SIe-L | Società Italiana di e-Learning

UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

ISYDE 2023

Italian Symposium on
DIGITAL EDUCATION

Reggio Emilia, 13 - 15 September 2023

Innovating Teaching & Learning.
Inclusion and Wellbeing for the Data Society

BOOK OF ABSTRACT

INDEX

ID 113 - A FRAMEWORK FOR LEARNING DESIGN AND SELF-REGULATED LEARNING: FIRST RESULTS OF SUPERRED PROJECT

Alice ROFFI, Gabriele BIAGINI, Stefano CUOMO, Maria RANIERI

ID 114 - AUGMENTED DIDACTIC: AUGMENTED REALITY FOR LEARNING AND MOTIVATION THROUGH A MULTIDISCIPLINARY APPROACH

Luna LEMBO, Elèna CIPOLLONE, Pietro OLIVA

ID 115 - FROM LMS TO LLMS: LEARNING MANAGEMENT SYSTEMS ENHANCED THROUGH LARGE LANGUAGE MODELS

Susanna SANCASSANI, Daniela CASIRAGHI

ID 116 - ARTIFICIAL INTELLIGENCE AND A CASE STUDY IN THE EDUCATIONAL CONTEXT OF YOUNG UNIVERSITY STUDENTS

Paolo FERRI, Giovanna DI ROSARIO

ID 117 - THE FEAR OF BLOOD DRAWS: NAO'S SUPPORT TO REDUCE ANXIETY AND STRESS IN CHILDREN.

Lino ROSSI, Enrico ORSENIGO, Maria VALENTINI, Marinella GARGIULO, Elisa BISAGNO, Alessia CADAMURO

ID 118 - USING A STUDENT RESPONSE SYSTEM (SRS) TO FOSTERING LEARNING: ANALYSIS OF DIFFERENT TYPES OF QUESTIONING

Isabella BRUNI, Francesca PEZZATI, Maria RANIERI, Marius Bogdan SPINU

ID 119 - THE SMART LEARNING DESIGN MODEL EXPERIMENTATION IN THE PHD COURSE "TEACHING METHODOLOGIES, STRATEGIES AND ACTIVITIES"

Susanna SANCASSANI, Valeria BALDONI, Federica BRAMBILLA

ID 121 - TECHNOLOGICAL AND DIGITAL CAPITAL OF PARENTS: A CONSTRUCT TO ANALYSE DIGITAL SKILLS

Giorgio CECCHI, Sara MORI

ID 122 - UNBLACKBOXING REALITY THROUGH LOGIC AND PHILOSOPHY OF LANGUAGE: TEACHERS' KNOWLEDGE AND NEW PATHS FOR TECHNOLOGY EDUCATION

Margherita DI STASIO, Luca ZANETTI, Cristina COCCIMIGLIO

ID 123 - "DO YOU EMOJI"? EMOJI COMPREHENSION IS PREDICTED (POSITIVELY) BY THEORY OF MIND AND (NEGATIVELY) BY THE FREQUENCY OF USE OF SOCIAL MEDIA

Elisa BISAGNO, Alessia CADAMURO

ID 125 - E-LEARNING AT THE UNIVERSITY OF BURGOS: INSTRUCTIONAL DESIGN AND NEW CHALLENGES WITH ARTIFICIAL INTELLIGENCE

Marta SANZ MANZANEDO

ID 128 - INTO THE WILD OF OPEN LICENSES' USE: AN ORIENTEERING GUIDE FOR TEACHERS AND PRACTITIONERS

Alessandra TOMASINI, Paola CORTI

ID 129 - BLENDING IVR WITH AI IN TEACHER TRAINING FOR LANGUAGE EDUCATORS
Ilaria COMPAGNONI

ID 130 - INCLUSIVE TEACHING: BLACKBOARD ALLY AND ACCESSIBILITY IN CATHOLIC UNIVERSITY
Luigi D'ALONZO, Sara GENGHI, Flavia Maria SCOTT, Elena TASSALINI

ID 131 - THE USE OF DIGITAL BADGES IN HIGHER EDUCATION. A CASE STUDY OF THE IMPACT ON COLLEGE STUDENTS
Federica PELIZZARI

ID 132 - PNRR AND SCHOOL INNOVATION BETWEEN INCLUSIVE PROCESSES AND POTENTIAL SCENARIOS
Massimiliano LO IACONO, Rossella SGAMBELLURI

ID 133 - THE ELECTRONIC MIDWIFE: SELF-EDUCATION THROUGH VIDEOGAMES AS A FORM OF MAIEUTICS
Fabrizio Fulio BRAGONI

ID 134 - TOWARDS A SYNCHRONOUS INTERACTIVE TELEPRESENCE
Andrea GARAVAGLIA, Ilaria TERRENGHI, Maurizio DE NINO

ID 135 - ONLINE APPLICATION FOR THE EARLY DETECTION OF STUDENTS AT RISK OF FAILING THROUGH ARTIFICIAL INTELLIGENCE
Giacomo NALLI, Andrea MARCONI, Sašo KARAKATIČ, Lucija BREZOČNIK, Anita MONTAGNA, Daniela AMENDOLA, Renato DE LEONE

ID 136 - ANALYSIS OF THE MULTIFACETED STUDENTS' EXPERIENCE IN USING VIDEO RECORDED LES SONS OF PHYSICS DELIVERED BY THE MOODLE PLATFORM
Daniela AMENDOLA, Giacomo NALLI, Andrea PERALI

ID 137 - PRODUCING DIGITAL ARTIFACTS TO COUNTER "DIGITAL EDUCATION POVERTY" IN THE LOGIC OF THIRD SPACE LEARNING
Stefano PASTA, Michele MARANGI

ID 139 - HATE SPEECH ONLINE: DETECTION METHODOLOGIES BETWEEN ALGORITHMIC AND QUALITATIVE EVALUATIONS. A CASE STUDY ON ANTI-SEMITISM ON TWITTER
Stefano PASTA

ID 140 - OPEN DATA AT SCHOOL FOR PROMOTION OF SOFT AND TRANSVERSAL SKILLS AND DEVELOPMENT OF DIGITAL AWARENESS
Flavia GIANNOLI

ID 141 - E-LEARNING AND CRIME PREVENTION: LESSONS FROM PAST EXPERIENCES AND RESEARCH
Giacomo DI GENNARO, Barbara VETTORI

ID 142 - OPEN EDUCATION FOR LIFELONG LEARNING & PUBLIC SECTOR PROFESSIONAL DEVELOPMENT: THE CASE OF FEDERICA WEBLEARNING LANGUAGE MOOCS
Ruth KERR, Valentina REDA

ID 143 - PREBUNKING AS PREVENTIVE ECOLOGY: THE CASE OF CONSPIRACY THINKING

Moriggi STEFANO, Bruno NICOLA

ID 144 - AUGMENTED AND VIRTUAL REALITY: AN INNOVATIVE APPROACH TO LEARNING "DIGITAL HUMANITIES"

Vivien VALLI, Nadia CARLOMAGNO

ID 145 - INSIDE BLACK MIRROR: MEDIA, SOCIETY, EDUCATION: A MULTIDISCIPLINARY WORK FOR THE STUDY OF MEDIA AND AUDIOVISUAL EDUCATION AT SCHOOL

Alessandra CARENZIO, Elisa FARINACCI

ID 146 - DIGITAL TRAINING IN PUBLIC ADMINISTRATION: RESULTS AND CHALLENGES. THE EXPERIENCE OF THE "REGIONE IN FORMAZIONE" PROJECT BY FEDERICA WEB LEARNING

Francesco BIZZARRO, Giuseppe SANCHEZ, Gabriele AMBROSANIO

ID 147 - GAMES AND VIDEO GAMES AS SCENARIOS TO SUPPORT DIGITAL LITERACIES: THE FIRST RESULTS FROM THE INTERNATIONAL PROJECT YO-MEDIA (YOUNGSTERS' MEDIA LITERACY IN TIMES OF CRISIS)

Alessandra CARENZIO, Simona FERRARI, Stefano PASTA

ID 148 - MOOCS AS PART OF A THREE-PRONGED APPROACH TO UNIVERSITY ORIENTATION

Ilaria MERCIAI

ID 150 - GDBL ID: AN INSTRUCTIONAL MODEL FOR THE DESIGN OF GAME-BASED LEARNING SCENARIOS

Andrea TINTERRI, Massimiliano ANDREOLETTI

ID 151 - TRENDS IN THE USE OF MULTIVARIATE ANALYSIS IN EDUCATIONAL RESEARCH: A REVIEW OF METHODS AND APPLICATIONS IN 2018-2022

Annamaria DE SANTIS, Katia SANNICANDRO, Claudia BELLINI, Tommaso MINERVA

ID 152 - GOOD DIGITAL SCHOOL BY AVOIDING THE HEALTH RISKS AND THREATS TO PHYSICAL AND PSYCHOLOGICAL WELL-BEING ARISING FROM THE USE OF DIGITAL TECHNOLOGIES

Giovanni ADORNI, Giulia CARMECI , Angela Maria SUGLIANO

ID 153 - FAKE NEWS BUSTERS: EMPOWERING PRIMARY SCHOOL STUDENTS TO DETECT DISINFORMATION, MISINFORMATION, AND MALINFORMATION

Giulia GARAU, Daniele AGOSTINI

ID 154 - ACADEMIC INTEGRITY IN ONLINE ASSESSMENT: A PROPOSAL FOR GUIDELINES

Katia SANNICANDRO, Annamaria DE SANTIS, Claudia BELLINI1, Tommaso MINERVA

ID 155 - DIGITAL COMMUNICATION AND PERMANENT AND RECURRENT HIGHER EDUCATION: ELEMENTS FOR A LIFELONG LEARNING ENGINE MODEL

Bruno BONIOLO

ID 157 - EXPLORING STRENGTHS AND WEAKNESSES OF THE PEER-TO-PEER OBSERVATION TOOL IN TEACHER INDUCTION: A FEEDBACK-BASED ANALYSIS

Maria Chiara PETTENATI, Anna TANCREDI, Sara MARTINELLI

Formative assessment in Emergency Remote Teaching. Teachers' beliefs and practices

Marco GIGANTI[1]

[1] Catholic University of the Sacred Heart, Milan (ITALY)

Abstract

Some research sees formative assessment as a useful tool to foster student engagement and inclusion, especially in online education. A study by Z. Chen, J. Jiao and K. Hu (2021), carried out in the pandemic period for Covid-19, finds that temporally and spatially separated students and teachers are subject to long-term criticality typical of distance education.

In this context, it is appropriate to take up the distinction postulated by Hodges et al. (2020) between online Distance Learning (DL) and emergency remote teaching (ERT). Unlike educational experiences designed to be online, ERT is a temporary and alternative mode of instructional delivery due to crisis circumstances. It involves the use of fully distance teaching strategies; instruction, which would otherwise be delivered face-to-face or as blended or hybrid teaching, will revert to the traditional format when the emergency has receded. In this context, the main goal is not to recreate a robust educational ecosystem but, rather, to provide temporary access to education and learning supports, while also preventing possible risks of disengagement typical of emergency situations.

Research shows that students feel isolated in online education (Hammond, 2009), resulting in high dropout rates (Hodges & Kim, 2010), high boredom rates, and poor performance (Fredricks, 2015). According to Chen, Jiao and Hu, the use of formative assessment in such contexts can be effective solution. Implemented with forum discussion tasks, quizzes and tests, it has been shown to be effective in improving engagement and increasing learning. The studies mentioned explicitly refer to a mixed mode of teaching between online and presence, specifically concerning DL. According to the authors there is limited evidence that this also works in the typical ERT mode.

Central to the management of such didactic has been the teaching profession, led by beliefs and transmuted into practice. The most problematic aspects emerging from empirical research (Richardson, 2002) concern the link between conceptions and effectiveness of teacher education (Balduzzi & Vannini, 2008). In this regard, there are studies inherent Teacher Change (Floden, 2002; Richardson, & Placier, 2002) and the ways in which beliefs and practices change: do the former follow the latter (and vice versa) or are they mutually interacting and synergistic (Goffman, 1973; Peterman, 1993)?

This contribution aims to present a multiple case study of three all-inclusive schools (primary to secondary) in the Lombardy Region, with the objective of investigating the context in which teachers operated during Covid 19, their beliefs and practice statements about formative assessment, learning and engagement during ERT, what are the links between context and beliefs and practices. In the first stage, semi-structured interviews were conducted with

principals, document analysis (three-year plan of educational provision, self-evaluation report, policy acts, circulars, etc.) and qualitative analysis was conducted on them. In the second stage, a questionnaire was administered to all teachers in the identified schools, aimed at investigating the constructs examined, and the data were analyzed quantitatively and qualitatively. In the third phase and from a constructivist perspective, a focus group was conducted with the school headmaster, the Internal Evaluation Core, teachers selected by school order to jointly interpret the data that emerged in the first two phases, and the data were analyzed qualitatively.

Analyses show that teachers favored formative assessment convinced that it could support student learning and engagement in a context considered emergent. Specifically, statistical analyses show that beliefs and practice statements about formative assessment are related to constructivist learning and student engagement; they are found to be consistent and applicable in the ERT context. It is interesting to note that the age and experience of the teachers are a conditioning factor as well as the order of teaching and the emergency situation. Also, the school had an effect on the formative assessment and learning beliefs: the smaller one, identifiably stronger with accompanying practices and teacher training was decisive on the agreement averages. The primary school also proved to be a favorable context for FA and student involvement and constructivist learning. Other hints of the analyses conducted will be given during the presentation of the contribution.

References

Chen, Z., Jiao, J., & Hu, K. (2021). *Formative assessment as an online instruction intervention: Student engagement, outcomes, and perceptions.* International Journal of Distance Education Technologies, 19(1), 1-16.

Hodges, C., Moore, S., Lockee, B., Trust, T. & Bond, M. (2020). *The Difference Between Emergency Remote Teaching and Online Learning.* Retrieved 6/06/2022 from https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning.

Hammond, M. (2009). *A review of recent papers on the use of technology for teaching and learning in higher education.* Journal of Asynchronous Learning Networks, 9, 17–32.

Hodges, C.B., & Kim, C. (2010). *Email, self-regulation, self-efficacy, and achievement in a college online mathematics course.* Journal of Educational Computing Research, 43(2), 207-223.

Fredricks, J.A. (2015). Academic engagement. In J. Wright (Ed.), *The international encyclopedia of social and behavioral sciences* (2nd ed., Vol. 2, 31–36). Elsevier.

Richardson, V., & Placier, P. (2002). Teacher Change. In V. Richardson (Ed.), *Handbook of research on teaching* (4th ed.) (905-947). Washington, DC: AERA.

Balduzzi, L. & Vannini, I. (2008) (a cura di). *Nuovi insegnanti per una scuola nuova? Un'indagine tra i docenti formati alla Scuola di Specializzazione all'Insegnamento Secondario (SSIS) dell'Università di Bologna.* Bologna: Clueb.

Floden, R.E. (2002). Research on effects of teaching: a continuing model for research on teaching. In V. Richardson (Ed.), *Handbook on research on teaching* (4th ed.) (3-16). Washington: AERA.

Goffman, E. (1963). *Behavior in public places: notes on the social organization of gatherings.* New York: Free Press of Glencoe.

Peterman, F.P. (1993). *Staff development and the process of changing: A teacher's emerging constructivist beliefs about learning and teaching.* The practice of constructivism in science education, 227- 245.

Determining behavioural intention to use Digital Game-based Learning in promoting 21st century learning and teaching amongst STEM pre-service educators.

Nonhlanhla GUMBI[1], Duduzile SIBAYA[2], Admire CHIBISA[3]

[123] *University of Zululand, Richards Bay (SOUTH AFRICA)*

Abstract

The global demand for self-directed learning has increased the likelihood of using Digital Game-Based Learning (DGBL) in science, technology, engineering, and mathematics (STEM) education. Integrating STEM content into digital games is envisioned to promote 21st-century critical skills such as problem-solving, critical thinking, creativity, and collaboration, all in a fun and engaging environment. The fun and engaging nature of digital games give them an advantage over other digital technologies when it comes to fostering learning and teaching engagement for pre-service educators (PSE) in the 21st century. International studies have expressed the successes of DGBL pedagogy and the diverse skills that PSEs acquire through its use (Blume, 2020; Ishak et al., 2021). However, there is a noticeable lack of empirical evidence that hinders its validation and implementation, especially in developing countries. The current study aims to explore determining factors towards using the DGBL methodology in the South African education system. A DGBL acceptance model is proposed, underlined by the Technology Acceptance Model (TAM) and the learning principles (Davis, 1989; Sukendro et al., 2020). A proposed model defines TAM's original constructs (perceived usefulness, perceived ease of use, attitude, and behavioral intention) and introduces five external constructs of learning theories, learning opportunity, perceived enjoyment, social influence, and cognitive engagement. The model hypothesizes positive and significant influence on behavioral intention to use DGBL. A quantitative survey design was adopted, with data collected from 255 PSEs at a South African university. The model was evaluated using partial least squares structural equation modeling with the help of SmartPLS3.0 (Hair et al., 2016). A two-step assessment approach was conducted. Firstly, the measurement model validated the instrument using Partial least squares structural equation modeling analysis. Secondly, structural modeling accounted for 59% explanatory strength of PSEs' behavioral intentions to use DGBL. Learning opportunity and social influence showed a substantial correlation towards in determining behavioral intention. Pre-service educators showed a strong intention to use DGBL when opportunities for critical thinking, control, and experimentation were offered. These findings are essential contributions to research and the development of customized DGBL that addresses the educational needs of diverse students and educators. External constructs explained 44% of the variance in perceived usefulness and 36% of perceived ease of use. Learning opportunity was found to be the strongest determining factor for PSEs towards using DGBL in STEM. The implications of the study's findings can inform local and global education stakeholders towards a successful application and adoption of DGBL. The study not only advises policymakers and universities on promoting 21st-century skills in South Africa but also compares DGBL from a

non-Western cultural perspective. DGBL methodology that reflects on students' diverse cultures allows for easy identification, relevancy, and acceptance.

Keywords: Digital Game-based learning, STEM education, Pre-service educators, Technology Acceptance Model, Digital Literacy

References

Blume, C. (2020). Games people (don't) play: An analysis of pre-service EFL teachers' behaviors and beliefs regarding digital game-based language learning. *Computer Assisted Language Learning*, *33*(1-2), 109-132.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Hair, J. F., Hult, T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.

Ishak, S. A., Din, R., & Hasran, U. A. (2021). Defining Digital Game-Based Learning for Science, Technology, Engineering, and Mathematics: A New Perspective on Design and Developmental Research. *J Med Internet Res*, *23*(2), e20537. https://doi.org/10.2196/20537

Sukendro, S., Habibi, A., Khaeruddin, K., Indrayana, B., Syahruddin, S., Makadada, F. A., & Hakim, H. (2020). Using an extended Technology Acceptance Model to understand students' use of e-learning during Covid-19: Indonesian sport science education context. *Heliyon*, *6*(11), e05410. https://doi.org/10.1016/j.heliyon.2020.e05410

Findings on the Students' Learning Approach to the "Professional Training" Delivered by the Academia during the Covid-19 Outbreak. A Case Study from the University of Milano-Bicocca.

Lorenzo MERIGNATI[1], Barbara BALZAN[1], Marco BONDI[1]

[1] University of Milano-Bicocca, Milan (ITALY)

Abstract

The COVID-19 pandemic has had a significant impact on students' learning behaviors and their time management, which has in turn impacted their performance in ICT certification exams. The data shed light on the self-determination thesis for online courses, stressing the fact that the more students are free to set their learning duties (for online courses), the more likely they are to reach better results.

Keywords: enter up to 5 keywords separated by commas

The work highlights the challenges faced by students in managing their time during academic years, particularly in Italy, where universities now require additional skill certifications alongside regular curricula. The focus of this case study is on ICT certifications compliant with the e-CF (European Competence Framework). The COVID-19 pandemic and associated lockdowns had implications on students' learning methods and their time management strategies.

The study examines the correlation between students' preparation for the e4Job ICT certification (that is e-CF compliant) at the University of Milano-Bicocca (UNIMIB) and their performance in the exam, both before and after the COVID-19 restrictions. A large dataset has been analysed: over 5100 preparation tests from the UNIMIB eLearning platform and more than 14500 official e4Job tests.

Following the temporal succession of the Italian anti-COVID legislation, the work has examined three timespans: the pre-restrictions phase, the implementation phase, and the after-restrictions phase. Using a quantitative approach, it has been found a correlation between the results of preparatory tests and final tests during these three periods. The evaluation of results involved calculating the R-squared for each dataset.

These time spans were identified as follows:

1) Pre-pandemic period: October 2019 to February 2020;
2) Pandemic period: March 2020 to August 2021;
3) Post-pandemic period: September 2021 to December 2022.

The correlation analysis focused on the final output of the tests and the preparatory tests, specifically looking into the relationship between the total number of "pass grades" in the preparatory exams and the results of the official exams. For the bunch, only the 'passed' exams were considered. The 'failed' exams were not considered because they could be influenced by various factors that penalize students, such as low personal commitment. No emphasis has been applied to the votes: the case study considered the shole set of exams as "pass/failed" assessments. Moreover, to ensure data privacy and comply with GDPR regulations, all the data used in the analysis were anonymized. Personal information obtained from both the e-learning platform and the exam platform was removed from the dataset.

The findings suggest a strong correlation (with R-squared values ranging from 0.71 to 0.93) between how students approach their preparation and their subsequent performance on the e4Job exam. During the lockdown and implementation phases, students tended to perform better on both preparatory and official tests, indicating changes in learning approaches due to altered time management. In the following table is an overview on the data.

Period	Passed Preparatory Exams	Passed Exams	Correlation	R-Squared
Pre-pandemic period: October 2019 to February 2020	149	829	0.848	0.719
Pandemic period: March 2020 to August 2021	735	955	0.979	0.959
Post-pandemic period: September 2021 to December 2022	1564	2828	0.968	0.938

Table 1 - Data and Correlation: n.b. for the calculation it has been used a monthly base; here (due to the space) there are represented only a comprehensive summary.

The research also supports the idea from instructional design literature (so-called self-determination theory by Deci and Ryan) that online courses are more successful when students have the freedom to manage their time without rigid constraints or administrative deadlines. The absence of strict bureaucratic timelines during the pandemic allowed students to invest time in learning more effectively. Considering the potential return to normalcy after the COVID-19 outbreak, the study raises important questions about challenges the academic ecosystem may face in maintaining formal graduations and professional training. This is particularly pertinent when considering Italian and EU policies and strategies for the ICT labour market, such as the e-CF framework, ESCO program, and DESI Index.

In conclusion, the work suggests that the pandemic has led to changes in students' learning behaviours and time management, impacting their performance in ICT certification exams. It also prompts a discussion on how academia can adapt to effectively balance formal graduation requirements with professional training. Policymakers and educators may need to consider flexible approaches to accommodate students' diverse learning needs and capitalize on successful methods developed during the pandemic.

References

CEN, European Commission, & EFTA. (2014). *European e-Competence Framework 3.0*.
Jordan, K. MOOC *Completion Rates: The Data* (2015). In http://www.katyjordan.com/MOOCproject.html (risorsa consultata nel marzo 2020)
Deci, Edward L. "8: Ryan, RM (1985). *Intrinsic motivation and self-determination in human behavior.* New York and London: Plenum (86).
Deci, Edward L., and Richard M. Ryan. "Self-determination theory: A macrotheory of human motivation, development, and health." *Canadian psychology/Psychologie canadienne* 49.3 (2008): 182.
Iengo, Eide Spedicato, *Il presente e le parole: spunti di riflessione dalla A alla Z.*, Franco Angeli, 2018
Sadovaya, Victoriya V., Olga V. Korshunova, and Zhumagali Zh Nauruzbay. "Person-alized education strategies." *International Electronic Journal of Mathematics Education* 11.1 (2016): 199-209.
Chrysafiadi, Konstantina, and Maria Virvou. *Advances in personalized web-based education,* Springer International Publishing, 2015

ISYDE 2023
Reggio Emilia
13-15 September 2023

Call for Paper

Title: Pilot study on the adoption by teachers of a video game for learning Italian grammar

Keyword: lower secondary school, learning Italian grammar, videogame, use of the game by the teacher

Abstract
Despite the strong interest of teachers in the use of the game, especially the digital one, however there are several critical issues attributable to the teaching role, which make its adoption in teaching complex:

- teachers have only limited time to prepare and play a game-based learning game
- teachers feel uncertain about using games in class due to their limited knowledge of (digital) games
- teachers find it difficult to identify appropriate assessments
- teachers find it difficult to integrate and choose video games effectively and efficiently into their classroom
- students find it difficult to connect knowledge acquired in a game and learning in the real world

However, multiple difficulties often make it difficult to learn the basics of the Italian language. The video game "Ross and the Sgrammanebbia" is the first grammar didactic video game that has a correspondence between the levels and the topics of the textbook and offers the teacher a valid help to organize a didactic path studied on the curricular skills.

In order to define the guidelines useful for an effective introduction of the game in the classroom, participatory qualitative-quantitative research was prepared on the methods that a small group of teachers put in place to design the training activity with the video game. The goal is:

- training planning skills for the use of the game: definition of learning goals, assessment methods and identified teaching strategies
- the pedagogical activities put in place to facilitate the introduction of the game in the classroom
- the roles covered by the teacher during all phases of the training activity

Interest
Research on the use of games in the classroom has focused on learning and students, neglecting to investigate the pedagogical dimensions of teachers, such as design solutions or teaching strategies that teachers make when teaching with games. What does the teacher do to mediate play in the relationship between learning and play and students and play?

Using digital games to promote transformative emotions and support moral development

Chiara Scuotto[1], Stefano Triberti[1], Maria Luisa Iavarone[2]

1. Department of Human Sciences, Università Telematica Pegaso, Italy
2. Department of Motor Sciences, Università Partenope di Napoli, Italy

Morality is a fundamental topic for education. Developing a functional moral compass would prevent youngsters to engage in risky behaviors or commit immoral actions that could affect their future development (Milani et al., 2018; Kuther & Higgins-D'Alessandro, 2000). However, the research from the last decades has shown that just-informing or teaching moral values does not guarantee that morality develops in a desirable way (Suhor & Suhor, 1992). The research shows that moral development is influenced by individual differences (e.g., personality characteristics such as agreeableness or the dark triad; social abilities such as empathy) (Wu et al., 2020; Djeriouat & Tremoliere, 2014). At the same time, besides personal morality, people (especially adolescents) could be driven to immoral behaviors by context, social relationships and group belonging (i.e., the Lucifer effect; social influence by peers) (Zimbardo, 2011). Indeed, the likeness of enacting moral conducts is affected by the possibility to engage in first-person experiences where one could exercise actual moral choices (Murphy & Zagal, 2011; Triberti, Villani, & Riva, 2015).

It is paramount to identify innovative resources to support moral development beyond the mere information/teaching of abstract moral values. New technologies can be used to structure experiences that support moral development. One interesting resource comes from the study of transformative emotions. Transformative emotions are complex emotional states that motivate people to change their behavior (Chirico & Yaden, 2018). According to literature, two transformative emotions may be particularly interesting for moral promotion:

- **Awe** that is a feeling of overwhelming wonder (e.g., when contemplating marvelous panoramas);
- **Elevation** or the moving feeling one feels when witnessing acts of notable moral virtue.

The transformative emotions elevation and, to an extent, awe are interesting for moral development as the literature shows that they influence moral behavior (Oliver, Hartmann & Woolley, 2012). Specifically, when one experiences awe he or she is typically keen to feel as part of humanity and driven to reduce mundane preoccupations to pursue the common good (Keltner & Piff, 2020; Gaggioli, Chirico, & Triberti, 2016). Conversely, when one experiences elevation, he or she is likely to feel the desire to help others and do good deeds (Silver & Haidt, 2008; Vianello, Galliani, & Haidt, 2010).

It is still unclear whether having frequent experiences of transformative emotions could improve moral reasoning or not. Typically, these experiences are relatively rare and often conveyed by the fruition of media (e.g., sad movies; art). It would be interesting to design new technologies which are able to elicit these strong emotional experiences (Liedgren, Desmet, & Gaggioli, 2023), while giving us a possibility of monitoring their effects within educational contexts.

We argue that video games may constitute an interesting resource to promote transformative emotions or, more broadly, vicarious transformative experiences.

- It would be possible to employ immersive technologies to implement marvelous and breathtaking visuals (e.g., natural scenes or even unrealistic environments) that permit the user to feel awe: the literature has already demonstrated that immersive virtual reality is effective in the promotion of awe (Chirico et al., 2018; Kahn & Cargile, 2021). An interesting aim for future research is to explore whether these properties of immersive digital environments could be furtherly improved through inclusion within the meaningful narratives of story-based video games;
- As far as elevation is concerned, video games could feature sophisticated narratives whose complex characters embody moral virtues. For example, the video game *To the moon* (developed and published by Freebird games in 2011) puts the player in the shoes of employees of a futuristic corporation that create virtual memories and help unsatisfied people to address their own life regrets. By working for an old man who wants to "go to the moon" for unclear reasons, they discover a personal moving story that touches on important themes like disability, true love and the importance of life choices. The immersive and interactive properties of video games could enhance the significance of morally-rich storytelling and improve its effects on viewers' intentions and behavior;
- However, this could be said for all kinds of media: indeed, the research has demonstrated that books and movies could generate elevation by portraying acts of moral virtue. On the other hand, video games have the advantage to immerse players within interactive narratives where players could perform moral or immoral choices and witness their consequences on the simulated social context. The famous video game *Bioshock* (developed by Irrational Games, 2K Australia, 2K Marin and published by 2K games, 2007), for example, features choices (e.g., saving or killing people) that only in the final act of the game reveal their consequences and make player reflect on their own moral values.

In other words, we suggest using technologies (specifically digital games) to harness their transformational power (Riva e Gaggioli, 2019). This could be done both with commercial games in order to discover their possible utility for educational aims, and to identify guidelines for the design of new gaming technologies devoted to the generation of transformational experiences. Long-term methods such as experience sampling (Hektner, Schmidt, & Csikszentmihalyi, 2007) may be useful resources to analyze video games' effects on moral development over time.

This creative use of new technologies may help developing digital soft skills (Iavarone & Aruta, 2022), namely abilities that would support an ethical usage of digital environments or a "digital moral literacy". Indeed, it is possible to achieve digital moral literacy by the implementation of educational interventions aimed at the involvement of participants in immersive virtual environments functional to the development of social skills. For the future, it is possible to envisage the contribution by media educators trained to use immersive, transformative digital environments for educational aims (Iavarone et al., 2023).

References

Chirico, A., Ferrise, F., Cordella, L., & Gaggioli, A. (2018). Designing awe in virtual reality: An experimental study. *Frontiers in psychology*, *8*, 2351.

Chirico, A., & Yaden, D. B. (2018). Awe: a self-transcendent and sometimes transformative emotion. *The function of emotions: When and why emotions help us*, 221-233.

Djeriouat, H., & Trémolière, B. (2014). The Dark Triad of personality and utilitarian moral judgment: The mediating role of Honesty/Humility and Harm/Care. *Personality and Individual Differences*, *67*, 11-16.

Gaggioli, A., Chirico, A., Triberti, S., & Riva, G. (2016). Transformative interactions: designing positive technologies to foster self-transcendence and meaning. *Annual Review of Cybertherapy and Telemedicine*, *14*, 169-175.

Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. Sage.

Iavarone, M. L., Chiara, S., & Aruta, L. (2023). Towards a Digital-Civil. An introductory reflection on Digital Moral Literacy Verso un Digitale-Civile. Una riflessione introduttiva sulla Digital Moral Literacy. *Q-TIMES WEBMAGAZINE*, *1*(1), 39-46.

Iavarone, M. L., & Aruta, L. (2022). Digital skills between soft and hard. The Media Educator among critical issues and opportunities. *Form@ re-Open Journal per la formazione in rete*, *22*(3), 242-251.

Milani, L., Apolloni, C., Binaghi, G., & Caravita, S. (2018). Il funzionamento morale come fattore di rischio per il bullismo e il cyberbullismo. *Il funzionamento morale come fattore di rischio per il bullismo e il cyberbullismo*, 47-66.

Kahn, A. S., & Cargile, A. C. (2021). Immersive and interactive awe: Evoking awe via presence in virtual reality and online videos to prompt prosocial behavior. *Human Communication Research*, *47*(4), 387-417.

Keltner, D., & Piff, P. K. (2020). Self-transcendent awe as a moral grounding of wisdom. *Psychological Inquiry*, *31*(2), 160-163.

Kuther, T. L., & HIGGINS-D'ALESSANDRO, A. N. N. (2000). Bridging the gap between moral reasoning and adolescent engagement in risky behavior. *Journal of Adolescence*, *23*(4), 409-422.

Liedgren, J., Desmet, P., & Gaggioli, A. (2023). Liminal design: A conceptual framework and three-step approach for developing technology that delivers transcendence and deeper experiences. *Frontiers in Psychology*, *14*, 275.

Murphy, J., & Zagal, J. (2011). Videogames and the Ethics of Care. *International Journal of Gaming and Computer-Mediated Simulations (IJGCMS)*, *3*(3), 69-81.

Oliver, M. B., Hartmann, T., & Woolley, J. K. (2012). Elevation in response to entertainment portrayals of moral virtue. *Human Communication Research*, *38*(3), 360-378.

Silvers, J. A., & Haidt, J. (2008). Moral elevation can induce nursing. *Emotion*, *8*(2), 291.

Suhor, C., & Suhor, B. (1992). *Teaching Values in the Literature Classroom: A Debate in Print. A Public School View. A Catholic School View*. ERIC Clearinghouse on Reading and Communication Skills, Indiana University, 2805 E. 10th St., Suite 150, Bloomington, IN 47408-2698.

Triberti, S., Villani, D., & Riva, G. (2015). Moral positioning in video games and its relation with dispositional traits: The emergence of a social dimension. *Computers in Human Behavior*, *50*, 1-8.

Vianello, M., Galliani, E. M., & Haidt, J. (2010). Elevation at work: The effects of leaders' moral excellence. *The Journal of Positive Psychology*, *5*(5), 390-411.

Wu, W., Su, Y., Huang, X., Liu, W., & Jiang, X. (2020). The dark triad, moral disengagement, and social entrepreneurial intention: moderating roles of empathic concern and perspective taking. *Frontiers in Psychology*, *11*, 1520.

Zimbardo, P. (2011). *The Lucifer effect: How good people turn evil*. Random House.

Digital platforms: the colonization of public education

Nelson DE LUCA PRETTO[1], Mariona GRANÉ[2]

[1] *Federal University of Bahia, Salvador, Bahia (BRAZIL)*

[2] *University of Barcelona, Barcelona, Catalunya (SPAIN)*

Extended Abstract

Throughout history, technology has had a continuous presence. Many technological artefacts produced by humanity have been incorporated into teaching-learning processes, from the first pencils to current machine-learning resources. With the arrival of each new artefact, the educational system feels doubly impacted/challenged: on the one hand, it is excited by the possibility of yet another artefact that can contribute to the functioning of the school, collaborating with the work of teachers introducing improvements in the teaching-learning processes; on the other, it brings tension to the routine of the school because, in most cases, these new technologies arrive at schools in the hands of the students themselves or via pressure from industry rather than via a nascent movement in pedagogical debate with the involvement of students and teachers.

From the transformation of information into the zeros and ones of the computational binary system in the latter half of the last century and today further advancing to other systems such as quantum computing, technologies have become omnipresent in society. Many of these technologies result from research and experimentation carried out by young hackers on the west coast of the United States, only sometimes formally linked to universities or research centres (Levy, 1994).

These first movements focused on the open development of software and hardware solutions that could communicate and process large volumes of data. The arrival of digital technologies has brought society and education in particular the possibility of changing the communication vector from one-to-all to all-to-all communication (Lemos, 2007; Lemos, 2012; Lévy, 2010). The internet has opened up the possibility of the general expansion of the democratization of communication and revolutionary possibilities for science, culture, and education (Leary, 1994).

We observe that the accelerated technological development of recent years brings to the fore topics such as Artificial Intelligence, Facial Recognition Systems, and the Internet of Things (IoT); in short, an advanced set of technologies that have been developed accompanied by a solid political dispute.

Perspectives of society and, of course, of technology fuel these disputes, ranging from those who celebrate the power of technology, a kind of countercultural free space (Goffman & Joy, 2004; Rheingold, 1993), with participation, generosity, and creativity (Shirky, 2010) and with the strength of networks (Benkler, 2015), to those who consider the internet something for amateurs (Keen, 2008) or that it dehumanizes relationships and frays the social fabric (Turkle, 2011). In addition, we recognize the non-neutrality of technologies and the ever-present threat of another form of social colonization brought about by a new configuration of the technological and cultural industry.

This article is the result of documentary research, which analyses the strategies of large private platforms (known as GAFAM - Google, Amazon, Facebook -Meta, Apple, and Microsoft) that have entered the education system in Brazil and the world, plus the identification and analysis of government strategies in contracting these solutions. The article presents the results of the first stage of the research concerning the situation of Brazilian education. Complementarily, we analyse two other references in this debate concerning public policy, namely the experience of Catalonia (Privacidad y Digitalización Democrática de los Centros Educativos - Pilot project (XNET, 2022) and the proposal

of the European Union for the creation of a sovereign common digital infrastructure within its member countries (Towards a Sovereign Digital Infrastructure of Commons, 2022).

We follow the growth of companies that offer platform and cloud services from the gigantic concentration of wealth in the American Silicon Valley. According to Forbes magazine (Forbes, 2023), among the 16 billionaires in the world in 2023 are Elon Musk (Twitter), Jeff Besos Amazon), Larry Ellison (Oracle), Bill Gates and Steve Ballmer (Microsoft), Larry Page and Sergey Brin (Google), Larry Ellison (Oracle) and Mark Zuckerberg (Meta), all who own companies that offer solutions for society's connectivity through their network platforms. They have begun to concentrate more power precisely because they deal in the most valuable contemporary currency: data. To expand this market, these companies act aggressively to expand their tentacles by entering the educational system. Thus, schools and universities are adopting, often uncritically, the so-called "surveillance capitalism" (Zuboff, 2020) or "Platform Capitalism" (Srnicek, 2018).

Today in Catalonia and throughout Europe, a new process of digitisation of schools is underway, driven by the need to establish a standard framework for digital educational competence (DigicompEdu, 2022) in all countries. At the same time, a sizeable post-pandemic investment (Recovery, Transformation and Resilience Plan, funded by the European Union PRTR - Next Generation EU); These two situations are converging in a new drive to digitise education, which, once again, is devoting great efforts to equipping schools with machines, equipment, specialised software, and online digital platforms.

