into 4 sub-modules which are Executive, Teacher, Student and Administration. To evaluation results of VEDEAF, the result found that the appropriate is at very high levels. |
| C065 12:00-12:15 | Digital competence of a teacher in a pandemic  
**Issabayeva Darazha**, Abai Kazakh National Pedagogical University, Kazakhstan  
Abstract—The article considers changes in the education system during the COVID-19 coronavirus infection pandemic. The term “digital competence of a teacher” is disclosed and a comparative analysis of the attitude to distance learning of teachers and students using a sociological survey is made. The teachers identified the lack of direct contact with the student as the main disadvantage of distance learning, and students feel discomfort due to the inability to receive knowledge directly from the teacher. A number of problems of distance learning have been identified and a course program has been created to improve the digital competence of a teacher. The course content covers the basics of pedagogical design, rubrics of educational results, platforms for collaboration, tools for creating a video lecture, platforms for monitoring and collecting information, digital footprint and analysis, online resources of virtual laboratory work. As a result of learning, 680 university teachers and teachers of secondary schools in Kazakhstan designed their own course. At the end of the first semester, the approbation of these courses was considered. The authors performed a two-step data analysis procedure using deductive and inductive analysis methods. According to the course indicators, many of the identified problems have significantly decreased. |
## Online Session 6

**Online Session 6: Information Communication Technology and Computer Application**

**Session Chair: TBA**

**Time:** 13:30-15:45 | **Room A:** 672 9642 2454 | **Meeting Link:** https://zoom.com.cn/j/67296422454

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<td><strong>C026</strong> 13:30-13:45</td>
<td><strong>Assessing the Qualities of Synthetic Visual Data Production</strong>&lt;br&gt;<strong>Jonathan Adams,</strong> Florida State University, United States&lt;br&gt;&lt;br&gt;Abstract—A literature review was conducted using journal articles and conference proceedings to examine emerging research practices, and applications of synthetic visual data over the past 5 years. The current research examined articles related to research trends in artificial intelligence training intended to improve computer vision and object detection. Search strings were developed and used to retrieve research articles from the ACM and IEEE databases. The resulting articles were examined for trends, general practices, disciplines where the greatest efforts have been made, advances, and relevant production processes. The research reveals that visual synthetic data encompasses filtering, augmentation, and object domain randomization techniques. Further, all of the research that included an evaluation of synthetic visual data suggest that there are noteworthy performance improvements in accuracy. Additionally, producing realistic synthetic data reduces the current limitations related to labeling, image quality, paucity of relevant data, and privacy issues.</td>
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<td><strong>C0003</strong> 13:45-14:00</td>
<td><strong>Unknown Oriented Programming: Mathematical Continuation</strong>&lt;br&gt;<strong>Zhu Ping,</strong> Tellhow Institute of Smart City, China&lt;br&gt;&lt;br&gt;Abstract—Natural language semantic engineering problems are faced with unknown input and intensive knowledge challenges. In order to adapt to the features of natural language semantic engineering, the AI programming language needs to be expanded mathematically: (1) Using many ways to improve the spatial distribution and coverage of instances; (2) Keeping different abstract function versions running at the same time; (3) Providing a large number of knowledge configuration files and supporting functions to deal with intensive knowledge problems; (4) Using the most possibility priority call to solve the problem of multiple running branches traversal. This paper introduces the unknown oriented programming ideas, basic strategy formulation, language design and simulation running examples. It provides a new method for the incremental research and development of large-scale natural language semantic engineering application. Finally, this paper summarizes the full text and puts forward the further research direction.</td>
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<td><strong>C0014</strong> 14:00-14:15</td>
