19th International Conference on Cognition and Exploratory Learning in Digital Age (CELDA 2022)

Lisbon, Portugal 8-10 November 2022

Editors:

Demetrios G. Sampson Dirk Ifenthaler Pedro Isaías Luís Rodrigues

ISBN: 978-1-7138-6378-6

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2022) by International Association for Development of the Information Society (IADIS) All rights reserved.

Printed with permission by Curran Associates, Inc. (2023)

For permission requests, please contact International Association for Development of the Information Society (IADIS) at the address below.

International Association for Development of the Information Society (IADIS) Rua Sao Sebastiao Da Pedreira No. 100, 30, 1050-209 Lisbon, Portugal

Phone: 351 21 3151373 Fax: 351 21 3151244

secretariat@iadis.org

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 Email: curran@proceedings.com Web: www.proceedings.com

TABLE OF CONTENTS

| FOREWORD | xi |
|-------------------|------|
| PROGRAM COMMITTEE | xiii |
| KEYNOTE LECTURE | XV |

FULL PAPERS

| SYNCHRONOUS AND ASYNCHRONOUS ONLINE LEARNING IN ENGLISH LANGUAGE CLASSROOMS IN INDONESIA: A LITERATURE REVIEW Akhyar Rido, Heri Kuswoyo and Berlinda Mandasari | 3 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| DIDACTIC ACTIVITIES ON ARTIFICIAL INTELLIGENCE: THE PERSPECTIVE OF STEM TEACHERS Cecilia Fissore, Francesco Floris, Marina Marchisio and Matteo Sacchet | 11 |
| A SYSTEMATIC REVIEW OF RESEARCH ON EFL ONLINE LEARNING: EFFECTIVENESS, CHALLENGES, LEARNING TOOLS, AND SUGGESTIONS Heri Kuswoyo, Akhyar Rido and Berlinda Mandasari | 19 |
| CLUSTERING TECHNIQUES TO INVESTIGATE ENGAGEMENT AND PERFORMANCE IN ONLINE MATHEMATICS COURSES Francesco Floris, Marina Marchisio, Fabio Roman, Matteo Sacchet and Sergio Rabellino | 27 |
| MIDDLE SCHOOL STUDENTS' INFORMATION AND COMMUNICATION LITERACY DEFICITS STUDY Svetlana Avdeeva and Alexander Uvarov | 35 |
| DETERMINING LEARNERS' BEHAVIORAL PATTERNS IN A TECHNOLOGY AND ANALYTICS ENHANCED ASSESSMENT ENVIRONMENT Muhittin Şahin and Dirk Ifenthaler | 42 |
| TOWARD BETTER DRIVING WITH GAZE AWARENESS ENVIRONMENT SUPPORTED BY AREA SEGMENTATION Taketo Yamada, Kenji Matsuura, Hironori Takeuchi, Akihiro Kashihara, Kenichi Yamasaki and Genta Kurita | 49 |
| LINKING GAMIFICATION, LUDOLOGY AND PEDAGOGY: PRINCIPLES TO DESIGN A SERIOUS GAME Joshua Esterhuizen, Günther Drevin, Dirk Snyman and Lynette Drevin | 57 |
| DEVELOPING AN ONTOLOGY OF MULTIPLE PROGRAMMING LANGUAGES FROM THE PERSPECTIVE OF COMPUTATIONAL THINKING EDUCATION Lalita Na Nongkhai, Jingyun Wang and Takahiko Mendori | 66 |