However, in the face of this situation, critical voices of experts (Gisbert et al., 2022) warn of the need for a social, political, and educational debate on what this digital transformation should be like. This is because the instrumental knowledge and the techno-pedagogical domain that should guide learning environments are no longer sufficient to design technological scenarios for teaching and learning. It is necessary to consider the social, economic, ideological, and political contexts surrounding the educational process and to become aware of how these contexts determine the technology and the processes it enables. Thus, institutional policies moves to create a transformational model based on technologies and giving teachers basic first-level competencies are challenged by researches that seek to question a "platforming education" (Rivera-Vargas et al., 2023).

Data from research carried out in Brazil (Parra et al., 2018) indicate that 70% of public universities and state education departments have adopted private solutions, such as Google or Microsoft, for their educational systems, constituting what we now refer to as the colonization of public education based on school management. Adopting these technological solutions has repercussions in the different dimensions of the lives of students, teachers, and researchers at all levels. In higher education, they generate/promote the vulnerability of university autonomy since information and communication technologies change rapidly, generating a relationship of dependency and the inability of universities to develop their own solutions, leading to a severe homogenization of educational processes. More seriously, they are vulnerable to invasion of privacy, considering the possibility of external access to sensitive data from teaching staff, students, and researchers and the content and results of scientific research within these institutions. These same concerns are present for the initial levels of education, with the aggravating factor of subjecting young people from an early age to contact with a single private solution, potentially forming a captive consumer for the rest of their lives (Peirano, 2019).

In conclusion, the article presents data regarding the presence of these platforms in educational systems and an analysis of public policies in Brazil and Europe designed to face the issue.

Keywords: Digital Platform, Digital Education, Social Networks, Public Education, Privatization of Education

References

Churchman, C.W. (1971). *The Design of Inquiring System*. New York: Basic Books.

Ivory, J., & Gean, S. (1991). *A paradigmatic Analysis of Contemporary IT development.* European Journal of IT, 1(4), 249-272.

Benkler, Y. (2015). *La riqueza de las redes: Como la producción social transforme los mercados*. Icaria Editorial.

FORBES. (2023). *World's billionaries list: The richiest in 2023*. https://www.forbes.com/billionaires.

Goffman, K., & Joy, D. (2004). *Counterculture Throug the Ages: From Abaham to Aced House*. Villard.

Gisbert, M., Lázaro, J.L., Esteve-González, V. (Ed.). (2022). Investigar e innovar en la era digital: aportaciones desde la tecnología educativa. Octaedro.

Keen, A. (2008). *O culto do amadorismo? Como ainternet actual está a matar a nossa cultura e a assaltar a economia*. Guerra e Paz.

Leary, T. (1994). *Chaos & cyberculture*. Ronin Publishing, Inc.

Lemos, A. (Ed.). (2007). *Cidade digital: Portais, inclusão e redes no Brasil*. Edufba.

Lemos, R. (2012). *Futuros possíveis: Mídia, cultura, sociedade, direitos*. Porto Alegre: Sulina.

Lévy, A. L. P. (2010). *O futuro da internet: Em direção a uma ciberdemocracia planetária*. Paulus.

Levy, S. (1994). *Hackers: Heroes of the computer revolution*. Penguin Books.

Parra, H., Cruz, L., Amiel, T., & Machado, J. (2018). Infraestruturas, economia e política informacional: O caso do google suite for education. *Mediações - Revista de Ciências Sociais*, *23*(1), 63. https://doi.org/10.5433/2176-6665.2018v23n1p63.

Peirano, M. (2019). *El enemigo conoce el sistema: Manipulación de ideas, personas e influencias después de la economía de la atención*. Debate Editorial.

Rheingold, H. (1993). *The virtual community: Homesteading on the eletronic frontier*. Addison Wesley.

Rivera-Vargas, P., Jacovkis, J., Passerón, E., & Cobo, C. (2023). Profesorado, Revista De Currículum Y Formación Del Profesorado, 27(1), 175-197. https://doi.org/10.30827/profesorado.v27i1.24643

Shirky, C. (2010). *Cognitive Surplus: Creativity and genorisity in a connected age*. The Penguin Press.

Srnicek, N. (2018). *Capitalismo de Plataformas*. Caja Negra Editora.

Turkle, S. (2011). *Alone Together: Why we expect more from technology and less from each other*. Basic Books.

ZUBOFF, S. (2020). *A era do capitalismo de vigilância* (G. SHLESINGER, Trans.). Autêntica.

A Moodle-based decision support system to support school governance

Antonio MARZANO[1], Sergio MIRANDA[1], Rosa VEGLIANTE[1]

[1] Dep. Of Human Sciences, Philosophy and Education, University of Salerno

Abstract

This paper describes a decision support system for school leaders created by using the Moodle platform as a basis and making integrations and customizations such as to transform it into a system which, in addition to allowing the management and provision of training courses, can be to support the decision-making processes of an educational institution. Skills management ideas have been outlined, specific functionalities have been described that can meet the needs of managers, innovative ideas based on skills management have been proposed for staff allocation on activities and intervention planning professional update. The project idea was evaluated through a comparison with some school managers of the Campania Region and the positive feedback is encouraging for the start of a trial.

Keywords: Moodle, decision support system, competence, school, e-learning

Extended abstract

Towards the end of the 70s of the last century we started talking about decision support systems (DSS) and soon a lot of interest and great expectations arose around them. With the technological evolutions mainly in the Information Technology sector in the following years, great enthusiasm arose due to the fact that DSSs had high analytical and information potential capable of really making a contribution in decision-making processes. Clearly, in the years that followed, DSSs evolved by offering support of various kinds (structured information, analysis tools, unstructured knowledge) and in various contexts (operational management, financial management, strategic decisions). This type of systems, by their nature, being in general systems able to offer support services to decision-making problems typical of governance, goes well with the principles of service science for which providers (i.e. the system) and clients (i.e. the manager) interact each other, work together to create added value. The principle is to build a base that can act as a guide in solving problems, a base in which experience can be used at run time, stored and capitalized to be correctly archived and reused, an aid system in the task to make decisions that is often delicate.

Consequently, data-driven decision making in education has received an increasing level of attention (Sergis & Sampson, 2015). This process refers to the stages of collecting, analysing and interpreting data at the institutional level to generate knowledge, practices and interventions in educational contexts (Mandinach, 2012). The use of data-driven decision-making processes serves to increase organizational effectiveness (Pistilli et al., 2014), since it can provide a basis on which to gather information about the institution and articulate communication between the actors within it. There are various research initiatives (Paletta, 2015; Cavalli & Fischer, 2011; European Commission report ET2020) for the identification of effective analytical methods to support the governance of schools in decision-making processes.

In the educational context, this objective is addressed by two fundamental approaches: Learning Analytics (LA) and Academic Analytics (AA) (Long & Siemens, 2011). The two existing analytic threads do not offer the capacity for the holistic decision support required by school leadership, given their isolated viewpoints. Therefore, the contribution of this work is to propose an approach that aims at filling this gap and, therefore, to facilitate the governance of school complexity by providing school managers with a system capable of monitoring the progress of school processes and intervene where possible to satisfy the needs of the actors involved, including the staff themselves and therefore the teachers, but also students, parents and anyone else who can benefit from the consequences of the aid of this system.

Starting from these premises, the objective of this work is to propose an approach for the creation of a governance support service that can be effective and applicable in school contexts where the presence of information systems is limited, but where the greatest needs are in the education environment and therefore driven or towable by solutions in which e-learning is one of the functions offered and where the basis on which reasoning can be carried out is incomplete, small or even non-existent. A further element to consider is that, in most schools, the budget available to purchase technologies is always limited.

Among the existing platforms in the open source world, the one that can best respond to the identified needs is the Moodle platform. The first question that arose was whether Moodle could be used as a DSS. Technically, the answer is yes, but the question is whether Moodle as DSS is an effective solution. However, this is true for most systems, including those explicitly designed as DSS which, moreover, are often prohibitively expensive. A further consideration is related to the fact that, today, the most successful DSSs are in the fields of health care, clinical research, engineering and there are rare examples in use in the world of schools, education and learning.

So what is the way to set up Moodle as a DSS? The literature (Miller et al., 2017) identifies some reference areas to which a DSS should provide an answer and, apparently, Moodle offers a wide variety of resources and functionalities that can respond to these needs. A set of plug-ins has been selected, installed and configured in order to create a system able to reach the goal of creating a decision support system for the school governance with functionalities of communication and collaboration, tracking of online activities, data analysis by means of charts and dashboards, knowledge sharing, skill gap analysis and, finally, delivery of customized e-learning courses.

The prototype of the DSS created by customizing Moodle was presented to some school managers of the Campania Region (in province of Salerno and Avellino) and the first evaluations are very positive. Obviously, being a prototype still being perfected, no feedback was formally collected, but through informal comparisons, we tried to identify needs and problems that could be addressed to improve the prototype. The greatest perplexities and therefore, consequently, the greatest criticalities are linked, on the one hand, to the modelling of skills and, on the other, to updating the database on which the system works. These aspects may be surely considered in some future development. In any case, the opinions received are encouraging to the point of paving the way for the formalization of the intentions of some schools in Campania in order to start an initial trial.

References

Breiter, A., & Light, D. (2006). Data for School Improvement: Factors for Designing Effective Information Systems to Support Decision-Making in Schools. *Educational Technology & Society*, 9(3), 206-217.

Cavalli, Alessandro; Fischer, Lorenzo (2011) *DIRIGERE LE SCUOLE OGGI Un'indagine della Fondazione per la Scuola realizzata dall'Istituto IARD*. Il Mulino Ed.

Claudiu, Brandas & Didraga, Otniel. (2014). COLLABORATIVE DECISION SUPPORT SYSTEMS: CLOUD, MOBILE AND SOCIAL APPROACHES. *Proc. Of the 13th International Conference on Informatics in Economy* (IE 2014), Bucharest, Romania.

Daniel, B. (2015). Big Data And Analytics In Higher Education: Opportunities And Challenges. *British Journal of Educational Technology*.

ET2020, (2019) European ideas for better learning: the governance of school education systems. *The final report and thematic outputs of the ET2020 Working Group Schools*

Kaufman, T. E., Graham, C. R., Picciano, A. G., Popham, J. A., & Wiley, D. (2014). Data-Driven Decision Making in the K-12 Classroom. In J.M. Spector, M.D. Merrill, J. Elen, & M.J. Bishop, (Eds.) *Handbook of Research on Educational Communications and Technology* (pp. 337-346). New York: Springer.

Lai, M.K., & Schildkamp, K. (2013). Data-based Decision Making: An Overview. In K. Schildkamp et al. (eds.), *Data-based Decision Making in Education* (pp. 9-21).

Legrottaglie, S., & Ligorio, M.B. (2014). L'uso delle tecnologie a scuola: il punto di vista dei docenti. *TD Tecnologie Didattiche*, 22(3), 183-190.

Long, P., & Siemens, G. (2011). Penetrating The Fog: Analytics In Learning And Education. *Educause Review*, 46(5), 30-32.

Mandinach, E. (2012). A Perfect Time for Data Use: Using Data-Driven Decision Making to Inform Practice. *Educational Psychologist*, 47(2), 71–85.

Miller, Matthew & McGuire, Kerry & M. Feigh, Karen. (2017). Decision Support System Requirements Definition for Human Extravehicular Activity Based on Cognitive Work Analysis. *Journal of Cognitive Engineering and Decision Making*. 11. 10.1177/1555343416672112.

Miranda, S.; Orciuoli, F.; Loia, V.; Sampson, D. (2017) An ontology-based model for competence management, *Data and Knowledge Engineering*, 107, pp. 51-66. DOI: http://dx.doi.org/10.1016/j.datak.2016.12.001

Paletta, Angelo (2015) Dirigenti scolastici leader per l'apprendimento, *Report IPRASE - Istituto provinciale per la ricerca e la sperimentazione educativa*.

Pistilli, M. D., Willis III, J. E., & Campbell, J. P. (2014). Analytics Through an Institutional Lens: Definition, Theory, Design, and Impact. In *Learning Analytics* (pp. 79-102). Springer New York.

Schildkamp, K., & Kuiper, W. (2010). Data-informed curriculum reform: Which data, what purposes, and promoting and hindering factors. *Teaching and Teacher Education*, 26(3), 482-496.

Schildkamp, K., Karbautzki, L., & Vanhoof, J. (2014). Exploring data use practices around Europe: Identifying enablers and barriers. *Studies in educational evaluation*, 42, 15-24.

Sergis, S. & Sampson, D.G. (2014). From Teachers" to Schools" ICT Competence Profiles. In D.G. Sampson, D. Ifenthaler, J.M. Spector & P. Isaias (Eds.). *Digital Systems for Open Access to Formal and Informal Learning* (pp. 307-327). Springer International Publishing.

Sergis, Stylianos; Sampson, Demetrios. (2015). School Analytics: A Framework for Supporting School Complexity Leadership. 10.1007/978-3-319-30295-9_6.

Snyder, S. (2013). The Simple, the Complicated, and the Complex: Educational Reform Through the Lens of Complexity Theory. *OECD Education Working Papers*, 96, OECD Publishing.

Van der Kleij, F. M., Vermeulen, J. A., Schildkamp, K., & Eggen, T. J. (2015). Integrating data-based decision making, Assessment for Learning and diagnostic testing in formative assessment. *Assessment in Education: Principles, Policy & Practice*, (ahead-of-print), 1-20.

Implementing the UNESCO OER Recommendation - advocating and upskilling through shared experiences

Paola CORTI[1], Bianca SANTOLINI[1]

[1] *Politecnico di Milano - METID, Milano (Italy)*

Abstract

Politecnico di Milano - METID organised a series of four (4) webinars at the national level on Open Education to share the basic knowledge around it, the main definitions, the open licences and the permissions they grant, the practices that can be developed starting from Open Educational Resources and the community - at the local, national, global levels - working and collaborating to implement the UNESCO OER Recommendation, signed by all UNESCO member Countries (including Italy) in 2019. This paper aims to share an experience and a practice that can be reused to enhance the implementation of the Recommendation in a diverse range of contexts.

Keywords: Open Education, Open Educational Resources, Open Educational Practices, advocacy, UNESCO OER Recommendation, Polimi Open Knowledge

Introduction

METID – Learning Innovation, Task Force of Politecnico di Milano, in collaboration with the Open Education Italia network, Creative Commons Chapter ITA and Wikimedia Italia patronage, organised a series of 4 webinars open to policymakers, teachers, researchers, instructional designers, librarians and students, on "Open Education for didactic innovation". This initiative addressed Sustainable Development Goal 4, "Quality Education for All". It intentionally aimed at igniting implementation actions for the UNESCO OER Recommendation, signed unanimously by all the member countries, including Italy, in November 2019. The Italian National Commission for UNESCO representative took part in the first webinar to present and promote it with the organisers. Each webinar was designed by an expert and co-hosted by essential guests from different national and international institutions to showcase relevant quality experiences and resources for the benefit of participants who could have insights about how to reuse and adapt without duplicating all efforts. The collaborative approach of the OE community was thus an essential part of the approach applied throughout the series and of the content itself through many examples of quality collaborations around OE resources, practices, and pedagogies.

The webinar series covered topics spanning from the meaning of "open", to an introduction to Open Education (OE), Open Educational Resources (OER) and Open Educational Practices (OEP). They then moved into technical and practical matters to help participants become more familiar with using OER through a deep dive into the details of Creative Commons open licences and their relation with copyright and author's right. Through a series of quality relevant examples (such as the open picture book *Together* and the *EN-Roads* simulation), participants had the opportunity to learn how to create OER and how to share them, how to enact OEP learning from the experiences described by practitioners worldwide, with a specific focus on reuse and adaptation to specific contexts. By the end of the webinar series, participants were also able to identify networked OER repositories to explore according to the intended learning outcomes of the courses they were designing and consciously operate the choice of the license under which to release their educational materials, also in case they reused OER from others released with a diverse range of licences. Understanding the basics of

designing, reusing, adapting Open Education Practices and implementing open pedagogical approaches were all part of the discussion generated by the final Q&A of each webinar. The webinars offered an opportunity to discuss how OE can serve the University and vice versa to experiment with learning innovative practices and co-creative approaches underlying the strengths and the areas for improvement of Open Education. Participants were invited to answer and discuss some questions during the webinars to help them assimilate the general structure and existing Creative Commons licences.

They had an opportunity to deepen the relationship between copyright, author's rights and Creative Commons licenses and to identify networked repositories to explore according to the expected learning outcomes of the educational experiences they were designing. Through tips on how to select and use the identified OER, they wanted to embed and adapt to the learning pathway they wanted to develop, according to the permissions indicated in the associated licences, they had the opportunity to grasp some of the main elements of the process of creating (and integrating with reuse) OER. Moving to the creation of resources, they worked on how to consciously operate the choice of the license under which to release their open resource. Understanding the basics of designing, reusing, adapting Open Education Practices and implementing open pedagogical approaches, they could finally consider how to enhance the role of students in knowledge creation in education through collaborative processes.

The design of the webinar series and the webinar content materials (slides, exercises, activities and guided explorations of resources, practices, and repositories) are the results of the work done in METID, the Learning Innovation Unit of Politecnico di Milano, starting from the MOOC "Using Open Educational Resources in Teaching", available on Polimi Open Knowledge Platform, through many ERASMUS+ projects experiences, the internal consultancy work with faculty to implement openly licenced MOOCs and the focus on Open Education in the book *La ricerca del giusto mezzo* (Sancassani et al., 2023).

The webinars have been recorded and uploaded on a specific playlist in the Polimi Open Knowledge YouTube channel under an open license. Guests agreed to share the recordings of each webinar under a CC BY 4.0 license. Most of the guest presentations, if consistent with the permission in the included content, were released with an open licence and uploaded to Zenodo. Participants in each webinar could request a certificate of attendance if desired. Many completed a final survey to provide feedback and took the opportunity to ask for more webinars on OE. This paper aims to share more about this reusable and adaptable Open Education experience and practice, explore further actions to be taken to enhance the implementation of the Recommendation in specific contexts and provide additional opportunities to learn more about OE and how to apply it in learning experiences.

References

Climate Interactive, (2023), *EN-Roads* [simulation], https://en-roads.climateinteractive.org/

Corti, P., Branda, F., Nascimbeni,, F., Iacona Salafia, S., (2023). *Cosa significa "Open"? Introduzione alla Open Education,* alle OER e alle OEP. Zenodo. https://doi.org/10.5281/zenodo.7696224

Corti, P., (2023). *Usare le OER - Comprendere le licenze open e il diritto d'autore/copyright; trovare, valutare e attribuire OER.* Zenodo. https://doi.org/10.5281/zenodo.7712741

Corti, P., Nervo, A., (2023). *Creare Open Educational Resources: scegliere la licenza e condividere le proprie OER.* Zenodo. https://doi.org/10.5281/zenodo.7741372

Corti, P., Poritz, J., (2023). *Mettere in atto Open Educational Practices*. Zenodo. https://doi.org/10.5281/zenodo.7763626

Nerantzi, C., Pulker, H., Bentley, P., Corti, P., Roberts, V., Fransman, G., Frank, O. and Mathers, B. (2021) *Together* (Versions 1, 2). Zenodo. https://doi.org/10.5281/zenodo.4703978

Nerantzi, C., Corti, P. (2023). *The Collaborative Picture Book Format as an Open Educational Resource for Socialisation, Learning, Teaching and Assessment in Higher Education*. In: Olivier, J., Rambow, A. (eds) *Open Educational Resources in Higher Education. Future Education and Learning Spaces*. Springer, Singapore. https://doi.org/10.1007/978-981-19-8590-4_5

Polimi Open Knowledge, *Open Education per l'innovazione didattica* [video playlist] (2023). YouTube. https://www.youtube.com/@PolimiOpenKnowledge/featured

Sancassani, S., Baldoni, V., Brambilla, F., Casiraghi, D., Corti, P., and Marenghi, P. (2023). *La ricerca del giusto mezzo. Strategie di equilibrio tra aula e digitale*. Ediz. MyLab. Pearson Education Italia.

The Smart Learning Design (25) model to support creative and transdisciplinary design in blended contexts

Susanna SANCASSANI[1], Daniela CASIRAGHI[1],

Valeria BALDONI[1], Federica BRAMBILLA[1]

[1] *Politecnico di Milano - METID, Milano (ITALY)*

Abstract

How do we design and manage learning and teaching experiences that can effectively integrate all the different dimensions of the current complex learning ecosystem, characterized by active pedagogies and open policies able maximize the value of online and blended settings, and creatively use the new rising technologies and tools? The "Smart Learning Design(25)" or SLD25 instructional design approach provides physical tools to be used for designing coherent online and blended experiences, while considering the sustainable effort needed by students to achieve the Intended Learning Outcomes. It supports the description of a teaching and learning experience with a transdisciplinary "language", being based on "learning events", which are the building blocks of the learning process.

Keywords: blended learning, smart learning, instructional design, learning and teaching methodologies.

The experience of the past years, characterized by an online setting during the COVID pandemic and by blended contexts afterwards, clearly showed us that we need to overcome the idea of a teacher acting as a sage on stage "transmitting" knowledge to students who are required to apply it in controlled environments. Teachers must act as designers, focusing on supporting the students in achieving the Intended Learning Outcomes while applying active learning methodologies, which can strongly support durable learning into. This can happen both into face-to-face but also into online or blended contexts.

The concept of knowledge itself is now variable and complex to define. The advent of artificial intelligence with all its tools able to support the educational context, not only automating some processes but, even more, supporting creative and generative processes that augment people's intelligence (Hassani, Silva, Unger, TajMazinani, & Mac Feely, 2020), requires the educational system to continuously change its perspective about why, what, and how to teach.

The first task of the teacher-designer is then to carefully design and continuously review the Intended Learning Outcomes to support the student's comprehension of the real world and the codification of it: this to interact with new emerging tools, which can amplify the learning process. The second task is then to design and manage all the components of the learning system, which is complex and extremely flexible, to create a coherent course that can be integrated into all the dimension of the whole learning experience. This means having a clear overview of the actions required for students to reach profound and durable learning, how they are interrelated, when and where they happen, and how they could be integrated into a training path that can be performed in different settings (in-person, online, synchronous, and asynchronous).

Teachers need a "toolbox" that supports the clear and visual description of the learning and teaching project both to manage it - monitoring it and taking corrective actions, if needed - and to discuss it with colleagues, from different disciplines too.

The "Smart Learning Design (25)" or SLD25 instructional design model has been developed by Politecnico di Milano-METID (https://www.metid.polimi.it/) to support teachers and instructional designers in managing the complexity of the present context.

The SLD25 is based on the comprehension and deconstruction of the learning process, which is a complex experience characterized by several "learning events" performed by the students and supported by teachers.

The learning events are the recognizable building blocks that occur in time and space during a learning and teaching experience; they are based on the acquisition of knowledge (low and hight interactivity content collection), the application and manipulation of knowledge (content elaboration, discussion, application and practical experience, production and research), the consolidation and storage of knowledge (retrieval, reflection and metacognition).

In particular, the "reflection and metacognition" learning event is particularly useful to create and consolidate meaning and locate the knowledge acquired in the whole context of the teaching and learning experience. This to support students in describing and interpreting reality with a transdisciplinary mindset, useful to approach the systemic challenges the future will propose with the new emerging tools such as the ones based on artificial intelligence.

The SLD25 model is an open tool released under an open license (CC BY NC SA 4.0). It takes its premises from the ABC Learning Design method by Clive Young and Nataša Perović, from UCL (2015), based on Diane Laurillard's Learning Types (2012). This last model already refers to learning moments seen from the perspective of the student: however, it is characterized by a strong focus on what happens in the "classroom".

The SLD25 is defined as "Smart" because it requires the teacher to be responsible for the entire learning process, which happens both within the classroom and outside the classroom and integrates the different dimensions of "face-to-face" and "online", "physical" and "digital". The number "25" refers to the "student effort" in terms of hours to obtain an ECTS (European Credit Transfers System); the underlying concept is that the designed teaching and learning experiences must be sustainable both for teachers and for students.

The method consists of four steps:

1. *Selection of Learning Events*: Starting from the general definition of the Intended Learning Outcomes teachers are required to shape the students learning experience through the "learning events" they want to put in place to support durable learning.
2. *Set of Durations and Timing*: Teachers define the mutual "weight" of the different learning events in terms of average time and the timing during the semester calendar; this means reasoning on the main activities required of students without exceeding the required effort.
3. *Choice of learning sets*: Teachers select the context in which each learning event will take place (in-person, synchronous online, asynchronous online, or autonomous learning).
4. *Design of Learning events*: Finally, teachers go into details, defining the specific activities, the tools, which kinds of activities will be evaluated, and the link among different learning events.

Being a design process, it is active and recursive: it can be used both to design a course or a part of it from scratch or to re-design it, having a specific challenge or problem to solve after having experienced it. For example, the model could be used in a context in which there is the need to switch from a face-to-face to a blended format, from a traditional to a more active or transdisciplinary approach. The model could also be applied in an educational context in which there is a strong will to use new generative tools to support creative processes, to use or to implement open contents and practices, etc.

The method has been tested within several contexts. Teachers have highlighted how the breakdown into learning events and settings in which they happen, common for all the types of knowledge and disciplines, helps to "play" with the various dimensions while always having a clear overview of the educational system, supporting the generation of new ideas that can be easily discussed with colleagues and integrated into a common path.

References

Bernstein, J. H. (2015). Transdisciplinarity: A review of its origins, development, and current issues.

Biggs, J., Tang, C., & Kennedy, G. (2022), *Teaching for quality learning at university*. McGraw-hill education.

Dziuban, C., Hartman, J., Cavanagh, T. B., & Moskal, P. D. (2011). Blended courses as drivers of institutional transformation. In *Blended learning across disciplines: Models for implementation* (pp. 17-37). IGI Global.

Fauconnier, G., &Turner, M. (2002). *The way we think: conceptual blending and the mind's hidden complexities*. Basic Books.

Hassani, H., Silva, E. S., Unger, S., TajMazinani, M., & Mac Feely, S. (2020). *Artificial intelligence (AI) or intelligence augmentation (IA): what is the future?*. Ai,1(2), 8.

Laurillard, D. (2012), *Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology.* Routledge.

Young, C., & Perović, N. (2016), *Rapid and creative course design: as easy as ABC?.* Procedia-Social and Behavioral Sciences, 228, 390-395.

Sancassani, S., Brambilla, F., Casiraghi, D., & Marenghi, P. (2019), *Progettare l'innovazione didattica*. Pearson.

Sancassani, S., Baldoni, V., Brambilla, F., Casiraghi, D., Corti, P. & Marenghi, P. (2023), *La ricerca del giusto mezzo. Strategie di equilibrio tra aula e digitale*. Pearson: 2023

Shuell, T. J. (1986). Cognitive conceptions of learning. *Review of educational research*, *56*(4), 411-436.

Sabzalieva, E., & Valentini, A. (2023). ChatGPT and artificial intelligence in higher education: quick start guide.

From Video to Learning Prop: A Top-down Approach to Improve the Effectiveness of Multimedia Resources in Medical Education

Floriana VINDIGNI[1], Francesco RIGONI[1], Elisabetta GALOPPINI[1], Elena AMADIO[1], Vito MOSCATO[1]

[1] IT Systems, Website Management, E-learning Division, University of Turin,

Abstract

In 2019 a multimedia project named Videolibrary was launched at the Department of Clinical and Biological Sciences of the University of Turin, Italy. The project aims to make video resources available for students who attend the MD programme in Medicine and Surgery. This paper shows the development of e-contents for medical education starting from videos. Media contents, initially produced by an outside supplier, were later reworked by means of H5P, an open-source authoring tool which allows creators to produce reusable interactive contents. The result was the transformation of three 30-40-minute videos into three interactive learning props, hosted on the Moodle platform, that is the Learning Management System used at the University of Turin.

Keywords: medical education, learning prop, multimedia, video

Over the last decade, the increasing use of technology in medical education has drawn the attention of the research community. Among educational media, videos are possibly the most widely used due to their easy accessibility and capabilities, hence becoming prominent for peoples' learning transformation.

While studying research trends in the literature on video usage, Taslibeyaz et al. (2016, p. 873) evidence that video resources promote effective learning and knowledge retention, thus having a positive impact on the acquisition of clinical skills. In addition, Ahmet et al. (2018, p. 1150), while analysing a set of research works which explored the influence of videos in surgical education, conclude that video-based education can produce significant effects on surgical training. Moreover, Srinivasa et al. (2020, p. 689) report that online media are valuable educational tools also in postgraduate medical education. Finally, according to Discore (2010, p. 10), at present there are several websites, such as MedlinePlus and New England Journal of Medicine (NEJM), which publish reliable and quality videos. However, these platforms are less popular if compared to, for instance, YouTube, which constitutes the preferred choice, regardless of a certain variability in both the educational quality and validity of the videos published therein. This fact represents a critical issue for the use of media in education, especially as far as novice learners are concerned, as they might not immediately recognise information quality.

In 2019 a multimedia project named Videolibrary was launched at the Department of Clinical and Biological Sciences of the University of Turin. The project's goal is to make certified quality video resources, available to students who attend the MD programme in Medicine and Surgery. Videolibrary is hosted on the Moodle platform, the Learning Management System used at the University of Turin. Videos were produced both by the university's Web and E-learning Staff and by an outside supplier which, after winning a tender, appointed to release twelve media contents for the project. The videos, which originally included an Italian soundtrack, were dubbed in English at a later stage. For the sake of accessibility, every video was eventually subtitled in both languages.

By using a top-down approach, this paper describes the transformation of the three videos related to urological topics into three learning props. Design, production and postproduction activities were carried out by the supplier in close contact with the urology professor but without the supervision of the Web and E-learning staff. The results were three 30-40-minute videos on

the following topics: Access to the Upper Urinary Tract, Access to the Lower Urinary Tract and Minimally Invasive Surgery.

In line with Multimedia Learning Theory, Mayer (2001) offers several recommendations on educational videos, especially on how to improve their effectiveness. In particular, he points out the importance of segmentation, namely the chunking of the information string, thus granting learners the possibility to engage with smaller pieces of information once a new topic is given. Segmenting can be achieved by creating short(er) videos, i.e. no longer than 6 minutes, or by including pauses within a video. Moreover, Bransford et al. (2000) report that non-interactive environments, like linear videos, are much less efficient than interactive ones. Indeed, interactive videos allow learners to explore and revisit specific parts and make the learning process engaging and more effective. Therefore, starting from these premises, videos were reworked by using H5P, an external plug-in integrated in Moodle, in order to produce three learning props. Among the resources available inside H5P, the 'Interactive Book' was chosen because it enables users to create props with different content types, such as interactive videos, image hotspots, questionnaires and multiple-choice quizzes.

Since the same type of editing procedure was performed for all three videos, as a representative case, only the one related to the 'Access to the Lower Urinary Tract' topic is described herein. The first step involved segmenting the whole video into clips, later used to create an 'Interactive Book' divided into the following chapters: 1. Introduction; 2. Endoscopic Instruments; 3. Endoscopic procedures; 4. Pathologic Findings; 4.1. Pathologic Findings: Test Your Knowledge; 5. Basic Endoscopic Procedures. The clips were embedded both as non-interactive videos (chapter 1) and interactive videos (chapters 2, 3 and 5). As for interactive videos, bookmarks, which allow learners to jump to a specific part of the clip, and single-choice questions for self-assessment were inserted to enhance the learning experience. As far as chapter 4 is concerned, an image hotspot was implemented. The longer clip related to chapter 4 was further subdivided into seven shorter clips, one for each different pathologic finding. These seven clips were then embedded into a single bladder image as interactive hotspots, each of them placed in the pertinent pathology zone. In this case, the single-choice questions for self-assessment were added separately (paragraph 4.1). Unfortunately, as these learning props have been available on Moodle only since April 2023, no feedback from students is available yet.

The Videolibrary project is in constant development and, as a work in progress, the opposite approach, i.e. bottom-up, is also being tested. The final goal of this experimentation is to support both professors and the outside supplier in designing and producing new videos which, with the supervision of the Web and E-learning staff, manage to follow the recommendations of Multimedia Learning.

References

Ahmet, A., Gamze, K., Rustem, M., & Sezen, K.A. (2018). *Is Video-Based Education an Effective Method in Surgical Education? A Systematic Review.* Journal of Surgical Education, 75(5), 1150-1158.

Bransford, J.D., Brown, A.L., & Cocking, R.R. (Eds.) (2000). *How People Learn: Brain, Mind, Experience, and School.* Washington, DC: National Academy Press.

Dinscore, A., & Andres, A., (2010). *Surgical Videos Online: A Survey of Prominent Sources and Future Trends*, Medical Reference Services Quarterly, 29(1), 10-27.

Mayer, R.E. (2001). *Multimedia Learning.* Cambridge: Cambridge University Press.

Srinivasa, K., Chen, Y., & Henning, M.A. (2020). *The Role of Online Videos in Teaching Procedural Skills to Post-graduate Medical Learners: A Systematic Narrative Review.* Medical Teacher, 42(6), 689-697.

Taslibeyaz, E., Aydemir, M., & Karaman, S. (2016). *An Analysis of Research Trends in Articles on Video Usage in Medical Education.* Education and Information Technology 22, 873-881.

Assessing AI Literacy: a framework-based approach.

Gabriele BIAGINI[1], Stefano CUOMO[1], Maria RANIERI[1]

[1] *University of Florence, Florence (Italy)*

Abstract

Artificial intelligence (AI) has the potential to transform various aspects of our lives, but its rapid development is posing several concerns related to its application in increasingly more aspects of daily life. To make informed decisions and fully comprehend AI and its implications, a solid understanding of its underlying mechanisms and awareness of its benefits and drawbacks are crucial. This article presents the development process of a questionnaire designed to assess AI literacy in high-education content. The questionnaire adopts a framework-based approach based upon most recent literature findings. The questionnaire was developed to be administered to doctoral students in the Learning Sciences and Digital Technologies program. Guided by a comprehensive framework encompassing cognitive, operational, critical, and ethical dimensions, the questionnaire aims at assessing participants' awareness and understanding of AI. The questionnaire includes over 60 items, covering a wide range of AI topics. Each item aligns with specific dimensions of the framework, assessing participants' knowledge, application, critical thinking, and ethical considerations about AI. The questionnaire, grounded upon an extensive literature review, and complemented with specific questions related to AI in education, is now undergoing several key steps, to be validated, tested and released as an effective tool to comprehensively assess AI literacy.

Keywords: Artificial Intelligence, AI Literacy, AI awareness assessment, Education, Ethics

Introduction

Artificial Intelligence (AI) is a rapidly evolving field that is showing its potential to revolutionize many aspects of our lives, from healthcare and transportation to education and entertainment (JRC, OECD, & UNESCO, 2021; Zawacki-Richter et al., 2019). However, the development of AI is not without controversy, and concerns have been raised about the possible ethical implications (Floridi et al., 2018; UNESCO, 2019; UNICEF, 2021; Zhang et al., 2022). In order to fully comprehend its evolution and application, it is essential to have a thorough understanding of the underlying principles and algorithms of AI (Cuomo et al., 2022). It is also crucial to cultivate a broad awareness and comprehension of the technological aspects, as well as both AI potential benefits and drawbacks (Gašević et al., 2023; Selwyn, 2022) to develop and implement AI taking into consideration ethical issues and human well-being.

In this context, this article aims to present the developmental process of a questionnaire designed to assess AI literacy in higher-education contexts. Although a common definition of AI literacy is not currently available (Cuomo et al., 2022; Kong & Zhang, 2023), it is widely recognised its importance to ensure individuals are equipped with skills to understand, navigate, and contribute to society where AI and its applications play an increasingly pervasive role. AI literacy aims at fostering responsible AI uses, addresses ethical concerns, reduces inequalities, nurtures adaptability, and enables informed decision-making. AI literacy can contribute - together with wider intended policies - to harnessing the transformative potential of AI while safeguarding human values and promoting a more inclusive and equitable future (Selwyn, 2023; Wilton et al., 2022) Indeed, for an open and democratic discussion around the role of AI in our society, we need more literate citizens that are able to confront such challenging issues (Floridi, 2021).

Although there is no agreement on the definition of AI literacy, various attempts have been undertaken to construct measurement tools for capturing its dimensions. These tools mostly deal with some components of AI (e.g., affective or collaboration) overlooking the concept of AI literacy in its inherent complexity (Laupichler et al., 2023). Illustrative instances for this phenomenon encompass the "Attitudes Towards Artificial Intelligence Scale" (Sindermann et al., 2021), the "General Attitudes

Towards Artificial Intelligence Scale" (Schepman & Rodway, 2022), and the "Artificial Intelligence Anxiety Scale" (Wang & Wang, 2022). To overcome this limitation, we first developed an AI literacy multidimensional framework, grounded on a wide review of the literature. Subsequently, we created a questionnaire involving either items from preexisting assessment tools and new or adapted items, that were framed within the original AI literacy framework we elaborated. In the next two paragraphs, we provide additional details starting with the construction of the framework.

As anticipated, for identifying the meaningful dimensions to conceptually represent the notion of AI literacy, a thorough review of literature has been carried out, incorporating insights from seminal works such as the contributions by Floridi, Ng and Selwyn, among others, and authoritative sources such as the European Commission (2018,2019,2020,2021), the Joint Research Centre (JRC, 2018), the Organisation for Economic Co-operation and Development (OECD, 2018a, 2018b, 2021), the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2019a, 2019b, 2021), the United Nations Children's Fund (UNICEF, 2020, 2021a, 2021b). Based on this overview of the literature, we defined a framework for AI literacy articulated along four dimensions, namely cognitive, operational, critical, and ethical (Cuomo et al., 2022). Through the review, we were also able to revise the different tools already adopted to evaluate the different elements of AI literacy (see literature mentioned above). On this ground, we elaborated a questionnaire to appraise participants' AI literacy by measuring their awareness across various aspects related to the cognitive, operational, critical and ethical aspects. The questionnaire comprises more than 60 items, which cover the four dimensions of the framework. The framework indeed provided a structured outline for the questionnaire leading to an operationalization of the different dimensions and subdimensions, meaning that the abstract concepts were translated into specific, measurable variables or items for the questionnaire. In addition, each item was carefully crafted to be accessible to a specific public, that is higher education students.

The questionnaire is now to be validated through a panel of experts who provide feedback on content validity. A pilot study will be conducted in a short time to evaluate the questionnaire's feasibility and gather participant feedback for further refinements. Lastly, item analysis techniques will be employed to ensure the questionnaire's reliability and validity for assessing AI literacy.

The availability of a general method capable of measuring AI literacy may provide helpful insights into the effectiveness of educational interventions. By encompassing the multidimensional nature of literacies (Calvani, 2009), and AI literacy in specific, this universally applicable scale could be a valuable tool for researchers and educators in assessing and enhancing AI literacy across diverse contexts. To this end additional, specific questions have been included to explore participants' perceptions of AI in the field of education.

References

Calvani, A., A. Fini, and M. Ranieri. 2009. "Assessing Digital Competence in Secondary Education. Issues, Models and Instruments." Issues in Information and Media Literacy: Education, Practice and Pedagogy, 153–172.