<td><strong>Brand Positioning Visualization System</strong>&lt;br&gt;<strong>Chung-Jen Chen,</strong> Department of Visual Communication Design, Southern Taiwan University of Science and Technology, Taiwan&lt;br&gt;&lt;br&gt;Abstract—At the initial stage of trademark design, brand positioning should be considered by the visual communication designer. However, in the field of visual communication, there are only a few educational institutions conduct researches or teachings on how to visualize the brand positioning. The author developed the Brand Positioning Visualization System (BPVS) based on Multidimensional Scaling. Basically, the development of BPVS included two stages: stage 1 was interface design and stage 2 was systems construction and implementation. The final established BPVS was web version and simple operation interface was the major characteristic. Currently BPVS is available online. In addition to the huge matrix for operation, BPVS also allows administrator to perform Subject Management, Samples Management, Matrix Management, and Map Management. BPVS could help the visual communication designers to effectively control the direction of brand design in the initial stage of trademark design, and avoid confusion with the trademark designs of the competitors.</td>
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| C068 14:15-14:30 | A Roadmap of Information and Communication Technology-Oriented Product-Service System for Older Adults in Hong Kong  
Si Yang AN, The Hong Kong Polytechnic University, Hong Kong, China  
Abstract—In light of the unprecedented growth of the aging population in Hong Kong, coupled with the massive diffusion of information and communication technology (ICT), the issue of the best approach to adopting ICT for solving aging problems has become a hot topic among stakeholders from industry, the academy, government, and elsewhere. Considering that older adults always exhibit a relatively low level of technology usage, product-service systems (PSS) could be an appropriate way of facilitating their acceptance of ICT. However, research on this topic is diverse and fragmented in conception and literature review. It is therefore necessary to conduct a systemic overview of the subject and propose a broader vision of PSS for ICT. This study reviews the recent progress of ICT for aging and its integration of pertinent product-service system as the basis for a roadmap which provides insights into future trends and challenges for the development of ICT-oriented PSS. |
| C070 14:30-14:45 | A Fault-tolerant Routing Method for Network-on-Chips Based on Communication Function Fault Model  
Masaru Fukushi, Yamaguchi University, Japan  
Abstract—Fault-tolerant packet routing is a key factor for realizing high-performance and dependable Network-on-Chip (NoC) systems. This paper proposes a fault model for communication functions and a novel fault-tolerant routing method that can cope with the fault model. When faults are considered on a communication function basis, designing a routing method becomes a challenging problem because communication patterns become asymmetric. Our basic idea for this problem is the concept of detour label so that only specific packets make a detour not to use the faulty communication functions. Simulation results indicate that the proposed method achieves at least 13% higher throughput and 68.8% lower latency compared with existing methods. |
| C078 14:45-15:00 | Design and Analysis of Deep-Learning Based Iris Recognition Technologies by Combination of U-Net and EfficientNet  
Chih-Peng Fan, National Chung Hsing University, Taiwan  
Abstract—In this paper, the effective deep-learning based methodology is developed for iris biometric authentication. Firstly, based on the U-Net model, the proposed system uses the semantic segmentation technology to localize and extract the ROI of iris. After the ROI of iris in the eye image is revealed, the inputted eye image will be cropped to the small-size eye image with the just-fitted ROI of iris. Then, the iris features of the cropped eye image are strengthened optionally by adaptive histogram equalization or Gabor filtering process. Finally, the cropped iris image is classified by the EfficientNet model. By the CASIA-v1 database, the proposed deep-learning based iris recognition scheme reaches the recognition accuracies up to 98%. Compared with the previous works, the proposed technology can provide the effective iris recognition accuracy for the biometrics applications with iris information. |
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| C088 15:00-15:15 | Low-noise CCD video signal acquisition and optimal digital denoise technology  
*Li Wencan*, Xi’an Institute of Optics and Precision Mechanics, Chinese Academy of Sciences, China  
Abstract—In order to improve the detection ability of the CCD camera, under low illumination and dim targets, and suppress the noise of the read system of the CCD camera. Based on the analysis of the main readout noise and characteristics of the CCD detector, this paper models and optimizes the CCD signal and noise, designs the optimal digital correlation double sampling algorithm, and combines it with Kalman to improve the denoise performance. Various digital correlation double sampling algorithms are verified by simulation experiments, and a CCD signal acquisition and experiment system based on PCIe acquisition card is built. The experimental results show that the denoise performance of the designed optimal filter is improved by 22%-32% compared with the digital filter using distributed kernel coefficients, and its denoise performance is improved by 60% compared with the traditional correlated double sampling technology. Combining Kalman filtering with optimal filtering further improves the denoise performance by 46%. It satisfies the need for optimal suppression of readout noise of CCD cameras. |