| STUDENT PERCEPTIONS OF AI-POWERED WRITING TOOLS: TOWARDS INDIVIDUALIZED TEACHING STRATEGIES Michael Burkhard | 73 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| PHYSICAL COMPUTING SYSTEMS – A SYSTEMATIC APPROACH Eric Schätz and Alke Martens | 82 |
| HOW GENERATIVE LANGUAGE MODELS CAN ENHANCE INTERACTIVE LEARNING WITH SOCIAL ROBOTS Stefan Sonderegger | 89 |
| IDENTIFYING CHALLENGES IN VIRTUAL TEAMS: A CASE STUDY OF TEAMWORK IN A GAME-BASED LEARNING ENVIRONMENT Kirsi Syynimaa, Kirsi Lainema and Timo Lainema | 97 |
| STUDENT ACCEPTANCE OF SOCIAL ROBOTS IN HIGHER EDUCATION – EVIDENCE FROM A VIGNETTE STUDY Josef Guggemos, Stefan Sonderegger and Sabine Seufert | 105 |
| SUPPORTING LEARNING COMMUNITIES VIA WEB SERVICE TECHNOLOGIES: NAVIGATING KNOWLEDGE TRANSFER BETWEEN INFRASTRUCTURAL SERVICES AND USER NEEDS Annika Wilmers and Sigrid Fahrer | 115 |
| INTRODUCTION OF COMPUTER-BASED SIMULATED EXPERIMENTS IN UNIVERSITY PSYCHOLOGY CLASS: A CLASS PRACTICE OF LEARNING DUAL STORAGE MODEL OF HUMAN MEMORY Kazuhisa Miwa, Mayu Yamakawa and Kazuaki Kojima | 124 |
| STUDENTS USE OF LEARNING AIDS: LESSONS FROM LEARNING ANALYTICS Dirk Tempelaar | 131 |
| AN EDUCATIONAL UNIFIED MODELLING LANGUAGE PROGRAMMING ENVIRONMENT AND ITS TWO CASE STUDIES Ryoga Maruyama, Shinpei Ogata, Mizue Kayama, Nobuyuki Tachi, Takashi Nagai and Naomi Taguchi | 139 |
| AUTOMATIC SPEECH RECOGNITION SYSTEM TO ENHANCE THE USE OF VOCALIZATION STRATEGY Saki Hirata and Masanori Yamada | 147 |
| ENHANCING ONLINE LEARNING FOCUSING ON THE RELATIONSHIP BETWEEN GAZE AND BROWSING MATERIALS Hironori Takeuchi, Kenji Matsuura and He Lei | 155 |
| THE PATTERN OF TEST-TAKING EFFORT ACROSS ITEMS IN COGNITIVE ABILITY TEST: A LATENT CLASS ANALYSIS Hanif Akhtar | 162 |
| PREDICTING NON-ROUTINE MATHEMATICAL PROBLEM-SOLVING ANXIETY OF NINTH GRADERS Emre Dinç, Dilek Sezgin-Memnun, Eunseo Lee and Bünyamin Aydın | 169 |
| EXPERIENCING FLOW IN VIRTUAL REALITY: AN INVESTIGATION OF COMPLEX INTERACTION STRUCTURES OF LEARNING-RELATED VARIABLES Miriam Mulders | 177 |

| EXPLORING THE ATTENTIONAL PROFILE OF GIFTED CHILDREN USING A VR-BASED ASSESSMENT TOOL Roberta Renati, Natale Salvatore Bonfiglio, Maria Lidia Mascia and Maria Pietronilla Penna | 185 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| KNOWLEDGE MAPPING FOR CREATIVE THINKING Alberto Giretti, Massimo Lemma, Matteo Zambelli and Franco Ripa di Meana | 193 |
| AFFORDANCES AND CONSTRAINTS OF THE E-ASSESSMENT SYSTEM NUMBAS: A CASE STUDY IN MATHEMATICS TEACHER EDUCATION Said Hadjerrouit and Celestine Ifeanyi Nnagbo | 201 |
| EDUCATIONAL CHATBOTS FOR COLLABORATIVE LEARNING: RESULTS OF A DESIGN EXPERIMENT IN A MIDDLE SCHOOL Michael Burkhard, Sabine Seufert, Matthias Cetto and Siegfried Handschuh | 209 |
| FLIPPED LEARNING IN CORPORATE CONTEXTS: A CASE STUDY Enrichetta Gentile, Paola Plantamura, Teresa Roselli and Veronica Rossano | 219 |
| EVALUATING DIFFERENT ASSESSMENT TYPES IN AN ONLINE GEOSCIENCE COURSE Emre Dinç and April L. Millet | 226 |
| PROBLEMATIC SMARTPHONE USE AND COGNITIVE FAILURES. AN EXPLORATIVE STUDY AMONG FREE DIFFERENT GENERATIONS (X, Y, Z) Maria Lidia Mascia, Natale Salvatore Bonfiglio, Roberta Renati, Stefania Cataudella, Łukasz Tomczyk and Maria Pietronilla Penna | 233 |
| EXPLORING SEMI-SUPERVISED LEARNING FOR AUDIO-BASED AUTOMATED CLASSROOM OBSERVATIONS Akchunya Chanchal and Imran Zualkernan | 241 |
| HOW DOES THE USE OF OPEN DIGITAL SPACES IMPACT STUDENTS SUCCESS AND DROPOUT IN A VIRTUAL UNIVERSITY? Khalifa Sylla, Guy Merlin Mbatchou Nkwetchoua and François Bouchet | 251 |
| SECURE DEMATERIALIZATION OF ASSESSMENTS IN DIGITAL UNIVERSITIES THROUGH MOODLE, WEBRTC AND SAFE EXAM BROWSER (SEB) Khalifa Sylla, Birahim Babou and Samuel Ouya | 259 |
| QUALITATIVE INDICATORS IN THE E-LEARNING ENVIRONMENT Ivana Ogrizek Biškupić, Josip Lopatič and Mihaela Banek Zorica | 267 |
| THE SUCCESS FACTORS OF THE DIGITAL TRANSFORMATION OF HIGHER EDUCATION INSTITUTIONS: THE EXPERIENCE OF HASSAN 2 UNIVERSITY OF CASABLANCA (UH2C) IN MOROCCO Birahim Babou, Khalifa Sylla and Samuel Ouya | 275 |