Cuomo, S., Biagini, G., & Ranieri, M. (2022). Artificial Intelligence Literacy, che cos'è e come promuoverla. Dall'analisi della letteratura ad una proposta di Framework. Media Education. https://doi.org/10.36253/me-13374joint r

European Commission. Joint Research Centre (JRC). (2018). The impact of Artificial Intelligence on learning, teaching, and education. Publications Office. https://data.europa.eu/doi/10.2760/12297

European Commission, Joint Research Centre (JRC) & Organisation for Economic Co-operation and Development (OECD). (2021). AI watch, national strategies on artificial intelligence: a European perspective. Publications Office of the European Union. https://doi.org/10.2760/069178.

European Commission (2018). High-Level Expert Group on Artificial Intelligence. Available online at: https://digital-strategy.ec.europa.eu/en/policies/expert-group-ai

European Commission (2019). Pilot the Assessment List of the Ethics Guidelines for Trustworthy AI. Available online at: https://ec.europa.eu/futurium/en/ethics-guidelines-trustworthy-ai/register-piloting-process-0.html

European Commission (2020). On Artificial Intelligence - A European approach to excellence and trust. Technical report, European Commission, Brussels.

European Commission (2021). Shaping Europe's digital future—European strategy for data. European Commission.

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., & Vayena, E. (2018). AI4People—An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations. Minds and Machines, 28(4), 689–707. http://dx. doi.org/10.1007/s11023- 018- 9482- 5.

Floridi, L. (2021). Introduction–The Importance of an Ethics-First Approach to the Development of AI. Ethics, Governance, and Policies in Artificial Intelligence, 1-4.

Gašević, D., Siemens, G., & Sadiq, S. (2023). Empowering learners for the age of artificial intelligence. Computers and Education: Artificial Intelligence, 100130. https://doi.org/10.1016/j.caeai.2023.100130.

Kong, S.-C., Cheung, W. M.-Y., & Tsang, O. (2022). Evaluating an artificial intelligence literacy programme for empowering and developing concepts, literacy and ethical awareness in senior secondary students. Education and Information Technologies. https://doi.org/10.1007/s10639-022-11408-7

Laupichler, M. C., Aster, A., & Raupach, T. (2023). Delphi study for the development and preliminary validation of an item set for the assessment of non-experts' AI literacy. *Computers and Education: Artificial Intelligence*, *4*, 100126. https://doi.org/10.1016/j.caeai.2023.100126.

Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. Computers and Education: Artificial Intelligence, 2, 100041. https://doi.org/10.1016/j.caeai.2021.100041.

Organisation for Economic Co-operation and Development (OECD). (2018a). Bridging the digital gender divide: Include, upskill, innovate. OECD Publishing. http://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf

Organisation for Economic Co-operation and Development (OECD). (2018b). Future of education and skills 2030: Conceptual learning framework. OECD Publishing. https://www.oecd.org/education/2030/Education-and-AI-preparing-forthe-future-AI-Attitudes-and-Values.pdf

Organisation for Economic Co-operation and Development (OECD). (2019). Recommendation of the Council on Artificial Intelligence. OECD Publishing. https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449.

Schepman, A., & Rodway, P. (2020). Initial validation of the general attitudes towards Artificial Intelligence Scale. Computers in Human Behavior Reports, 1, 100014. https://doi.org/10.1016/j.chbr.2020.100014

Selwyn, N. (2022). The future of AI and education: Some cautionary notes. European Journal of Education, 57(4), 620–631. https://doi.org/10.1111/ejed.12532

United Nations Children's Fund. (2020). Policy guidance on AI for children Draft 1.0. https ://www.unicef.org/globalinsight/media/1171/file/UNICEF-Global-Insight-policy-guidance-AI-children-draft-1.0-2020.pdf.

United Nations Children's Fund. (2021a). AI policy guidance: How the world responded. https://www.unicef.org/globalinsight/stories/ai-policy-guidance-how-world-responded.

United Nations Children's Fund. (2021b). Policy guidance on AI for children 2.0. UNICEF. https://www.unicef.org/globalinsight/media/2356/file/UNICEF-Global-Insight-po licy-guidance-AI-children-2.0-2021.pdf.

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2019a). Beijing consensus on artificial intelligence and education. https://unesdoc.unesco.org/ark: /48223/pf0000368303.

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2019b). Stepping up AI for social good. United Nations Educational, Scientific and Cultural Organization.

United Nations Educational, Scientific and Cultural Organization. (2021). AI and education: Guidance for policy makers. https://unesdoc.unesco.org/ark: /48223/pf0000376709.

Wang, B., Rau, P. L. P., & Yuan, T. (2022). In Measuring user competence in using artificial intelligence: Validity and reliability of artificial intelligence literacy scale. Behaviour and Information Technology. https://doi.org/10.1080/0144929X.2022.2072768.

Wang, Y. Y., & Wang, Y. S. (2022). Development and validation of an artificial intelligence anxiety scale: An initial application in predicting motivated learning behavior. Interactive Learning Environments, 30(4), 619–634. https://doi.org/ 10.1080/10494820.2019.1674887

Wilton, L., Ip, S., Sharma, M., Fan, F. (2022). Where Is the AI? AI Literacy for Educators. In: Rodrigo, M.M., Matsuda, N., Cristea, A.I., Dimitrova, V. (eds) Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners' and Doctoral Consortium. AIED 2022. Lecture Notes in Computer Science, vol 13356. Springer, Cham. https://doi.org/10.1007/978-3-031-11647-6_31

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators? International Journal of Educational Technology in Higher Education, 16(1), 1–27. http://dx.doi.org/10.1186/s41239-019-0171-0.

Zhang, H., Lee, I., Ali, S., DiPaola, D., Cheng, Y., & Breazeal, C. (2022). Integrating Ethics and Career Futures with Technical Learning to Promote AI Literacy for Middle School Students: An Exploratory Study. International Journal of Artificial Intelligence in Education. https://doi.org/10.1007/s40593-022-00293-3

A framework for Learning Design and Self-Regulated Learning: First results of SuperRED Project

Alice ROFFI[1], Gabriele BIAGINI[1], Stefano CUOMO[1], Maria RANIERI[1]

[1] *University of Florence, Florence (Italy)*

Abstract

Supporting Self Regulated Learning in Digital and Remote Education (SuperRED) is an Erasmus+ funded project involving researchers and school partners from four European countries (Italy, Spain, Belgium, The Netherlands). One of the main results of the project is the development of a theoretical framework, including guidelines for Learning Design and Self Regulated Learning - named "SuperRED framework" - aimed to support teachers in designing and implementing effective and engaging learning activities leveraging on students' self-regulation processes. This study describes the activities carried out for SuperRED framework's development, which includes a literature analysis, the conduction of a survey for teachers, and the expert validation of the draft version of the framework. The framework is one of the tools, developed by the project, to support teachers in an effective design of learning activities to support self-regulated learning.

Keywords: Learning Design, Self-Regulated Learning, Distance education, Digital Technologies

Introduction

Supporting Self-Regulated Learning in Digital and Remote Education (SuperRED) is an Erasmus+ funded project involving researchers and school partners from four European countries (Italy, Spain, Belgium, The Netherlands). This project has been conceived during the Covid-19 pandemic that, for long periods, forced students and teachers behind a screen for educational purposes. One of the main challenges in facing this situation was the low level of digital competences of students and teachers in using digital technologies for teaching and learning (Carretero-Gomez et al., 2021; Ranieri, Gaggioli, Borges, 2020). Moreover, according to recent studies on the Italian context, in the online environment teachers have mainly reproduced face-to-face classroom dynamics with mixed results causing, as a general outcome, a loss of contact with 6-10% of students (Giovannella, Passarelli, & Persico, 2020; INDIRE, 2020; SIRD, 2020). This was mainly due to their lack of competences for blended/remote Learning Design (LD) and in the scarce capacity of supporting student's motivation and Self-Regulated Learning (SRL) especially in digital contexts (Carretero-Gomez et al., 2021).

To address these limitations that, besides the emergency period, may constitute a significant barrier to the adoption of effective teaching strategies in remote/blended environments, SuperRED aims at increasing the digital readiness of the school ecosystem to manage an effective shift towards digital education and fostering the resilience to tackle unplanned events of the teachers and students at the lower secondary schools. To this purpose, in the first phase of the project, the Consortium developed a framework - named "SuperRED Framework" - to support teachers in designing and implementing effective and engaging learning activities with a focus on digital and remote education, LD and SRL. This framework was grounded on the literature evidence and refined with a survey targeted to teachers of the SuperRED school partners aiming at collecting teachers' knowledge, experiences and needs on the main themes addressed by SuperRED.

The framework was conceived as a compendium of pedagogical guidelines aimed at facilitating the implementation of LD and fostering the advancement of students' SRL across diverse educational contexts. It frames LD and SRL from three perspectives - Methods/Models, Tools/Technologies, and Learning Ecologies - to be implemented in three distinct learning contexts: Remote, Blended, and Face-to-face learning.

To develop the framework, in a first phase the research partners identified seminal papers that focused on LD and SRL. A second phase was devoted to a further selection process to validate the initial screening of papers, involving the research institutions partner of the Consortium to define the criteria

for selecting relevant papers. In the last phase the selected papers were analyzed using a coding table encompassing categories such as General Information, Aims and Methods, and Results and Implications.

To enhance the applicability of the framework and assess its relevance, a survey tailored to the needs and practices of teachers was delivered to the partner schools, and the results were integrated into the draft of the framework. The last step to validate the framework was the involvement of an international panel of teachers and researchers, selected outside the SuperRED consortium to ensure independence of validation. The validation process demonstrated a high level of agreement among the panel members regarding the clarity, understandability, consistency, and significance of the framework, to be adopted by teachers and researchers as guidelines for an effective LD and SRL.

As explained above, the SuperRED Framework considers LD and SRL dimensions, each declined in three different perspectives, resulting into the following set of indications:

Learning Design:
- Methods and Models: this perspective focuses on the design level teachers are working on, the attention to the context of the learning activities, the consistency between the defined learning objective and the teaching strategies to reach them, the integration of the resources (i. e. human, digital) and the evaluation aspect.
- Tools and Technologies: this perspective focuses on the use of tools and technology in general for the learning design process, paying attention to the aspect of sharing teachers' design with the community, and, when possible, to use the data to inform the design process.
- Learning Ecologies: this perspective focuses on developing learning strategies in terms of individual learning ecologies taking into account the learner's intention and motivation, and in the importance of integrating ICT resources both as elements and as training strategies to improve teachers learning ecologies and the pedagogical, technological and contextual areas during the design process.

Self-Regulated Learning:
- Methods and Models: this perspective focuses on the multifaceted nature of regulation, encompassing motivational, emotional, behavioral, and cognitive aspects, with a focus on engaging learners based on their purposes, intents, and goals. It emphasizes the importance of enabling learners to connect theory and practice through personal goal setting or personalizing course goals.
- Tools and Technologies: this perspective focuses on the importance of choosing a tool that prioritizes a clear goal setting, and emphasizes self-assessment, and feedback. The need to opt for tools that support visual mechanisms, interactivity, social comparison, and help-seeking, and, finally, the importance of taking into account the cognitive load and employing strategies to balance it when selecting the appropriate tool.
- Learning Ecologies: this perspective focuses on the importance of promoting tools and attitudes fostering the development of a Personal Learning Environment (PLE) and of guiding students in constructing a Personal Development Planning (PDP). Additionally, the indications encourage the use of web resources and technologies that support learner autonomy and self-direction, such as current awareness techniques and social networks.

This framework, that has been released to the partner schools for the design of the learning activities to be implemented in two pilots in the project, is one of the tools that will form the SuperRED Toolkit, a set of resources, developed by the project Consortium, to enable the teachers to be informed on the concept of the school as learning ecosystem supporting DL and SRL, to understand the elements and procedures to implement DL and RSL and to support them in scaling-up SuperRED good practices.

Acknowledgements

valuable contributions and support throughout the research process. We extend our appreciation to Donatella Persico, Francesca Pozzi, Marcello Passarelli, Marcus Specht, Jacqueline Wong, Naomi Wahls, Albert Sangrà Morer, Dèlia Espanol, Marc Romero, for their insightful discussions and feedback that greatly enriched the quality of this work. Finally, we would like to thank the schools participating in the project: Bernardusscholen (BE), Escola Solc (SP), and Istituto Comprensivo Sarzana-ISA13 (IT), who generously devoted their time and participated in this study.

References

Carretero Gomez, S., Napierala, J., Bessios, A., Mägi, E., Pugacewicz, A., Ranieri, M., Triquet, K., Lombaerts, K., Robledo Bottcher, N., Montanari, M. and Gonzalez Vazquez, I. (2021) *What did we learn from schooling practices during the COVID-19 lockdown*, EUR 30559 EN, Publications Office of the European Union, Luxembourg. SBN 978-92-76-28418-5, doi:10.2760/135208, JRC123654.

Giovannella, C., Passarelli, M., & Persico, D. (2020). *Measuring the effect of the Covid-19 pandemic on the Italian Learning Ecosystems at the steady state: a school teachers' perspective*. Interaction Design and Architecture (s) Journal (IxD&A), (45).

INDIRE (2020). Indagine tra i docenti italiani pratiche didattiche durante il lockdown. Report preliminare. http://www.indire.it/wp-content/uploads/2020/07/Pratiche-didattiche-durante-il-lockdown-Report-2.pdf

Ranieri, M., Gaggioli, C., Borges, M.K. (2020) *La didattica alla prova del Covid-19 In Italia. Uno studio sulla scuola primaria*. Praxis educativa, 15.

SIRD (2020). Per un confronto sulle modalità di didattica a distanza adottate nelle scuole italiane nel periodo di emergenza COVID-19.
https://www.sird.it/wp-content/uploads/2020/07/Una_prima_panoramica_dei_dati.pdf

Augmented Didactic: Augmented Reality for Learning and Motivation through a Multidisciplinary Approach

Luna LEMBO[1], Elèna CIPOLLONE[2], Pietro OLIVA[3]

[1,2] *Niccolò Cusano University – Heracle Lab, Rome (ITALY)*

[3] *Niccolò Cusano University – Engineering Department, Rome (ITALY)*

In the field of teaching and learning innovation, augmented reality is a response in line with the new needs of the educational landscape. The potential of augmented reality encompasses the pillars that support the field of pedagogy, giving meaning to digital citizenship and outlining a framework for education that aims to develop it (Rivoltella, 2022). This contribution represents the continuation of a broader research strand called "Augmented Didactic," proposing a new educational methodology that incorporates the use of Augmented Reality to enhance learning processes (Lembo, 2023; Cipollone, 2023). This work aims to promote and enhance the learning processes and motivation to learn of university students, evaluating the role of augmented reality in understanding abstract concepts that can be manipulated through it, in both humanities and technological faculties (Yildirn, 2018). The research also supports a dual purpose: addressing the limitations of technologies due to excessive costs and making it accessible through smartphones, thus bridging the potential gap that could arise from the use of other less accessible devices, and supporting the concept of multidisciplinarity, which becomes essential in the new landscape of teaching through collaboration with the engineering department, developing cross- cutting skills for the construction of innovative methodological approaches (Guglielmi, 2017). To provide a quantitative estimation of the effectiveness of the proposed method, this experimental quantitative research evaluates a control group subjected to traditional teaching and an experimental group subjected to teaching with augmented reality support. The fundamental principles of motivation and learning transcend the differences that make each technology specific, from virtual reality to augmented reality to artificial intelligence (Keller, 2016). The research investigates how augmented reality integrated into lessons provided to students can influence their motivational level, thereby creating a positive cascade effect on the learning processes. The construct of motivation can be defined as multicomponential, as it identifies four categories that determine the entirety of the construct: interest, relevance, expectancy and result (Keller, 1979). From these categories, the complexity of motivation emerges, influenced by levels of curiosity and interest related to the knowledge concepts being learned. Additionally, the subject must perceive the relevance of the information in relation to their objectives, learning styles, and past experiences. The motivational construct also encompasses the students confidence and perceived satisfaction, related to positive expectations for success and the subsequent achievements attributed to their own abilities. Thus, this construct relies on a complexity of sub-constructs that, through their interaction, contribute to determining the complexity of the entire motivational expression. In the theoretical panorama just described, augmented reality fits compatibly, anchoring itself to all the sub-components that define motivation. Manipulating virtual objects superimposed on the students physical reality satisfies their levels of curiosity. This technology, in fact, makes the presentation of content more effective by requiring greater interaction and engagement from students. Augmented reality overcomes the limitations imposed by current teaching aids such as slides, images, or video files, making the learning experience much more exciting and engaging (Tomassoni, 2021). Interacting through augmented reality with the concept to be internalized correlates with the new predispositions and attitudes of students, who now operate in the digital realm. Augmented reality is among the technologies with a significant impact on educational contexts, favoring a reevaluation of teaching, learning, and research fields. This technology allows offering students forms of learning that are no longer purely theoretical but rather visual, manipulable, and highly interactive, enriching the real world with the overlay of digital data and the simulation of dynamic processes. The potential offered by augmented reality lies in its ability to incorporate informative content into objects that, when captured, respond with text, images, or presentation and in-depth videos. In a physical reality context, what is typically presented to the student is an inanimate, immobile, and silent object. However, what augmented reality offers,

simply on the screen of a mobile device, comes to life and becomes enriched with elements that facilitate understanding (Panciroli, 2018). The potential of augmented reality lies in the possibility of interacting with objects and transforming learning environments into digitally enriched spaces through manipulation and access to information that is not immediately accessible. Students who have access to augmented reality via smartphones can scan images that allow them to question and resolve doubts through exploration, giving rise to an experience that extends the range of possibilities associated with engagement (Panciroli, 2018). Student-centered learning is valued by this technological innovation as it reconsiders the centrality in terms of active learning and the construction of meaning derived from the experience conveyed by the smartphone. Students become aware of the reality surrounding them, no longer passive consumers but creators of innovative content (Bower, 2014).The use of augmented reality by students enhances their knowledge, expression, and reworking of what they have learned, stimulating the construction of knowledge and creativity. Scientific evidence shows that one of the dimensions greatly favored by the contribution of augmented reality is interactivity. This dimension is identified as one of the most important for promoting meaningful learning processes. Indeed, the objects presented through augmented reality are not subject to the static and immobility of more traditional teaching aids but can move and animate in response to user actions. The significance of the resulting learning derives from the improvement of memory skills, leading to longer retention of knowledge acquired through augmented reality (Dünser, 2012).

References

Bower, M. (2014). Augmented reality in education – Cases, places, and potentials. *In 2013 IEEE 63rd Annual Conference International Council for Educational Media (ICEM)*.

Cipollone, E., Lembo, L., Monteleone, S., Oliva, P., Peluso Cassese, F. (2023). Augmented didactic: an interdisciplinary approach to assessing augmented reality in learning. *Pratica - E-learning* (printing)

Dünser, A., Walker, L., Horner H., Bentall D. (2012). Creating Interactive Physics Education Books with Augmented Reality. *In Proceedings of the 24th Australian HCII*

Guglielmi, G. (2017). The "augmented" Legionnaire – An exercise in Latin vocabulary in "augmented reality". Bricks. *SIe-L - Italian Society of e-Learning*, 1, pp. 40-50.

Keller, J., (2016). Motivation, Learning, and Technology: Applying the ARCS-V Motivation Model. *Participatory Educational Research (PER)*. 3(2), pp. 1-13.

Lembo, L., Cipollone, E., Oliva, O, Monteleone, S.(2023), AUGMENTED DIDACTIC: wow effect for learning. Use of Augmented Reality through a QR-code to enhance learning processes in undergraduates, *Italian Journal of Health, Education and Sports,* 7(2). Edizioni Universitarie Romane Doi: https://doi.org/10.32043/gsd.v7i2.893

Panciroli, C., Macauda, A. (2018). Educazione al patrimonio e realtà aumentata: quali prospettive. *Italian journal of educational research*, 11(20), pp. 47-62.

Pasta, S., Rivoltella, P. C. (2022). Superare la "povertà educativa digitale". Ipotesi di un nuovo costrutto per la cittadinanza digitale. Pensa MultiMedia Editore, pp. 600-604.

Refat N., Kassim H., Rahman MA., Razali R. (2020). Measuring student motivation on the use of a mobile assisted grammar learning tool. *PLoS ONE*, 15(8) https://doi.org/10.1371/journal.pone.0236862

Tomassoni, R. (2021), The instrumental function of "augmented reality" in the processes of representation, transmission and construction of knowledge. *MeTis. Mondi educativi. Temi, indagini, suggestioni*, 11(1). DOI: 10.30557/MT00157

Yildirim H., I. (2018). The Effect of Technological Pedagogical Content Knowledge Based Training Programs Used in Astronomy Classes on the Success Levels of Science Teacher Candidates. *Universal Journal of Educational Research,* 6(6), pp. 1328 - 1338. DOI: 10.13189/ujer.2018.060624

From LMS to LLMs: Learning Management Systems enhanced through Large Language Models

Susanna SANCASSANI[1], Daniela CASIRAGHI[1]

[1] Politecnico di Milano - METID, Milano (ITALY)

Abstract

This article explores the potential of integrating Large Language Models (LLMs) into Learning Management Systems (LMS) to enhance digital learning. It discusses the transition from traditional LMS to a more personalized approach using LLMs, focusing on the possibilities for personalized learning pathways, fostering critical thinking, promoting student engagement, and supporting content exploration. The piece underscores the need for further research to fully understand the implications of this integration.

Keywords: Large Language Models, Learning Management Systems, Digital learning, Personalized education, Artificial intelligence.

In the last decades Learning Management Systems (LMS) have emerged as a cornerstone of online education, transforming teaching and learning processes by providing a platform for content delivery, communication, and assessment (Watson and Watson, 2007). However, LMS have been criticized for their 'one-size-fits-all' approach, which often fails to address individual learners' needs (Margaryan et al., 2015).

The advent of Large Language Models (LLMs), such as OpenAI's GPT-3 and GPT-4, introduces a new possibility in digital learning. These models have shown remarkable capabilities in generating human-like text, understanding context, and simulating conversation (Brown et al., 2020). Drawing on Siemens' (2005) connectivism theory and the importance of digital literacy in the information age, this article explores the transition towards "LLMs enhanced" Learning Management Systems as primary tools for supporting digital learning.

The integration of AI in education began with Intelligent Tutoring Systems (ITS), which utilized rule-based systems to provide personalized instruction and feedback (Koedinger, Anderson, Hadley, & Mark, 1997). However, these systems were largely limited by their inability to process natural language, a barrier that has been largely overcome with the advent of LLMs.

About ten years ago, Georgia Tech's "Jill Watson", an AI-powered teaching assistant, demonstrated the potential of AI in automating some aspects of teaching (Qiaosi et al., 2020), but LLMs, such as OpenAI's GPT-3, represent a significant advancement in the field of AI, opening up new possibilities in personalized learning (Brown et al., 2020). In 2022, Holmes et al, proposed a typology of AI in education tools and applications falling into three interrelated categories: student-focused, teacher-focused, and institution-focused (Holmes et al., 2022).

The integration of LLMs into LMS presents a promising avenue for the future of digital learning, particularly in "student-focused" AI for education. Integrating the administrative capabilities of LMS with the personalization and adaptability of LLMs could create a new kind of adaptive environment, enabling a more effective and engaging learning experience. The potential of LLMs in education is vast. For instance, Intelligent Tutoring Systems have been instrumental in providing personalized instruction, and LLMS can enhance these systems by simulating human-like, contextually appropriate responses (VanLehn, 2011; Brown et al., 2020).

Similarly, Automated Essay Scoring (AES) systems, like those used by Turnitin and ETS, could be enhanced by LLMs. These models could provide more detailed feedback on complex issues such as argument structure, coherence, and clarity, thereby enhancing the learning process (Shermis & Burstein, 2013).

Furthermore, AI-powered virtual learning assistants can be significantly improved with the use of LLMs, which can provide more accurate and engaging answers to student queries, fostering a more interactive learning environment (Goel, 2020).

As noted by Luckin (2018), "AI can provide us with the tools to turn the science of learning into the science of learners, enabling us to focus on the needs of individual learners and not just the class as a whole."

More in detail, LLMs, specifically trained about a domain or course content, open up a range of possibilities for supporting content exploration and comprehension in digital learning environments, such as:

1. Personalized Learning Pathways: LLMS can provide personalized learning experiences by adapting responses based on the learner's needs, tailoring explanations to individual learning styles, previous knowledge, and current understanding (Brown et al., 2020). This level of personalization has been shown to improve learning outcomes (Pane et al., 2015).
2. Fostering Critical Thinking: LLMs can generate thought-provoking questions or present counter arguments to a learner's viewpoint, promoting deeper engagement with the material (Weston et al., 2015).
3. Promoting Student Engagement: By providing immediate, contextually appropriate feedback, LLMs can enhance student engagement. They can answer queries, provide explanations, and engage in academic discussions, simulating a more interactive learning environment (Kim et al.2018)
4. Stimulating Content Exploration: LLMs could support content exploration by generating summaries of complex texts, suggesting additional resources for further reading, or highlighting connections between different areas of knowledge (Kirschner et al., 2006).

While LLMs hold significant potential, they should be viewed as a tool to complement traditional LMS, providing additional resources and personalized assistance to learners. As we navigate the path towards more personalized and effective digital learning, it is critical to keep the focus on the learner, ensuring that the technology serves the needs of each individual (Luckin, 2018).

The integration of LLMs into LMS could potentially revolutionize digital learning. However, more research and real-world testing will be needed to fully understand the potential benefits and challenges of such integration. Despite the challenges, LLMs open up an exciting new frontier in education, offering the possibility of more personalized, interactive, and engaging learning experiences.

References

Bernstein, J. H. (2015). Transdisciplinarity: A review of its origins, development, and current issues.

Kim, B., Suh, H., Heo, J. & Choi, Y., (2018). AI-Driven Interface Design for Intelligent Tutoring System Improves Student Engagement. Paper presented at the ACM Symposium on Neural Gaze Detection, Woodstock, NY, 3-5 June.

Brown, T. B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., ... & Agarwal, S. (2020). Language models are few-shot learners. *arXiv preprint arXiv:2005.14165.*

Goel, Ashok K. (2020). AI-Powered Learning: Making Education Accessible, Affordable, and Achievable. *ArXiv abs/2006.01908.*

Hao, K. (2020). OpenAI's new language generator GPT-3 is shockingly good—and completely mindless. *MIT Technology Review.*

Holmes, W., Persson, J., Chounta, I.-A., Wasson, B., & Dimitrova, V. (2022). *Artificial intelligence and Education. A critical view through the lens of human rights, democracy, and the rule of law.* Council of Europe.

Holstein, K., Aleven, V., & Rummel, N. (2020). A conceptual framework for human–AI hybrid adaptivity in education. In *Artificial Intelligence in Education: 21st International Conference, AIED 2020, Ifrane, Morocco, July 6–10, 2020, Proceedings, Part I 21* (pp. 240-254). Springer International Publishing.

Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). *Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching.* Educational psychologist, 41(2), 75-86.

Koedinger, K. R., Anderson, J. R., Hadley, W. H., & Mark, M. A. (1997). *Intelligent tutoring goes to school in the big city.* International Journal of Artificial Intelligence in Education (IJAIED), 8, 30-43.

Luckin, R. (2018). *Machine learning and human intelligence: the future of education for the 21st century*. UCL Institute of Education Press.

Margaryan, A., Bianco, M., & Littlejohn, A. (2015). *Instructional quality of Massive Open Online Courses (MOOCs)*. Computers & Education, 80, 77-83.

Pane, J. F., Steiner, E. D., Baird, M. D., & Hamilton, L. S. (2015). Continued Progress: Promising Evidence on Personalized Learning. *Rand Corporation.*

Wang, Qiaosi, Shan Jing, Ida Camacho, David A. Joyner and Ashok K. Goel. (2020) Jill Watson SA: Design and Evaluation of a Virtual Agent to Build Communities Among Online Learners. In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems.*

Shermis, M. D., & Burstein, J. (Eds.). (2013). *Handbook of automated essay evaluation: Current applications and new directions.* Routledge.

Siemens, G. (2005). *Connectivism: A learning theory for the digital age.* International Journal of Instructional Technology and Distance Learning, 2, 3-10.

VanLehn, K. (2011). *The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems.* Educational Psychologist, 46, 197-221.

Watson, W. R., & Watson, S. L. (2007). An argument for clarity: what are learning management systems, what are they not, and what should they become?. TechTrends, 51, 28-34.

Weston, J., Chopra, S., & Bordes, A. (2015). Towards AI-complete question answering: A set of prerequisite toy tasks. *arXiv preprint arXiv:1502.05698*

ARTIFICIAL INTELLIGENCE AND A CASE STUDY IN THE EDUCATIONAL CONTEXT OF YOUNG UNIVERSITY STUDENTS

In the era of digitalization, artificial intelligence (AI) emerges as an essential tool in the educational realm, with growing relevance for university students. This paper investigates the application of AI in the educational context, focusing on a case study among young adults (20-24 years old), outlining how AI can enrich the learning and research process. The work particularly concentrates on two key aspects: the use of AI as an assistive data mining tool and the application of AI in generative research processes and critical comparison.

The first part of the analysis highlights how AI can be employed to analyze and manage large volumes of data (Jordan & Mitchell, 2015), to predict and simulate events (Agrawal, Gans, & Goldfarb, 2018), to automate research processes (Chui, Manyika, & Miremadi, 2016), and to personalize the learning experience (Baker & Siemens, 2014). These applications portray AI as a potent data mining tool that can enhance the efficiency and effectiveness of research and learning processes.

In the second part, the paper explores how AI can be used to generate research hypotheses, identify patterns and trends in the data (King, 2009), conduct literature research and systematic reviews, and deconstruct the AI decision-making process to better understand how decisions are reached (Rudin, 2019).

In order to elaborate the theoretical aspects defined, a preliminary experiment was conducted with a class from the Faculty of Design (Communication Design) at the Politecnico di Milano, revealing methods and activities developed for exercise purposes in the context of the Digital Culture course. Students (50 MA students divided into ten groups of 5 members each) developed projects on digital culture, using AI to assist both in data collection and analysis, and in the generation of new ideas and critical analysis of the results. In the case study presented, students used AI tools to analyze a vast corpus of texts related to digital culture. Each group should design and develop a digital product according to the digital culture's productivity parameters, i.e., how can a designer apply AI to Instagramism and live stream of social media, digital publishing, e-commerce, …

The hypothesis is that AI enabled them to conduct a quicker and more efficient analysis than they could have done with traditional tools. Students need to identify trends, recurring themes, and connections between different studies and methodologies. They were asked to use AI tools to simulate potential evolutions of their assigned topics, finding plausible solutions and learning the dimension of self-construction of prompts.

Finally, students used AI to understand and critically compare different perspectives on digital culture through a "third-party" support such as AI. Through the use of techniques such as model interpretability and representation learning, students were able to "deconstruct" the AI decision-making process, gaining a deeper understanding of how conclusions were reached.

Our approach is aimed to maximize the benefits and minimize the risks of the use of AI in design teaching context. Therefore, the study encourages further exploration into the potential and challenges of AI in the educational context.

Agrawal, A., Gans, J., & Goldfarb, A. (2018). Prediction machines: The simple economics of artificial intelligence. Harvard Business Press.

Baker, R. S., & Siemens, G. (2014). Educational data mining and learning analytics. In K. Sawyer (Ed.), The Cambridge handbook of the learning sciences. Cambridge University Press.

Chui, M., Manyika, J., & Miremadi, M. (2016). Where machines could replace humansand where they can't (yet). McKinsey Quarterly.

Jordan, M. I., & Mitchell, T. M. (2015). Machine learning: Trends, perspectives, and prospects. Science.

• Rudin, C. (2019). Stop explaining black box machine learning models for high stakes decisions and use interpretable models instead. Nature Machine Intelligence, 1(5), 206-215.

The fear of blood draws: NAO's support to reduce anxiety and stress in children

Lino ROSSI[1], Enrico ORSENIGO[2], Maria VALENTINI[3], Marinella GARGIULO[4], Elisa BISAGNO[5], Alessia CADAMURO[5]

[1] Department of Pedagogy at the Salesian University Institute, Venice (ITALY)

[2] Ph.D. Student in Learning Sciences and Digital Technologies, Modena and Reggio Emilia (ITALY)

[3] Ph.D. Student in Learning Sciences and Digital Technologies, Padua (ITALY)

[4] Canossa High School, Reggio Emilia (ITALY)

[5] Department of Biomedical, Metabolic and Neural Sciences, Modena and Reggio Emilia (ITALY)

The present study is situated within a research framework that recognizes the pervasiveness of technology at all levels of life, including the fundamental realm of caregiving and health. Specifically, the emergence of social robotics establishes unprecedented possibilities for implementing and improving delicate and stressful situations, such as undergoing medical procedures.

In this perspective, we conducted a systematic literature review to evaluate the role of new technologies in the healthcare field, particularly during the blood sampling procedure; the results of this review serve as the starting point for designing our research horizon. Computerized searches were conducted between 1 and April 5, 2023, by using the Scopus, WebOfScience, Ebsco, Eric, Doaj, PubMed databases, using six keyword strings and their combinations. The documents identified from the database searches amount to a total of 259. Studies were selected based on four inclusion criteria: (1) typical development; (2) age range 4-12 years; (3) hospital setting; (4) type of robot (social); (5) ethical aspect of healthcare. After initial article identification, the title and abstract of each article were read to determine if the article met inclusion criteria. In so doing, we generally referred to criteria provided by PRISMA guidelines for systematic reviews (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009). Before the screening phase, the overlaps were removed, and the inconsistencies were discussed by the team of authors. After removing articles not meeting inclusion criteria, 42 eligible articles published before 5 april 2023 were included. Starting from the 42 selected documents, we propose a brief critical discussion based on the key issues for structuring the subsequent phases of our study.

From the literature review, it emerges that children undergoing venipuncture or capillary blood sampling often experience high levels of fear, anxiety, and pain (Kennedy et al., 2008), which can result in refusal and avoidance behaviors in children, distress for parents, longer procedure times, and increased workload for healthcare professionals (Sokolowski et al., 2010). At present, distraction is the most commonly used method to reduce fear and pain during blood collection. However, research results are not consistent, and there are doubts about which distraction techniques are most effective. For example, watching cartoons or listening to music did not have a positive effect during needle procedures (Arts et al., 1994), while distraction techniques involving the use of video games appear to be more effective (Jurdi et al., 2018). Social Robots (SR) offer new intervention opportunities to alleviate children's pain and anxiety during blood collection. They can be used both as a technological distraction method and as a coaching intervention (Cifuentes et al., 2020). SRs are designed to interact and communicate with humans through play, gestures, posture, gaze, and colors, and they have been successfully used in various contexts. Increasingly, robotic assistants are being employed in healthcare settings, especially in pediatrics, where they appear to have great potential, such as providing new ways to address the emotional needs of hospitalized children (Logan et al., 2019). In this sense, they represent a valuable support for improving the well-being of children during hospitalization (Moerman & Jansens, 2021). Similar findings were achieved by Farrier et al. (2019), whose research highlighted significantly lower levels of fear and pain in children who interacted with a robotic assistant during medical procedures compared to their peers receiving traditional care. Further evidence in this direction was gathered by Rossi et al. (2022), who investigated the effectiveness of a robotic assistant in managing stress in children (3-10 years old) awaiting an emergency procedure using salivary cortisol levels as an evaluation measure. Interaction with a robotic assistant proved to be more effective than other experimental conditions (playing with a nurse and waiting with parents). To our knowledge, there is only one study

in the literature that investigates children's interaction with SR in healthcare during blood collection. Smakman et al. (2021) conducted an experiment to examine the effectiveness of an SR (NAO) as a distraction method to reduce pain and anxiety in children (4- 12 years old) during blood collection. The research demonstrated that interaction with NAO (experimental condition) significantly reduced anxiety before blood collection compared to standard procedure, with no intervention (control condition).

Therefore, the literature review reveals a significant gap in the utilization of NAO robots in the blood sampling procedure, and our study is aimed at filling this void. We find it interesting to verify the effectiveness of the interaction with NAO from a comparative perspective with two other distracting experimental conditions: interaction with an educational figure and the proposal of a video game. The topic under examination concerns a complex situation with a high level of challenge. It is important to consider that the time frame in which the distractor must perform its function is very brief: only a few minutes, which are crucial for generating an effective engagement response. The video game is a well-known tool with which children quickly relate; however, the choice of the game is not trivial as it can be ambiguous: if the child likes it, detachment will be difficult, while rejection could increase stress. In any case, "getting into the game" is not an immediate matter. The educator can establish an initial and immediate empathic relationship through a simple yet defined situation that allows for an exit from the interaction without a sense of loss or abandonment. NAO, as an "unusual object," leverages the novelty effect by eliciting an immediate, positive or negative response, capturing the child's attention. If programmed correctly, it can engage the subject in a "controlled" interaction with brief verbal actions and behaviors, oriented towards accompanying the test.

The challenge is to program the interaction between the robot and the child in such a way as to govern the time and draw the maximum benefit from it.

References

Baglayici, E., Gurpinar, C., Uluer, P., Kose, H. (2021). *A new facial expression processing system for an affectively aware robot*. Computer Science, 12662 LNCS, 36-51.

Borenstein, J., Howard, A., Wagner, A.R. (2017). *Pediatric robotics and ethics: The robot is ready to see you now, but should it be trusted?*. Robot Ethics, 2.0 127-141.

Castiglioni, M., Zappa, G., Pepe, A. (2018). *The recreational-educational use of robots in pediatrics. An exploratory research on the well-being of hospitalized children*. Mondo Digitale, 17(75).

Fosch-Villaronga, E. (2019). *l'll take care of you, said the robot: Reflecting upon the legal and ethical aspects of the use and development of social robots for therapy*. Paladyn, 10(1), 77-93.

Guo, X. (2021). *Development Status of Medical Nursing Robots: Focused on Flexiblility, Autonomous Mobility, and Non-contact Physical Signs Monitoring*. ACM International Conference Proceeding Series, 178-187.

Jeong, S., Logan, D.E., Goodwin, M.S., Breazeal, C., Weinstock, P. (2015). *A Social Robot to Mitigate Stress, Anxiety, and Pain in Hospital Pediatric Care*. ACM/IEEE International Conference on Human-Robot Interaction, 103-104.

Jin, M., Choi, H. (2022). *Caregiver Views on Prospective Use of Robotic Care in Helping Children Adapt to Hospitalization*. Healthcare (Switzerland).

Jin, M., Kim, J. (2020). *A survey of nurses; need for care robots in Childrens Hospitals: Combining robotcare, game-care, and edu-care*. CIN - Computers Informatics Nursing, 38(7), 349-357.

Jones, R.A. (2016). *An inquiry concerning the understanding of child-robot interaction*. Frontiers in Artificial Intelligence and Applications, 290, 89-98.

Jurdi, S., Montaner, J., Garcia-Sanjuan, F., Jaen, J., Nacher, V. (2018). *A systematic review of game technologies for pediatric patients*. Computers in Biology and Medicine, 97, 89-112.

