2021 IEEE International Conference on Engineering, Technology & Education (TALE 2021)

Wuhan, Hubei Province, China 5 – 8 December 2021

Pages 1-579



IEEE Catalog Number: ISBN:

CFP21TAL-POD 978-1-6654-3688-5

Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP21TAL-POD
ISBN (Print-On-Demand):	978-1-6654-3688-5
ISBN (Online):	978-1-6654-3687-8
ISSN:	2374-0191

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



Title (very long titles are truncated)	Page range
Teaching Business Process Management with a Flipped-Classroom and Problem-based Learning approach with the Use of Apromore and	1-8
Programming Plagiarism and Collusion: Student Perceptions and Mitigating Strategies in Indonesia	9-14
Peak Shift Estimation: A Novel Method to Estimate Ranking of Selectively Omitted Examination Data	15-22
Japanese Elementary Schools' Playful Programming Curriculum Considerations: Readiness, Limitations and Teacher Training	23-28
A Bi-Channel Math Word Problem Solver With Understanding and Reasoning	29-34
Supporting students goal setting process using chatbot: implementation in a fully online graduate course	35-41
Teaching Computer System Courses with an Online Large-Scale Method	42-47
Developing, Delivering and Evaluating Teacher Professional Learning for a New School-Leaving Physics Syllabus using Action Research	48-51
Solving Explicit Arithmetic Word Problems via Using Vectorized Syntax-Semantics Model	52-58
Exploring the Students' Profiles of Academic Help Seeking in Tutoring Systems	59-64
On the Approaches of Solving Arithmetic Problems	65-70
Engineering Student Attitudes to Digital Reading Teaching Technology in the post-coronavirus era	71-78
Is Augmented Reality Robot as Effective as Physical Robot in Motivating Students to Learn Programming?	79-86
A Finance-Based Self-Learning Online Platform for Holistic Evaluation of Innovation Projects	87-93
Analysis of Learning Behavior Based on MOOC Data	94-98
The Influence of Learning Style on Biology Teaching in AR Learning Environment	99-105
Asia-Pacific STEAM Education in K-12 Schools: Systematic Literature Review	106-112
Students' Perception on Using Edmodo as Collaborative Problem-based Learning Platform	113-118
Learning Experiences in a Fully 3D Conference: Relationships with 3D Factors and Innovative Mindset	119-125
Comparative Study on Collaborative Innovation Practices for Excavating Innovation Potentials of Undergraduates in Engineering	126-131
A Relation-Centric Solver for Text-Diagram Function Problems	132-137
A domain adaptive and continual learning method for skeleton behavior recognition in classroom environment	138-144
Fine-graining Conversational Filler Usage in Computer-assisted Language Teaching	145-150
Development of Open-Response Prompt-Based Metacognitive Tutor for Online Classrooms	151-158
Teaching Android App Development to First Year Undergraduates: Textual Programming or Visual Programming?	159-166
Knowledge Tracing With Learning Memory and Sequence Dependence	167-172
Exploring Fair and Effective Online Electronic Exam in place of In-Person Examinations during Remote Learning	173-179
Effects of Different Activities on Learning Efficiency of m-Learning Users	180-187
Learner's Experience About Freehand Sketching Vs CAD For Concept Ideation Process During Product Design Development	188-195
Research on the Impact of Expectation on Knowledge Sharing of Online Learners	196-203
Anomaly Detection for Early Warning in Object-oriented Programming Course	204-211
EtherLearn: Decentralizing Learning via Blockchain	212-217
Bug Fixing versus Code Reading: Which Is Better for Algorithm Learning?	218-225
A Personalized Online Homework System in a Freshman Engineering Linear Algebra Course	226-232
Investigating Creativity in Computer Science Syllabi in Australia	233-240
Learning through Formula Student Electric: Students and Staff Perspectives	241-247
Why Not More Virtual Reality in Higher Ed Teaching and Learning?	248-254
On Individualized Online Assessments in STEM Subjects	255-260
On Analysing Student Resilience in Higher Education Programs using a Data-Driven Approach	261-267
Breaking Boundaries: Students' Motivation Toward Interdisciplinary Learning in Higher Education	268-275
Super-Node Topology in Collaborative Learning: Concrete Examples and Benefits	276-282
Implementation of Long Short-Term Memory (LSTM) Models for Engagement Estimation in Online Learning	283-289
Learning Analytics of the Relationships among Knowledge Constructions, Self-regulated Learning, and Learning Performance	290-297
Study on the Influence of Interaction Style on Learners	298-303
Educational Robot Aided Photo Taking and Management	304-310
An Enhanced Intelligent Teaching Support System for College Courses	311-317
Conversion of Virtual Lab Experiments using FOSS: A Case Study of Virtual Labs by NMEICT	318-324
ns3-lab: a Scalable Online NS-3 Lab Platform for Learning Computer Networks	325-331
Virtual Reality-Based Immersive Digital Learning Resources: Initial Study of the Design Features Perception from Future Architects	332-337
Effect of Embedding Prompts on Learning Performance and Metacognitive Monitoring	338-344
Computational Thinking Test for Lower Primary Students: Design Principles, Content Validation, and Pilot Testing	345-352
How do Learners Learn: Behavioral Profiles of High School Math Learners	353-358