| C033 15:15-15:30 | Implementing Virtual Reality Based Competence Recognition  
*Raine Kauppinen*, Haaga-Helia University of Applied Sciences, Finland  
Abstract—In this paper, we discuss using VR (virtual reality) in competence recognition. In education, VR is an increasingly used technology, and competence recognition is an essential task, for example, in vocational education as well as in the evaluation of learning. In vocational settings, effective competence recognition is also increasingly significant for employers since many potential employees, such as immigrants, are without formal degrees or education but have adequate competencies. For identifying relevant competencies in this setting, we present two novel competence recognition models suitable for VR based competence recognition. In addition, we discuss two types of relevant VR implementations and provide examples of them using Oculus Quest VR technology with Unity and 3DVista development platforms. Furthermore, we evaluate the applicability and significance of these models and the user experience of the VR implementations. |
| C071 15:30-15:45 | Understanding Art through Augmented Reality: Exploring Mobile Tools for Everyone’s Use  
*Maria Rita Nogueira*, Institute of Systems and Robotics, University of Coimbra, Portugal  
Abstract—This work seeks to register in real-time the dance movement through the principles of Augmented Reality. From the reading and analyzing of this movement is intended to explore different visual approaches, such as drawing or an abstract painting. For this purpose, this work aims to develop a mobile system that detects, different parts of the human body and records the movement made by these points. Through the movement detection this system will interpret movement parameters, analyze and classify them into new values to then generate a new visual representation. The new visual composition will be presented in real-time and in a three-dimensional format allowing the participants a closer and more detailed art perspective. This work is intended to give everyone a better understanding of art, but also to contribute with a tool that can stimulate the creative process, the physical and emotional wellbeing, through of a multidisciplinary work. |
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| C054 13:30-13:45 | How can video game atmosphere affect audience emotion with sound  
Poom Thiparpakul, King Mongkut's University of Technology Thonburi, Thailand  
Abstract—Sound plays a vital role in the medium that delivers the message and enhances the viewer experience as well. From research and testing methods, it can be seen that the sound has an impact on the listener, however the degree of impact depends on the experience of the audience that can be resonated with that or the mental strength of the listeners. In addition, the degree of impact depends on the type and other elements of the medium that create a great environment for the audience to feel more easily. All of these findings prove that sound can create ambience and change the mood of an audience. But other elements are needed to create a perfect atmosphere and influence the audience’s mood. |
| C059 13:45-14:00 | Review on Fake News in Malaysia during the Movement Control Order (MCO) from the Ethics in ICT Perspective  
Nor Asiakin Hasbullah, National Defence University of Malaysia, Malaysia  
Abstract—Prevalence of fake news during the movement control order (MCO) could be seen through disclaimers made by the Ministry of Communications and Multimedia Malaysia over the Royal Malaysia Police official social networking sites. The police and MCMC have opened 273 investigation papers with 136 of them under investigation as of 21st of October 2020. Descriptive analysis was used to extract and identify the disclaimers’ main points and popular fake news titles. Accordingly, this study identified the viral types of fake news elements and popular fake news titles during the MCO to reflect the most prominent types of news. The ethical considerations in receiving news, not to forward unverified news and the worst is creating fake news are crucial issues to be addressed. Therefore, it is important to educate people by stressing on the important of ethics in ICT. |
| C004 14:00-14:15 | Proposal of Automatic GPU Offloading Method from Various Language Applications  
Yoji Yamato, NTT Corporation, Japan  