Logan, D.E., Breazeal, C., Goodwin, M.S., Heathers, J., Weinstock, P. (2019). *Social robots for hospitalized children*. Pediatrics, 144(1).

Loh, J., Loh, W. (2022). *Social robotics and the good life: The normative side of forming emotional bonds with robots*. Berlin: Transcript.

Smakman, M.H., Smith, K., Buser, L., Monshouwer, T. (2021). *Mitigating Children's Pain and Anxiety during Blood Draw Using Social Robots*. Electronic (Switzerland).

Moerman, C.J., Jansens, R.M.L. (2021). *Using social robot PLEO to enhance the well-being of hospitalised children*. Journal of Child Health Care, 25(3), 412-426.

Mott, T., Lovelace, J., Steward, B. (2021). *Design considerations for child-robot interaction in pediatric contexts*. ACM/IEEE International Conference on Human-Robot Interaction, 252-256.

Ros, R., Nalin, M., Wood, R., Giusti, A., Pozzi, C. (2011). *Child-robot interaction in the wild: Advice to the aspiring experiment*. ICM - Proceedings of the 2011 ACM International Conference on Multimodal Interaction, 335-342.

Talami, F., Romero, M., Borga, G. (2021). *A Robotic Companion. Pediatric Protective Isolation Units*. Studies in Computational Intelligence, 982, 103-107.

Vallès-Peris, N., Angulo, C., Domènech, M. (2018). *Children's imaginaries of human-robot interaction in healthcare*. International Journal of Environmental Research and Public Health, 15(5), 970.

Yew, G.C.K. (2021). *Trust in and Ethical Design of Carebots: The Case for Ethics of Care*. International Journal of Social Robotics, 13(4), 629-645.

Using a Student Response System (SRS) to fostering learning: analysis of different types of questioning

Isabella BRUNI[1], Francesca PEZZATI[1], Maria RANIERI[2], Marius Bogdan SPINU[1]

[1] University of Florence - SIAF, Florence (ITALY)
[2] University of Florence - FORLILPSI, Florence (ITALY)

Abstract

In recent times, also following the pandemic emergency period, many universities have moved towards a process of rethinking teaching practices, offering stimuli and support to the teachers in testing new tools and methodologies, especially towards hybrid solutions. Particular attention is paid to digital learning tools that can encourage participation and interaction by students, thus overcoming transmissive approaches. This contribution focuses on the didactic experimentation of a Student Response System, conducted at the University of Florence in the a.y. 2020/2021 and 2021/2022, where 10 teachers from different disciplinary areas and about 300 students were involved. The didactic and participatory potential of this tool was investigated with a view to formative assessment, distinguishing four possible models of use, characterized by different timing, types of questions and purposes. Findings provided by professor experience and a survey among students show the positive value of this tool, which in its simplicity still manages to stimulate student involvement, with possible effects on attention, motivation and learning.

Keywords: Student Response System, formative assessment, feedback, hybrid teaching, Wooclap.

Introduction

The continuation of the pandemic situation has stimulated university institutions to rethink teaching practices and to experiment with hybrid or distance learning forms, also for the following academic years (Carretero Gomez et al., 2021; Salmi, 2020). Therefore, many universities have supported their teachers, both with the expansion of the technological infrastructures available, and with training programs on new tools and methodologies suitable for facing the renewed challenges of university teaching (Cirlan & Loukkola, 2021). Following this line of action, in September 2020 the University of Florence (Unifi) carried out a comparison of the student response system tools available on the market, and subscribed to an annual license with Wooclap, the only tool that guaranteed integration as a plugin in the Moodle platform. Integration with the institutional platform, in addition to being practically useful, was also a prerogative set by the University guidelines, which aimed to identify Moodle as the fulcrum of all online teaching activities in the recovery and hybrid teaching phase.

As known, the common feature of all student response systems is that they allow the teacher to ask questions in real time to their students and immediately view the results: this dynamic allows students to be involved, even in large classes, and to provide them feedback on any incorrect answers, with possible educational implications (Kay & LeSage, 2009; Wood & Shirazi, 2020). With respect to this basic, simple and traditional mechanism, some authors have wanted to explore the didactic value of specific types of questions, of the moment or of the method of administration (Lantz & Stawiski, 2014; Mayer et al., 2009). At Unifi, the introduction of the new tool was accompanied by training meetings aimed at teachers, in which both the technical functioning and the possible educational uses were presented. In particular, in continuity with previous works (Ranieri et al., 2018), the authors have outlined 4 possible models for questioning with Wooclap:

1. Activation question: administered at the beginning of a lesson in which a new topic is presented, aimed at activating pre-knowledge and making students curious. Does not assign score. This can be a poll or word cloud question;

2. Immediate feedback: administered at the end of the expository part of the lesson, aimed at verifying understanding of the fundamental concepts. Use closed-ended questions, such as quizzes or correspondence, to reveal any errors;

3. In-depth question: starting from a stimulus (case study, exercise, example of concrete application, etc.), one or more open or closed questions are proposed to students to stimulate reflection and in-depth analysis. Of the question types in Wooclap, the brainstorming question or others can be used;

4. Final quiz question: administered at the end of the lesson to verify the level of preparation achieved and carry out any revision or corrective interventions. Typically, it can be done with 4/6 multiple-choice questions in a short time: it also includes the application of the challenge mode, with which after each question the ranking of the participants is presented based on the score achieved.

Once the training phase was completed, a didactic experimentation was launched, aimed precisely at validating the use of this tool from a formative assessment perspective, with the intention of gathering the point of view of teachers and students on the 4 models of use and their educational effects. The experimentation was carried out over the academic years 2020/2021 and 2021/2022 and involved 11 courses in different subject areas. To collect the teachers' opinion, a narrative tool was used, to be compiled following each lesson in which the use of Wooclap was experimented: in total, 42 logbooks were collected, which were subjected to thematic analysis. To survey the students' point of view, an online questionnaire was used which included a series of closed questions in relation to usability, level of participation and involvement, plus a variable section, calibrated on how Wooclap was used in each specific course. The responses to the questionnaire were 368 in all and were subject to descriptive analysis.

The results show a high level of appreciation for the tool, both by teachers and students: the use is in fact intuitive and further facilitated by the integration in Moodle. As far as teaching is concerned, the observations of the teachers focus on the short-term effects, with a certain optimism towards the possible effects on long-term learning. The use of Wooclap also seems to make up for, at least in part, the possible negative consequences of distance learning, recovering an interaction dimension and thus stimulating greater student participation. The perception of students is also that the sessions have had positive effects, not only in terms of involvement, but also of interest in the topic of the lesson and contribution to maintaining the level of attention. The activation question is particularly welcome, as it makes students feel more involved, while the prompt feedback question, useful for teachers to immediately correct any misconceptions, is less appreciated by students: they are more afraid of making a mistake because they have not been able to study. The data collected, even if partial, therefore tend towards a positive evaluation of this digital learning tool, and show its flexibility both in the various disciplines and for different didactic applications.

References

Carretero Gomez, S., Napierala, J., Bessios, A., Mägi, E., Pugacewicz, A., Ranieri, M., ... Gonzalez Vazquez, I. (2021). *What did we learn from schooling practices during the COVID-19 lockdown*. Publications Office of the European Union. doi: 10.2760/135208, JRC123654

Cirlan, E., & Loukkola, T. (2021). Internal quality assurance in times of Covid-19. *European University Association*. Available at: https://www.eua.eu/downloads/publications/internal%20qa.pdf (accessed 18/10/2021).

Kay, R. H., & LeSage, A. (2009). Examining the benefits and challenges of using audience response systems: a review of the literature. *Computers & Education*, 53(3), 819-827.

Lantz, M. E., & Stawiski, A. (2014). Effectiveness of clickers: effect of feedback and the timing of questions on learning. *Computers in Human Behavior*, 31, 280-286.

Mayer, R.E., Stull, A., DeLeeuw, K., Almeroth, K., Bimber, B., Chun, D., & Zhang, H. (2009). Clickers in college classrooms: fostering learning with questioning methods in large lecture classes. Contemporary Educational Psychology, 34(1), 51–57.

Ranieri M., Bruni I., Raffaghelli J. E. (2018). Gli Student Response System nelle aule universitarie: esperienze d'uso e valore formativo, *Lifelong, Lifewide Learning*, vol. 14, n° 31, pp. 96 - 109 https://doi.org/10.19241/lll.v14i31.117

Salmi, J. (2020). *COVID's Lessons for Global Higher Education. Coping with the Present while Building a More Equitable Future*. Indianapolis: Lumina Foundation .

Herrada RI., Baños R., Alcayde A. (2020). Student Response Systems: A Multidisciplinary Analysis Using Visual Analytics. *Education Sciences*. 2020; 10(12):348. https://doi.org/10.3390/educsci10120348

Wood, R., Shirazi, S. (2020). A systematic review of audience response systems for teaching and learning in higher education: The student experience. *Computers & Education*, vol. 153, https://doi.org/10.1016/j.compedu.2020.103896.

The Smart Learning Design model experimentation in the PhD course "Teaching methodologies, strategies and activities"

Susanna SANCASSANI[1], Valeria BALDONI[1],

Federica BRAMBILLA[1]

[1] *Politecnico di Milano - METID, Milano (ITALY)*

Abstract

This article explores the implications of the rapid shift to online teaching and learning due to the pandemic, focusing on the development and application of the "Smart Learning Design" (SLD) method at METID-Politecnico di Milano. Through its application in the Erasmus + "XL project: Extended Learning for Higher Education teachers and trainers," the SLD method was tested in different teaching contexts. The results indicate its effectiveness in managing the complexity of blended learning courses, fostering creativity, supporting coherent course design, integrating active methodologies, and focusing on the overall learning process.

Keywords: Blended Learning, Smart Learning Design (SLD), Online Education, Teaching Methodologies, Extended Classroom.

The abrupt onset and rapid spread of the COVID-19 pandemic instigated a sudden transition of the entire teaching and learning experience to an online platform, thereby necessitating educational institutions to swiftly adopt digital technologies to continue providing quality education to their students. However, once the strictest emergency period concluded, the urgency for a transformation in teaching methodologies became prominent. Various factors, including the inability to attend in-person classes due to occupational commitments, geographical barriers, or economic constraints (the rising costs of living in university towns) made it imperative to ensure that students had the option of attending classes either online or in person (Lederman, 2020). The requirement for a blended teaching and learning experience, a combination of online and in-person classes, persists even today. While blended learning undoubtedly enriches the learning experience and offers benefits to both educators and learners, it introduces new dimensions that educators need to manage effectively (Hew & Lo, 2018). In order to optimize the benefits of blended learning, educators must ensure the thoughtful design of the learning experience, encompassing both physical and digital aspects, as well as the teaching methodologies employed (Garrison & Vaughan, 2008). One of the primary implications that the new paradigm of the extended classroom brings is the idea that the teaching process is no longer confined to the physical classroom but has the potential to encompass the entire process leading to the Intended Learning Outcomes considering all its different dimensions: in-person, online, synchronous, and asynchronous. Thus, starting from the need to consider all these new dimensions to design an effective blended experience, the "Smart Learning Design" or SLD method was developed at METID-Politecnico di Milano. It is an instructional design approach designed to manage this new complexity in teaching-learning process. In SLD method the "learning events" represent the main elements of the model and constitute recognizable units recurring in time and space that can be traced back to events related to the acquisition of knowledge (frontal content collection, interactive content collection), to the application and manipulation of knowledge (content transformation, discussion, practice/experience, production/investigation), and to the consolidation of knowledge (retrieval, reflection and metacognition) (Merrill, 2002).The strategy adopted was to design activities to cover all the eight learning events of the model to stimulate activities enhancing reflection and metacognition (Zimmerman, 2002), activities encouraging discussion on particular topics and group activities for research and co-creation of contents (Scardamalia & Bereiter, 2006). To facilitate work between students, particularly between online and in presence students, several technological tools were chosen: Students Response Systems (Kay & LeSage, 2009), online collaborative whiteboards , online tools for collaborative annotations (Novak, Razzouk, & Johnson, 2012) and online collaborative tools (Kearney & Schuck, 2006). Also, MOOCs and lessons recordings were used to free up classroom

time for more challenging activities as they can be left to the student's autonomous study at home (Bates, 2015).The testing on the field of the SLD method within the frame of Erasmus + project "XL project: Extended Learning for Higher Education teachers and trainers" was perfectly fitting because the main objective of the project was to test new blended learning strategies aiming to create a guide for teachers to better design and manage hybrid courses . The SLD method was chosen by the partners as the methodological approach of the project, which was subsequently tested by all seven partners in their courses through multiple experimentations in all the countries involved. Taking in account the variability of the contexts, METID has defined models that would demonstrate flexibility and adaptability to the different classroom contexts of all partners involved. Reflecting on aspects such as student numbers, the intended level of interactions between students and teachers, the digital tools and class equipment, and the degree of flexibility of furnishings and spaces, three distinct teaching sets (referred to as framesets) were identified to handle the significant complexity and variety of contexts encountered in teaching practice (Dillenbourg & Jermann, 2010):

- Frontal class: a teaching set characterized by low interactivity where contents are predominantly shared in a frontal transmissive mode with low interaction.
- Interactive class: a teaching set characterized by high interactivity with frequent interactions between the teacher and the students and among students in pairs and groups.
- Hands-on class: a teaching set characterized by the co-creation of knowledge involving students and teachers.

Each partner within the project then had to select the frameset most representative of its course and experiment with the Smart Learning Design method during the lessons, using its learning events to design activities to effectively manage and engage students in blended learning.

At Politecnico di Milano, the pilot experimentation was developed in the PhD course "Teaching methodologies, strategies, and activities", involving 20 PhD students coming from several PhD Courses (Engineering, Design and Architecture). The set chosen has been a mix of interactive class and hands-on class. The course physical space has been the experimental classroom of the Politecnico di Milano, Educafé, a learning space equipped with all the necessary technological tools to best manage the extended learning classroom (automated cameras, environmental microphones, projectors, digital boards, etc.) and the interactive set (movable tables and chairs).The strategy adopted was to design activities covering all the eight learning events of the SLD model to stimulate in particular activities enhancing reflection and metacognition, activities encouraging discussion on particular topics, and group activities for research and co-creation of contents To facilitate collaboration among students, especially between online and in-person students, several technological tools were chosen: Students Response Systems (e.g. Wooclap), online collaborative visual boards (e.g. Miro), online tools for collaborative annotations and peer assessment (e.g. Feedbackfuits), and other online collaborative tools (Bower., 2019). Also, MOOCs and recordings were utilized to free up classroom time for more challenging activities, as they can be assigned for students' at home work. One of the first implications that the new paradigm of the extended classroom brings is the fact that the teaching process is no longer limited to what happens in the classroom but has the opportunity to encompass the entire process leading to the Intended Learning Outcomes taking into account all its different dimensions: presence, online, synchronous and asynchronous (Bower, 2019). The impact of the test has been analyzed taking in account: the results of the final assessment, a digital online survey about the quality of the experience and individual interviews. The data collected, that will be analyzed in the full paper, put in evidence how the hybrid teaching learning experience can be effective and well-perceived only if the main focus is on students activities and interactions in all dimensions (presence, online, synchronous and asynchronous) and if a correct balance in scheduling the timing of all activities is assured.

In conclusion, the method proved effective in managing the complexities of blended learning courses, fostering creativity, supporting coherent course design, and integrating active methodologies. The experimentations indicated that the SLD method allows teachers to focus on the overall learning process, rather than just the content they need to deliver in class, resulting in a more comprehensive and effective teaching and learning experience. This study underscores the potential of the SLD method in facilitating the seamless integration of in-person and online learning, thereby contributing to the advancement of education in the digital age.

References

Bates, A. W. (2015). *Teaching in a digital age: Guidelines for designing teaching and learning.* BCcampus.

Bower, M. (2019). Technology-mediated learning theory. *British Journal of Educational Technology,* 50(3), 1035-1048.

Dillenbourg, P. (1999). What do you mean by collaborative learning? Collaborative-learning: Cognitive and Computational Approaches. *Oxford: Elsevier*, 1-19.

Erasmus+ (2018). XL project: Extended Learning for Higher Education teachers and trainers. Retrieved from https://www.erasmusplus.lu/

Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. John Wiley & Sons.

Hew, K. F., & Lo, C. K. (2018). Flipped classroom improves student learning in health professions education: a meta-analysis. *BMC medical education*, 18, 1-12.

Jonassen, D. H. (1999). *Designing constructivist learning environments. Instructional design theories and models: A new paradigm of instructional theory*, 2, 215-239.

Kay, R. H., & LeSage, A. (2009). Examining the benefits and challenges of using audience response systems: A review of the literature. *Computers & Education*, 53(3), 819-827.

Kearney, M., & Schuck, S. (2006). Spotlight on authentic learning: Student developed digital video projects. *Australasian Journal of Educational Technology*, 22(2).

McKenney, S., & Reeves, T. C. (2018). *Conducting educational design research*. Routledge.

Lederman, D. (2020). Will shift to remote teaching be boon or bane for online learning. *Inside Higher Ed*, 18.

Merrill, M. D. (2002). First principles of instruction. *Educational technology research and development*, 50, 43-59.

Novak, E., Razzouk, R., & Johnson, T. E. (2012). The educational use of social annotation tools in higher education: A literature review. *The Internet and Higher Education*, 15(1), 39-49.

Scardamalia, M., & Bereiter, C. (2006). *Knowledge building: Theory, pedagogy, and technology*. Cambridge handbook of the learning sciences, 97-118.

Thomas, J. W. (2000). *A review of research on project-based learning*. San Rafael, CA: Autodesk Foundation.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, 41(2), 64-70.

Technological and digital capital of parents: a construct to analyse digital skills

Giorgio CECCHI[1], Sara MORI[1,2]

[1] Università Telematica degli Studi (IUL), Florence (ITALY)

[2] National Institute for Documentation, Innovation and Educational Research (INDIRE), Florence (ITALY)

Abstract

Keywords: Technological Capital, Digital capital, Parents, Multidimensional concept, Factor Analysis

The concept of digital and technological capital refers to two related concepts in the field of education and the digital society.

Technological capital mostly refers to the technological resources and infrastructure available in an educational or social context. It includes access to digital technologies, such as computers, mobile devices, Internet connection, software and digital resources. It is essential to ensure equitable access to digital resources and to create a learning or working environment in which technologies are available and used effectively. A person's technological capital can be further developed through education, vocational training, work experience and personal development. In a world where technology is increasingly present and decisive, individual technological capital can be a critical factor for work and professional success. (Carlson & Isaacs, 2018, pp. 243-265). Individual technological capital refers to an individual's ability to use and adapt to new technologies to improve their productivity and level of employability. A person's technological capital can include a wide range of technological skills, such as the ability to use computers and software, programming skills, knowledge of networks and cybersecurity, familiarity with mobile devices, and the use of software applications.

On the other hand, digital capital refers to the skills, knowledge and abilities a person possesses to use digital technologies effectively. It includes the ability to navigate the Internet, use digital tools and applications, evaluate and analyse digital information and participate critically and consciously in the digital society. Digital capital is closely linked to an individual's digital skills and digital literacy. A person with high digital capital is able to use digital technologies effectively to communicate, search for information, solve problems and actively participate in the digital society (Carretero, et al., 2017; Ragnedda & Ruiu, 2020; OECD, 2023).

The possibility of understanding how parents' digital skills are in some way related to the experiences their children have, especially when teaching in virtual contexts, is of particular relevance (Osorio-Saez et al., 2021, pp.1-19)

Different conceptualisations lead to different operationalisations of these concepts. The aim of this study is to demonstrate that technological and digital capital are multidimensional concepts, and therefore must be studied through the analysis of several variables, which can also be of different nature.

The analysis of technological capital is part of a broader study aimed at investigating how parents of students aged 6 to 14 have addressed issues related to remote collaborative learning. The questionnaire for data collection and the segmentation of the concept of technological capital, which will be illustrated shortly, were defined in collaboration with researchers from the University of Bath.

The questionnaire was administered in Italy using a Computer-Assisted Web Interviewing (CAWI) method, and the sample under study consists of (n=282) parents of school-age children and adolescents.

Since the concepts of technological and digital capital are multidimensional, individuals with different socio-demographic characteristics will record different values depending on the dimension considered.

Consequently, since the data collection comes from a questionnaire, each dimension of the multidimensional concept must correspond to one or more questions and any aggregation of the information obtained from them must be carried out considering the multidimensional nature of the concept. (Maggino, 2007, pp. 1-304).

The theoretical starting hypothesis is that four dimensions contribute to the concept representation of technological capital: "Objective", "Social", "Embodied" and "Institutional". The "Embodied "dimension can then be divided into four further subdimensions: "Attitudes towards technology", "Operational skills", "Information skills" and "Mobile skills".

The type of variables referred to the dimensions mentioned above is varied, some are discrete quantitative and others are categorical ordinals obtained through different Likert self-report scales.

The factor Analysis that will be conducted must consider the ordinal nature of the variables considered; in fact, when working with Likert-type data, factor analysis utilizing Pearson's correlations can result in factors that are solely derived from similarities in item distribution. Consequently, the items may give the impression of being multidimensional, despite not actually being so.

Polychoric correlation coefficients represent the maximum likelihood estimates of Pearson's correlations for latent variables that follow a normal distribution. Hence, according to research studies, (Basto & Pereira, 2012, pp. 1-29) the raw-data matrix of polychoric correlations instead of Pearson's correlations should be utilized for Factor Analysis dealing with ordinal data such as Likert items.

Preliminary analysis has shown that due to the complex and multidimensional nature of digital and technological capital, respondents with similar socio-demographic characteristics have obtained similar results in some dimensions but not in others. Therefore, it is worth considering reducing the number of dimensions by aggregating those that are highly correlated during both the data collection and analysis phases. On the other hand, it would be beneficial to keep separate the dimensions that are not correlated with each other.

Additionally, in the analysis phase, it may be useful to aggregate the information derived from these dimensions using composite indicators that consider the multidimensional nature of the studied concepts.

The analyses we are conducting can help us better understand the construct of digital and technological capital. Delving into this aspect in the parent population can help us better understand how to build support for students in different learning environments (Mori et al, 2021, pp. 179-200).

References

Basto, M., & Pereira, J.M. (2012). *An SPSS R-Menu for Ordinal Factor Analysis*. Journal of Statistics Software, 46(4), 1-29.

Carlson, A., & Isaacs, A.M. (2018). *Technological capital: an alternative to the digital divide.* Journal of Applied Communication Research, 46(2), 243-265.

Carretero, S., Vuorikari, R., & Punie, Y. (2017). *The digital competence framework for citizens*. Luxembourg: EuropeanUnion. https://publications.europa.eu/en/publication-detail/-/publication/3c5e7879-308f-11e7-9412-01aa75ed71a1/language-en. Accessed on February 20, 2023.

Maggino, F., (2007). *Rilevazione e analisi statistica del dato soggettivo.* Firenze University Press, Archivio E-Prints.

Mori, S., Panzavolta, S., & Rosa, A. (2021). *Distance Education and Parental Role, in Italy. Evidence-Based Reflections from an International Survey, after the First Lockdown*. Rivista Italiana di Educazione Familiare, 19(2), 179-200. https://doi.org/10.36253/rief-10292

OECD (2023), *Teaching for the Future: Global Engagement, Sustainability and Digital Skills*, International Summit on the Teaching Profession, OECD Publishing, Paris, https://doi.org/10.1787/d6b3d234-en.

Ragnedda, M., & Ruiu, M.L. (2020). *Operationalising Digital Capital*, Digital Capital, Emerald Publishing Limited, Bingley, 39-65. https://doi.org/10.1108/978-1-83909-550-420201003

Osorio-Saez, E.M., Eryilmaz, N., Sandoval-Hernández, A., Lau, Y.Y., Barahona, E., Bhatti, A.A., Ofoe, G.C., Castro, Ordóñez L.A., Cortez Ochoa, A.A., Espinoza, P., Rafael, Á., Fonseca, A.E., Isac, M.M., Dhanapala, K.V., Kameshwara, K.K., Martínez, C., Ysrael A., Mekonnen, G.T., Mejía J.F., Miranda, C., Moh'd, S.A., Morales, U.R., Morgan, K.K., Morgan, T.L., Mori, S., Ebenezah Nde, F., Panzavolta, S., Parcerisa, L., Paz, C.L., Picardo, O., Piñeros, C., Rivera-Vargas, P., Rosa, A., Saldarriaga, L.M., Silveira Aberastury, A., Tang, Y., Taniguchi, K., Treviño, E., Villalobo, C., Zhao, & D., Zionts, A. (2021). *Survey Data on the Impact of COVID-19 on Parental Engagement Across 23 Countries*. Data In Brief, vol. 32, ISSN: 2352-3409, pp. 1-19. https://doi.org/10.1016/j.dib.2021.106813

Unblackboxing reality through logic and philosophy of language: teachers' knowledge and new paths for technology education

Introduction

European policies on citizenship education are increasingly interested in media, data and education technology (Gerhard, 2017; CoE, 2018; OECD, 2019). This trend reflects the necessity to interact in a thoughtful and active manner with a multifaced reality composed of natural, social and technological worlds (Floridi, 2014; 2019; Ferraris, 2021). In order to learn how to inhabit such reality – which is massively lived *onlife* (Floridi, 2015) - in this paper we suggest to consider logic and philosophy of language as a basis for developing a new kind of media education and education technology.

Theoretical Background

We look from an active learning and constructivist perspective, in order to draw a conceptual line that starts from Freinet (1957) and Papert (Papert & Harel,1991)) to hackers (Himanen, 2001) and makers (Hatch, 2013) perspective, in which technology assumes a peculiar role both as an educational tool and as an educational object.

We identify in the understanding of formal languages a basis for unblackboxing the reality we are currently living in. Our working hypothesis is that logic and philosophy of language can be powerful grounds that can help teachers in order to approach our contemporary world.

There are several reasons that justify the focus on logic and philosophy of language.

First, logic is a formal language, and to educate children to understand formal languages is fundamental in order to understand how digital reality is structured and programmed. Logical literacy therefore allows children to become familiar with the formal languages that are used in computer programming and coding (Davis, 2000). This perspective can promote an active and critical engagement with technologies (as opposed to a passive uncritical experience).

Second, logical thinking skills are fundamental for computational thinking. Computational thinking, in turn, is regarded as crucial in order to help children to appreciate the way in which computers and other machines work. Again, a focus on logic education is instrumental for a digital education, supporting the promotion in educational path of computational thinking as structure and coding as language, where "structure" and "language" take on a different and deeper meaning than that in common use.

Third, logical skills are ubiquitous across all disciplines and throughout all compulsory education. The key role of logical and argumentative skills is highlighted in the documents that define the identity of Italian schools, that is, *Indicazioni nazionali* (2012) and *Nuovi scenari* (2018). Logical and thinking skills are also crucial in secondary school – across the curriculum and in specific disciplines – and in the test that universities use to evaluate the enrolment of candidate students.

Materials and Methods

What kind of training can sustain teachers in developing this framework and use it as a basis for realizing teaching and learning experiences?

The argument for this proposal hinges on exploratory research conducted in Italian schools (Di Stasio et al. 2022). Eleven teachers from two Institutes took part to this project. Its structure was inspired by Design Based Research (Design-Based Research Collective, 2003) and teachers experimented in their classes (primary and secondary school) educational activities co-designed with the INDIRE working group. These activities were centered around the following nodes: ordinary language and its characteristics; ideal language and its characteristics; the relationship between ordinary and formal language; the relationship between the truth of declarative statements and their form; the role of language in the process of thought; logical connectives. With respect to the activities of coding, we identified the following themes: the definition of coding; the use of symbolic languages; algorithms; the use of programming language.

We collected data through several tools, such as logbooks, structured observer tools, visual documentation of the lessons, and we collect the points of view of participants through seven remote focus groups with students and remote interviews with teachers.

Results

The data analysis showed us a certain level of difficulty in managing a significant theoretical proposal and transforming it into teaching activities. Nonetheless, a significant shift in approach has emerged in the way we approach technology and its role in the teaching and learning process.

Conclusions

In this contribution, the pilot data will be analysed in terms of strengths and weaknesses of the experimentation, so as to identify threats and opportunities for future training on these topics.

To this end, we will propose a SWOT analysis that allows us to connect the results with a new model to be built and tested.

References

Council of Europe – Education Department (2018). Reference framework of competences for democratic culture - Volume 1. Strasburg: Council of Europe Publishing. Retrieved from: http://rm.coe.int/0900001680a3d85a.

Davis, M. (2000). The Universal Computer: The Road from Leibniz to Turing. New York: W. W. Norton and Company.

Di Stasio, M., Camizzi, L., & Messini, L. (2022). Understanding languages and building literacies for citizens education. Journal of e-Learning and Knowledge Society, 18(3), 117-127.

Floridi L. (2019). The logic of information: A theory of philosophy as conceptual design. Oxford University Press.

Floridi, L. (2015). The Onlife Manifesto: Being Human in a Hyperconnected Era. Springer Open.

Floridi, L. (2014). The fourth revolution: How the infosphere is reshaping human reality. Oxford: Oxford OUP.

Freinet C. (1957). L'école moderne française: guide pratique pour l'organisation matérielle, technique et pédagogique de l'Ecole Populaire. Vienne: Editions Rossignol.

Gerhard P. (2017). Digital Citizenship Education. Working Conference. Strasburg: Council of Europe. Retrieved from: https://www.coe.int/en/web/digitalcitizenship-education/e-library.

Hatch M. (2013). The Maker Movement Manifesto. New York: McGraw-Hill Education.

Himanen P. (2001). The Hacker Ethic. New York: Random House.

Papert S., Harel I. (1991). Situating constructionism. Constructionism 36(2), 1–11.

OECD (2019). OECD Learning Compass 2030 Concept Note Series. Retrieved from: www.oecd.org/education/2030-project/contact/OECD_Learning_Compass_2030_Concept_Note_Series.pdf.

"Do you Emoji"? Emoji Comprehension is Predicted (Positively) by Theory of Mind and (Negatively) by the Frequency of Use of Social Media

Elisa BISAGNO[1], Alessia CADAMURO[1]

[1] *Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia (ITALY)*

In Italy, the use of social media is central to the online experience of young people, especially pre-adolescents (11-14 years) (Bozzola et al., 2022). According to the 2016 OssCom survey, 86.5% of adolescents have at least one social media profile: the most used social networks are WhatsApp (37.3%), Facebook (36.5%) and Instagram (18.8%) (Mascheroni & Ólafsson, 2018). Social media are used for a variety of activities, including sharing information, interacting with peers, and developing identity (Uhls, 2017). Therefore, the ability to deal with them critically and mindfully may be crucial in building positive social relationships. One skill that can facilitate understanding of communication thus social relationships is that of Theory of Mind (ToM). Indeed, communicative success requires the ability to reason about the conversation partner's beliefs, intentions and desires, as means to make sense of the (often ambiguous) language and behaviour (Baron-Cohen et al., 2000). While the role of ToM has been widely investigated in traditional communication processes, little is known about what psychological and environmental prerequisites affect young people's comprehension of digital messages (Cherbonnier & Michinov, 2022) and especially of emojis, pictograms useful to fill in emotional and pragmatical cues otherwise missing from typed conversation. This study aims to fill this gap by exploring the role of a psychological variable, ToM, and an environmental one, namely the frequency of use of social media in determining pre-adolescents' emoji comprehension ability.

Ninety-two Italian pre-adolescents (41 girls; mean age = 13.34 years old) took part in the study. Participants were enrolled in eight-grade classes from a middle school located in Northern Italy. Parents/legal guardians provided informed consent for the participation of their children in the study. Each participant completed an online questionnaire administered collectively to the class during a school hour. Below the scales included in the questionnaire are listed.

- *Theory of Mind*. We used two measures of ToM. First, we administered the "Reading the Mind in the Eyes" questionnaire (Baron-Cohen et al., 2001), Children version. The questionnaire comprises 28 items (pictures of gazes), and the participant is required to select the correct emotion the gaze is expressing out of four alternatives. The score can range from 0 to 28. Second, we administered an adapted version of the "Real/Apparent Emotions" task (Sidera et al., 2011; 2013), where children are presented with four scenarios in which the protagonist is "faking" their emotions. The participant is asked what emotion is really experienced by the character and to justify their answer. For each scenario, one point is given for the correct identification of the emotion and, according to the complexity of the answer and the reference to mental states, 0 to 2 points can be given for the explanation. Scores can therefore range between 0 and 24.

- *Frequency of Use of Social Media*. We adapted the questions of the Experience Sampling Method (ESM) Social Media Use Questionnaire (E-SMUQ: Beyens e al., 2021) to gather the frequency of use of a series of social media (namely WhatsApp, Telegram, Facebook, Instagram and TikTok) based on a Likert scale (from 0 = Never to 4 = More than four hours per day). Scores for each social media were then summed in a final Frequency of Use of Social Media score.

- *Emoji Comprehension*. Based on the secondary and tertiary emotions identified by Plutchik (2003), we selected 35 emojis conveying those emotions according to the Unicode classification. Participants had to select the correct emotions the emoji expressed among four alternatives. Scores ranged between 0 and 35.

All measures showed sufficient variability (no ceiling or floor effect). Therefore, as a preliminary analysis to explore the relationship between the Theory of Mind, the Frequency of Use of Social Media and Emoji Comprehension of pre-adolescents, we run a correlation analysis. First, the Eyes test and Real/Apparent Emotions task correlated with one another (r=.40, p<.001), coherently with them being two ToM measures. Second, both the Eyes test (r=.43, p<.001) and the Real/Apparent Emotions task (r=.51, p<.001) were positively correlated with Emoji Comprehension, while Frequency of Use of Social Media was negatively correlated to it (r=-.35, p<.001). We then run a hierarchical regression analysis where psychological variables (ToM measures) were inserted at Block 1, and the Frequency of Use of Social Media was inserted in a second block. The analysis revealed that both the Eyes test (β=.29; p<.01) and the Real/Apparent Emotions task (β=.33; p<.01) scores positively predicted emoji comprehension (R^2=.38). The frequency of use of social media, explaining 5% of the variance, entered the regression as a negative predictor (β=-.25; p<.01).

The results underline the prominent role of ToM in comprehending emojis as emotional cues in digital contexts. Interestingly, the Real/Apparent Emotions task showed slightly more predictive power of Emoji Comprehension than the Eyes test in the regression analysis: this could be explained because it is not only an emotion recognition task but involves the more refined ability to interpret emotions based on the circumstances – which might be key to correctly understanding emojis. In this sense, ToM would enable the correct identification of the pragmatic meaning of messages, being able to capture inferences, irony, and sarcasm to make sense of the behavior in relation to the context. This is also in line with previous research, showing the importance of the ToM in promoting positive social interactions in general (Baron-Cohen et al., 2000). On a practical level, this finding suggests that ToM training could be key to empowering youngsters' communication skills via digital messages. Particular attention should be given to the affective component of the ToM, as well as the pragmatic cues that children can detect from digital messages to better understand their general meaning.

Second, but not least important, we found that the Frequency of Use of Social Media negatively predicted emoji comprehension, probably meaning that many youngsters use media frequently but without having sufficient awareness of them. In other words, frequently using social media alone does not guarantee that youngsters can use them properly and fully comprehend them. Poorly aware use of media may explain the problems that are often related to Social Media use in young people, such as cyberbullying, hate speech, and online grooming. In this sense, metacognition training on the use of social media could be also relevant to guarantee that youngsters use social media with effectiveness and awareness.

References

- Baron-Cohen, S., Tager Flusberg, H., & Cohen, D. J. (2000). *Understanding other minds: Perspectives from developmental cognitive neuroscience*. 2nd ed. Oxford University Press.
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., Plumb, I. (2001). *The "Reading the Mind in the Eyes" Test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism*. Journal of Child Psychology and Psychiatry, 42, 241-51. 10.1111/1469-7610.00715
- Beyens, I., Pouwels, J. L., van Driel, I. I., Keijsers, L., & Valkenburg, P. M. (2021). *Social Media Use and Adolescents' Well-Being: Developing a Typology of Person-Specific Effect Patterns*. Communication Research, 10.1177/00936502211038196
- Bozzola, E., Spina, G., Agostiniani, R., Barni, S., Russo, R., Scarpato, E., Di Mauro, A., Di Stefano, A. V., Caruso, C., Corsello, G., & Staiano, A. (2022). *The Use of Social Media in Children and Adolescents: Scoping Review on the Potential Risks*. International journal of environmental research and public health, 19(16), 9960. https://doi.org/10.3390/ijerph19169960
- Cherbonnier, A., & Michinov, N. (2022). *The recognition of emotions beyond facial expressions: Comparing emoticons specifically designed to convey basic emotions with other modes of expression*. Computers in Human Behavior, 118, 106689. https://doi.org/10.1016/j.chb.2021.106689
- Mascheroni, G. e Ólafsson, K. (2018). *Accesso, usi, rischi e opportunità di internet per i ragazzi italiani. I primi risultati di EU Kids Online 2017*. EU Kids Online e OssCom.
- Plutchik, R. (2003). *Emotions and life: Perspectives from psychology, biology, and evolution*. American Psychological Association.
- Sidera, F., Amadó, A. & Serrat, E. (2013). *Are You Really Happy? Children's Understanding of Real vs. Pretend Emotions*. Current Psychology, 32, 18-31. https://doi.org/10.1007/s12144-012-9159-9
- Sidera, F., Serrat, E., Rostan, C., & Sanz-Torrent, M. (2011). *Do children realize that pretend emotions might be unreal?* The Journal of genetic psychology, 172, 40-55. https://doi.org/10.1080/00221325.2010.504761
- Uhls, Y. T., Ellison, N. B., & Subrahmanyam, K. (2017). *Benefits and costs of social media in adolescence*. Pediatrics, 140(Supplement_2), S67-S70.

E-learning at the University of Burgos: Instructional Design and New challenges with Artificial Intelligence

Marta SANZ MANZANEDO[1]

[1] *University of Burgos, Burgos (SPAGNA)*

Extended Abstract

In the academic year 2014/15, the University of Burgos (UBU), after verification by the University Council (Ministry of Education) and favorable evaluation by the Quality Agency of the University System of Castilla y León (ACSUCYL), began offering four online degree programs. This project was an innovative proposal as it became the only public university in Castilla y León to take this step.

Since the early academic years, student reception has been positive, and there has been an increase in enrollment every year. Good instructional design, careful selection of activities, and, above all, a fully virtual assessment seems to be the keys to this success.

This article presents the methodological foundations of these online courses, focusing on the design of some subjects in the Spanish Language and Literature degree program at the University of Burgos, which is offered both in face-to-face and virtual modes. In an effective online learning model, it is essential to create a good design, considering the differences between this form of teaching and traditional methods. Therefore, a series of adaptations to the materials, tools to be used, and the roles of both the teacher and the student need to be made.