Title (very long titles are truncated)	Page range
A Mobile Computing Based Attendance System and Students' Attitude Study	359-366
SRACR: Semantic and Relationship-aware Online Course Recommendation	367-374
Towards a systematic educational framework for human-machine teaming	375-382
Interactive Virtual Reality Game for Online Learning of Science Subject in Primary Schools	383-389
Cybersecurity training for Web Applications through Serious Games	390-398
Using a Visualization System To Enhance Students' Online Learning Participation Based on Learning Behaviors and Social Presence	399-404
Exploring Intrinsic Motivation Types in Augmented Reality Systems: Differences in Technology Acceptance, Learning Performance, and	405-411
Factor Analysis for the Acceptance of Introductory Courses Among University Students in China	412-419
The Cloud-Based Textbook on campus: From Choice to Advantage	420-427
Missed Information: A Video Game Designed to Teach Methods of Spotting Fake News in Social Media	428-435
A Systematic Review of Virtual Reality Interventions for Children with Social Skills Deficits	436-443
A Study of Debugging Sequence on Multi-Bug Program	444-449
Dynamic Educational Knowledge Graph Model via Information Entropy for Knowledge Building	450-456
Exploring Students' Flow Level, Social Centrality, and Academic Achievement in a Blended Course	457-464
Towards self-regulated individual learning path generation using outcome taxonomies and constructive alignment	465-472
Developing Creative Digital Communication, Learning Resources and Evaluation Skills with YouTube and Self and Peer-Assessment	473-478
A Novel Instructional Design Based on Cognitive Apprenticeship Model to Enhance Teaching Network Management	479-486
Artificial Intelligence in the Assessment Process of MOOCs using a cloud-computing ecosystem	487-493
Learning by Doing from Afar: Mobilizing the Internet of Things to Enrich Remote Learning	494-499
Research on student behavior characters from the campus big data	500-505
A Framework of Cross-Modal Learning for Solving Geometry Problems	506-512
Data Analysis for Curriculum Alteration in Information Communication Technology	513-518
Content Clock Graph: Visualizing Teaching Orchestration from Classroom Videos	519-524
Solving Solid Geometric Calculation Problems in Text	525-530
A Paradigm of Diagram Understanding in Problem Solving	531-535
Shuishan Online: Constructing and Teaching with A Data-driven Learning Platform	536-543
An Analysis System of Classroom Interaction in Higher Education Based on PORTAAL	544-549
Introducing a Discussion Support System using Individual Audio Instruction to Activate Passive Members	550-557
Analysis of Emphasis and Prosodic Features on Face-to-Face Discussions	558-564
AI Builders: Teaching Thai Students to Build End-to-End Machine Learning Projects Online	565-572
Entity-Dependency Graph Enforced Quantity Relation Extraction for Solving Arithmetic Word Problems	573-579
A Data Mining Approach for Early Prediction Of Academic Performance of Students	580-587
Adaptive User Interface for Smart Programming Exercise	588-594
Challenges and Exit Strategies for Adapting Interactive Online Education Amid the Pandemic and its Aftermath	595-602
Teachers' Stages of Concern on STEM Education in a Rural Secondary School in Guangzhou	603-608
The Readiness of Shenzhen Primary Science Teachers Using Problem-Based Learning to Implement STEM Education	609-614
Serious Game for Medical Imaging in Fully Immersive Virtual Reality	615-621
Analysis of the relationship between fine-grained daily spatial and temporal activity frequency and academic performance	622-629
Hong Kong Science In-service Teachers' Behavioural Intention towards STEM Education and Their Technological Pedagogical Content	630-637
Exams with Internet Access in a Fundamental Engineering Course	638-645
DeepCURATER: Deep Learning for CoURse And Teaching Evaluation and Review	646-653
Teaching Visualization-first for Novices to Understand Programming	654-660
Effective Learning of Cybersecurity Concepts with Model-Eliciting Activities	661-667
Animated MOOC Videos on Semiconductor Devices and Their Versatile Use for Self-Learning & Formal Teaching Delivery	668-672
An Optimized Course-Offering Approach Based on Multi-Agent Negotiation	673-680
A Student Performance Predication Approach Based on Multi-Agent System and Deep Learning	681-688
A Multi-Agent-Based Approach for the Study of Student Behavior Dynamics in Peer Learning Environments	689-694
The Intervention Model for Children with Autism Spectrum Disorder Based on Educational Game	695-702
Joint gaze estimation and facail expression for student engagement prediction in collaborative learning	703-707
Perspective Study of 2012-2020 TALE Publications	708-714
A Review of Research on Language Intervention Methods for Autistic Children at Home and Abroad	715-722
Designing an Effective Hackathon via University-Industry Collaboration for Data Science Education	723-728