SHORT PAPERS

| USING E-STUDY MATERIALS TO PROMOTE MATHEMATICS | |
|---------------------------------------------------|--|
| SELF-LEARNING AT UNIVERSITY | |
| Anna Vintere, Sarmite Cernajeva and Vera Gosteine | |

285

| USING ZOOM MEETING PLATFORM AS A SYNCHRONOUS ONLINE LEARNING TOOL IN EFL CLASSROOM AT INDONESIA TERTIARY LEVEL: A LITERATURE REVIEW Berlinda Mandasari, Akhyar Rido and Heri Kuswoyo | 291 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| LEARNING SYSTEM USING CROSS REALITY TECHNIQUE FOR PHYSICAL ELECTRONIC CIRCUIT CONSTRUCTION AND VIRTUAL MID-AIR OPERATIONS Atsushi Takemura | 295 |
| THE IMPACT OF A SOCIAL ROBOT'S VOICE ON CHILDREN'S LEARNING Hsiu-Feng Wang and Shin-Lan Shiu | 299 |
| DESIGNING A GAMIFIED WEB APPLICATION FOR TRAINING ACADEMIC READING SKILLS Ella Dovhaniuk and Tobias Thelen | 303 |
| THE FUTURE OF TEACHING AND LEARNING: FACE TO FACE, HYBRID, AND ONLINE INSTRUCTIONAL DELIVERY MODELS John W. Hatcher III, Angela King-Corken and Thomas DeVaney | 308 |
| A DIGITAL EDUCATIONAL GAME FOR PRACTICING OER Lubna Ali, Quang Phung, Rene Roepke and Ulrik Schroeder | 313 |
| THE EQUITY OF PEDAGOGICAL APPROACHES IN E-LEARNING INITIATIVES IN HIGHER EDUCATION INSTITUTIONS IN UNITED ARAB EMIRATES Lina Daouk, Nafeth Hamdi Al Hashlamoun and Mai Ezzat | 317 |
| TRAINING PREFERENCES OF ADULT LEARNERS IN ONLINE LEARNING ENVIRONMENTS: DISTANCE LEARNING GATE Muhittin Şahin, Cennet Terzi Müftüoğlu, Savaş Ceylan and Salim Atay | 323 |
| LEARNING ANALYTICS BASED INTERVENTIONS: A SYSTEMATIC REVIEW OF EXPERIMENTAL STUDIES Mustafa Tepgeç and Dirk Ifenthaler | 327 |
| A MEMORY PALACE FOR BRAIN ANATOMY AND FUNCTION REPRESENTED IN VIRTUAL REALITY Ludivine Blais, Hossain Samar Qorbani, Ali Arya and Jim Davies | 331 |
| USING MARKOV CHAIN ON ONLINE LEARNING HISTORY DATA TO DEVELOP LEARNER MODEL FOR MEASURING STRENGTH OF LEARNING HABITS Tuan M. Tran and Shinobu Hasegawa | 335 |
| THE VALUE OF VIRTUAL REALITY AS A COMPLEMENTARY TOOL FOR LEARNING SUCCESS Thomas Keller, Rosalia Curcio and Elke Brucker-Kley | 339 |
| LEARNING AND TEACHING COMPUTATIONAL THINKING: A CROSS-DISCIPLINARY, COLLABORATIVE, USER-CENTERED DESIGN MODEL Mahnaz Moallem, Dastyni C. Loksa, Marcia Vandiver, Qing Li, Qijie Cai, Rachel Billman, | 345 |
| Lea Ann Christenson, Melike Kara and Christine Engbert LONG-TERM INTERACTION WITH A VIRTUAL ROBOT FACILITATOR OF SMALL GROUP DISCUSSIONS Elinor Mizrahi, Noa Danzig and Goren Gordon | 349 |

| A DIGITAL STUDY ASSISTANT FOR HIERARCHICAL GOAL SETTING COMPANION FACES THE FIRST REAL USERS <i>Felix Weber</i> | 354 |
|------------------------------------------------------------------------------------------------------------------------------|-----|
| ON THE EFFECTIVENESS OF AN AI-DRIVEN EDUCATIONAL RESOURCE RECOMMENDATION SYSTEM FOR HIGHER EDUCATION Johannes Schrumpf | 359 |

REFLECTION PAPERS

| AI SUPPORTED EMOTIONS ANALYSIS: A SYSTEM TO PROMOTE | 367 |
|-------------------------------------------------------------|-----|
| ENGAGEMENT IN DIGITAL LEARNING | |
| Lucio Monterubbiano and Chiara Moroni | |
| SELF-ORGANIZED TEACHERS LEARNING TO OVERCOME THE | 370 |
| CHALLENGES OF REMOTE STUDIES | |
| Sarmite Cernajeva and Anna Vintere | |
| THE ACCESSIBLE MULTIMEDIA EDUCATIONAL PILLS (MEP): A FORMAT | 373 |
| TO PROMOTE INCLUSION IN CORPORATE DIGITAL LEARNING | |
| Chiara Moroni and Lucio Monterubbiano | |