Instructional design is an important phase in the educational design of a course or virtual module. The ADDIE model has been adopted for the degree programs, which includes the following phases: analysis, design, development, implementation, and evaluation. The model aims to facilitate the necessary processes for quality instructional design, and checklists have been used for content control and assessment delivery to achieve learning objectives. Naturally, continuous adaptations are necessary, as the emergence of Chat GPT and Artificial Intelligence has required changes in the design of tasks and final exams for various subjects. Therefore, in addition to the instructional design model, some proposed adaptations to the rapidly changing new situation will be analyzed.

Teacher training for both online and in-person courses is necessary to provide educators with the tools to make the most of ChatGPT while also bringing about changes in assessable tasks to enhance students' critical thinking. This ensures that ChatGPT serves as a support for their learning rather than a shortcut to avoid completing assignments.

The online degrees at the University of Burgos have been highly successful, with student enrollment consistently increasing or remaining stable over the years. A thoughtful instructional design, continuous assessment methodology, and faculty support appear to be the key factors contributing to this success. However, with the introduction of ChatGPT, some changes need to be implemented in the upcoming academic year 2023/2024 to ensure that the assessment remains reliable and of high quality.

References

Abella, V., López, C., Ortega, N., Sánchez, P., & Lezcano, F. (2011). Implantación de UBUVirtual en la Universidad de Burgos: evaluación y expectativas de uso. Edutec. Revista Electrónica de Tecnología Educativa, (38), a184. https://doi.org/10.21556/edutec.2011.38.385

Adell, J., & Sales, A. (2000). Enseñanza online: elementos para la definición del rol del profesor. En Las nuevas tecnologías para la mejora educativa. Sevilla: Kronos.

Aldoobie, N. (2015). ADDIE Model Analysis phase. American International Journal of Contemporary Research.

Alonso Díaz, L., & Blázquez-Entonado, F. (2009). Are the Functions of Teachers in e- Learning and Face-to-Face Learning Environments Really Different? Educational Technology & Society, 12(4), 331-343.

Avella-Ibáñez, C. P., Sandoval-Valero, E. M., & Montañez-Torres, C. (2017). Selección de herramientas web para la creación de actividades de aprendizaje en Cibermutua. Revista de investigación, desarrollo e innovación, 8(1), 107. https://doi.org/10.19053/20278306.v8.n1.2017.7372

Bates, A. (1991). Third generation distance education: the challenge of new technology. Research in Distance Education, 3(2), 10-16.

Chicaiza, R. M., Castillo, L. A. C., Ghose, G., Magayanes, I. E. C., & Fonseca, V. T. G. (2023). Aplicaciones de Chat GPT como inteligencia artificial para el aprendizaje de idioma inglés: avances, desafíos y perspectivas futuras: Applications of Chat GPT as Artificial Intelligence for English Language Learning: Advances, Challenges, and Future Perspectives. LATAM Revista Latinoamericana de Ciencias Sociales y Humanidades, 4(2), 2610-2628.

Dumford, A. D., & Miller, A. L. (2018). Online learning in higher education: exploring advantages and disadvantages for engagement. Journal of Computing in Higher Education, 30(3), 452-465. https://doi.org/10.1007/s12528-018-9179-z

Li, J., Galley, M., Brockett, C., Gao, J., Dolan, B., & Devlin, J. (2019). Acute-Eval: A Benchmark for Conversational Evaluation of Chat-oriented Dialogue Systems. arXiv preprint arXiv:1910.09756.

Llorente Cejudo, M. del C. (2007). La tutoría virtual técnicas, herramientas y estrategias. Eduweb, 1(1), 23-38.

Mao, R. E. (2003). Bases para Reconstruir el Diseño Instruccional en los Sistemas de Educación a Distancia Bases for Reconstruction of the Instructional Design in a System of Distance Education. Docencia Universitaria, 1.

Morales-Chan, M. A. (2023). Explorando el potencial de Chat GPT: Una clasificación de Prompts efectivos para la enseñanza.

OpenAI. (2021). GPT-3.5. Retrieved from https://openai.com/research/gpt-3.5

Into the wild of open licenses' use: an orienteering guide for teachers and practitioners

Alessandra TOMASINI[1], Paola CORTI[1]

[1] *METID - Politecnico di Milano, Milan (ITALY)*

Abstract   DA 6 A 14 PAGINE

While working on the creation of open education resources (OER), it is often a drama to understand and evaluate which kind of online material it is possible to re-use. Then it becomes even more complex to reply to simple questions like: "Can I share then my final outputs under an open license? Which one should I use?". Responses to these questions are not always unique or, at least, need a quite structured process to be achieved. This paper collects and organizes the experience of the team of teachers and experts working in the Erasmus+ project Uforest (www.uforest.eu) that struggles on the creation of their own OER in the frame of MOOC development "Nature in the city: turning knowledge into urban forestry practice", hosted in Polimi Open Knowledge platform. Through this experience the paper tries to summarize some major hints to optimize the search, selection and use of online resources to produce an OER.

Keywords: OER, open license, Uforest, MOOC

Introduction

One of the objectives of the Erasmus+ project Uforest[1], has been to create training support able to prepare urban forestry practitioners who can provide urban forestry solutions that help to better adapt and mitigate the negative effects of climate change.

The learning opportunity offered by the project has been shaped in the form of a blended programme that offers around 10 ECTS (Fig.1).

Figure 1 – Uforest training programme

Many different international experts, coming from universities, companies and associations of the private sector, contributed to the design and concrete development of content and to students' support along the path. One of the main challenges afforded during the implementation of the programme, and in particular on MOOC creation, has been the integration of third parties materials (such as images, schemes, photos, etc…) in the development of Open Educational Resources in the form of video lessons. Experts are not fully aware about what an OER is (Belikov and Bodily, 2016; Ozdemir and Bonk, 2017) and to the Creative Commons licenses (Reed, 2012). Moreover, recognised the difficulties in

---

[1] www.uforest.eu

understanding if an image, a photo, a specific content found online can be freely used based on licenses (Baas, M, et al. 2019; Schuwer and Janssen, 2018) and, in case, if it can be change to fit their own context (Sloep, 2014). We, as METID, the "Innovation Teaching and Learning Task Force" of the Politecnico di Milano[2], had to plan strong support to instructors in such activity. Along this process it was possible to identify specific recurring situations often referring to images or schemes/graphs:

1. The content is copyright protected or no information about licences is present, nor directly associated to the image (in such case, our suggestion is to always treat it as copyright protected), nor in the website "Term of use", that usually gives some rules on how to consider contents in it. This situation occurred in the majority of materials that experts would like to include in their lessons. The adopted solutions were:

   - looking for open alternatives through Google advanced search or open databases (e.g. Wikimedia Commons, Unsplash, Pixabay). Considering the kind of content needed, very linked to specific case studies in urban forestry, this solution couldn't never be applied;
   - looking for alternatives offered by stock providers (under the subscription of a plan);
   - getting in contact with the website or the owner of the content asking for permission. In Uforest this solution has been the most common procedure adopted that has always brought to a positive end considering the educational purposes of the initiative. In doing so it is important to declare the owner the licence under which the final output has going to be released;
   - re-edit or re-create the image, while referring to the original source. This is quite a critical issue as, at least in Italy[3], there are no clear definitions of which kind of modification is acceptable for educational purposes, even if it is widely accepted as a practice when the purpose is clear and there is no payment involved for users.

2. No license is associated with the content, but some indications are present under "Terms of use" (see for example Paris City Council[4]). Sometimes it was possible to obtain specific instructions on how photos and images can be treated, based on reuse purposes, and what to do to obtain permission. More often there is no differentiation between visual material and other formats; it also happens that the website shows material from third parties without clearly stating their origin. So it is impossible to be sure about the correct use of that particular content. This situation often occurs with public institutions' websites, for example, from City Councils, state or local communities, national and international associations.

3. An open license is associated with the image or the whole website. What is important to verify, then, is the compatibility[5] between this license and the one under which the final OER has to be released[6].

Through such brief examples, this paper aims at offering concrete tips anyone working on new content creation integrating online material can use to orient their choices while checking with the legal context they refer to.

---

[2] www.metid.polimi.it

[3] https://www.altalex.com/documents/codici-altalex/2014/06/26/legge-sul-diritto-d-autore

[4] https://www.paris.fr/pages/mentions-legales-235

[5] https://wiki.creativecommons.org/wiki/Wiki/cc_license_compatibility

[6] https://creativecommons.org/share-your-work/

References

Baas, M, et al. (2019). *Teachers' Adoption of Open Educational Resources in Higher Education.* Journal of Interactive Media in Education, 2019(1): 9, pp. 1–11. DOI: https://doi.org/10.5334/jime.510

Belikov, OM and Bodily, R. (2016). *Incentives and barriers to OER adoption: A qualitative analysis of faculty perceptions*. Open Praxis, 8(3). DOI: https://doi.org/10.5944/openpraxis.8.3.308

Ozdemir, O and Bonk, C. (2017). *Turkish Teachers' Awareness and Perceptions of Open Educational Resources*. Journal of Learning for Development, 4(3).

Reed, P. (2012). *Awareness, attitudes and participation of teaching staff towards the open content movement in one university*. Research in Learning Technology, 20, 1–14.

Schuwer, R and Janssen, B. (2018). *Adoption of Sharing and Reuse of Open Resources by Educators in Higher Education Institutions in the Netherlands: A Qualitative Research of Practices, Motives, and Conditions*. The International Review of Research in Open and Distributed Learning, 19(3). DOI: https://doi.org/10.19173/irrodl.v19i3.3390

Sloep, P. (2014). *Didactic methods for open and online education*. In: Jelgerhuis, H and Schuwer, R (eds.), Open and Online Education; special edition on didactics, 15–18. Utrecht, The Netherlands: Surf Open Education Special Interest Group.

Blending iVR with AI in teacher training for language educators

Ilaria Compagnoni

Ca' Foscari University of Venice, Venice, Italy
The University of Arizona, Tucson, United States

Extended abstract

Growing interests in the field of Artificial Intelligence (AI) are calling for a thorough understanding of how to integrate this technology in language educational practices aimed at enhancing content retention, interactivity and linguistic production amongst students. Furthermore, there is a growing necessity to investigate the collaborative affordances of immersive technologies in facilitating human interactions through the use of artificial assistants in data management and collaborative work projects. To conduct this type of enquiries, educators can use highly immersive platforms enabling multi-user interactivity in AI-supporting virtual spaces. A technology which affords this integration is immersive Virtual Reality (iVR), which is defined as an "advanced form of human-computer interface that allows users to interact with and become immersed in a computer-generated environment in a naturalistic fashion" (Eichenberg, 2012, p.3). As highlighted in the literature, immersion is a key element of iVR in its capacity of delivering an illusion of reality to levels of realism that profoundly impact user behaviors (Slater & Wilbur, 1997; Dincelli & Yayla, 2019). Therefore, iVR becomes a comprehensive digital experience where virtuality predominates over reality, since it is accessed with head-mounted displays (HMDs) and hand controllers physically disconnecting users from the real world. Recent technological improvements have permitted the integration of web browsers in iVR platforms that can be navigated by users as they explore virtual environments through avatar embodiment. Despite the increasing availability of computer and mobile-based AI, there is still a paucity of research on implementations of this technology in educational settings, especially with reference to the design of task-based language activities contributing to language development through collaborative task planning. With these considerations, participatory learning acquire particular importance as it enables teachers to experience technologies from a learners' standpoints. Given the importance of interactions in educational practices and content interoperability, it is necessary to train teachers to use and experience iVR and AI to boost students' collaborative interactions in product creation. In fact, using these technologies in collaborative language activities can encourage students' linguistic production as they interact with each other through avatars to attain task goals. However, implementations of these activities are dependent on teachers' knowledge and exposure to iVR and AI, which can be accomplished through tailored training and exposure to iVR and AI. To address these needs, this study presents the results of observations conducted on 4 language teachers in the iVR collaboration platform Horizon Workrooms where they used the generative AI tool ChatGPT to plan a fictitious conference trip in English. The activities were structured according to the task-based methodology of Ellis (2003), which involved teachers in experiential phases of in-person training provision and iVR-based brainstorming, planning and presentation activities where they shared group reports and attended to linguistic forms that could potentially be used by students conducting similar iVR activities. By conducting a task where they pretended to have won a budget of 10,000$ to travel to a conference of their choice, teachers joined the platform Horizon Workrooms using Meta Quest 2 HMDs, where they utilized ChatGPT to select their destination, draw an expense plan and identify suitable lodging as they wrote their decisions on a virtual blackboard. All interactions were avatar-based and unfolded in English, which was the language taught by participating teachers to non-native speakers. At the end of the planning process, teachers pitched their plan in Horizon Workrooms to the researcher, who, like the rest of the teachers, embodied an avatar while observing the activities. Data was collected through a survey distributed to the teachers at the end of the activities via Google Modules, which was aimed at understanding parameters of perceived usability and acceptance of using iVR and AI for language learning purposes. Questions on usability and acceptability were structured according to Bales' TAM model (1950), while other queries aimed at understanding participants' opinions on the competences needed by teachers and students to conduct iVR and AI-based language activities. Promising results obtained from a qualitative data analysis showed overall high scores attributed to acceptance and usability of iVR and AI for language learning purposes and provided useful information on the skill sets and instructional guidelines necessary to teach and learn languages with AI-supporting iVR.

References

Bales, R. F. (1950). Interaction process analysis; a method for the study of small groups (pp. xi, 203). Addison-Wesley.

Cook, M., Lischer-Katz, Z., Hall, N., Hardesty, J., Johnson, J., McDonald, R., & Carlisle, T. (2019). Challenges and Strategies for Educational Virtual Reality. *Information Technology and Libraries, 38*(4), Article 4. https://doi.org/10.6017/ital.v38i4.11075

Davis, F. D. (1993). User Acceptance of Information Technology: System Characteristics, User Perceptions and Behavioral Impacts. International Journal of Man-Machine Studies. https://doi.org/10.1006/IMMS.1993.1022

Dincelli, E., & Yayla, A. (2022). Immersive virtual reality in the age of the Metaverse: A hybrid-narrative review based on the technology affordance perspective. The Journal of Strategic Information Systems, 31(2), 101717. https://doi.org/10.1016/j.jsis.2022.101717

Eichenberg, C. (2012). Virtual Reality in Psychological, Medical and Pedagogical Applications. IntechOpen, 2012.Ellis, R. (2003). *Task-based Language Learning and Teaching*. OUP Oxford.

Ellis, R. (2003). *Task-based Language Learning and Teaching*. OUP Oxford.

Khukalenko, I. S., Kaplan-Rakowski, R., An, Y., & Iushina, V. D. (2022). Teachers' perceptions of using virtual reality technology in classrooms: A large-scale survey. *Education and Information Technologies*. https://doi.org/10.1007/s10639-022-11061-0

Holly, M., Pirker, J., Resch, S., Brettschuh, S., & Guetl, C. (2021). Designing VR Experiences - Expectations for Teaching and Learning in VR. *Educational Technology & Society, 24*, 107–119.

Hou, Y. (2020). Foreign Language Education in the Era of Artificial Intelligence. In M. Atiquzzaman, N. Yen, & Z. Xu (Eds.), *Big Data Analytics for Cyber-Physical System in Smart City* (pp. 937–944). Springer. https://doi.org/10.1007/978-981-15-2568-1_128

Markauskaite, L., Marrone, R., Poquet, O., Knight, S., Martinez-Maldonado, R., Howard, S., Tondeur, J., De Laat, M., Buckingham Shum, S., Gašević, D., & Siemens, G. (2022). Rethinking the entwinement between artificial intelligence and human learning: What capabilities do learners need for a world with AI? *Computers and Education: Artificial Intelligence, 3*, 100056. https://doi.org/10.1016/j.caeai.2022.100056

Pirkkalainen, H.; Makridou, E.; Torro, O.; Kosmas, P.; Vrasidas, C. and Peltola, K. (2021). Educating Educators about Virtual Reality in Virtual Reality: Effective Learning Principles Operationalized in a VR Solution. In *Proceedings of the 13th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management (IC3K 2021)*, SciTePress, pp. 75-82. https://doi.org/10.5220/0010638100003064

Slater, M., Wilbur, S. 1997. A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. Presence: Teleoperators & Virtual Environments. 6 (6), 603–616. https://doi.org/10.1162/pres.1997.6.6.603.

Inclusive teaching: Blackboard Ally and accessibility in Catholic University

Luigi d'Alonzo, Sara Genghi, Flavia Maria Scott, Elena Tassalini

Università Cattolica del Sacro Cuore, Milano (Italia)

Complexity acts as a paradigm in Italy's university classrooms, which are increasingly populated by people from countries with different cultural patterns, disabilities and ASDs (Specific Learning Disorders), health, relational and social problems, various abilities and learning profiles, and language differences. Improper management of such complexity can have negative effects in learning and adaptation to university life.

In this scenario it is therefore necessary to promote inclusion by sensitizing teaching staff to prepare accessible learning materials, as well as providing flexibility in ways to encourage course participation and knowledge acquisition.

Intervening in learning environments is another necessary action to deliver inclusive teaching also with the use of suitable technologies: these have had a significant acceleration in relation with the Covid-19 pandemic, when universities and educational institutions of all levels had to adapt - in an emergency - to the need to adequately carry out training remotely, not only through video lectures but also through the sharing of digital and multimedia content with their students.

In the last two years it appears necessary to acquire specialist platforms, designed to guarantee excellent training together with a high level of usability, in addition to a series of tools capable of offering all students equal access to content and study.

Accessibility can be considered as one of the measures of University's sensitivity to the entire student community: the Catholic University of the Sacred Heart has embraced and promoted this model, sharing the principles of Universal Design for Learning (UDL), a framework attentive to the use of methods, tools and strategies that give all individuals equal opportunities to learn.

Three are the pillars of the Accessibility project in Catholic University:

1) *Design System*. Set of rules and guidelines defined with the objective of ensuring consistency and continuity in terms of accessibility within the digital ecosystem in which the student is inserted: institutional websites of the University, applications such as the iCatt student portal or STEP, platforms and tools for learning (Blackboard, Panopto, etc.).
2) *Guidelines for Teachers*. The document "Educational-Didactic Intervention for Students with Disabilities and Specific Learning Disorders (SLDs)," disseminated to the entire teaching staff of the University, aims to provide guidance with respect to Integration Services, offer ideas for collaboration between Services and Lecturers, and delve into the topic of preparing accessible teaching materials.
3) *Blackboard Ally*. Introduced in 2020, it is a tool designed to help spread a culture of a more inclusive focus in teaching practices in the University that can generate *Alternative Formats* that meet the learning needs of students and feedback to lecturers to improve the level of accessibility of the educational content created.

Integrated into the University's Learning Management System, Blackboard, Ally starting from the original file automatically creates *Alternative Formats* (tagged pdf, electronic braille, audio files, HTML, etc.) and makes them available to students, who can decide to use the format that best suits their specific learning needs. Blackboard Ally also measures the accessibility of each file posted in the online course and shows the Lecturer a visual indicator of the level of accessibility of the content. The lecturer can

also drill down, deriving specific information about the type of accessibility issues detected and practical guidance for improving the document's accessibility score. To complete the information provided by the accessibility indicators of the individual course contents, the course accessibility report provides the teacher an overview of the course accessibility level, which is particularly useful for identifying major accessibility issues and developing an intervention strategy by step and priority. The report highlights the course accessibility score and number of contents by type; accessibility issues and number of contents affected; and the list of course contents sorted by accessibility score.

The Blackboard Ally project in Catholic University

Blackboard Ally's introduction plan is organized into three phases: a pilot trial, a consolidation and fine-tuning phase, activation on all Blackboard courses. The pilot was conducted from February to June 2021, involving 72 courses and 52 faculty members from all faculties, to ensure full representation of the different scientific-disciplinary fields. The pilot was built around three cornerstones: engagement and dissemination of an inclusive culture; training materials and in-progress support; activity and project monitoring.

The pilot's monitoring plan enabled quantitative and qualitative data to be collected.

On the quantitative side, the reports returned from Ally's University dashboard and the detailed reports allowed us to have a clear picture with respect to the average accessibility levels of the courses and content proposed by the teachers, with the possibility of highlighting the main recurring accessibility problems. Also interesting is the data regarding the main alternative formats used by students.

On the qualitative side, the administration of a questionnaire to the teachers and students who participated in the pilot allowed us to obtain important indications with respect to the teaching experience (difficulties encountered, best ways of support...) and the students' enjoyment of the initiative.

The analysis of the experience conducted provided the working group with important insights, highlighting, for example, from the outset the need to investigate accessibility and accessibility issues for some specific subject areas, such as the quantitative and linguistic areas.

At the same time, before proceeding with the extension of Blackboard Ally to the entire University, the working team has revised and expanded the training materials offered to faculty, reorganizing the support team and designing a cycle of training webinars aimed at faculty.

In December 2021 Ally was activated in all Blackboard courses: an initial communication initiative of the project is structured, with the aim of reaching Lecturers and students, and officially launching it.

A first round of meetings targeting lecturers was proposed in March 2022, followed by targeted meetings for the two subject areas mentioned above: mathematics and language areas.

The second semester of the 2022-23 academic year saw the launch of a new communicative proposal, aimed at bringing attention back to Blackboard Ally and more generally to the topic of accessibility; enhancing the dissemination and awareness work already carried out, enriching it further; accompanying teachers in the process of discovering and using Blackboard Ally tools.

The initiative took the form of the production of short video-pills dedicated to the in-depth study of one of the themes and/or tools of Blackboard Ally, to be added to the previously produced material, sent via e-mail to instructors every two weeks.

The constantly elaborated monitoring reports are allowing us to verify the progress of the project and the level of accessibility of courses in the University, and to map out the next steps in the Catholic University's journey toward inclusion.

Bibliographical references

- L. d'Alonzo, 2022, *Promuovere l'inclusione in Università. Un salto di qualità*, Education Sciences & Society, FrancoAngeli.
- E. Borgonovi, F. A. Comellini, F. Ferrucci, L. Mason, G. Migliaccio, A. Scaletta, G. Tanucci, 2022, Rapporto ANVUR *Gli studenti con disabilità e DSA nelle università italiane. Una risorsa da valorizzare*.
- Z. Čerešňová, 2018, *Inclusive higher education*, Nakladatelství Gasset, Prague.
- R.M Gargiulo, D. Metcalf, 2022, *Teaching in today's inclusive classrooms: A universal design for learning approach*, Cengace.
- Kieran, L., & Anderson, C., 2019, *Connecting Universal Design for Learning With Culturally Responsive Teaching. Education and Urban Society*, 51(9), 1202–1216.
- A. Collins, F. Azmat & R. Rentschler, 2019, *Bringing everyone on the same journey: revisiting inclusion in higher education*, Studies in Higher Education.
- L. Varriale, T. Volpe, P. Briganti, 2022, *Il ruolo delle università per la promozione della cultura dell'inclusione interna ed esterna* in *Un ponte tra università e mondo del lavoro per l'inclusione e la vita indipendente*, Franco Angeli.

Sitography

- https://help.blackboard.com/it/Learn/Administrator/SaaS/Tools_Management/Ally
- https://help.blackboard.com/Ally/Ally_for_LMS/Administrator/Accessibility_in_Ally

The use of digital badges in Higher Education. A case study of the impact on college students

Federica PELIZZARI[1]

[1] Università Cattolica del Sacro Cuore, Milano (Italy)

Extended Abstract

The use of digital badges in education has become increasingly popular in recent years, and much scientific literature has focused on this topic.

Digital badges are digital tools used in education to recognise and certify students' competences and learning outcomes. These are similar to traditional physical badges or medals that are awarded to mark a skill or achievement but can be shared through social media platforms or can be incorporated into a digital curriculum. One of their main features is that they can be displayed online, allowing students to share them easily with potential employers, higher education institutions or other interested bodies. Badges are often supported by a detailed description of the skills acquired and the criteria used to assign them, making it easier to understand their meaning and value (Frederiksen, 2013).

Researchers examined the benefits and challenges of implementing digital badges, including the effects on student motivation, the impact on learning and assessment, and the best practices for badge design and implementation.

One of their main features is the ability to recognise and value the skills acquired by students outside the traditional school environment (Abramovich, 2016). For example, a badge could be awarded for the ability to solve complex problems and engage in effective collaboration or for creativity. In this way, students can demonstrate their specific skills to others, including potential employers or higher education institutions (Carey & Stefaniak, 2018).

Furthermore, scientific literature has highlighted the role of digital badges in student motivation. Badges can provide immediate and tangible feedback on student performance, thereby encouraging engagement and active participation (Hurst, 2015) and can be designed to be 'open' or 'stackable', allowing students to earn successive badges to build an increasingly advanced skill set. This progression system can increase students' motivation to pursue long-term learning goals (Newby & Cheng, 2020).

However, the implementation of digital badges in education also raises crucial challenges. It is important that badges are based on clear and reliable criteria to ensure the integrity of the assessment process, and their design must be carefully evaluated to ensure that they are valid and recognised by stakeholders, such as employers or academic institutions (Ostashewski & Reid, 2015).

Literature suggests some good practices for the design and implementation of digital badges. These include involving students in the badge designing process, collaboration between faculty and industry experts to define evaluation criteria, using reliable technologies for badge management and validation, and creating opportunities for badge users to highlight and share their achievements (Shields & Chugh, 2017).

In Higher Education, digital badges are a means to recognise and validate students' skills and achievements beyond the traditional grade-based assessment system (Besser & Newby, 2019). For example, they can be awarded to students to demonstrate completion of specific courses, modules or

projects or can be acquired through various activities, such as attending workshops, completing projects, collaborating with other students or achieving specific levels of competence in a given field of study.

In this scenario, a case study was conducted within the one-year course on didactics and media education within the blended master's degree in Media Education, where digital badges are linked to individual actions that students must and can carry out in itinere (the Blackboard platform assigns them automatically the achievement of the objectives recognised) within the course itself, such as watching video lectures, delivering activities, downloading in-depth materials or answering self-assessment tests.

The research question refers to the understanding of the impact of digital badges in student viewing and how this may or may not help support widespread teaching and assessment. To this end, a questionnaire was administered to students with a scale investigating their degree of satisfaction and impressions; further, interviews with a selected sample were conducted to reflect on the effectiveness of badges.

The descriptive and inferential analyses revealed that students strongly argue that badges do not represent a person's real abilities and they are not satisfied with the characteristics of the implementation of digital badges, in particular badges are not motivating unless teachers emphasise them and they do not represent achievements in terms of skills attained.

This finding partly confirms students' desire not to see the need for tangible 'objects', such as points or badges, in relation to their learning (Alt, 2023), and confirms how these can be supportive but not essential within the process.

References

Abramovich, S. (2016). Understanding digital badges in higher education through assessment. *On the Horizon*, *24*(1), 126-131.

Alt, D. (2023). Who benefits from digital badges? Motivational precursors of digital badge usages in higher education. *Current Psychology*, *42*(8), 6629-6640.

Besser, E. D., & Newby, T. J. (2019). Exploring the role of feedback and its impact within a digital badge system from student perspectives. *TechTrends*, *63*, 485-495.

Carey, K. L., & Stefaniak, J. E. (2018). An exploration of the utility of digital badging in higher education settings. *Educational Technology Research and Development*, *66*, 1211-1229.

Frederiksen, L. (2013). Digital badges. *Public Services Quarterly*, *9*(4), 321-325.

Gibson, D., Ostashewski, N., Flintoff, K., Grant, S., & Knight, E. (2015). Digital badges in education. *Education and Information Technologies*, *20*, 403-410.

Hurst, E. J. (2015). Digital badges: Beyond learning incentives. *Journal of Electronic Resources in Medical Libraries*, *12*(3), 182-189.

Newby, T. J., & Cheng, Z. (2020). Instructional digital badges: Effective learning tools. *Educational Technology Research and Development*, *68*, 1053-1067.

Ostashewski, N., & Reid, D. (2015). A history and frameworks of digital badges in education. *Gamification in education and business*, 187-200.

Shields, R., & Chugh, R. (2017). Digital badges–rewards for learning?. *Education and Information Technologies*, *22*, 1817-1824.

PNRR and school innovation between inclusive processes and potential scenarios

Massimiliano LO IACONO[1], Rossella SGAMBELLURI[2]

[1] *University Mediterranea of Reggio Calabria, Reggio Calabria (ITALY)*

[2] *University Mediterranea of Reggio Calabria, Reggio Calabria (ITALY)*

This paper aims to analyze the potential development of teaching practices and methodologies within the future perspectives of innovation in relation to the upcoming project implementation of the PNRR School 4.0 (MI, 2022).

Starting from the inclusive educational act (Cottini, 2017) (Aiello, Sharma, Sibilio, 2016) and the need for renewal we investigate how much the development of technologies understood not only as facilitators (Calvani, Cottini, 2020), but as a paradigmatic bridge of learning in today's society, can influence the learning standards of pupils in the Italian Education system. The difficulties that emerge are related not only to the absence of long-term planning , but are substantiated through two guidelines that characterize our education system. On the one hand, we have fragile territorial realities, where social marginalization, the absence of civic virtues due to easy deviance represent potential implementation obstacles; on the other hand, the reality of educators and teachers who are unlikely to be able in such a short time to train and update themselves to be able to apply these new teaching methodologies. Inclusion, tout court, should ensure full accessibility and usability (Rivoltella, 2020) (Guglielman, 2011) to new technologies, making themselves protagonists in the transmission of knowledge (Calvani, 2013). However, it is evident how, despite efforts at the European level, the gaps are still there, almost a digital-divide (Lopez-Aguado et al., 2022). From here should start a reflection on how to act to substantiate that principle of equity (Benadusi, Giancola, 2022) that should govern the world of education and all of society in general. (Pasta, Rivoltella, 2022). So future teaching practices should stand on a fertile learning ground, ready to access and receive. The main concern is that already the architecture of the buildings of many Italian schools are not ready to receive e.g. immersive classrooms or classrooms dedicated to the performance of digitally constructed activities; the principle of Universal Design (Mace, 1985) is not basic tractable, as well as Universal design for Learning (Sgambelluri, 2020)) could be posed, in the unfolding of events, as a chimera that is difficult to implement.

A subsequent analysis of the field of inquiry concerns teachers' digital competences required for the implementation of new teaching practices through the use of new software and hardware. Recent studies (Lo Iacono, Cardinale, 2022) (Cabero-Almenara et al., 2022) have shown that teachers' basic digital skills, as measured through The DigComp 2.2, are lacking and teachers have difficulties in reworking them in a didactic key, including through metacognitive processes. The knowledge therefore of technological devices is foreshadowed as inadequate to the demands, far from a possible practical fallout within the PNRR School 4.0.

Finally, some perplexities may arise if we intersect digital, inclusion and soft skills, in fact it could happen that in the attempt to adjust standards and standardize learning constructs we could reduce the capacity for inclusion, the development of the pupil's

subjective learning potential and finally to reduce the enhancement of pupils' soft skills by reducing their social and emotional skills (Maccarini, 2023).

References

Aiello, P., Sharma, U., Sibilio M., (2016). *La centralità delle percezioni del docente nell'agire didattico inclusivo: perché una formazione docente in chiave semplessa.* Italian Journal of Education research, 16, 11-21.

Benadusi, L., Giancola, O. (2022) *Equità e merito nella scuola. Teorie, indagini empiriche, politiche.* Milano: Franco Angeli.

Cabero-Almenara, J., Guillén-Gámez, F. D., Ruiz-Palmero, J., & Palacios-Rodríguez, A. (2022). *Teacher's digital competence to assist students with functional diversity: Identifcation of factors through logistic regression methods.* British Journal of Educational Technology, 53(1), 41–57

Calvani, A. (2013). *L'innovazione tecnologica nella scuola: come perseguire un'innovazione tecnologica sostenibile ed efficace.* LEA – Lingue e letterature d'Oriente e d'Occidente,2, 567–584.

Calvani A., Cottini G. (2020). *Tecnologie per l'inclusione. Quando e come avvalersene.* Roma: Carocci.

Cottini, G. (2017). *Didattica Speciale e inclusione scolastica.* Roma: Carocci.

Guglielman, E. (2011). *Verso l'«e-learning» inclusivo. Primi contributi per la costruzione di linee guida per l'accessibilità metodologico-didattica.* Journal of Educational, Cultural and Psychological Studies (ECPSJournal),2(4),167-186.

Lo Iacono M., Cardinale C., 2023. *Inclusion and digital skills. Strategic priorities for the development of digital competences of special education teachers.* QTimes, 4, 376-397.

Lopez-Aguado, Mercedes, gutierrez-provecho, L., Diaz, J.Q., Llamas, J.L.G., 2022. *Social exclusion and digital divide.* Journal of e-learning and knowledge society, 3, 74-82.

Maccarini, A., M., 2023. *Character skills e didattica digitale. Verso nuove relazioni educative?* Bologna: il Mulino.

Mace, R.(1985).Universal Design, *Barrier- free Environments for Everyone.* Los Angeles, CA: Designers West

Ministero dell'Istruzione (2022). Decreto Ministeriale n.161 del 14 Giugno 2022. *Adozione del "Piano Scuola 4.0" in attuazione della linea di investimento 3.2 "Scuola 4.0: scuole innovative, cablaggio, nuovi ambienti di apprendimento e laboratori" nell'ambito della Missione 4 – Componente 1 – del Piano nazionale di ripresa e resilienza, finanziato dall'Unione europea – Next Generation EU.* Roma

Pasta, S., & Rivoltella, P. C. (2022). *Superare la "povertà educativa digitale". Ipotesi di un nuovo costrutto per la cittadinanza digitale. In La formazione degli insegnanti: problemi, prospettive e proposte per una scuola di qualità e aperta a tutti e tutte,* 600-604. Lecce: Pensa MultiMedia Editore.

Rivoltella, P.C. (2020). T*ecnologie di comunità.* Brescia: Editrice Morcelliana

Sgambelluri, R. (2020) *Dall'ICF all'universal design for learning.* Roma: Anicia.

The electronic midwife: self-education through videogames as a form of maieutics

Fabrizio Fulio Bragoni[1]

1.   Phd sdudent, Università E-Campus, Italy

Digital natives were born and raised in a globally technological environment (Lenhart et al., 2015) which encompasses most of their relevant social and cultural experiences, from knowledge acquisition and social relation building to moral literacy and the acquisition of moral values. In the so-called onlife situation, informal learning contexts, such as virtual and digital environments (Hawkey, 2004; Selfton-Green, 2004), have gained paramount importance on account of the way they promote interest, motivation, collaboration and social interaction of individuals (Degner et al., 2022): that's why, in recent years, the academy has approached them with growing interest. Being able to transfer these benefits to formal learning contexts by truly applying digital and tech means would result in a big-time learning revolution. Needless to say, this would imply an even wider and more invasive use of technology.

Risks and opportunities on that matter have been widely discussed and somehow assessed but, to date, no final answer has been reached: in fact, participants on this debate still seem to be manicheally split in two opposite sides, each one of which predictably digging in its heels.

On the one hand, to quote Umberto Eco's famous opposition between "apocalittici" and "integrati" (Eco, 1964), the hardcore critics, the millenarian-wannabes stressing on tech-development related risks; on the other hand, the dappled ranks of the "integrati", seeing engineers and programmers blindly developing hardware, software, sensors or whatever it takes to make technology easier and more useful, in one word more invasive ("because that's what we do…"), and corporate white collars hypocritically making big money out of potentially risky technologies.

Commonsense should call us to one simple remark: both positions lack of reflection and/or impartiality, be it because of the subject's position within the productive system or due to an inveterate pessimistic view on progress.

In our case, we can't help but consider technology both as a risk *and* as an opportunity towards cognitive, emotional and moral development of the youth (Quimson, 2020). That's not just commonsense: we really believe that a correct use of technology might result in great benefits, even when it comes to possible tech-related risk prevention.

But let's not anticipate.

Risks and opportunities in this field are often tightly interlaced: we know that the use of social media, and technology in general, plays a prominent role in young people's development, but we also know that inappropriate contents or over-exposure might have a negative impact on health, moral orientation, thought and judgement (Ardi, 2018).

So, how can we be sure about the effects? Can we take all the advantages and just let the downsides out? Former studies have concluded that digital media can be used as means of moral education (Katsarov et al., 2019; Khoo, 2012) and this is particularly the case with videogames - even single player videogames in which no actual human interaction is needed or involved. In fact, several commercial off the shelf videogames out there throw their players right in the middle of fictional, virtual worlds calling them to confront with moral dilemmas and forcing them to engage in their solution; and we are well aware that, as Kohlberg (1984) suggested, the experience of moral dilemmas allows for moral thought development (Khoo, 2012).

So, although small evidence exists that videogames might produce moral progress in terms of actual moral behavior, we can at least safely conclude that they can help clarify and deepen moral thought, eg. contrasting moral blindness – a sort of inability that prevents us from seeing or recognizing a moral issue, letting us steer clear from moral decision-making and adoption of a moral behavior (Rest, 1986).

Now, by drawing a connection between videogames and moral thought, we are stepping into the field of digital-driven moral self-education.

But why does that work?

First things first: the use of multimedia as means of self-education is not new (Zakhro, 2020); in fact, researches show that the use of media resources in experiential learning might stimulate reflection on moral values and behaviors among students.

Moreover, videogames do not act as mere exempla: in fact, they allow for indirect and experiential acquisition of moral values, forcing the players to activate a specific cognition mode, which is both visual and kinesthetic, in a tech-empowered "learning by doing" fashion (Zagami, 2018; Iavarone, Scuotto & Aruta, 2023).

Self-education is not even exclusive to informal learning contexts - in fact it's been considered as a key element of formal learning processes too, allowing students to develop and strengthen metacognition and soft skills by moving at their own individual pace (Zakro, 2020) – yet, we think, current views on moral education or literacy as found in public school curricula are deficient both in terms of consideration and practices. In fact, civics (which is as close as you get to moral education in schools) is clearly still seen as a sum of positive notions to be imparted.

We suggest that this view be overturned: we see moral education not as a part of a vague yet traditional chalk and talk teaching, but as an opportunity to promote open reflection on moral issues and dilemmas. There should be no positive notions in moral education: it's more like a process in which the teacher acts as a facilitator, or a midwife, to put it socratically, helping students to give birth to their own moral views. And we dare go even farther: we suggest, in fact, that videogames be used as facilitators, both in formal and informal learning contexts, so to allow efficient self-education in the moral field.

Here we retell a controlled player-videogame relation as a potential maieutic process, urging the player to think or rethink his/her moral positions, and we foster its application to formal and informal learning contexts alike. Our starting point is a baconian-wittgensteinian assumption: we believe that truth emerges more readily from error than from confusion, so we'd rather let the students try for themselves and be mistaken in a virtual world than just let them grope in the dark, leaving them unprepared to face unexpected (and unexplored) moral dilemmas in the real world.

On that basis, we will assess typical off the shelf commercial games dynamics to see if and how they can be combined (Katsarov et al., 2019; Staines 2010; Hodge, 2018) to empower video-gaming's own maieutic potential in bringing player's ideas from a latent state to clear consciousness.

Our final aim is to completely rethink the player-videogame relation in order to define clear guidelines for the design and production of a maieutic videogame, to be used as means for moral self-education in formal and informal contexts alike.