Abstract—To use heterogeneous hardware such as GPU, programmers must have sufficient technical skills to utilize OpenMP, CUDA, and OpenCL. Based on that, I have proposed environment-adaptive software that enables automatic conversion, configuration, and high performance operation of once written code, according to the hardware to be placed. However, the source language for offloading was mainly C/C++ language applications currently, and there was no research for common offloading for various language applications. In this paper, for a new element of environment-adaptive software, I study a common method for automatically offloading for various language applications not only in C language but also in Python. |
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| C066 14:15-14:30 | Analysis of COVID-19 Tweets During Lockdown Phases  
**Prince Tyagi**, Delhi Technological University, India  
Abstract—With the advent of the internet among people in recent times, usage of social media and expressing views online has become part of everyone’s routine. People are sharing their opinions on social media through text, videos, images, etc. Due to the nature of data shared on social media, it could be used to effectively analyze the emotions of humans, understand and model various events. One such event that happened in recent times is a pandemic due to the Covid-19 virus. Through this paper, we try to compare the emotions and sentiments of people worldwide during four phases of complete and relaxed lockdown through tweets. The four phases of lockdown are defined as Constricted Phase, Semi Constricted Phase, Semi Relaxed Phase, Relaxed Phase. This work will enable the community to provide useful insights and show how people adjusted and how they fought themselves to the pandemic. |
| C030 14:30-14:45 | A Real-Time COVID-19 Data Visualization and Information Repository in the Philippines  
**Julio Jerison E. Macromoh**, I-Shou University, Taiwan  
Abstract—The current COVID-19 pandemic has caused undeniable damages in varying sectors throughout the world, from healthcare, to economy, to education and politics. One of the pressing issues that the spread of this disease has also caused is the corresponding propagation of misinformation and “fake news” on the coronavirus. In response to this, the Sustainable Development Solutions Network (SDSN) Youth Philippines has proudly created and seeks to expand a consolidated and comprehensive Interactive Philippine Dashboard (https://covid19.sdsnyouthph.org/), a one-stop shop for all relevant information on COVID-19, specifically designed to be understood by the youth. |
| C1012 14:45-15:00 | A Corpus-based Contrastive Study on Advise and Suggest  
**Sun Hui**, Shanghai Technical Institute of Electronics & Information, China  
Abstract—This paper explores difference between Advise and Suggest in the fields of collocation, semantic prosody and register. Under the aid of the British National Corpus (BNC), the author collects and samples evidence accordingly, finds out great difference between them, and points out some false friends we make everyday. Analyzed in a more scientific way, this paper aims to provide a corpus-based method for readers to perceive English words. |
| C091 15:00-15:15 | Influencers and social media: State of the Art and Bibliometric Analysis  
**Juan Sebastián Fernández Prados**, University of Almeria, Spain  
Abstract—The main objective of this paper is to show the state of the art of scientific studies on influencers in social media. For this purpose, we have extracted the documents from the Scopus databases (search results for "influencer" and "social media" were 817) and examined them with the bibliographic analysis tool VOSviewer. The description of the documents claims a fast pace in the last year 2020 (41% of all documents), the strong influence of the United States (29.5% of the documents) and the interesting interdisciplinarity between technical, scientific, and social subjects. The bibliometric analysis provided co-occurrences by keywords, with an increase in human and Instagram aspects, and co-authorships by nationalities with a strong Anglo-Saxon area of influence. In addition to the conclusions derived from the bibliometric analysis, digital citizenship education is claimed to critically address the impact of influencers on social networks. |
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| C0002 15:15-15:30 | Automatic information extraction from text-based requirements  
*Simon Fritz*, Intelligent Systems and Production Engineering, Research Center for Information Technology (FZI), Germany  
Abstract—Requirements form the legal basis for many development projects. They are usually exchanged between customer and supplier in the form of product and requirements specifications and require a subsequent integration effort into the corresponding requirements management solutions. Especially for small and medium-sized enterprises (SME), which mainly use office solutions for the management of requirements, this involves a very high integration effort, which is why this is usually only partially managed or not managed at all. Software solutions available on the market already offer support, but they are too expensive or complex, especially for small companies.  