Title (very long titles are truncated)	Page range
Comparison Experiment of Learning State Between Visual Programming Language and Text Programming Language	729-733
Statistical Moderation: A Case Study in Grading on a Curve	734-739
Online Teaching on Student Programming Performance During the Pandemic	740-744
Group Reports in the Online Platform: A Puzzle, a Ride in the Park or a Steep Slope: A Case Study of Multicultural Undergraduates in the	745-750
X-Reality (XR) and Immersive Learning: Theories, Use Cases, and Future Development	751-754
A Digital Tool to Provide Pre-Screening to Dyslexia in Hong Kong	755-761
COVID- 19 pandemic and Online Teaching from the Lenses of K-12 STEM Teachers in Albania	762-768
On The Necessity of Multi Physical Fields Simulation Experiments in MEMS Teaching	769-773
Differences in learning engagement, academic workload, and technology use during online learning: a comparison among primary, middle,	774-779
Reverse Engineering Pedagogy as an Educational Tool to Promote Symbiosis between Design and Physics	780-784
A Component-detection-based Approach for Interpreting Off-line Handwritten Chemical Cyclic Compound Structures	785-791
Pair Learning in Robotics Education: Design, Outcomes, and Lessons Learned	792-796
A Step Toward a Tailor-Made Education Realization for Engineering Experiments With Online/on-Demand Approach	797-802
Evolution of Skill Training in Nuclear Power Plants	803-807
An Algorithm for Correcting Video-Audio Asynchronization Based on Syncnet	808-811
Using Simulated Work-Integrated Learning in Mechatronics Courses	812-817
Math Word Problem Solver Based on Text-to-Text Transformer Model	818-822
Two-Stream Completeness Modeling for Weakly Supervised Temporal Action Detection	823-828
Autonomous Assessment of a Laboratory Exam for the Digital Hardware Curriculum	829-833
Arithmetic Problem Solver Based on BERT Model and Mathematical Cognitive Pattern	834-837
Enhancing Adaptive Online Chemistry Course with AI-Chatbot	838-843
Rotation Invariance for Offline Handwritten Chemical Organic Ring Structure Symbols Recognition	844-848
Topic Modeling in MOOCs: What Was to Be Discussed, What the Instructor Discussed, and What the Learners Discussed	849-853
Applying Peer Instruction to Computer Science Students Using Non-native Language: A Study with Undergraduate Students	854-858
Combining Periodic Feature and Behavioral Transfer With Ensemble of Models for MOOCs Dropout Prediction	859-864
Analysis of Computer Science Textbooks by Topic Modeling and Dynamic Time Warping	865-870
Development of a Game to Foster Programming Thinking for Learning through Reading Program	871-876
Hotspots and Trends of Research on Smart Learning Environments in China: Bibliometric Analysis by Citespace	877-882
Instructional design based on Discrete-event simulation: provide a humanized and complete experiential learning cycle	883-889
The Social Creative Expression of College Students under Different Problem Situations: A Virtual Reality Research	890-893
Embedding VRAD (Virtual Reality Aided Design) in Architectural Pedagogy	894-898
Effects of Tangible Rewards on Student Learning Performance, Knowledge Construction, and Perception in Fully Online Gamified Learning	899-904
ChemPOV: Digitizing an Organic Chemistry Boardgame to Support Online Learning	905-909
Does Team Teaching Improve Student Engagement in an Age of Digital Learning	910-914
Exploring the Essential Word Lists for Engineering Education: Engaging the Vocabulary Profiling Approach (VPA)	915-918
Utilizing a Telegram Quiz Bot to Promote Retrieval Practice	919-923
Experiential Learning Through Remote Electrical Engineering Labs During the COVID-19 Pandemic	924-928
Planning and Design of Online Peer Assessment Professional Development Training in Higher Education	929-933
Effect of Using Embodied Avatars on Turn-taking during Conversational Activities in a Social VR Space	934-937
Design and Implementation of Virtual Sanxian Teaching System	938-943
Impact of Educational Robotics on Student Learning and Motivation: A Case Study	944-949
The CLEAR Framework to Implement Active Learning in STEM Education	950-954
Comparative Analysis of the Quality of Accreditation among the Electronics Engineering Program of Private and Public Higher Education	955-960
Patterns and Trends in Online Learning Behaviors: Evidence from Google Analytics	961-964
Developing Evaluation Criteria for Engineering Training Programs in Remote Medical Education in Asia	965-969
Communication Network Experiment Design Based on Virtual Simulation Platform	970-975
The Context-Oriented System based on ELECTRA for Solving Math Word Problem	976-981
Mobile Participatory Simulation of COVID-19 Transmission Using the micro:bit	982-985
Stacking Ensemble Learning-based Gender Identification for User Profiling in Smart Education	986-991
An Overview of China-New Zealand Joint Cooperative Higher Education Programs	992-996
Teaching Security Notions in Entry-Level Programming Courses	997-1000