References

Ardi, Z., Viola, K., & Sukmawati, I. (2018). An Analysis of Internet Abuses Impact on Children's Moral Development. *JPPI (Jurnal Penelitian Pendidikan Indonesia)*, *4*(1), 44-50.

Degner, M., Moser, S., Lewalter, D., *Digital media in institutional informal learning places: A systematic literature review*, Computers and Education Open, Volume 3, 2022, 100068, ISSN 2666-5573, https://doi.org/10.1016/j.caeo.2021.100068.

Francis, R. (2012). *The decentring of the traditional university: The future of (self) education in virtually figured worlds*. Routledge.

Hawkey, R. (2004). Learning with digital technologies in museums, science centers and galleries (Vol. 9). Bristol, UK: Nesta Futurelab.

Hodge, S. (2018). *Press trigger for morality: an exploration into the role of moral development, moral decision-making and video game play* (Doctoral dissertation, Bournemouth University).

Huda, M., Siregar, M., Ramlan, K. S. M., Teh, H. S., Jamsari, E. A., Rahman, S. K. A., ... & Ninsiana10, W. (2017). From live interaction to virtual interaction: Addressing moral engagement in the digital era. *Journal of Theoretical and Applied Information Technology*, *95*(19), 4964-4972.

Iavarone, M. L., Scuotto, C., & Aruta, L. (2023). Towards a Digital-Civil. An introductory reflection on Digital Moral Literacy Verso un Digitale-Civile. Una riflessione introduttiva sulla Digital Moral Literacy. *Q-TIMES WEBMAGAZINE*, *1*(1), 39-46.

Katsarov, J., Christen, M., Mauerhofer, R., Schmocker, D., & Tanner, C. (2019). Training moral sensitivity through video games: A review of suitable game mechanisms. *Games and Culture: A Journal of Interactive Media, 14*(4), 344–366. https://doi.org/10.1177/1555412017719344

Khoo, A. (2012). Video games as moral educators?. *Asia Pacific Journal of Education*, *32*(4), 416-429.

Kohlberg, L. (1984). *Essays on moral development: Volume 2. The psychology of moral development. San Francisco*, CA: Harper & Row

Lenhart, A. (2015). Teens, social media & technology overview.

Quimson Jr, L. O. (2020). social media on the moral development of the young people. *International Journal of Research*, *9*(7), 45-54.

Rest, J. (1986). Moral development: Advances in research and theory. New York, NY: Praeger.

Staines, D. (2010). Videogames and moral pedagogy: A Neo-Kohlbergian approach. In *Ethics and game design: Teaching values through play* (pp. 35-51). IGI Global.

Sefton-Green, Julian. (2004). Literature Review in Informal Learning with Technology Outside School.

Zakhro, U. (2020). Media Resources As An Effective Tool Of Students' self-Education. *European Journal of Research and Reflection in Educational Sciences Vol*, *8*(8).

Towards A 360 Synchronous Interactive Telepresence

Andrea GARAVAGLIA[1], Ilaria TERRENGHI[1], Maurizio DE NINO[1]

[1] *Università degli Studi di Milano, Milano (ITALY)*

Abstract

This contribution proposes an analysis applied to the design of a prototype of a 360-degree synchronous interactive telepresence environment.

The aim of this contribution is to evaluate and validate a novel didactic interaction paradigm, based on a VR360 telepresence application and experienced through Head Mounted Displays (HMD). More accurately, it aims to study the teacher-student interaction of a prototype of teaching-learning environment which allows the inclusion of students who cannot participate in face-to-face activities.

From a technological point of view, the idea is to enable an extension of the distance learning experience that provides remote learners with the opportunity to enjoyan immersive connection with both the teacher and the environment in which they operate, while allowing the learners to interact with the teacher at various levels. The latter, wearing a HMD with see-through capability, will be able to use the visual and vocal indications provided by the learners to improve the effectiveness of teaching.

Keywords: Immersive education, VR360, Telepresence, Didactic interaction, distance learning

Introduction

This contribution proposes an analysis applied to the design of a prototype of a 360-degree synchronous interactive telepresence environment.

Training and teaching professionals at all levels during the pandemic due to the spread of covid-19, experienced the opportunities offered by online teaching. Unfortunately, this forced distance period has also highlighted some limits, especially as regards the inclusion of all the students and the implementation of situated learning. According to Hodges et al. (2020) it's crucial to plan online learning experiences solving the main problems that have arisen.

Particular attention should be paid to procedural training tasks, which mainly consist of a combination of cognitive strategies and motor skills rather than basic declarative knowledge (Gagne, 1984). Video Tutorials or asynchronous simulators are normally used to learn procedural tasks, but for more complex tasks that employ application and analysis they may not be enough. Moreover, they can't ensure freedom of exploration nor interaction with the teacher (Blattgerste et al., 2021).

Two mainly educational contexts normally proposed in a presence mode, are particularly affected by some of the limitations mentioned above (Pirker and Dangel, 2021):

- laboratory environments, where students involved in workshops need to observe specific practices and techniques, and to observe the characteristics of the environment and the instrumentation;
- outdoors, where it is necessary to reach places that are not always easily accessible.

Both settings require a specific interaction, which can only take place in synchrony, ensuring the regulation and feedback processes (Rivoltella, 2021) useful for the alignment of teaching and learning process (Laurillard, 2014).

The interaction must foster the activation of feedback, an information provided by an agent regarding aspects of one's performance or understanding (Hattie & Timperley, 2007):

thanks to teachers and peers' feedback, students can improve their level of engagement and motivation. Thanks to learners' feedback, teachers can regulate the teaching process, considering students' answers and understanding.

A way to avoid losing these aspects of face-to-face teaching is to allow a synchronous teaching activity in telepresence to give teachers and students the opportunity to observe the entire environment and interact in it. This would be possible by further developing 360 video and telepresence technology.

At the moment the use of 360 headsets in teaching is mainly dedicated to the visualization of virtual environments whose production involves excessive costs or from static 360 images with very few possibilities of interaction. There is currently no telepresence system that allows synchronous interaction. With this project we want to contribute to fill this gap through the development of a prototype solution called Immersive synchronous learning 360 (ISL360 - ImmerSyncLearn360) Project.

Materials and Methods

The project consists of three main phases: 1) preliminary analysis of the application requirements; 2) development of the technological platform; 3) pilot study.

The first part of analysis covers the 360 video workflow, in particular the characteristics of setting, the stitching, encoding and transcoding, protocol, upload and delivery (server streaming) and the viewing. The pilot study will be carried out on a sample of didactic activities which includes the didactic interactions of the research object.

Laboratory activities from universities and from some upper secondary schools will be selected and assigned into experimental and control groups. Each laboratory session will be filmed. At the end of each session, the participating students will be asked to fill in a survey on the quality of the didactic interaction and the feedback received. At the end of the experimental sessions, a focus group will be proposed to the involved teachersin order to obtain useful information on the usability of the technological solution.

Results

At the time, the development of the first prototype is still in progress. It is based on Antmedia server streaming connected to two 360 cameras.

When it will be ready, the research group will start the pilot study in which teachers and students from both experimental and control groups will experience the same educational program.

Conclusions

Compared to a static 360 video or a two-dimensional telepresence system, a 360-degree telepresence interface would have the potential to enhance students' sense of presence and interaction possibilities, enabling them to better understand the characteristics of the environment as well as crucial circumstances and provide more details.

From a technological point of view, the idea is to enable an extension of the distance learning experience that provides remote learners with the opportunity to experience an immersive connection with both the teacher and the environment, while allowing the learners to interact with the teacher at various levels.

Acknowledgements

References

Blattgerste, J., Luksch, K., Lewa, C., & Pfeiffer, T. (2021). Trainar: A scalable interaction concept and didactic framework for procedural trainings using handheld augmented reality. Multimodal Technologies and Interaction, 5(7). https://doi.org/10.3390/mti5070030

Gagne, R.M. (1984). Learning outcomes and their effects: Useful categories of human performance. Am. Psychol. 39, 377

Hattie.J., & Timperley H. (2007). The power of feedback. Review of Educational Research, 77(1), 81–112

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. Educause Review, (March 27, 2020). Https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online -learning

Laurillard, D. (2012). Teaching as a design science. Building Pedagogical Patterns for Learning and Technology. Taylor and Francis.

Pirker, J., & Dengel, A. (2021). The potential of 360-degree virtual reality videos and real VR for education-A literature review." in IEEE Computer Graphics and Applications, doi: 10.1109/MCG.2021.3067999

Rivoltella (2021). La moderazione. In Rivoltella (a cura di). Apprendere a distanza. Raffaello Cortina: Milano.

Online application for the early detection of students at risk of failing through artificial intelligence

Giacomo NALLI[1], Andrea MARCONI[2], Sašo KARAKATIČ[3], Lucija BREZOČNIK[3], Anita MONTAGNA[4], Daniela AMENDOLA[2], Renato DE LEONE[2]

[1] Middlesex University, London (United Kingdom)
[2] University of Camerino, Camerino (Italy)
[3] University of Maribor, Maribor (Slovenia)
[4] Centro Studi Pluriversum, Siena (Italy)

Abstract

A worrying trend that recently affected the university system is characterized by the students' drop-out. Universities usually link the problem with some aspects as study program, structure, and organization of the examinations, that require more involvement from students, that negatively affect their motivation. Even if universities make some improvement actions, as tutoring, to provide students the best approach for their studies aimed at promoting academic success and avoiding university drop-out, sometimes they don't seem to achieve the results expected. It can happen that the factors which led students to drop-out cannot be related to their approach in the study but can be due to the students' engagement and social interaction. Universities identify these factors only after students' drop-out, checking their activities and attendance done only at the end of the academic year, too late for avoiding severe consequences. This work reports a possible solution to this problem by exploiting artificial intelligence methods based on machine learning, firstly applying the clustering to group students according to their behaviour and then implementing a classification model to predict students at risk. Once checked the accuracy of the machine learning models, the application designed and realized in this work has been plugged in an online platform to allow the universities' staff to easily execute the software supporting the students to achieve their goals in terms of engagement and learning outcomes. This is a contribution to reduce university drop-out, with possibility to improve the proposed application by user feedbacks and large amount of data collected.

Keywords: drop-out, clustering, classification, machine learning, artificial intelligence.

Students' drop-out is a problem that has recently affected several universities and has had issues in terms of enrolment, revenue (for institutions and their hosting cities) and social issues (for the students and their families). Recently the university drop-out, especially after the covid-19 pandemic, has increased reaching percentages around 24% in Italy (Piazza & Rizzari, 2020, pp. 47-65), 31% in Netherlands and around 50% in Latin America (Opazo et. Al., 2021, pp.1-27) that led to negative consequences in the students. The unsuccessful learning and consequent interruption of the educational path, indeed, can cause dangerous emotional states as depression and sense of inadequacy that identify a real psychological trauma (Kim & Kim, 2018, pp. 1-18). The university system usually tends to focus on the improvement of specific aspects when they try to find a solution for the drop-out, such as study program, structure, and organization of the examinations. Indeed, the motivation of a student often depends by the design of the teaching activities (Valerio, 2012, pp. 30-35) that have an important role in the achievement of learning outcomes. Several strategies have been implemented by universities to try to reduce the drop-out, such as the tutoring, which is a process aimed at supporting the different aspects of a student's learning development (De Santis et al., 2021, pp. 265-277) and that guides students to face the critical stages of their studies (Da Re, 2018, pp. 185-199).

In the literature different type of activities were performed to reduce this phenomenon as the peer tutoring for students with disabilities (Kowalsky & Fresko, 2002, pp. 259-271), e-learning solutions (Sulčič & Sulčič, 2007, pp. 201- 210) using also machine learning models (Nalli et al., 2021, pp. 1-21), software applications for improving students' performance (Amendola et al., 2023, pp. 17-29) and on-line tutoring systems that provides automatic feedbacks to help students to write programming code (Nalli et al., 2023, pp. 27- 35). Even if universities made actions to provide to students the best approach for their studies, aimed at promoting academic success and avoiding university drop-out (Da Re, 2018, pp. 185-199), sometimes they don't seem to achieve the results expected. The reasons that can led student to leave the university studies could be indeed due to other factors as socio-economic condition (Guzmán-Castillo et al., 2022, pp. 566-571) and academic and social integration (Tentshol et al., 2019, pp. 46- 56).mIn this work we have used numerical methods of artificial intelligence as a machine learning approach aimed at identifying students at risk of failing based on the students' engagement features and other relevant information. We have considered as relevant variables for this problem: academic behaviour and several socio-economic conditions as degree course, student status, first enrolment year, accommodation on campus, meals on campus, scholarship, completed surveys, interested in topics, attendance to lectures, acquired CFU. Sex has been also included as a variable. Firstly, a clustering technique has been applied used to identify groups of students with similarities in terms of engagement activities. The clusters obtained were then compared with the CFU acquired to identify the students at risk of failing, characterized by the cluster with the high percentage of students who didn't obtain CFU at the end of the academic year. The records belonged to this cluster were then labelled in a new dataset with the class "at risk". A classification model, after a comparison between several classification techniques in order to find the best algorithm, was then implemented using the new dataset to predict students at risk, and then integrated in an on-line platform, accessible to the university staff.

The students' drop-out can affect universities causing the decrease of the enrolments that impacts also negatively in social and economic terms for the institution where the most of budget comes from the tuition fees and from financial support correlated with the enrolment and the percentage of drop-out. Drop-out is a real problem that universities staff can't early detect, because of lack of specific tools that identify students at risk of failing well before the end of the academic year. Early prediction and warnings on the students' drop-out and identifying the factors that affect this phenomenon became a challenge for universities, in order to avoid the students' leaving and the interruption of their educational path (Lye et al., 2010, pp. 299-306). In this work, we have designed and created two machine learning models aimed to assist the university staff with an on-line tool able to predict the students that are considered "at risk" of drop-out, based on their engagements and social interaction in the academic environment. The comparisons performed between several machine learning algorithms, both for unsupervised and for supervised model and the accuracy returned by the classification model confirm the effectiveness and the reliability of the models here proposed. After the testing phase, an online platform has been implemented to allow the universities staff to easily execute the machine learning models to identify the students that tend to drop-out, to analyse the weaknesses and provide some actions that help the students to achieve their learning outcomes and proceed without interruption the degree course.

The next step could be the implementation of an artificial intelligence recommendations system, able to automatically provide specific actions adapting to the needs of the students at risk of failing.

References

Amendola, D., Nalli, G., Miceli, C. (2023). *Machine-Learning-Based Software to Group Heterogeneous Students for Online Peer Assessment Activities*. Communications in Computer and Information Science, 1779, 17–29.

Da Re, L. (2018). *Promoting the academic success: the Formative Tutoring between research and intervention in the experience of the University of Padua*. Formazione & Insegnamento, 16(3), 185-199.

De Santis, A., Sannicandro, K., Bellini, C., & Minerva T. (2021). *Cluster analysis for tailored tutoring system*. Q-times webmagazine, 3, 265-277.

Guzmán-Castillo, S., Körner, F., Pantoja-García, J. I., Nieto-Ramos, L., Gómez-Charris, Y., Castro-Sarmiento, A., & Romero-Conrado, A. R. (2022). *Implementation of a Predictive Information System for University Dropout Prevention*. Procedia Computer Science, 198, 566-571.

Kim, D., & Kim, S. (2018). *Sustainable education: analyzing the determinants of university student dropout by nonlinear panel data models*. Sustainability, 10(4), 1-18.

Kowalsky, R., & Fresko, B. (2002). *Peer Tutoring for College Students with Disabilities*. Higher Education Research & Development, 21(3), 259-271.

Lye, C. T., Ng, L. N., Hassan, M. D., Goh, W. W., Law, C. Y., & Ismail, N. (2010). *Predicting Pre-university student's Mathematics achievement*. Procedia-Social and Behavioral Sciences, 8, 299-306.

Nalli, G., Amendola D., Perali, A., Mostarda, L. (2021). *Comparative analysis of clustering algorithms and Moodle plugin for creation of student heterogeneous groups in online university courses*. Applied Sciences 11(13), 1-21.

Nalli, G., Culmone, R., Perali, A., & Amendola D. (2023). *Online tutoring system for programming courses to improve exam pass rate*. Journal of e-Learning and Knowledge Society, 19(1), 27-35.

Opazo D, Moreno S, Álvarez-Miranda E, Pereira J. (2021). *Analysis of First-Year University Student Dropout through Machine Learning Models: A Comparison between Universities*. Mathematics. 9(20), 1-27.

Piazza, R., & Rizzari, S. (2020). *L'orientamento formativo come antidoto alla dispersione universitaria: un percorso di studio guidato per il rafforzamento delle abilità di autoregolazione degli studenti del primo anno del corso di studi in scienze dell'educazione e della formazione*. Annali della facoltà di Scienze della formazione Università degli studi di Catania, 19, 47-65.

Sulčič, V., & Sulčič, A. (2007). *Can online tutors improve the quality of e-learning.* Issues in Informing Science and Information Technology, 4, 201-210.

Tentshol, K., McNeil, R., & Tongkumchum, P. (2019). *Determinants of university dropout: A case of Thailand.* Asian Social Science, 15(7), 49-56.

Valerio, K. (2012). *Intrinsic motivation in the class*room. Journal of Student Engagement: Education Matters, 2(1), 30-35.

Analysis of the multifaceted students' experience in using video recorded lessons of Physics delivered by the Moodle platform

Daniela AMENDOLA[1], Giacomo NALLI[2], Andrea PERALI[3]

[1] *School of Biosciences and Veterinary Medicine, University of Camerino, 62032-Camerino, MC (ITALY)*

[2] *Faculty of Science and Technology, Computer Science Department, Middlesex University, London (UK)*

[3] *School of Pharmacy, Physics Unit, University of Camerino, 62032-Camerino, MC (ITALY)*

Abstract

To face the complex problems due to the Covid-19 pandemic and to the earthquake of central Italy in 2016, the University of Camerino embraced a strategy based on the synergy of online instruments, such as streaming of the lectures, their video recordings, organization and delivering of the digital material by the Moodle e-learning platform. In this work, we report the analysis of the students' diverse and multifaceted experience in using the video recorded lessons of Physics through the results of a questionnaire and the correlation with the data extracted from the Moodle platform and the video conference system. New and interesting features emerging from this approach have been evidenced: the students appreciated time and space flexibility, personalization of the learning path, modular speed in acquiring knowledge and clarifying difficult concepts. In this way, the critical issues connected with the distance and the compatibility with job or other duties of the students have been circumvented, maintaining the high-quality standards of the learning process and the satisfaction of the students attending the Physics course.

Introduction

During the Covid-19 pandemic years and to face the several problems caused by the severe earthquake of central Italy in 2016, the University of Camerino has developed a comprehensive online strategy to carry on the learning and teaching institutional activities maintaining high quality standards and satisfaction of the students, while making the planned actions sustainable for teachers, tutors, and technicians.

The main instruments adopted by University of Camerino consisted of video conference system, Moodle e-learning platform and systematic video recording of the lessons streamed online during the onsite lectures. The video recorded lectures have been collected in courses and delivered through the Moodle platform of the University of Camerino, a service still active after the conclusion of the pandemic emergency, mainly addressed to specific categories of non-resident students, but also available for any students interested.

A first study of the effectiveness of video lessons to improve Physics teaching at the university level has been reported in (Amendola, 2017, pp. 10018-10024), while the use of video tutorials in a blended learning approach for Chemistry has been discussed in (Schettini, 2021, pp. 61-72).

Methods

In this work we have studied the diverse and multifaceted students' experience with using the video recorded lessons of the Physics course given in the first year of all the degrees of the School of Pharmacy during the academic year 2022-23. One of the authors of the present work (A.P.) is the teacher of the course. The opinions and suggestions of the students on this system have been collected through a questionnaire made characterized by 19 multiple choice and

open-field questions, to which 40 students responded up to now. The results of the questionnaire have been correlated with the learning analytics available on the Moodle platform, with the data extracted from the video conference system and with the marks given to the students in the exam sessions. Altogether, the amount of data collected during several months of online activities enables an in-depth investigation on the effectiveness of the video recorded lessons organized in Moodle in improving the learning outcomes and the satisfaction of the students.

Results

The main results reported in this work consist in finding a set of different motivations and way of using the video lessons by the students: i) flexibility in using the video lessons to make the study compatible with their job activities or other personal duties; ii) hybrid approach to the course, with alternation of onsite presence in Camerino and distant attendance; iii) a new method to study the contents of the Physics course, with students' attention dedicated to the interaction with the teacher and details left for late individual analysis watching the videos; iv) selective access to the videos to better understand difficult parts of the course, choosing the suitable speed of moving forward the videos. Hence, the recorded video lessons of Physics well organized and delivered by the Moodle platform allow the students to personalize and to self-organize their learning path and experience according to their lifestyle and method of study.

The cross correlations with the learning analytics of the Moodle platform and of the video conference system adopted by the University of Camerino, plus the exam marks, indicate an increased percentage of students passing the exam of Physics in the first year. The average values of the marks are like the average values before the pandemic period and the earthquake event. Note that 94% of the students who responded to the questionnaire have declared that the use of recorded video lessons led to a better result in the final exam.

Conclusions and Perspectives

The enhanced learning system here proposed and analyzed can maintain a high-quality standard of the learning and teaching activities, while at the same time enabling time and space flexibility and a high level of personalization of the learning experience.
In the near future, the multimedia system here presented, being embedded in the Moodle platform, will be integrated with other software applications based on artificial intelligence methods recently realized by our digital learning team, in order to improve the online tutoring services (Nalli, 2023, pp.27-35) and to enhance the interaction among the students through workgroups assisted by clustering algorithms (Nalli, 2021, pp. 5800). In addition, several technologies could be exploited to motivate and engage the students, such as Virtual reality (VR) (Singh et al., 2020, pp. 661-664), augmented reality (AR) (Mohanty et al., 2020, pp. 753-760), and Gamified simulation (Hope et al., 2022, pp. 1-15), which effectiveness will deserve investigation.

Acknowledgements

References

Amendola, D., Perali, A., Vitali, D. (2017). *Using video lectures in e-learning platform to improve physics teaching at university level.* EDULEARN17 Proceedings 10018-10024

Hope, D.L., Grant, G.D., Rogers, G.D., King, M.A. (2022) *Virtualized Gamified Pharmacy Simulation during COVID-19.* Pharmacy 2022, 10, 4, 1-15.

Mohanty, P., Hassan, A., Ekis, E. (2020) *Augmented reality for relaunching tourism post-COVID-19: socially distant, virtually connected.* Worldwide Hospitality and Tourism Themes 12(6), 753-760.

Nalli, G., Amendola D., Perali, A., Mostarda, L. (2021). Comparative analysis of clustering algorithms and Moodle plugin for creation of student heterogeneous groups in online university courses. Applied Sciences 11(13), 5800.

Nalli, G., Culmone, R., Perali, A., Amendola, D. (2023). Online tutoring system for programming courses to improve exam pass rate. Journal of e-Learning and Knowledge Society 19(1), 27-35.

Schettini, C., Amendola, D., Borsini, I., Galassi, R. (2021). A blended learning approach for general chemistry modules using a Moodle platform for first year academic students. Journal of e-learning and knowledge society 16 (2), 61-72.

Singh, R.P., Javaid, M., Kataria, R.,Tyagi, M., Haleem, A., Suman, R.(2020). *Significant applications of virtual reality for COVID-19 pandemic*. Diabetes & Metabolic Syndrome: Clinical Research & Reviews 14(4), 661-664.

Producing digital artifacts to counter "digital education poverty" in the logic of third space learning, Book of Abstracts and Proceedings Book of ISYDE2023

Stefano PASTA[1], Michele MARANGI[2]

[1] *Catholic University of the Sacred Heart, Milan, Italy*
[2] *Catholic University of the Sacred Heart, Milan, Italy*

Abstract

Since 2021, the Research Centre on Media Education, Innovation and Technology (CREMIT) of the Catholic University has been proposing to use the new construct of "digital educational poverty", overcoming and expanding the concept of "digital divide".

Taking the "educational opportunities" of an Area as the basis of the concept of "digital educational poverty", the term "digital educational poverty" refers to the lack of acquisition of digital skills, understood as a new form of literacy (Rivoltella, 2020) needed in the digital society to analyze the production and the use of different digital contents by the "prosumers". This deficiency makes it very difficult for the individual to access the opportunities offered by the digital and infosphere. In terms of defining the paradigm, it should be emphasized that the concept of digital educational poverty is the result of the hybridization of two "digital competence' reference frameworks".

One is based on a rights perspective, in line with the *European Union's Digital Competencies 2.1 framework* (2017) and *2.2* (2022), associated with «a critical, conscious and responsible use of digital technology for learning, working and participating in society» (Vuorikari, Kluzer, Punie, 2022). It also complements the new *EU Strategy on the Rights of the Child* (2021) and the *General Comment to the UN Convention on the Rights of the Child concerning the children in the digital environment* (2021), with particular reference to the right to learning, to access to correct information, to privacy, freedom of expression and opinion, to protection and non-discrimination. This perspective can be found in the idea of "Digital Competence" of *Europe's Digital Decade 2030* (2021) and in previous European digital competence surveys, such as ICILS (2018) and DESI (2019). A different perspective that focuses more on the dynamism and transdisciplinary nature of competences is what Rivoltella (2020) calls New Literacy, stressing how a segmented approach betrays the 'citizenship vocation' of digital competence (Buckingham, 2019). From a theoretical standpoint, he reinterprets digital competence on the basis of three dimensions: criticism (semantics, meanings, social and cultural sense), ethics (values, responsibilities, citizenship), aesthetics (codes, languages, narratives), while also relying on the concept of Dynamic Literacies (Potter, McDougall, 2017). In Italy, we can detect this vocation in the five areas that constitute the Digital Civic Education Curriculum of the Ministry of Education (2018); in the international and research arena, we find this approach in the work of the Stanford History Education Group (SHEG) of Stanford University, in *Students' Civic Online Reasoning* (2019) and *Evaluating Information: The Cornerstone of Civic Online Reasoning* (2016).

Other texts have defined the construct (Pasta, Rivoltella 2022; Pasta 2022), discussed the measurability of the phenomenon (Pasta, Marangi, Rivoltella, 2021), presented the Digital Competence Score (DCS) survey instrument and data from a survey (Marangi, Pasta, Rivoltella, 2022), investigated situations where educational poverty and digital educational poverty do not coincide (Marangi, Pasta, Rivoltella, 2023).

The study analyzes a significant sample of 1400 digital artifacts produced by lower secondary school students from 100 schools, that are the outcomes of the newsrooms (Digital Writing : Wikipedia, Online Petition ; Podcast : Review, Investigation ; Digital Storytelling ; Social Marketing), i.e. third learning spaces (Potter, McDougall, 2017) around which is built the project to combat digital educational poverty.

The artifacts will be analyzed both according to some indicators of the aesthetic, critical and ethical dimensions of digital competence (Rivoltella, 2022) and to the dimensions of the design and the implementation process leading to "onlife citizenship" (Pasta, Rivoltella, 2022).

From the analysis of the artifacts of "Connessioni Digitali", emerge both the complexity of the concept of digital competence, and the need to equip oneself with multiple methodologies and teaching tools to place the creation of concrete media products and the planning of communication strategies, following some cornerstones:

- cross-media logic and trans-media dynamics, which allow both to cross and experiment with different platforms and to adapt the same concept to different formats, with specific characteristics, rules and styles;

- the creation of third learning spaces, capable of bringing out the theoretical sense of processes and awareness of one's own skills, starting from laboratory operations, from the collective and collaborative dimension, from people's social and cultural consumption, in a continuous hybridization not only of the formal sphere with the informal one, but also of educational roles and postures;

- the need to rethink and renew some cornerstones of classical media education, such as the critical spirit, the creative capacity and the productive vocation, in an increasingly post-media and fluid context.

Keywords: Digital competence; Digital educational poverty; Digital divide; Onlife Citizienship; Third Spaces Literacies.

References

Marangi, M. – Pasta, S. – Rivoltella, P.C. (2022). *Digital educational poverty: construct, tools to detect it, results. Povertà educativa digitale: costrutto, strumenti per rilevarla, risultati*. QTimes. Journal of Education, Technology and Social Studies, XIV, 4 (2022), 236-252.

Marangi, M. – Pasta, S. – Rivoltella, P.C. (2023). *When digital educational poverty and educational poverty do not coincide: sociodemographic and cultural description, digital skills, educational*

questions. Quando povertà educativa digitale e povertà educativa non coincidono: descrizione sociodemografica e culturale, competenze digitali, interrogativi educativi. QTimes. Journal of Education, Technology and Social Studies, XV(1), 181-199.

Pasta, S. (2022). *« Pauvreté éducative numérique ». Fracture numérique, les mineurs et l'école italienne*, in F. Moussa-Babaci, E. Costa-Fernandez, S. Gahar, *Éducation et psychologie en temps de crises* (pp. 35-50). Paris: Harmattan.

Pasta, S. - Marangi, M. – Rivoltella, P.C. (2021). *Digital Educational Poverty: A Survey and Some Questions about the Detection of a New Construct*. In *Proceedings of the 2nd International Conference of the Journal Scuola Democratica "Reinventing Education*, vol. 1, Citizenship, Work and The Global Age, 697-710.

Pasta, S. - Rivoltella P.C. (eds.) (2022). *Superare la 'povertà educativa digitale'. Ipotesi di un nuovo costrutto per la cittadinanza digitale*, in M. Fiorucci, E. Zizioli (eds.), *La formazione degli insegnanti: problemi, prospettive e proposte per una scuola di qualità e aperta a tutti e tutte* (pp. 600-604). Lecce: Pensa Multimedia, Lecce.

Pasta, S. - Rivoltella P.C. (eds.) (2022). *Crescere onlife. L'Educazione civica digitale progettata da 74 insegnanti-autori*. Brescia: Scholé.

Potter, J. – McDougall, J. (2017). *Digital Media, Culture and Education*. London: Palgrave MacMillan.

Rivoltella P.C. (2020). *Nuovi alfabeti. Educazione e culture nella società post-mediale*. Brescia: Scholé.

Rivoltella, P.C. (2022). *Educating to Digital Citizenship: conceptual development and a framework proposal*. Journal of e-Learning and Knowledge Society, 18(3).

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes*. Luxembourg: Publications Office of the European Union.

Hate speech online: detection methodologies between algorithmic and qualitative evaluations. A case study on antiSemitism on Twitter, Book of Abstracts and Proceedings Book of ISYDE2023

Stefano PASTA[1]

[1] Catholic University of the Sacred Heart, Milan, Italy

Abstract

Research on the forms of contemporary hatred (Siegel, 2020; Santerini, 2021), and in particular studies on the changes that have taken place on the social Web (Pasta, 2018, 2019), agree that this phenomenon requires a multidisciplinary approach.

At an international level, the field of Hate Studies, which combines the legal and IT fields with the humanities (sociological, pedagogical, anthropological, philosophical, linguistic, semiotic) and the interests of scholars, researchers, politicians, communication experts, human rights, NGO leaders, is marked by a significant number of research aimed at automating detection processes and creating an algorithm capable of identifying online hatred. The corpus is almost always taken from Twitter, since among the main social networks it is the only one with easy access to data automatically through APIs, i.e. application programming interfaces.

In this field of research there is a tension between human-non-human and technology-human action, with the tendency to limit interventions to artificial intelligence to the detriment of more interpretative approaches. At the macro level, we can identify two groups among international studies. The first includes searches that use only machine learning methods, while the second includes studies that combine automatic search with human classification (Pasta, 2021; 2023).

The contribution presents an analysis that combines socio-educational approach and automatic computer processing. This methodology is applied to various target groups and aims, alongside detection, at a more in-depth study of its characteristics, in order to design coherent educational interventions. This case deals with the classification of antiSemitic hate speech on Twitter, in Italian from 1st March 2019 to 28th February 2023. The question is whether there are monthly spikes in antiSemitic hatred, and the research is carried out through temporal analyses of samples manually classified by experts, and later is specified which rhetoric and forms of hatred are prevalent.

The methodology used falls under the techniques of social network analysis (SNA). The data were collected using the open-source Python library GetOldTweets3, which allows to obtain tweets via query search. With the search string that combined the presence of a lemma identifying the target group with (AND) a reference to elements typical of antiSemitism according to the literature, all the tweets published in the two years were extracted. Subsequently, following the technique of simple random sampling without repetition, a sample consisting of 100 tweets per month was selected, thus obtaining a sample dataset of 4800 total

posts (Gareth et al., 2017). The latter was manually classified by industry experts ("annotators"), who determined whether the tweet contained hate or not. In case there was a hate content, they assigned the rhetoric and the corresponding form of antiSemitism, according to the Working Definition of the International Holocaust Remembrance Alliance (IHRA). The former were derived from a psycho-social analysis and historical-literary on linguistic forms of hostility and already tested for other target groups by the same interdisciplinary team (insults, derision/irony, exclusion/separation, prejudice, dehumanization, humiliation/contempt, fear, competition, incitement/violence).

After returning the main results (however the contribution focuses on the methodological approach), the last step is to submit the results to a confusion matrix, i.e. a tool for analyzing the errors made by a machine learning model (Gareth, Witten, Tibshirani, 2017). All the texts classified by the annotators are thus also evaluated by an algorithm capable of establishing whether the tweet contains hate, after applying a series of typical Natural Language Processing (NLP) procedures to "clean" the texts, such as the removal of superfluous characters, the conversion of text to lowercase and the removal of stopwords (Bird, Klein, Loper, 2009). For the "alternative" classification, the dictionary of negative words from another scientific research in Italian is used. It will be highlighted how the algorithm that takes into account only the roots of the words does not perform well in identifying hateful content, with a high degree of difference in the evaluation on the same tweets between the manual annotation process, also called tagging, which requires collaboration with experts, and that is produced by the algorithm created with the dictionary of negative words of another methodology.

From the case study, connected to the debate in the Hate Studies, emerges the need to contextualize the signs (words, images, memes…) in context. The high error rate produced by the algorithm confirms that semantic analysis alone is not sufficient to be able to correctly automate such a complex process. It is necessary to possess a knowledge of reality and therefore of the context in which it is found, as well as reflect on the different means used in the mechanisms of othering, i.e. on a set of dynamics, processes, structures, including linguistic ones, which dialectically group subjects into a "us" and "them" in groups presented as homogeneous and alternative to each other (Powell & Menendian, 2018), and in perspectivation strategies of polarization us vs. them (Graumann, Kallmeyer, 2002).

Algorithmic logic, as Bruner (1996) has shown, deals with already encoded information, the meaning of which is established in advance; computational logic is interested in stimuli and responses, not in the meaning to be attributed to things, processes information, while those who do culture and education interpret and produce meaning: an operation full of ambiguity and above all sensitive to the context. Therefore, from the case study, it emerges that algorithms that limit themselves to identifying insults, or that only detect the presence of hate words, are not enough, while it is necessary to continue experimenting with research that integrates the two phases of human and automatic classification, applying interdisciplinary approaches and start from an in-depth knowledge of the manifestations of the phenomena at the center of the investigation.

References

Marangi, M. – Pasta, S. – Rivoltella, P.C. (2022). *Digital educational poverty: construct, tools to detect it, results. Povertà educativa digitale: costrutto, strumenti per rilevarla, risultati.* QTimes. Journal of Education, Technology and Social Studies, XIV, 4 (2022), 236-252.

Bird, S. - Klein, E. - Loper, E. (2009). *Natural Language Processing with Python*. Sebastopol: O'Reilly Media.

Bruner, J.S. (1996). *La cultura dell'educazione*. Milano: Feltrinelli.

Gareth, J. - Witten. D. - Tibshirani, T. (2017). *An Introduction to Statistical Learning*. Berlin: Springer.

Graumann, C.F. - Kallmeyer, W. (2002). Perspective and Perspectivation in Discourse. Amsterdam: Benjamins.

Pasta, S. (2018). *Razzismi 2.0. Analisi socio-educativa dell'odio online*. Brescia: Scholé Morcelliana.

Pasta, S. (2019). *Conversazioni via social network con giovani autori di performances* d'odio. Pedagogia Oggi, XVII, 2, 369-383.

Pasta, S. (2021), *Detection di odio antimusulmano tra machine learning e valutazione qualitativa*. In S. Polenghi - F. Cereda - P. Zini (eds.), *La responsabilità della pedagogia nelle trasformazioni dei rapporti sociali. Storia, linee di ricerca e prospettive* (pp. 1169-1179). Lecce-Rovato: Pensa Multimedia.

Pasta, S. (2023), *Hate Speech Research: Algorithmic and Qualitative Evaluations. A Case Study of AntiGypsy Hate on Twitter*. REM. Research on Education and Media, 15(1), 130-139.

Powell, J. – Menendian, S. (2018). The Problem of Othering. Othering and Belonging.

Santerini, S. (2021). *La mente ostile. Forme dell'odio contemporaneo*. Milano: Cortina.

Santerini, S. (2023). *L'antisemitismo e le sue metamorfosi. Distorsione della Shoah, odio online e complottismi*. Firenze: Giuntina.

Siegel, A.A. (2020). *Online hate speech*. In N. Persily - J.A. Tucker (Eds.), *Social Media and Democracy* (pp. 56-88). Cambridge: Cambridge University Press.

OPEN DATA AT SCHOOL FOR PROMOTION OF SOFT AND TRANSVERSAL SKILLS AND DEVELOPMENT OF DIGITAL AWARENESS

Flavia Giannoli

LS A. Volta, Milan (Italy)

Abstract

Innovating the teaching-learning process must answer to several diverse objectives. This paper presents a Project implemented as part of a scientific high school's Civic Education vertical curriculum for second grades as an example of effective strategy aimed to transform educational paths in welcoming ecosystems, able to support a full and safe development and promotes psychological and social well-being of future citizens starting from the very early stages of development.

Keywords: Open Data, STEAM, Civic Education, #SCUOLAFUTURA, Data society.

Introduction

In recent years, a great many projects have been carried out in Italian schools of all levels, which have contributed to the formation of students as competent, informed people, skilled in the use of technologies and the Web. In addition, informal tools and processes have been introduced through the adoption of cross-curricular activities within the educational system so that they contribute to the awareness of the unity of knowledge. Impetus has been provided by the recent introductions of STEAM (Science, Technology, Engineering, Arts, Mathematis) teaching and Civic Education (on the topics of: Constitution, 17 Sustainable Development Goals and Digital Citizenship). This paper presents a Project implemented as part of a scientific high school's Civic Education vertical curriculum for second grades.

Materials and Methods

The Project involves the following five steps: addressing a social or sustainability topic in Civic Education by teachers of Geo-history, Italian, Science; dividing students into working groups to explore different critical aspects of the topic; researching and selecting meaningful Open Data regarding those aspects (Math teacher); processing data using appropriate online software(Math teacher); publishing the research results online for public sharing (including in the form of a short article); giving back to peers in a final classroom debriefing.