The project DAM4KMU, funded by German Federal Ministry for Education and Research (BMBF), addresses this challenge and by enabling SMEs from Germany to integrate requirement documents automatically into existing requirement structures with the help of NLP-based techniques. For this purpose, the documents to be processed are divided into semantic roles, which can then be transferred into a semantic data structure. This in turn enables an automatic linking of the requirements and system components, which reduces the manual effort and avoids possible errors. |
| C100 15:30-15:45 | Intergenerational digital and democratic divide: comparative analysis of unconventional and digital activism around the world  
*Juan Sebastián Fernández Prados*, University of Almeria, Spain  
Abstract—Social and political activism is one of the pillars of a country’s political culture and democratic health. The latest wave of the World Values Survey with a sample of 67,267 respondents in 46 countries, collects two sets of questions on unconventional political actions face-to-face and digitally. A typology of activism and two scales of face-to-face and digital activism (FUPAS and DUPAS) have been obtained. A democratic gap is found between those who participate and those who do not, and another digital gap between those who participate face-to-face and digitally. Its impact has been evaluated by age, more active and more digital young people, and by country, the most active and digital developed countries. Educating for digital citizenship becomes a priority to overcome the divides and improve democratic health. |
| C102 15:45-16:00 | Analysis of teenage cyberactivists on Twitter and Instagram around the world  
*Juan Sebastián Fernández Prados*, University of Almeria, Spain  
Abstract—The latest social movements of the second decade of this century have recently highlighted the image of teenage activists such as the paradigmatic case of Greta Thunberg. These teen activists engage in their activism through social media. Following an analysis of a dozen listings in books and websites of young and teenage activists, 38 teenage cyber-activists have been identified who at least have a Twitter or Instagram account. The main results point to a female profile and environmental causes. Another notable finding is the predominance of Instagram, which doubles the number of followers and macoinfluencers of Twitter. These adolescent experiences of digital activism can be a good model and pedagogical tool for education on critical and active digital citizenship. |
A Framework for Detecting and Summarizing Students' Typical Errors in English Teaching
Zhengwang Yu, Beijing University of Posts and Telecommunications Beijing, China

Abstract—With the development of online education, the mining and analysis of educational data has become especially important. In teaching, detecting students' typical errors is an extremely important factor for higher teaching efficacy. Most of the current researches use clustering or decision tree algorithms for partitioning. However, these algorithms more or less fail to recognize the connection between students and the errors they make, and cannot effectively and intuitively derive their typical errors. This paper proposes a framework that combines community detection and association rules to detect students' typical errors in English teaching. First, the framework adds the error auxiliary nodes and obtains the student's error communities and typical errors. Second, it calculates the errors' frequent itemsets, and mines the association rules between errors. And last, it combines the association rules with the error communities to supplement the potential errors, which effectively summarizes students' typical errors in their learning process.