Title (very long titles are truncated)	Page range
Motivation Generator: An Empirical Model of Intrinsic Motivation for Learning	1001-1005
A Hands-On Mobile Device Forensics Course in Cybersecurity Education	1006-1010
Model of Nonlinear Learning Path using Heutagogy	1011-1016
Rethinking Educational Excellence with the Digital Transformation: A New Perspective on Developing Tech-driven Virtual Mentoring Platform for Unfinished Learning amid Covid-19	1017-1022
Mobile learning and Social Media Applied in Entrepreneurship Education Courses in a Higher Vocational College	1023-1027
Sentence Learning System for Children with Dyslexia to Learn English As Second Language	1028-1032
A Prior Probability of Speaker Information and Emojis Embedding Approach to Sarcasm Detection	1033-1038
Fostering Computational Thinking and Systems Thinking through Aquaponics Capstone Projects	1039-1044
Industrial Doctorate: A Case Study of EngD in the UK	1045-1050
Managing Hands-on Electrical and Computer Engineering Labs during the COVID-19 Pandemic	1051-1056
CARES Model for Computing Education	1057-1061
Improving Online Teaching Based on Knowledge Tracing Model	1062-1066
Practical Application of the Learning Mechanics-Game Mechanics Framework for Serious Games Design and Analysis for the Development of	1067-1072
DiGen: Distractor Generator for Multiple Choice Questions in Code comprehension	1073-1078
Data Analytic Framework on Student Participation in Generic Competence Development Activities	1079-1084
Learning Delicate Pixel-Level Representations for Bottom-Up Human Pose Estimation	1085-1090
A call for a systematic analysis of the environmental impact of education technologies	1091-1096
An Integrated Observing Technic for Collaborative Learning Engagement: The Multimodal Learning Analytics Based on the Video Coding	1097-1101
A Computer Supported Collaborative Annotation System	1102-1105
Examining the Brain Functional Connectivity Pattern of Children with Dyslexia during Rapid Naming Tasks: A Preliminary Study	1106-1111
An Emotional Intervention System for Children with ASD Based on the First Order Motion Model	1112-1117
An Avatar-Based Personal Pronouns Intervention System for Children with Autism Spectrum Disorder	1118-1123
Application of Computer Games in the Visual Perception Assessment of Children with Autism Spectrum Disorder	1124-1129
Leveraging Real-Time Simulation and Collaboration Platform for Project-Based Learning: Case Study of Astana IT University	1130-1134
A preliminary study of brain connectivity in autism using affection-evoked movie clips	1135-1138
World Class STEM – Benchmarking and Delivering based on Evidence Based Cognitive Science	1139-1144
Retrieval Practice for Effective Teaching of an Engineering Course	1145-1149
Welcome to the Microworld: STEAM Education Approach to Learn Plant Ultrastructure Cell Biology	1150-1153
E-Teaching Process Analysis and Development: From a Human Resource Development Perspective	1154-1157
Exploring the role of different types of peer affective pedagogical agents in video learning	1158-1160
The Eye Gaze Tracking During Online Learning with Teacher's Facial Image for Junior and Senior High School Students	1161-1162
Enhancing Peer Assessment Validity with Engagement Behaviors: A Structural Equation Modeling Approach	1163-1166
Work-in-progress: Didactical Design for Virtual Reality Education	1167-1170
A System Framework to Support the Collaborative Reading for Students	1171-1173