Dealing with Open data provides formidable opportunities for educating about digital citizenship about many related topics. In fact, the term Open Data refers to certain types of data (information, numerical data, etc.) that can be freely used, reused, and redistributed, according to the indications present in the license of use (Italian Open Data License v2. 0). Moreover, thanks to Open Data, administrations can promote transparency and citizen participation, but also optimize their resources and improve their efficiency provided, of course, that the citizens themselves are properly informed and involved in the processes. The

use of Open Data allows the creation of online services and mobile apps, both by other public entities and private companies, research, and analysis, by research institutes and universities, publication of "data journalism" articles by traditional and online newspapers.

We start by teaching simple open publishing of graphs obtained in self-produced Google sheets and then publishing datasheet in CSV (Comma Separated Values). Subsequently move on to more sophisticated creations: many typical opensource apps for STEAM, allow us to process and publish found data online in open form. We used U-map and Datawrapper. U-map allows you to create maps or routes with OpenStreetMap layers in few times and place them on a site or share them online. Steps are simple: Select a layer for your map; Add markers, lines, polygons (POIs); Choose colors and icons of POIs; Add options to the map (overview map, geolocation of a user on loading ...); Automatically import geostructured data (geojson, gpx, kml, osm …) Choose the license for the data; Include in its site or share the created map. Datawrapper allows three different types of maps to be made from large online datasheets (statistical and institutional opendata) or from manually reported data. One can create Choropletic Maps, Symbol Maps (proportioned and colored according to the data) or Location Maps, where indicators are added into a map to show specific locations or where something happened.

The entire process was implemented by assigning successive activities through Google Classroom, assessed through evaluation rubrics (Google grids). Peer assessment was done through appropriately prepared google forms.

Results

The planned STEAM and Civic Education learning objectives were met, and the production of the final papers was marked by creativity. U-map is great for leading an educational field trip by markers on the Google Map, but it also allows you to collect data in real time, via a Google form on filled out on a smartphone on an open sheet, to report geo-structured information about interesting places; as my students did last year, when hosting Ukrainian students, to suggest them where to go in the neighborhood: Dear Friend I suggest you (in Italian). Datawrapper is most useful for enriching and documenting research, such as in the following examples of creating any articles on civic education topics (in Italian): Emigrazione in Italia; Survey of Mafia victims in Italy; Water.

Activity monitoring, coping and problem-solving skills and peer evaluation showed active participation and enjoyment of the innovative Project, which will be replicated.

Conclusions

The success of this educational pathway highlights how it is possible to apply innovative techniques in schools in accordance with National Directions. It is desirable for schools to use PNRR resources and #SCUOLAFUTURA training to bring their educational offerings up to date.

References

Aliprandi S. (2014). Il fenomeno open data. Indicazioni e norme per un mondo di dati aperti, Ledizioni

Francesco Piero Paolicelli (2022). Corso #SCUOLAFUTURA, (Blog) https://www.piersoft.it/category/opendata/,

http://umap.openstreetmap.fr/it/

https://www.datawrapper.de/

G. Di Gennaro, B. Vettori

Università degli Studi di Napoli Federico II

E-learning and crime prevention: lessons from past experiences and research

Much of the criminological literature to date has focused on the criminogenic effects of the digital revolution. The emergence of a whole new set of crimes that could not exist without modern technologies has been discussed (cyber-dependent crimes, such as hacking), as have the ways in which new technologies facilitate the commission of traditional crimes (cyber-enabled and cyber-assisted crimes). We know less about how ICT technologies can protect us from (cyber)crime. This paper focuses on the role that technologies, and e-learning in particular, can play in protecting citizens - especially vulnerable groups such as children and youth - from crime and increasing their digital security. It does so by examining the methods and results of experiences and research conducted to date at the national and international levels to identify best practices in teaching and learning.

Open Education for Lifelong Learning & Public Sector Professional Development: the case of Federica WebLearning language Moocs

Ruth KERR[1], Valentina REDA[1]

[1] *University of Naples, Federico II*

The world of work is in a state of rapid transformation, making it necessary to rethink strategies for enhancing workforce development (McKinsey, 2023; WEF, 2023; Deloitte, 2016). European institutions have made significant investments in recent years to boost the acquisition of relevant workplace skills to ensure Europe's competitiveness, and diverse funding initiatives have been launched as part of a wider intent to achieve higher levels of up- and re-skilling within the framework of the European Skills Agenda (Li, 2022; EC, 2016). One of the sectors that has received closer attention is that of the Public administration (Pa), also in view of the need to strengthen and enhance the skills portfolio within the Pa as an integral part of the broader intent to guarantee the country's future success (Oecd, 2021; Musella, 2022; Di Mascio & Natalini, 2022). Language skills are considered a major component of this portfolio (Marconi & Vergolini, 2022; EC, 2018), with two objectives: improve multilingualism for integration (EC, 2020; Ottaviani, 2019), and enhance individual competitiveness, earning power, and work opportunities (Liwinsky, 2019). Moocs (Massive open online courses) are one of the most established tools available today to try to systematize the response to this need on a large scale (Suarez & El-Henaway, 2023; Zhang & Sun, 2023; Kan & Bax, 2017; Bárcena & Martín-Monje, 2015). In this context Federica WebLearning, the Centre for digital education at the University of Naples Federico II, developed a portfolio of language courses specifically designed for lifelong learners and the Pa, delivered on the Federica.eu platform. This presentation aims to introduce the project and illustrate how open learning in the form of Moocs becomes a resource for skills development in the long term[1].

The project currently includes 13 language Moocs, each in line with a specific level of the European framework for languages: 8 A2 courses were designed to take employees at Job Centres in Campania to a working level of competence in 4 European languages - English, French, German and Spanish; 5 English courses were developed in parallel, given the importance of English as a *lingua franca* in the international workplace, and as a prerequisite for recruitment and promotion selection procedures. The courses have constituted two main blocks, each with specific characteristics relating to their scope and development, designed as intensive programmes that could be scaled up to accommodate large numbers of users and be delivered within a reasonably short time.

The A2 courses commissioned by Ifel (Institute for local finance and economics) focused on enhancing general and workplace language competence for their 987 mainly front-desk employees at the Job Centers in Campania. Each course was delivered in hybrid mode to be completed by employees during working hours over 6 weeks, for a total of 8,000 enrolments to monitor and 48 live sessions to manage. Key aspects of the Mooc design for this specific

---

[1] On the topic see the issue 2021/3 of the Rivista Digital Politics on "Online education", available in open access (https://www.rivisteweb.it/issn/2785-0072/issue/8441). On Moocs and on Federica, see also De Notaris, D., Melchionna, T. & Reda, V. (2020).

audience were manageable chunks of content, steady progression, multiple opportunities for practice and self-assessment, and the addition of specific "On the job" units and weekly live sessions with participant numbers ranging from 200 to 900. These were delivered by Federica WebLearning teachers with technical assistance from Ifel tutors, and required careful planning and management on a pedagogic and technical level. The compulsory attendance prevents completion data being used as an indicator of success, but learner satisfaction rates were significantly high in terms of appreciation of the initiative and quality of the courses.

The 6 English courses, on the other hand, were created for a lifelong learner audience in an open access environment, with a design focus on inclusion and engagement in a learning context where drop-out rates are normally high. The courses are highly interactive, with numerous formative activities, skills practice, and class discussions to encourage engagement with the support of Federica tutors. These courses have registered over 37,000 active users, with over 1,000 new users only on English Elementary in its first month. Completion rates currently stand at over 12% on Elementary, 6% on Intermediate and 6% on Upper Intermediate, compared to an average retention rate in the Mooc universe of 3 to 5%. This audience is made up of 10% teachers, 10% unemployed and 25% students from 76 different Italian universities. The largest segment of the audience, 40%, however, belongs to the Pa workers, motivated by professional development goals. As a further development of the initiative, the courses have also become an integral part of recognised Cpd programs for employees of local institutions. To date, more than 1,500 employees of the Federico II University have completed the placement test and are starting the program, and about 3,500 employees of the Regione Campania have already used the English courses for language enhancement at different levels, with a peak at the Independent User B1 level. An indication of the success of the training initiative is that, although the courses are not compulsory, completion levels are encouragingly high: currently at 23% on English Elementary and 32% on English Lower intermediate. While the fact that over 30% of employees on the Elementary and Lower intermediate courses have a Masters degree or higher can be considered an indication of the relevance of the initiative in responding to local needs.

In conclusion, the project made it possible to explore the use of open education and Moocs as the basis of a scalable strategy for the development of individual competence blocks, taking language courses that aimed to integrate open access and training for the Pa as a test case. The experience confirmed the widespread, and perceived, need on the part of lifelong learners and public sector professionals for access to language training at all levels, even those covered by school and university syllabuses. And satisfaction with the availability of structured (in line with competence frameworks), flexible (online), interactive (with contents, peers and tutors) skills enhancement programmes. Regarding the macro dimension of training provision, the project confirms the value of Mooc-based project design for the achievement of several strategic objectives: sustainability, in view of the re- and up-skilling that the future workplace needs, reducing the costs for provision and delivery of training programs, and any subsequent updating of the same; scalability, in view of the massive and incremental need for professional development, with huge numbers of learners in different locations; stackability, whereby a generalist lifelong learner oriented design can be integrated with personalized delivery modes. Which is why the modular but structured nature of Moocs represents a valid format and investment for a long-term, coordinated approach to skills development.

References

Bárcena, E. & Martín-Monje, E. (2015). *Language MOOCs. Providing Learning, Transcending Boundaries*. Varsavia: Sciendo.

Deloitte (2016). *Transitioning to the future of work and the workplace*. https://www2.deloitte.com/content/dam/Deloitte/global/Documents/HumanCapital/gx-hc-us-cons-transitioning-to-the-future-of-work-and-the-workplace.pdf

De Notaris, D., Melchionna, T. & Reda, V. (2020), *Didattica Digitale*, Roma: Salerno editore.

Di Mascio, F. & Natalini, A. (2022). *Pubbliche amministrazioni. Tradizioni, paradigmi e percorsi di ricerca*. Bologna: Il Mulino.

Dondi M., Klier J., Panier, & Schubert J. (2021). *Defining the skills citizens will need in the future workplace,* McKinsey & Company, 25 April. https://www.mckinsey.com/industries/public-sector/our-insights/defining-the-skills-citizens-will-need-in-the-future-world-of-work.

European Commission (2020). *ET2020. Providing multilingual communication skills for the labour market. Report from the WG Language for Jobs*. https://ec.europa.eu/assets/eac/languages/policy/strategic-framework/documents/languages-for-jobs-report_en.pdf.

European Commission (2018). *Proposal for a COUNCIL RECOMMENDATION on Key Competences for LifeLong Learning*. Brussels, 17 gennaio. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018SC0014.

European Commission (2016). *A new skills agenda for Europe*. Brussels, 10 giugno. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016DC0381.

Kan, Q. & Bax, S. (2017). *Beyond the Language Classroom. Researching MOOCs and Other Innovations*. Research-publishing.net.

Li, L. (2022). *Reskilling and Upskilling the Future-ready Workforce for Industry 4.0 and Beyond*. Information Systems Frontiers, 11 August, https://link.springer.com/article/10.1007/s10796-022-10308-y.

Liwiński, J. (2019). *The wage premium from foreign language skills*. Empirica 46, 691–711, https://doi.org/10.1007/s10663-019-09459-0.

Marconi, G. & Vergolini, L. (2022). *The demand for language skills in the European labour market: Evidence from online job ads*. Fbk-Irvapp WP 08, October. https://irvapp.fbk.eu/wp-content/uploads/2022/10/WP_IRVAPP_2022_08.pdf.

Musella, F. (2022). *Digital regulation: come si cambia la Pubblica amministrazione*. Rivista di Digital Politics. 2(1-2), 3-32, doi: 10.53227/105064.

Suarez, M. & El-Henawy, W. (2023). *Optimizing Online English Language Learning and Teaching,* Cham: Springer.

Oecd (2021). *Public Employment and Management 2021: The Future of the Public Service*. Paris: Oecd Publishing. https://doi.org/10.1787/938f0d65-en.

Ottaviani, J. (2019). *In Europe, speaking more than one language is still a privilege*. European Data Journalism Network, 30 December. https://www.europeandatajournalism.eu/cp_data_news/In-Europe-speaking-more-than-one-language-is-still-a-privilege/.

Zhang, Y. & Sun, R. (2023). *LMOOC research 2014 to 2021: What have we done and where are we going next?* ReCALL, 1(16). doi:10.1017/S0958344022000246.

World Economic Forum (2023). *Future of Jobs Report*. Insight Reports, May 2023, ISBN-13: 978-2-940631-96-4.

Prebunking as preventive ecology:
the case of conspiracy thinking

Stefano MORIGGI[1], Nicola BRUNO[1]

[1] *Università di Modena e Reggio Emilia, Reggio Emilia (ITALY)*

This contribution aims to dwell on the methodological aspects of a research-action designed and implemented in the terms of an educational "remediation" of prebunking (Van Der Linden, 2023). The research project has been designed as an educational ecology aimed at defusing conspiracy thinking (Brotherton, 2021) from within.

Conspiracism - like much of the most insidious disinformation - not infrequently leverages elements of truth; and, precisely with this in mind, it was felt that prebunking, properly contextualized, could prove to be a particularly effective approach in order to delve with a growing degree of awareness and autonomy of evaluation into the often ambiguous complexity of the infosphere.

Indeed, prebunking can be considered a complementary (and symmetrical) approach to debunking (Wardle & Derakhshan, 2017). As such it aims to "vaccinate" people by providing them with the cognitive and methodological "antibodies" to recognize and reject misleading narratives, unfounded arguments and unreliable beliefs.

Allowing, therefore, exercises and functional activities to learn how to recognize and neutralize conspiracy narratives, it was thought - also through the monitored co-design of persuasive and viral cases and scenarios - to test this approach in educational paths in the belief that, compared to retroactive debunking, it could produce of significant educational spin-offs also in view of a citizenship (educational) project.

In more detail, the research-action in question took place within "Open the Box", a media and data literacy program that involved thousands of secondary school teachers and students in Italy.

The remediation of prebunking in schools involved, first and foremost, an immersive analysis of real cases of conspiracy functional to decrypt its typical constituent grammars and content (manipulated images, viral memes, AI-generated synthetic media, manipulative data visualizations, fake experts, etc.). Such im-mediated "exposure" made it possible to share with the trainees (in the specific case of our training paths, these were teachers and students from secondary and high schools) techniques and tools for anamnesis of manipulative strategies, useful, among other things, to "enhance" at the same time the narrative and theoretical frameworks underlying them.

Not only that, the aforementioned ecological perspective has found its theoretical and operational poignancy precisely by "re-mediating" the methodology of prebunking within an epistemological frame that treasures the evidence from modern evolutionary theory with regard to the concepts of both inheritance and environment.

Taking, in fact, due account of the fact that all species - and the human species is no exception - inherit both genes and environments, we have been able to redefine the concept of environment itself in terms of that horizon of practices and relationships that is progressively constituted by responding to given adaptive challenges.

This conceptual landing has thus allowed us to rethink instructional design (in general) and the development of educational pathways related to conspiracy thinking (in particular) in the ecological terms of a design of heritages to come.

From this perspective, it is precisely by responding to the duly thought-out adaptive challenges of trainers that the participants to the research-action worked on the progressive establishment of an environment in which shared knowledge and skills useful for stigmatizing at the very least the dynamics typically underlying conspiracy narratives grew.

Precisely in this sense, prebunking was "remediated" (and re-semantized) in terms of designing adaptive challenges that a) exposed (immunizing) the trainees to instances of conspiracies (to the point, seemingly paradoxical, of having them design simulations of them); (b) the "responses" to such inoculations - appropriately followed and monitored by the trainers - then gradually went on to concretize and consolidate niches of awareness; that is, environments and contexts in which, without yielding to the fanatical utopias of a world without disinformation, they enabled the dissemination of practices and strategies for recognizing a conspiracy, its narrative strategies and its seductive potential.

References

Brotherton, R. (2021). *Menti sospettose. Perché siamo tutti complottisti*. Bollati Boringhieri.

Cook, J., & Lewandowsky, S., & Ecker, U.K.H. (2017). "Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence". *PLoS ONE* 12(5).

Ecker, U.K.H., & Lewandowsky, S., Cook, J. et al. (2022). "The psychological drivers of misinformation belief and its resistance to correction". *Nat Rev Psychol 1*, pp. 13–29.

Gottschall, J. (2022). *Il lato oscuro delle storie*, Bollati Boringhieri.

Lewandowsky, S., & Cook, J. (2020). *The Conspiracy Theory Handbook* (Available at http://sks.to/conspiracy).

Phillips, W. & Milner, R. (2023). *Tu sei qui. Come orientarsi nella tempesta dell'informazione digitale*. Ledizioni.

Van Der Linden, S. (2023). *Foolproof. Why we fall for misinformation and how to build immunity*, 4th Estate.

Wardle, C. (2023) "Misunderstanding Misinformation" in *Issues in Science and Technology 39*, no. 3 (Spring 2023): 38–40. https://doi.org/10.58875/ZAUD1691.

Wardle, C., & Derakhshan, H. (2017). *Information Disorder: Toward an interdisciplinary framework for research and policy making*, Council of Europe report (Available at https://edoc.coe.int/en/media/7495-information-disorder-toward-an-interdisciplinary-framework-for-research-and-policy-making.html).

Augmented and Virtual reality:
an innovative approach to learning "digital humanities"

Vivien VALLI[2], Nadia CARLOMAGNO[1]

[1] Università degli studi Suor Orsola Benincasa; [2] IIS FS Nitti di Portici

Traditional methods of education become everyday increasingly digitized and driven by technology innovations. Among the most significant trends in EdTech, augmented reality rightfully takes a leading position. With AR, classroom education can be more interactive, as AR can enable teachers to show virtual examples of concepts and add gaming elements to provide textbook material support. This will enable students to learn faster and memorize information. (1)

The study approaches a didactic disciplinary content (such as a history content) exploited in augmented or virtual reality with two groups of 15 years old Secondary School students, in order to monitor the influence of the different experience on learning. (2) The first group took part in the augmented reality experience, based on a QR-race and the use of merge-cube app: the students worked in small group with their own devices, the race was held in the school gymnasium. The second group took part in the virtual reality experience, carried out using Class-VR visors with their interactive contents; this group worked in its classroom. An enjoyment survey was carried out short after the experiences, while a quali-quantitative test was carried out in a tenday and the result subsequentially evaluated. The observation lead to a preliminary conclusion: the augmented reality experience, based on a dynamic and social interaction, proved much more effective in providing a strong learning retention of the proposed contents, even if the virtual reality experience, individually runned and widely static, was perceived as more appealing.

Aim and scope: evaluate the effects of an immersive virtual environment in a static, individual perspective versus the effects of an augmented reality environment in a dynamic, group-mediated experience, with relevance to didactic activities, in order to assess the cognitive footprint of virtual devices and contents compared with active AR-mediated, corporeal experiences.

Keywords: augmented reality, virtual reality, QR code, experiential learning

Bibliography:

(1) Matt Bower, Cathie Howe, Nerida McCredie, Austin Robinson & David Grover (2014) Augmented Reality in education – cases, places and potentials, Educational. Media International, 51:1, 1-15, DOI: 10.1080/09523987.2014.889400

(2) Vladimir Geroimenko, Augmented Reality in Education, a new technology for teaching and learning. Springer, 2020. ISBN: 978-3-030-42156-4

Inside Black Mirror: *Media, Society, Education:* a multidisciplinary work for the Study of Media and Audiovisual Education at School

Alessandra CARENZIO [1], Elisa FARINACCI[2]

[1] *Università Cattolica del Sacro Cuore, Milano (ITALY)*

[2] *Università di Bologna, Bologna (ITALY)*

Keywords: *Tv seriality, Media Education, Audiovisual Literacy, education, interdisciplinarity*

Extended Abstract

In recent years, especially in response to the pandemic, a variety of Media Education and audiovisual literacy courses have multiplied in the attempt to respond to the increased *onlife* (Floridi 2017) and mediated experience of being in the world. Since cinema's inception, the images that moved on and behind the screens of the first cinematographers changed completely the way we relate to and represent reality. Audiovisual media have gradually become both a mirror (sometimes distorted) that reflect the attitudes, values, and norms shared by a society and, at the same time, a window towards distant worlds and perspectives. Some scholars have highlighted how cinema has become a "place of memory", a large collective diary, a space capable of welcoming in the short, medium and long term, the sensitive or minimal oscillations of an economic and social, ideological, cultural and anthropological nature. Conversely, today the widespread consumption of Tv series seems to fulfill another function: it can be considered, and studied, as a barometer to measure social change, global sociocultural penchants, and the influence of global economic powers in shaping what and who is profitable to represent on screen. Tv series also become the arenas where younger generations debate and negotiate new social imaginaries and identities. In other words, tv series not only reflect the reality we already live in but also shape what we envision for the future. Thus, learning how to "read" moving images empowers us to understand what it means to be in the world at the time of digital hyper-connectivity and how they can shape the society we live in. The task to guide students through the ever-growing complexity of the contemporary mediascape has increasingly fallen onto schools and teachers who often feel unprepared, and often at a disadvantage compared to their "born digital" students, to undertake this mission. Furthermore, in the last decade in Italy, there has been renewed attention from institutions to include cinema, and more generally audiovisual media, within the school curriculum, which has elicited many requests from teachers to be supported in the development of lesson plans that are mindful of the changing sociocultural context where their students are living.

To this end, the contribution "*Inside* Black Mirror*: Media, Society, Education*" intends to respond to the need of a new education *on* and *with* audiovisual products and the combined need of understanding and live the contemporary mediatized society, offering secondary school teachers of any subject an innovative guideline that combines theoretical reflections and practical activities to develop lessons plans that integrate audiovisual and media literacy education in the classroom, in educational spaces, or in third spaces (Potter and McDougall 2019). Starting from the viewing of a selection of sequences from the tv series *Black Mirror* the project wishes to achieve three main objectives: (1) gain insight on the workings of the contemporary media context; (2) expose students to the social implications of living in a mediatized

world (the relationship with devices, the fine line between media control and trust, cyberstupidity, the cohabitation of public and private); (3) learn basic skills to detect and understand the use of the audiovisual language.

Black Mirror is a science fiction series organized into self-contained episodes (stand-alone episodes) which cross different genres each time, touching in each episode a specific thematic scenario that forwards the relationship between man and technology in a possible future. This TV series lends itself perfectly to meeting the objectives of a "New Media Education" (Rivoltella 2020). The TV series in question, in fact, allows us to critically explore multiple characteristics of the contemporary media landscape and how its potential future impacts on our lives. The ability of the series to narrate contemporary (and in some cases, future) themes, issues and problems is certainly enhanced by the construction of suitable settings to support reflections in the various communities involved. Therefore, the project is nourished by a collection of lesson plans that can be adopted in different school and educational contexts. The activities have been designed around images and texts from a selection of *Black Mirror* episodes, providing ready-made scenarios through lesson plans designed to engage with adolescents and younger people. With regard to meeting the demands of the school programs, the topics of the lesson plans intersect themes that are appropriate to fit within the "civic digital citizenship" courses as they can be easily intertwined within a broader work on digital culture, responsibility, and awareness aimed at building an attentive, creative, respectful attitude at all levels. At the same time, they can be used to explore specific themes within several subjects such as, for instance, the technological advancements of A.I. within a science course or the effects of social rating within a sociology or politics course.

Lastly, the result is also an intellectual laboratory within the academic system as it deliberately combines two perspectives, that of Media Studies and that of the Educational Sciences. This experimental combination of perspectives was carried out for two main reasons. Firstly, the theoretical perspective of Media Education unites these two well-defined and recognizable souls in their conceptual debts and methodological dynamics. Different, yet complementary, backgrounds are set into dialogue with one another in an attempt to provide a nuanced and faceted outlook onto the contemporary mediascape. The second reason is ideological positioning. This work wishes to counteract the extreme fragmentation between disciplines and research fields, at least in the Italian academic system. This fragmentation can be particularly counterproductive in Media and Audiovisual Education, as it can negatively impact the service that it wishes to provide to school institutions. Only through cross-pollination of different expertise new knowledge and ideas can be produced.

Bibliography

Bennato, D. (ed) (2018). *Black Mirror. Distopia e antropologia digitale*, Catania: Villaggio Maori Edizioni.

Buckingham, D. (2019). *The Media Education Manifesto*, Cambridge: Polity.

Carenzio, A. (2023). *La pandemia irrompe nel family drama: il caso della serie This is us*. in Aroldi, P., Carenzio, A. (eds.). *La Media Education alla prova della pandemia*. Milano: Educatt.

Denicolai, L., Farinacci, E. (2022). "YouTube e TikTok: forme di racconto audiovisivo digitale", «IMAGO», 24: 183 - 201.

Floridi, L. (a cura di) (2015). *The Onlife Manifesto: Being Human in a Hyperconnected Era*. London: Springer.

Garofalo, D. (2017). *Black Mirror. Memorie dal futuro*. Roma: Edizioni Estemporanee.

Innocenti, V., Pescatore, G. (2008). *Le nuove forme della serialità televisiva. Storia, linguaggio e temi*. Bologna: Archetipolibri.

Johnson D.K. (2020). *Black Mirror and Philosophy. Dark Reflections,* Hoboken, NJ: Wiley Blackwell.

Mittell, J. (2017). *Complex Tv. Teoria e tecnica dello storytelling delle serie tv*. Roma: Minimum fax.

Potter, J., and McDougall, J. (2017). *Digital Media, Culture and Education: Theorising third space literacies*. London: Palgrave Macmillan/Springer.

Prensky M. (2010). H. Sapiens Digitale: dagli Immigrati digitali e nativi digitali alla saggezza digitale. *TD-Tecnologie Didattiche,* 50, pp. 17-24.

Rivoltella, P.C. (2020). *Nuovi alfabeti. Educazione e culture nella società post-mediale*. Brescia: Scholé.

Rivoltella P.C. (2015). *Le virtù del digitale*. Brescia: Morcelliana.

Rivoltella P.C. (1998). *L'audiovisivo e la formazione*. Padova: CEDAM.

Digital Training in Public Administration: Results and Challenges. The Experience of the "Regione in Formazione" Project by Federica Web Learning.

Francesco BIZZARRO[1], Giuseppe SANCHEZ[1], Gabriele AMBROSANIO[1].

[1]*Federica Web Learning – Centro di Ateneo per l'Innovazione, la Sperimentazione e la Diffusione della Didattica Multimediale - Università degli Studi di Napoli Federico II, Naples (ITALY)*

Abstract

This work aims to demonstrate the added value provided by MOOC courses in professional training. Far from being a temporary training method strictly dependent on hyper-connectivity, which characterized the pandemic period, e-learning represents a consolidated trend and a permanent component of university education and professional training. The success of this tool can be attributed to various factors: the preference of students for audiovisual content and asynchronous teaching tools as preferred learning methods (Reda, 2020 e De Notaris - Passarelli, 2020) the rapid progress of technology and organization (Musella, 2022), which necessitates continuous upskilling and reskilling of competencies (De Notaris - Melchionna, 2020), the enhancement of interaction, communication, and assessment opportunities (Calise, 2020), the consolidation of private actors in the field of educational offerings (Calise - Reda, 2021), the gentrification and tourist development of cities, and the need to reach learners who are geographically distant from the physical training venue.

The reflection will continue by illustrating the case study, the "Regione in Formazione" project, a partnership developed in 2022 by the Federica Web Learning Center at the University of Naples Federico II and Regione Campania (Regional Government) to promote and deliver continuous professional training pathways for public-sector employees at the Regione. Over a period of 14 months, the project delivered 18 MOOC courses in e-learning mode to all personnel of the Campania Region. During this timeframe, 3,400 staff members, including managers and officials, were involved, with over 16,000 course registrations and more than 14,000 certifications generated.

This project, unique in Italy, produced a considerable amount of learning analytics and constituted a pioneering experience in digital education within the public administration. At the end of each of the 18 courses, qualitative surveys were administered to gather feedback on the learning experience, addressing aspects such as objective clarity, usefulness of acquired skills, duration, satisfaction, teaching methodologies, and technical aspects of the learning experience. The survey results showed high user satisfaction regarding the overall experience offered by the MOOCs.
Specifically:
- Over 60% of the feedback received rated the experience with scores 5 and 6 on a scale from 0 to 6;
- The completion rate for selected courses ranged from 80% to 90%, in contrast with existing studies which indicate that drop-out rates in MOOCs are usually significantly high, even among paying users (Borrella, 2019);
- The proportionate number of users enrolled in hard skills courses and those in soft skills courses demonstrates the suitability of MOOCs as a tool for the transmission of diverse forms of knowledge.

It should be noted that the courses examined in this research were also delivered in the "classic" MOOC format, belonging to the Federica PRO cluster and intended for open-access professional training available to anyone. These courses were offered not only to individuals already employed but also to university students and recent graduates. Therefore, a significant aspect of the analysis lies in comparing the analytics provided by users in the open-access mode, characterized by diverse ages and educational needs, with those from project participants. This comparison highlights the flexibility of

the training offering delivered through MOOCs and their potential in imparting skills to learners with different educational needs and motivational factors.

In conclusion, the results achieved within the "Regione in Formazione" project confirm the suitability of MOOC-based training programs in meeting the didactic, organizational, and utilization needs characterizing professional training.

Bibliography

REDA V. (2020), *Generazione Greta*, in Didattica Digitale - Chi, Come e Perché, p. 143, Salerno Editrice
DE NOTARIS D. - PASSARELLI L. (2020), *La cassetta degli attrezzi,* in Didattica Digitale - Chi, Come e Perché, p. 81, Salerno Editrice.
MUSELLA F. (2022), *Digital Regulations: come si cambia la Pubblica amministrazione*, in Rivista di Digital Politics - Amministrazione 5.0, n. 1-2/2022, p. 21, Il Mulino.
DE NOTARIS D. - MELCHIONNA T. (2020), *La manifattura digitale*, in Didattica Digitale - Chi, Come e Perché, Salerno Editrice.
CALISE M. (2020), *L'università ibrida*, in Didattica Digitale - Chi, Come e Perché, p. 21, Salerno Editrice.
CALISE M. - REDA V. (2021), Governare l'e-learning, in Rivista di Digital Politics - Didattica Online, n. 3/2021, p. 415, Il Mulino.
BORRELLA I., Ponce-Cueto E., Caballero S., (2019), *Predict and Intervene: Addressing the dropout problem in a Mooc-based program*, L@S '19, June 24–25, 2019, Chicago, IL, USA.

Games and video games as scenarios to support digital literacies: the first results from the international project YO-MEDIA (Youngsters' Media Literacy in times of Crisis)

Alessandra CARENZIO [1], Simona FERRARI[1], Stefano PASTA[1]

[1] Università Cattolica del Sacro Cuore, Milano (ITALY)

Keywords: media literacy, crisis, video games, games, emergency

The younger generation is facing many changes and challenges related to political, military, and pandemic crisis that have gained prominence in the media: in this perspective Media Literacy and critical thinking are very crucial to handle information and false contents. The reason for choosing this target owes to the observation that youngsters often scroll news content in their mobile devices without giving too much thought, consuming news content exclusively through social media without journalistic filter (Herdzina & Lauricella, 2020). This period is crucial for developing critical thinking, which allows youngsters to develop the ability to think for themselves, make decisions and evaluate consequences. Considering these premises, the project YO-MEDIA - Youngsters' Media Literacy in times of Crisis (funded by the the European Media and Information Fund established by the European University Institute and the Calouste Gulbenkian Foundation) is working on this topic through the design and development of a hybrid game on misinformation/disinformation, information literacy and crisis communication. YO-MEDIA is divided in three phases: map the use of media design and information literacy in times of crisis; development and validation of a hybrid game and a MOOC for media awareness; assessment of the feasibility of the strategies adopted. The research team is using mixed methods to combine quantitative and qualitative methods, approaches, or research concepts in a single study, improving the validity and reliability of the results and enriching the understanding of the phenomena studied (Cameron & Sankaran, 2015).

The contribution will focus on the first results from the literature analysis, drawing on a selection of data from the 46 scientifical papers produced by scholars from 2019 to 2023 in games and video games in times of crisis, and the interview conducted with teachers, educators, journalists with background on media studies, games, and crisis management (N.10 in Italy). In particular the main questions are: in what way can game-playing foster youngsters' media literacy in times of crisis? From what perspective are video games considered thinking about crisis situations such as war, climate and health emergencies? Are there experiences that can be considered as good practices?

To deal with these two questions we decided to tick the main connections between the point of view of scholars and researchers - expressed in papers and scientific contributions from the literature analysis - and the perspective of teachers, educators and journalists interviewed. The main connections refer to: 1) the new role attributed to gaming and video games especially, after the experiences lived during the pandemic in terms of personal well being and social connection. As pointed out in an Editorial by Willy C. Kriz, very rich in references and ideas, «the World Health Organization (WHO) have changed their attitude toward online gaming, from warning of its dangerous and addictive character to praising its positive impact on socializing and coping with stress. In 2019 the WHO called game addiction a sign of mental disorder, and warned people against

developing game addiction. However, in this year, 2020, the WHO appealed to people to stay home and play games. In a joint effort, the global games industry agreed to disseminate key messages from the WHO to support awareness and to slow the spread of COVID-19» (Kriz, 2020); 2) the importance of games in promoting young people's media literacy as objects of analysis (many educators worked on video games to disassemble them and see what's inside, for example building a character or an avatar) and games and video games as a tool to work on other topics (history, sociology, religion etc.); 3) the main features of games and video games to promote a more critical and active engagement thanks to the narrative approach (they are a form of storytelling, they tell a story and this supports young people's learning, motivation and engagement), the mechanism of identification with a story or a person/character, the interaction allowed combined with the possibility to fail, the need to develop a strategy useful also "ouside the game" to learn how to deal with emergencies and decision making. Games and video games, then, are an engaging tool and they encourage active participation of the audience, allowing a better understanding on important issues (such as the crisis preparedness, monitoring, and control) and helping to anticipate potential consequences in given parameters (for example in emerging risk identification).

The cross-referencing of data from literature analysis and qualitative interviews seems to reveal a renewed need for collaboration between young people, teachers, educators, experts and game developers: especially dealing with social messages or social issues, they have to be very well integrated and blended with video games mechanisms, so that it would be very difficult to really separate or isolate the components (social messages and playing).

Bibliography

Andersen, E.S. (2010). Are We Getting Any Better? Comparing Project Management in the Years 2000 and 2008. *Project Management Journal*, *41*(4), 4–16.

Carenzio, A., Ferrari S., Rivoltella P. C. (2021). *A Media Diet Today: A Framework and Tool to Question Media Uses*, in Ruokamo H., Kangas M. (Eds.), *Media Education at the top*, UK: Cambridge Scholars Publishing.

Cauberghe, V., Van Wesenbeeck, I., De Jans, S., Hudders, L., & Ponnet, K. (2021). HowAdolescents Use Social Media to Cope with Feelings of Loneliness and Anxiety duringCOVID-19 Lockdown. *Cyberpsychology, Behavior, and Social Networking*, 24(4), 250–257.

Gee, J. P. (2013). *Come un videogioco. Insegnare e apprendere nella scuola digitale*. Milano: Cortina.

Kitz, W. C. (2020). Gaming in the time of COVID-19, *Simulation & Gaming 2020*, Vol. 51(4) 403–410.

Lauricella, A. R., Herdzina, J. (2020). Early childhood educators' teaching of digital citizenship competencies, *Computers & Education,* Volume 158, 2020.

Marston, H.R., Kowert, R. (2020). What role can videogames play in the COVID-19 pandemic? *Emerald Open Research*, 2: 34.

Nilsson, A., Rosendahl, I., & Jayaram-Lindström, N. (2022). Gaming and social media useamong adolescents in the midst of the COVID-19 pandemic. *NAD Nordic Studies onAlcohol and Drugs*.

Ohannes, N., Vuorre, M., & Przybylski, A. K. (2021). Video game play is positivelycorrelated with well-being. *Royal Society Open Science*, 8(2).

Rivoltella, P.C. (2020). *Nuovi alfabeti. Educazione e culture nella società post-mediale*. Brescia: Scholé.

MOOCs as part of a three-pronged approach to university orientation

Ilaria MERCIAI[1],

[1] *Federica Web Learning Centre, University of Naples Federico II, Naples (ITALY)*

Abstract

In the context of a global knowledge society and an increasing need for a highly-skilled graduate workforce, there is renewed concern about low overall graduate numbers in Italy, especially in STEM, as well as high drop-out rates from degree courses. The institutions are responding with various initiatives and Federica Web Learning, the Centre for innovation in digital education at the University of Naples Federico II, has adopted a 3-pronged, MOOC-based approach to orientation to prepare school-leavers for university, professional life, or a combination of both. This abstract presents a new experiment in MOOC design and delivery which places much greater emphasis on the third aspect of orientation: personal development, self-knowledge and empowerment.

.

Keywords: MOOCs, university entrance, orientation; hybrid learning; self-knowledge

Within the context of a growing need for a differently, and highly, skilled workforce for today's digital knowledge society, the importance of a university education is considered of strategic benefit on a national and personal level. In recognition of this, in recent years, there has been close monitoring on the part of European Institutions and member states regarding overall numbers of graduates and choice of discipline. Another measure that is considered highly significant - in terms of human as well as economic costs - is student drop-out rates and numbers of students changing university degree programs after one or two years of study. In Italy, figures are still relatively high on both these counts compared to other similar European member states as the official figures (OECD, Eurostat) report. And, at the national level, there has been growing public interest in this issue as is evidenced by the high number of recent articles in the national press. In May 2023, for example, the national newspaper La Repubblica reported Record numbers of University dropouts after Freshman year referring to Ministry of Education data that put the dropout rate of university studies after the first year at 7.3%, in 2021-2022. In the light of these figures, European and national initiatives, including the updated DEAP, Digital Education Action Plan (2021-2027), and Italian Ministerial recommendations, promote consolidated orientation strategies to address the issue, and guide students more effectively in difficult choices regarding future work or study, and offer better support for the difficult transition from school to university, also considering personal factors like aptitude, motivation and maturity. It is in this context that Federica Web Learning, the Centre for innovation in digital education at the University of Naples Federico II, has adopted a 3-pronged, MOOC-based approach to orientation to prepare school-leavers for university, professional life, or a combination of both. The Federica Web Learning approach is designed to address the three main issues facing school-leavers: choice of degree subject and institution; preparation for university entrance exams; and last but not least, self-awareness enhancement and psychological support to help them adapt to change as they shape their future. The first prong in the Federica approach is to provide insight into degree content, didactic approach and possible career outcomes for specific degree programs, via its MOOC catalogue of curricular courses authored by university professors in a wide range of disciplinary areas. The second prong, realized in partnership with CISIA (Consortium Interuniversity for Integrated Access Systems), is aimed at improving baseline knowledge and providing preparatory courses in key areas, specifically mentioned by the Ministry of Education, where weaknesses have been identified, to support students in preparing for university entrance and study, or indeed through first-year university exams. This prong is particularly devoted to boost interaction between schools and universities to improve levels of college readiness on the part of school-leavers.