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| C096 17:00-17:15 | The Practical Path of Labor View in the New Era to Promote the Innovation of Labor and Education Curriculum  
**Jingning Liu**, Wuhan University of Science and Technology, China  
Abstract—The concept of labor is formed on the basis of labor practice, and the role of the concept of labor in line with social development in regulating and guiding education is positive. The concept of labor in the new era has rich levels of guidance for labor and education, which can guide labor and education to cultivate innovative and technical talents in the new era, adjust the relationship between labor and education and society, and make the educational content more in line with social needs. In the process of implementing labor education curriculum, students are urged to establish a correct view of labor, highlight the spirit of labor, model workers and artisans, and strengthen the practice of labor education, which is conducive to giving full play to the role of labor view in labor education in the new era and promoting the innovation of labor education curriculum. |
| C105 17:15-17:30 | Research on the Influence of PBL Teaching on College Students’ Attitudes to Advanced Mathematics  
**Xin Hu**, Early Warning Academy, China  
Abstract—In order to meet the needs of talent training under the current situation, many colleges and universities have begun to adopt a problem-based teaching model (Problem-Based Learning, PBL) in their teaching. This article uses the "College Students <Advanced Mathematics> Learning Attitudes Scale" and semi-structured interviews as the main tools, and conducts teaching experiments to empirically test the influence of the PBL model on advanced mathematics learning attitudes. The survey results of the scale show that PBL teaching has a significant positive impact on the learning attitude of Advanced Mathematics. Through PBL teaching, students realize the value of advanced mathematics and increase their interest in learning, but PBL teaching does not significantly increase students’ confidence in learning. Combined with the analysis of interviews, the article puts forward three research inspirations for the practice of PBL teaching, in order to promote the development of PBL teaching reform in universities. |
| C110 17:30-17:45 | Exploration on the Cultivation of Innovative Undergraduate Talents in Computer Major Promoted by Organic Integration of Teaching and Scientific Research  
**Shanshan Gao**, Shandong University of Finance and Economics, Jinan, Shandong, China  
Abstract—With the development of the times, it has become the goal of higher education to focus on cultivating "innovative, compound, applied" talents. The key to cultivate compound innovative talents is to cultivate their practical and innovative ability in the computer major characterized by "high technology", "innovation", "frontier" and "practice". Talent cultivation depends on teaching and scientific research, which are two important functions of colleges and universities. Therefore, this paper first discusses the relationship between teaching and scientific research, and finds that teaching and scientific research are interdependent, mutually reinforcing and inseparable. Teaching must be supported by scientific research, and scientific research must also serve teaching. Then, based on years of teaching and scientific research experience, this paper shares some experiences of organic integration of teaching and research to promote the cultivation of innovative talents from these aspects: enriching teaching content with scientific research achievements, strengthening practice teaching through scientific research activities, promoting the improvement of teaching conditions with scientific research. |
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| C111 17:45-18:00 | Developing Fine-grained Performance Indicators for Assessment of Computer Engineering using Outcome-based Education  
*Khalid Ammar*, Ajman University, United Arab Emirates |
| **Abstract**—Continuous assessment of the program learning outcomes (PLOs) is a fundamental part of a higher education program for program improvement and desirable to maintain the requirements of accreditation bodies. Accreditation bodies provide considerable flexibility to institutions to show how the assessment are carried out, which is generally carried out by assessing the course learning outcomes (CLOs) and mapping CLOs to PLOs. While this provides an indication of which PLO is achieved and which needs attention, it risks missing out many fine-grained aspects of the learning outcomes. In this paper, we identify specific performance indicators (PIs) for each dimension for every PLO to precisely measure all individual performance criterion within the various dimensions of a PLO which leads to a proper remedial action for the program continuous improvement. We share the experiences learnt while developing and implementing this model for our program, with the updated ABET student learning outcomes (SLO) 1-7. |

| C083 18:00-18:15 | Conceptual change texts supported by the history of science to develop a qualitative understanding of the light wave  
*Hachmi Ali*, OAPM group, Laboratory of Materials, Waves, Energy and Environment, Department of Physics. Faculty of Sciences, Mohammed I University, Morocco |
| **Abstract**—In order to develop a qualitative understanding of the wave nature of light, we have designed and tested our approach which we call the Conceptual Change Texts Backed by the History of Sciences (CCTBHS). The CCTBHS uses two texts, one to recreate the controversy between Newton and Huygens over the nature of light, and the other to push students to engage in the task of resolving this controversy. In doing so, we aim to improve student’s use of the optical wave model and the geometric optical model, as well as the correct prediction of light behavior. We adopted the Pre-experimental method with the design of the pre and post-test and a group of 28 students in the third year of high school. The comparison of the initial and final conceptions showed that the CCTBHS succeeded in rectifying the scientifically unacceptable ideas of the students. |
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