Subjects identified include basic Maths, Chemistry, Physics, Language competencies and Biology. In terms of the third prong, this paper also presents a new experiment in MOOC design and delivery which places much greater emphasis on the third aspect of orientation: personal development, self-knowledge and empowerment. The experiment has consisted in using the experience and empathy gained through long-term research and analysis to develop 2 courses that offer strategies and tools to help students manage their time, passions and work, and learn how to construct a matrix for their own priorities and aspirations. The courses aim to respond to school-leavers' real needs within the context of the school classroom by providing parallel pathways for students and teachers alike. The courses are interactive and engaging, highly visual with enhanced video content, and are designed to be used in self-learning. However, they are also designed to include high-school teachers as multipliers, using the courses as part of a hybrid learning project, through a structured hybrid delivery mode. Teachers are provided with a series of worksheets and downloadable materials for engaging their students in the online content and in flipped classroom mode. The instructional design includes a variety of reflection, interaction and groupwork exercises focusing on self-expression, self-awareness, motivation and autonomous decision-making. The complete offering is available for free on the Federica Web Learning platform at https://www.federica.eu/orientamento/.

Acknowledgements

References

European Union. (2020). *Digital Education Action Plan (2021-2027)*. Retrieved from January 13, 2020, https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en.

Eurostat. (2018). *Back Work beats study for 25% of university drop-outs*. Retrieved from https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180404-1.

Eurostat. (2023). *Early leavers from education and training*. Retrieved from May 30, 2023 https://ec.europa.eu/eurostat/statisticsexplained/ index.php?title=Early_leavers_from_education_and_training.

Ferreira, J. (2018). *Facilitating the transition: Doing more than bridging the gap between school and university geography*. Journal of Geography in Higher Education, 42(3), 372-383, 1-3 https://doi.org/10.1080/03098265.2018.1437397.

Merciai I., Kerr R. (2021). *MOOCs as a tool for virtual university orientation*, in "Education and New Developments", Mafalda Carmo, World Institute for Advanced Research and Science (WIARS) ISBN: 978-989-54815-8-3.

Merciai I., Kerr R., Melchionna G. (2021) *MOOCs for bridging the school - university gap*, Chapter in "Education and New Developments VI", Mafalda Carmo, World Institute for Advanced Research and Science (WIARS), ISBN 978-989-54815-2-1, 185-195.

Merciai I., Melchionna G. (2020). *Quando il Mooc aiuta a gestire l'orientamento* in "Smart education" I libri del Sole 24 Ore, code: 9771973564394, pp. 50-52.

Merciai I., Kerr R. (2019). *MOOCs as a Key Strategy for University Orientation* in Education and New Developments 2019, ISSN: 2184-044X ISBN: 978-989-54312-5-0 2019, 286-90.

OECD. (2023). Education at a Glance. Retrieved May 30, 2023 from https://www.oecd.org/education/education-at-a-glance.

Reda V. (2020). *Generazione Greta*. In De Notaris D., Melchionna G., Reda V. (a cura di).

(2020) Didattica digitale. Chi, come e perché. Salerno editore. ISBN: 8869735354, 136.

La Repubblica. (2023). *Record di abbandoni universitari dopo il primo anno*.

GDBL ID: an instructional model for the design of game-based learning scenarios

Andrea TINTERRI[1,2], Massimiliano ANDREOLETTI[3]

[1] Università Telematica degli Studi IUL, Via M. Buonarroti 10 - 50122 Firenze (ITALY)

[2] Università degli Studi di Modena e Reggio Emilia, Viale A. Allegri 9, 42121 Reggio Emilia (ITALY)

[2] Università Cattolica del Sacro Cuore, Largo A. Gemelli 1, 20123 Milano (ITALY)

Abstract

Gaming is ever more relevant in our society and noted for its potential in promoting meaningful learning. However, games are still seldom employed in school and higher education. This paper presents a new instructional model to design game-based learning activities, focusing on the different and overlapping roles that games, considered as a medium, can play in teaching and learning scenarios.

Keywords: Game-based learning; game design; instructional design; media education; constructivism

We live in a society of gamers: gaming, both analog and digital, is ever more popular for older and younger generations alike (IIDEA-Censis, 2021). Concurrently, the last few years have shown a rising interest in using games in education. Games, both digital and traditional (such as boardgames) have the potential not only to engage and motivate students, but also to promote the acquisition of relevant knowledge, skills, and attitudes, as several empirical studies reported (Bayeck, 2020; Plass et al., 2020; Abdul Jabbar and Felicia, 2015). However, actual use of games in Italian schools and higher education settings is still very limited (Allsop & Jessel, 2015; Loperfido, Dipace & Scarinci, 2019) and directed toward a function of pure entertainment or exercise (Nicholson, 2011) rather than as a complete learning environment. The reasons for this discrepancy are, at least in part, due to resistance by teachers to include games in their teaching and learning practice. Persico et al. (2019) report that teachers' competence in the design of GBL activities is superficial and restricted to personal experience; furthermore, teachers report not feeling adequately prepared to include games in the curriculum (Allsop et al., 2013; Takeuchi, Vaala, 2014), fearing the burden in terms of preparation time (Nieland et al., 2021) and finding difficulties in finding games that are aligned with learning goals (Molin, 2017). One way to address these problems is to provide an integrate model to guide the design of game-based teaching and learning activities considering both instructional guidance as well as the need to progressively develop critical game literacy required to design and personalize game-based learning activities.

The goal of this intervention is to present a new model, called *Game Design-Based Learning ID* (GDBL ID, Figure 1), that is aimed at:

- Reducing the terminological confusion in the use of games for educational activities; terms such as playful learning, gamification, and game-based learning (and even, sometimes, coding) are used almost interchangeably, whereas they refer to different approaches that require, in turn, different skills and instructional strategies.

- Providing a step-by-step instructional guide starting from the definition of learning goals, assessment and evaluation criteria to the choice and personalization of the gaming experience, passing through the constructive alignment of learning and gaming goals.
- Defining a set of scenarios (Table 1) for using games as a medium to promote meaningful learning, be it as a tool to promote different types of knowledge (factual, conceptual, procedural, or strategic) (learning *with* games), as an object, or text, to be interpreted and critically analysed (learning *of* games) or as a language that is used to solve problems or design challenges (learning *through* games).

Media education approach	ID	Name of the Scenario: Games as	Description: Student play to
Any	01	Self-espression	Have fun
Teaching with games	02	Systems of content	Learn disciplinary content
	03	Manipulation of systems	Explore and test non-linear systems
	04	Reflection prompts	Start a reflection on a specific topic
	05	Gateways of technologies	Learn a specific technology
	06	Self-reflection prompt	Reflect on own's behaviours and habits
	07	Exploration of points of view	Explore identities and perspectives
	08	Exercise	Consolidate knowledge/skills
	09	Socialization	Meet, communicate, share an experience
	10	Assessment	Assess specific learning goals
Teaching of games	11	Texts	Critically "read" and interpret games as artifacts that express values, beliefs, and ideologies.
Teaching through games	12	Systems of mechanics	Learn how to write or code
	13	Documentary	Document one's understanding and ideas
	14	Creation engines	Create new media (games, mods, videos...)
	15	Design challenges	Design games as research/problem solving activity

Table 1. Scenarios of game-based learning (Adapted from Andreoletti and Tinterri, 2023).

In addition to defining scenarios, the GDBL ID model has four defining features that help set it apart from existing instructional frameworks upon which the model iterates and improves:

1- It is based on established pedagogical frameworks: the Technological Pedagogical and Content Knowledge (TPaCK), the Play Curricular Reflection Discussion (PCaRD), and the *Inquiry, Communication, Construction and Expression* (ICCE).
2- It integrates current best evidence from game studies, pedagogy, and cognitive science perspectives to game-based learning.
3- It focuses on the different roles played by teachers in designing and applying game-based activities.
4- It focuses on the personalization of the game and learning experience, through both in-game and out-game changes to make help constructive alignment and promote accessibility.

References

Abdul Jabbar, A. I., & Felicia, P. (2015). Gameplay engagement and learning in game-based learning: A systematic review. *Review of educational research*, *85*(4), 740-779.

Allsop, Y., Yildirim, E. Y., & Screpanti, M. (2013, October). Teachers' beliefs about game based learning: A comparative study of pedagogy, curriculum and practice in Italy, Turkey and the UK. In *Proceedings of the 7th European Conference on Games-Based Learning* (Vol. 1, pp. 1-10).

Andreoletti, M. & Tinterri, A. (2023). *Apprendere con I giochi. Esperienze di progettazione ludica.* Roma: Carocci.

Allsop, Y., & Jessel, J. (2015). Teachers' Experience and Reflections on Game-Based Learning in the Primary Classroom: Views from England and Italy. *International Journal of Game-Based Learning*, 5(1), 1–17. https://doi.org/10.4018/ijgbl.2015010101

Bayeck, R. Y. (2020). Examining Board Gameplay and Learning: A Multidisciplinary Review of Recent Research. https://doi.org/10.25384/SAGE.c.4943763

IIDEA-CENSIS (2021). Il valore economico e sociale dei videogiochi in Italia. Primo Rapporto IIDEA-CENSIS. https://iideassociation.com/kdocs/2021649/rapporto_iidea-censis_il_valore_economico_e_sociale_dei_videogiochi_in_italia_versione_integrale_dig

Loperfido, F. F., Dipace, A., & Scarinci, A. (2019). TO PLAY OR NOT TO PLAY? A CASE STUDY OF TEACHERS' CONFIDENCE AND PERCEPTION WITH REGARD TO DIGITAL GAMES AT SCHOOL. *Italian Journal of Educational Technology*, 27(2). https://doi.org/10.17471/2499-4324/1062

Molin, G. (2017). The Role of the Teacher in Game-Based Learning: A Review and Outlook. In M. Ma & A. Oikonomou (A c. Di), *Serious Games and Edutainment Applications: Volume II* (pp. 649–674). Springer International Publishing. https://doi.org/10.1007/978-3-319-51645-5_28

Nieland, T., Fehrenbach, A., Marowsky, M., & Burfeind, M. (2021). The Teacher-Centered Perspective on Digital Game-Based Learning. In C. Aprea & D. Ifenthaler (A c. Di), *Game-based Learning Across the Disciplines* (pp. 341–362). Springer International Publishing. https://doi.org/10.1007/978-3-030-75142-5_15

Takeuchi, L. M., & Vaala, S. (2014). Level up Learning: A National Survey on Teaching with Digital Games. In *Joan Ganz Cooney Center at Sesame Workshop*. Joan Ganz Cooney Center at Sesame Workshop. 1900 Broadway, New York, NY 10023.

Persico, D., Passarelli, M., Pozzi, F., Earp, J., Dagnino, F., & Manganello, F. (2019). Meeting players where they are: Digital games and learning ecologies. *British Journal of Educational Technology*, 50. https://doi.org/10.1111/bjet.12777

Plass, J. L., Mayer, R. E., & Homer, B. D. (A c. Di). (2020). *Handbook of Game-Based Learning*. MIT Press.

Trends in the use of multivariate analysis in educational research: a review of methods and applications in 2018-2022

Annamaria DE SANTIS[1], Katia SANNICANDRO[1],
Claudia BELLINI[1], Tommaso MINERVA[1]

[1] *University of Modena and Reggio Emilia, Reggio Emilia (ITALY)*

Our society can be labeled a "data society" or "big data society" due to the considerable volume of data we produce daily, mainly through digital devices.

In disciplines such as information philosophy and knowledge management, in the well-known DIKW pyramid (also called "information hierarchy", "knowledge hierarchy", or "wisdom hierarchy"), data are defined as symbols, objective observations, basic elements that have no meaning or value until processed. Procedures of classification, selection, sorting, and calculation allow us to transform data into information with meaning and significance; the combination of information, experiences, human understandings, skills, and values generates knowledge (Ackoff, 1989; Rowley, 2007).

Turning data into useful information and knowledge requires operations of analysis and interpretation that necessitate an interdisciplinary set of skills, rigorous practices, and proper tools.

A large amount of data is also stored in platforms and contexts related to the educational sector.

Digital learning environments host large numbers of learners. Methods of online interaction are increasingly sophisticated. Accurate tracking systems indicate when and how people browse online environments. Online surveys or assessments, digital tools, and robots are easy-to-use mechanisms in the digital world to produce and collect data. Training entities and companies store (sometimes *open*) data on the management and monitoring of their system.

These data produced in the education field can represent an interesting resource for research to give an understanding of how learning and education systems work and how to enhance the teaching process and training entities' management.

Computing and interpreting processes and skills must be put in place to transform data into useful information and knowledge.

Multivariate analysis is one of the statistical solutions we can use for this purpose. Operating simultaneously on many variables and data, which is important in complex educational inquiry scenarios (Ary et al., 2010), the methods of multivariate analysis allow us to develop classifications (i.e., cluster analysis) and models (i.e., regressions) and reduce dimensionality (i.e., factorial analysis) by returning data-driven understandings of educational phenomena (Bartholomew et al., 2008; Hair et al., 2014; de Lillo et al., 2007; De Santis, 2022).

How does the international educational research community make use of multivariate analysis techniques?

In recent studies, researchers used multivariate analysis to investigate teachers' training and skills, students' opinions and assessments, efficacy of teaching methods, educational poverties, and organization of training institutions.

For example, starting from the hypothesis that the improvement of digital skills of the teachers influences the acquisition of digital skills of the pupils, García-Vandewalle and colleagues (2023) describe the level of digital skills in future teachers in early childhood education, in primary and secondary education through the results of a survey analyzed using descriptive statistics, factorial analysis, and multivariate linear regression. Moving to students, Sointu and colleagues (2023) discuss the factors that, according to the university students, can create a successful flipped course distinguishing pedagogical, social, and technological dimensions. They applied an exploratory factorial analysis to verify the validity of a survey administered, and a structural equation model is built for predicting the students' satisfaction. On the management of training organizations, Mordhorst & Jenert

(2023) investigate the structural and pedagogical features of dual study programs that integrate academic and vocational learning in the German higher education system, identifying different organizational and curricular integration combinations through a cluster analysis.

Our study aims to identify trends in the application of multivariate analysis methods over the past five years.
We have conducted a review of research that utilized these techniques. We described the kind of studies, data, and methods together with the themes and contexts to which the studies are referred.
The review covers five years between 2018-2022 and consists of two phases.
In the first one, we conducted a more general investigation by inserting the term "multivariate analysis" in the search string. In the second phase, aware that multivariate analysis includes numerous techniques, we refined our search based on the results of the first phase adding the most popular multivariate analysis techniques in the strings.
We extracted only the paper written in English, archived in the Scopus database, and published in journals in the category Education. Our review included bibliometrics such as years of publications, leading journals, most cited articles, and authors.
We used RStudio and Vosviewer to perform the analysis and represent the results.

By investigating the most recent scientific literature, we can gain awareness of how multivariate analysis techniques are being used in educational research, the topics for which the use of such techniques is well established, and the fields in which further actions need to be adopted.

References

Ackoff, R. L. (1989). From data to wisdom. *Journal of applied systems analysis*, *16*(1), 3-9.

Ary, D., Jacobs, L.C., Irvine, C.K.S., & Walker, D. (2010). *Introduction to Research in Education* (8th ed.). Belmont (CA): Wadsworth Cengage Learning.

Bartholomew, D.J., Steele, F., Moustaki, I., & Galbraith, J.I. (2008). *Analysis of multivariate social science data* (2nd ed.). Boca Raton (FL): CRC press, Taylor & Francis Group.

de Lillo, A., Argentin, G., Lucchini, M., Sarti, S., & Terraneo, M. (2007). *Analisi multivariata per le scienze sociali*. Milano: Pearson Education.

De Santis, A. (2022). *Analisi multivariata e learning analytics. Metodi e applicazioni*. Milano: Pearson.

García-Vandewalle García, J. M., García-Carmona, M., Trujillo Torres, J. M., & Moya Fernández, P. (2021). Analysis of digital competence of educators (DigCompEdu) in teacher trainees: the context of Melilla, Spain. *Technology, Knowledge and Learning*, 1-28.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., & Tatham, R.L. (2014). *Multivariate data analysis* (7th ed.). Edinburgh Gate, Harlow, Essex (GB): Pearson.

Mordhorst, L., & Jenert, T. (2023). Curricular integration of academic and vocational education: a theory-based empirical typology of dual study programmes in Germany. *Higher Education*, *85*, 1257-1279.

Rowley, J. (2007). The wisdom hierarchy: representations of the DIKW hierarchy. *Journal of information science*, *33*(2), 163-180.

Sointu, E., Hyypiä, M., Lambert, M. C., Hirsto, L., Saarelainen, M., & Valtonen, T. (2023). Preliminary evidence of key factors in successful flipping: Predicting positive student experiences in flipped classrooms. *Higher Education*, *85*(3), 503-520.

"Good digital school": avoiding the health risks and threats to physical and psychological well-being arising from the use of digital technologies

Giovanni ADORNI1, Giulia CARMECI2 , Angela Maria SUGLIANO2

[1] University of Genoa (Italy)

[2] Associazione EPICT Italia (Italy)

Abstract

This contribution focuses attention on a paradox: on the one hand, it states that students must be trained in awareness of the risks of excessive use of digital technology - Competence 4.3 of the DigComp 2.2 framework "Protecting health and well-being" - and on the other hand, the use of digital in teaching is strongly supported as evidenced by the Italian School Plan 4.0 (2022), in accordance with the European Action Plan for Digital Education 2021-2027 (European Commission, 2021).

The issue was raised by the students themselves interviewed during a research carried out by Generazioni Connesse the Italian Safer Internet Center in 2023: among the main topics that students would like to be covered during the Digital Education hours, there is the theme "how to avoid spending too much time online".

It's clear the need for careful reflection on how to balance the benefits of school digitization with the potential disadvantages for the health of students.

With the aim of providing teachers with concrete advice and resources to resolve the paradox, we have analyzed the definition and examples of the 4.3 competence in the DigComp 2.2 framework; then the questions of the most widespread digital skills assessment/self-assessment tools based on the DigComp 2.2 framework; then we searched for resources useful for training on competence 4.3 topics; finally, we have identified training models to support a concrete balance between digital and non-digital in teaching.

The model is under construction and will be used in the training of the PNRR Project "C-KIDD: a Community and a Kit Innovative for Digital Education", starting in June 2023.

Keywords: DigComp 2.2, health and well-being, assessment tools

Extended abstract

The purpose of this paper is to focus attention on an apparent paradox of the current "digital age": on the one hand, students are urged to be trained in awareness of the risks of excessive digital use - Competency 4.3 of the DigComp 2.2 framework "Protecting health and well-being" - and on the other hand, digital use is proposed as an innovation of both during time spent at School and during study time at home, which adds up to the time students usually already spend with digital devices .

Indeed, the current substantial funding for the School 4.0 Plan (2022) - in accordance with the European Digital Education Action Plan 2021-2027 (European Commission, 2021) - includes both the creation of increasingly digitally oriented school environments and the European DigComp 2.2 framework (Vuorikari et al., 2022) as a reference for training students' basic digital skills.

All of this makes clear the need for careful reflection on how to balance the benefits of school digitization with the potential disadvantages for the health of students, who already spend a

large part of their daily time using digital devices for leisure or digital citizenship activities (booking, searching for information, ...).

The issue was raised by the students themselves interviewed during the annual research conducted by Skuola.net, UniFirenze and La Sapienza, on behalf of Generazioni Connesse - the Italian Safer Internet Centre - and presented on the occasion of Safer Internet Day 2023 (2023): among the main topics that students would like to be treated with greater attention in class, during Digital Education hours, was the theme "how to avoid spending too much time online". The research highlighted how, despite the previous years 2022 and 2021, still a large percentage of teenagers - 47% of respondents - are connected to the Internet for more than 5 hours a day. According to the report, male and female students of the sample analyzed, use the time spent online mainly for search for current information, maintaining relationships with others through social networks, following influencers and creators, buying products online, and creating personal digital content.

To the above data must be added the hours spent on digital devices for educational purposes.

This contribution illustrates 1) a method for carrying out a path of critical reflection with the teachers of the School and 2) concrete activities to be carried out with the students for an optimal balance of use of digital in the students' "daily diet": the goal is to define a model of pedagogical practice to educate students to the completeness of digital competence, person being at the center in the digital world.

The steps followed to achieve the goal are as follows:

- analysis of the definition of the 4.3 competence "Protecting health and well-being" as defined in the DigComp 2.2 framework, considering the examples of knowledge, skills and attitudes, and the use cases;

- analysis of the questions of the most popular digital competence assessment/self-assessment tools based on the DigComp 2.2 framework: Europass CV Online, MyDigiSkills, Pix, DCDS, Task, Benessere digitale, and the DigCompQ-S tool, developed within a research project of the PhD in Digital Humanities of the University of Genoa (Sugliano & Carmeci, 2021);

- identification of the most appropriate educational contents to train students' knowledge, skills and attitudes towards the full 4.3 competence;

- search for contents for training on the topics of the 4.3 competence, addressed to students, on three levels of school (primary school, lower and upper secondary school);

- definition of training models that support a concrete balance between digital and non-digital in teaching.

The model is under construction and will be used in the training of the PNRR Project "C-KIDD: a Community and a Kit Innovative for Digital Education", starting from June 2023.

References

Vuorikari, R., Kluzer, S. and Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens*, EUR 31006 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-48882-8, doi:10.2760/115376, JRC128415.

MIUR. (2022). Piano Scuola 4.0
https://www.miur.gov.it/documents/20182/6735034/PIANO_SCUOLA_4.0.pdf/

European Commission (2021): Digital Education Action Plan 2021-2027.
https://education.ec.europa.eu/focus-topics/digital-education/action-plan

Generazioni Connesse (2023). Access 20-05-2023. Retrieved from:
https://www.generazioniconnesse.it/site/it/2023/02/08/il-30-dei-giovani-passa-pi-di-5-ore-online-la-ricerca-2023-/

Europass CV Online. Access 20-05-2023. Retrieved from: https://europa.eu/europass/en

MyDigiSkills. Accessed 20-05-2023. Retrieved from https://mydigiskills.eu/

Pix: online platform for digital skills evaluation and certification. Accessed 20-05-2023. Retrieved from https://pix.org/

C-KIDD Project. A Community and an Innovative Kit for Digital Education.
https://www.liceogiorgione.edu.it/ pnrr-c-kidd/

DCDS Digital Competences Development System. Accessed 20-05-2023. Retrieved from
http://www.dcds-project.eu/

TASK Project. Accessed 20-05-2023. Retrieved from http://www.taskeuproject.com/

Sugliano, A. M. & Carmeci, G. (2021). A tool for digital competence diagnostic assessment based on DIGCOMP 2.1. In ICERI2021 Proceedings (pp. 6023-6032). IATED.

Fake News Busters: Empowering Primary School Students to Detect Disinformation, Misinformation, and Malinformation

Giulia GARAU[1], Daniele AGOSTINI[2]

[1] *University of Padua, Padua (ITALY)*

[2] *University of Trento, Trento (ITALY)*

Extended Abstract

In recent years, the problem of the "Fake news" have been raised incrementally, although the idea is no news, it have gained momentum and attracted attention thanks to the Internet and especially the social networks. Events like the presidential elections of 2016 in USA, Brexit and the Covid19 pandemic have highlighted the humongous dimension and impact of the phenomenon.

"Fake news" is a broad term encompassing a spectrum of intentional or unintentional distortion of facts, that can be classified in three types: dis-information, mis-information, and mal-information. Dis-information occurs when wholly or partially false information is intentionally spread for economic, political, or personal reasons. Mis-information happens when distorted or fake information is believed to be true and shared, while Mal-information occurs when real facts are shared with the intention to harm a person or organization (Wardle & Derakhshan, 2017). Sometimes even "false news", news that are completely invented for recreational reasons, are erroneously categorised under the "fake news" umbrella. Those are complex phenomenons that could constitute a threat to individual rights and the functioning of democratic institutions. The conditions for them to spread are mainly three: individual cognitive construction, social loss of trust in institutions, and geopolitical conflicts between different groups (Fontana, 2018).

This is why it is important to educate students, starting from primary school, to be aware of the fake news, and to equip them with information literacy and competences of detection and critical thinking.

For this purpose an experimental educational intervention was designed. The intervention took place in two primary school in classes in Padua, Italy, involving 41 students and comprised four sessions. The first session aimed to give an overview of fake news, while the second tackled the different types of fake news and their impacts. In the third session, the children were taught how to recognize and counter fake news, and in the fourth session, they acted as fact-checkers. The intervention was designed to align with the National Curriculum Guidelines (MIUR, 2012) and involved different strategies to engage students with and without digital devices.

The teaching approach includes lectures and active learning, as well as discussions and hands-on experiences. The activities included:
- Interactive lessons
- Cooperative learning (e.g. work in groups, each with a leader who communicated the group's answers to a Kahoot quiz)
- Creation of a personalized guidebook containing 10 rules for identifying fake news.

- Authentic tasks: fact-check news stories using the skills they had learned.

In order to assess the intervention effectiveness an array of tools have been employed: survey of the students' access to digital devices and social media, pre- and post-test questionnaires, a Kahoot game, an authentic task, and a rubric for evaluation. Participant observation of the students was also employed (including their interactions with one another to evaluate their subjective experience and behavior), as well as formative assessment of their knowledge and skills.

The results showed an overall increase in awareness and understanding of fake news among the students, with most demonstrating an improved ability to identify false or misleading information. The study also highlighted the importance of teaching students to read critically, consult multiple sources, and think carefully before sharing information online.

The results of the experimentation shows that most of the fifth-grade primary school students in the classes have access to personal digital devices (74% of one class and 50% of the other) and many of them use social media (58% of one class and 45% of the other).
In this context it is paramount to teach critical thinking and information literacy skills. The data gathered suggest that it helps to combat the spread of fake news indeed. At the end of the interventions both classes showed a significant increase both in the general awareness about the the phenomenon and in correctly classifying news stories:
- The awareness about the complexity of the Fake News phenomenon raises for the initial 2% to the 83%.
- In one class, the ability to correctly detect fake news reached on average the 89% from an initial 65%; in the other class it reached the 85% from an initial 63%.

In general, students of both the classes improved their skills to think critically, search for information, recognize fake news, and participate in activities. The study found that most children achieved intermediate or advanced levels in each of these areas, demonstrating their ability to think critically, search for information, and recognize different types of fake news. Additionally, the study found that the children demonstrated curiosity and provided suitable contributions to activities.

Future study will be directed at extending the experimentation and evaluating its effectiveness in different school contexts and grades.

References

Fontana, A. (2018). *Fake news: sicuri che sia falso? Gestire disinformazione, false notizie e conoscenza deformata*. Milano: Hoepli Editore.

Ministero dell'Istruzione, dell'Università e della Ricerca. (2012). *Indicazioni nazionali per il curricolo della scuola dell'infanzia e del primo ciclo d'istruzione*. Italia. URL: https://www.miur.gov.it/documents/20182/51310/DM+254_2012.pdf

Wardle, C., & Derakhshan, H. (2017). *Information Disorder: Toward an interdisciplinary framework for research and policymaking*. From Council of Europe: https://edoc.coe.int/en/media/7495-information-disorder-toward-an-interdisciplinary-framework-for-research-and-policy-making.html

Academic integrity in online assessment:
a proposal for guidelines

Katia SANNICANDRO[1], Annamaria DE SANTIS[1],
Claudia BELLINI[1], Tommaso MINERVA[1]

[1] *University of Modena and Reggio Emilia, Reggio Emilia (ITALY)*

In recent years - accomplice to the COVID-19 emergency - the utilization of digital environments, APPs, and tools for assessment in the university context and in online learning has grown significantly (Sannicandro, in press). The expression "online assessment of learning" relates "to the use of digital tools to assess or measuring learning outcomes, both face-to-face and in distance-learning environments" (Bartley, 2005, p. 6). In the different contexts of online learning, assessment "is created, written, delivered and marked with technology, usually a specialist assessment platform" (Gibson, n.d., p. 1). Digital resources enable the implementation of assessment testing that can be conducted both in the presence (e.g., at labs, classrooms etc.) and at a distance. Monitoring tools, such as e-proctoring systems (particularly for summative assessment), can be used in both cases.

The different technology solutions *alone*, however, cannot guarantee the creation of a "*safe*" assessment environment, capable of ensuring academic integrity and the quality of the assessment process. Among the main needs emphasized by instructors in the context of online assessments, we find both the need to avoid plagiarism by learners and the possibility of developing an authentic culture of academic integrity (Robinson et al., 2017; Tatum, 2022). Not coincidentally, reference to *academic integ*rity in studies on online assessment is a constant (Garg et al., 2022; Surahman et al., 2022; Holden et al., 2022; Hartnett et al., 2023). Inevitably, these aspects impact the attitudes and opinions associated with online assessment from instructors and students (Bahar et al., 2018; St-Onge et al., 2022). Such attitudes and opinions can affect positively or negatively, even to the point of challenging the quality of online assessment and the correct performance of testing.

Online assessment requires a high level of digital skills for exam taking, and as a consequence students face a double challenge related to learning how online assessment works and preparing for the exam (Abubakar et al., 2022). Assessment can, indeed, generate anxiety and stress in students, and that can result in cases of cheating. The study by Sanchez-Cabrero and colleagues (2021) revealed, however, that stress seems to decrease rapidly once the exam begins, and once is over, "most students consider that there is little difference between on-site and online evaluation, and both prompt the same amount of stress, if not less for remote exams" (Sanchez-Cabrero et al., 2021, p. 11).

There is no consensus in the literature on whether cheating is more frequent in online or face-to-face assessments (Reedy et al., 2021). These issues are also common in traditional learning contexts but may sometimes be amplified in the online experience (Akimov, 2020).

Academic dishonesty can therefore result in "behaviors such as the use of unauthorized materials, facilitation (helping others to engage in cheating), falsification (misrepresentation of self), and plagiarism (claiming another's work as one's own)" (Holden et al., 2021, p. 2) and in some cases even contract cheating and ghost-writers (Hill et al., 2021). Holden and colleagues (2002) identified a number of reasons that may be causes of academic dishonesty, such as individual and psychological factors, institutional factors, or factors related to test delivery instruments.

The term *e-dishonesty* has been used to refer to behaviors that diverge from academic integrity in the online environment, bringing up novel considerations that may not have been taken into consideration in previous studies (Holden et al., 2021). In many cases, countering these phenomena with surveillance strategies alone (Verhoef et al., 2021) is not an effective option. In digital learning environments not narrowly connected to *Emergency Remote Teaching and Learning*, many of the described critical aspects can be overcome. In blended or distance learning degree programs, "through detailed guidelines,

adequate training, and test practice sessions to familiarize with how online assessment works, it is possible to have an impact [on the phenomena of academic dishonesty]" (Abubakar et al., 2022, p. 196), not only from the perspective of control.

The proposal of guidelines shared - including at the institutional level - with faculty, students, and other professionals, appears capable of significantly impacting the processes under examination (*academic integrity, cheating, e-dishonesty).* The focus of educational research is shifting, necessarily, "towards an approach that is preventative, educative and positive in promoting student success" (Center for Teaching and Learning, UC Berkeley).

Against this complex background, we conducted an analysis of some of the guidelines and frameworks proposed in the academic context and internationally (e.g., by the Teaching and Learning Center and Center for Academic Integrity) used to promote the dissemination of an authentic culture of academic integrity. The research involved the below phases (in this paper, we present the first phase of the study):
  - *First Phase*, analysis and mapping of guidelines, frameworks, and digital resources developed in the university context to encourage academic integrity;
  - *Second Phase*, development of an early proposal for *guidelines* - from the resources identified and analyzed in the previous phase - to be implemented in blended or distance learning degree programs.

The relationship between online assessment and academic integrity is predicted to become even more *crucial*, also due to the development and growth of Artificial Intelligence (AI) systems (Perkins, 2023) and online learning. To develop and implement guidelines and honor codes, universities must reduce the cheating culture, particularly, in online courses (Holden et al., 2021).

Reference

Abubakar, U., Asri, N. A. A. N. M., Rohi, N. A. M., Ramli, N. H., Khairuddin, N. I. M., Izham, N. F. S., & Sa'ad, A. A. (2022). Perceptions of undergraduate pharmacy students towards online assessments used during the COVID-19 pandemic in a public university in Malaysia. *Pharmacy Education*, 22(1), 191-198.

Akimov, A., & Malin, M. (2020). When old becomes new: a case study of oral examination as an online assessment tool. *Assessment & Evaluation in Higher Education*, 45(8), 1205-1221.

Bahar, M., & Asil, M. (2018). Attitude towards e-assessment: influence of gender, computer usage and level of education. *Open Learning: The Journal of Open, Distance and e-Learning*, 33(3), 221-237.

Bartley J. M. (2005). Assessment is as Assessment Does: A Conceptual Framework for Understanding Online Assessment and Measurement. In S. L. Howell & M. Hricko (Eds). *Online Assessment and Measurement: Foundations and Challenges* (pp.1-45). IGI Global.

Center for Teaching and Learning Berkeley (n.d.). *Academic Integrity*. Retrieved from https://teaching.berkeley.edu/resources/course-design-guide/design-effective assessments/academic-integrity

Garg, M., & Goel, A. (2022). A systematic literature review on online assessment security: Current challenges and integrity strategies. *Computers & Security*, 113, 102544.

Gibson, M. (n.d.). Introduction to E-Assessment. *The Watt Works quick guides*, 17. Learning and Teaching Academy, Heriot-Watt University.

Hartnett, M., Butler, P., & Rawlins, P. (2023). Online proctored exams and digital inequalities during the pandemic. *Journal of Computer Assisted Learning*, 1-13.

Hill, G., Mason, J., & Dunn, A. (2021). Contract cheating: an increasing challenge for global academic community arising from COVID-19. *Research and practice in technology enhanced learning*, 16, 1-20.

Holden, O. L., Norris, M. E., & Kuhlmeier, V. A. (2021). Academic integrity in online assessment: A research review. *Frontiers in Education*, Vol. 6. Frontiers Media SA.

Perkins, M. (2023). Academic Integrity considerations of AI Large Language Models in the post-pandemic era: ChatGPT and beyond. *Journal of University Teaching & Learning Practice*, 20(2), 07.

Reedy, A., Pfitzner, D., Rook, L., & Ellis, L. (2021). Responding to the COVID-19 emergency: student and academic staff perceptions of academic integrity in the transition to online exams at three Australian universities. *International Journal for Educational Integrity*, 17(1), 1-32.

Robinson, J. A., & Glanzer, P. L. (2017). Building a culture of academic integrity: What students perceive and need. *College Student Journal*, 51(2), 209-221.

Sánchez-Cabrero, R., Casado-Pérez, J., Arigita-García, A., Zubiaurre-Ibáñez, E., Gil-Pareja, D., & Sánchez-Rico, A. (2021). E-assessment in e-learning degrees: comparison vs. face-to-face assessment through perceived stress and academic performance in a longitudinal study. *Applied Sciences*, 11(16), 7664.

St-Onge, C., Ouellet, K., Lakhal, S., Dubé, T., & Marceau, M. (2022). COVID-19 as the tipping point for integrating e-assessment in higher education practices. *British Journal of Educational Technology*, 53(2), 349-366.

Surahman, E., & Wang, T. H. (2022). Academic dishonesty and trustworthy assessment in online learning: a systematic literature review. Journal of Computer Assisted Learning, 38(6), 1535-1553.

Tatum, H. E. (2022). Honor codes and academic integrity: Three decades of research. *Journal of College and Character*, 23(1), 32-47.

Digital communication and permanent and recurrent higher education: elements for a lifelong learning engine model

Bruno BONIOLO

[1] Past University of Turin, Torino (Italy)

Abstract

The aim of this paper is to identify the main elements of an innovative model for the management of lifelong and recurrent education by Italian universities. The analysis focuses on the professional dimension of digital communicators who, due to digital innovation, have to master models and tools that are constantly changing and have to cope with real paradigm shifts, with a strictly interdisciplinary approach. For these professionals, on-the-job learning plays a fundamental and peculiar role: in-company training is based more on coaching and mentoring than on traditional educational actions and is closely connected to the logic of projects. Self-training includes both an intense participation, mostly autonomous, in specialized and in-depth courses, as well as the customary practice of collaborative peer-to-peer learning within communities of practice. An innovative model for universities to manage lifelong and recurrent education requires these elements to be integrated into a more comprehensive and prolonged pathway based on the Specializing Master, the tool that university regulations provide for lifelong and recurrent education. It is crucial to establish a stable and structured connection between the Specializing Master and the "Third Mission" (engagement with society beyond traditional teaching and research) in practical and institutional terms.

Keywords: lifelong learning, learning on the job, Master, digital communication

The aim of this paper is to identify the main elements of an innovative model for the management of lifelong and recurrent education by Italian universities, where the Specializing Master is defined as the primary tool for this purpose. The importance of lifelong and recurrent education is increasingly evident in a "learning society" [Stiglitz & Greenwald, 2018], in which individual, corporate, governmental, and even "social" learning are crucial. Lifelong and recurrent education becomes a strategic factor for economic development. On the other hand, technological innovation continues to rapidly transform work. This is particularly evident in the case of new generative AI systems that anticipate profound changes for the intellectual and creative professions, such as intelligent assistants, new methods of accessing information, systems capable of generating code, images, text, music, etc.

Ways, timing, and relevance of the changes affecting the professional dimension require a more comprehensive, flexible, and prolonged institutional approach to lifelong and recurrent education. This approach should include stronger ties between universities and the productive context, as well as the utilization and valorisation of innovative training and self-training models and tools that emerge from technological innovation.

1. Professional Dimension and Digital Communication Professions

A fundamental reference of a new approach is the concept of the professional dimension, which refers to the context where personal and organizational culture intersect, influence each other, and shape choices, organization, and products. The impact of innovation has been particularly strong on digital communication professions, making them an excellent sensor and testing ground for the evolution of the professional dimension and lifelong learning. Companies and professionals in the digital communication and web industry constantly face global competition, risking rapid obsolescence. They work with constantly changing models and tools, requiring them to adapt to paradigm shifts. For them, technology is not just a tool; it is an integral part of an environment that, through the interpretation of needs, trends, orientations, fashions, and styles, weaves together multiple cultures to produce services. Moreover, these cultures shape expectations and evaluation criteria for products, services, and user interactions.

2. Lifelong Learning in the Digital Communication Sector

For knowledge workers and digital creatives, on-the-job learning plays a fundamental role. «International literature […] confirms that knowledge workers are primarily characterized by a mix of skills linked to specific situations, technologies used, the nature of the work processes, and the division of labor model. These individuals do not learn in the abstract but rather learn, act, and reinforce their skills within professional and organizational contexts» [Cesaria, 2008, p.116]. Training in digital communication companies relies more on coaching and mentoring than traditional educational actions. It strengthens not only transferred knowledge and skills but also metacognitive abilities, contextual competencies, and professional identity reinforcement. This type of training is closely connected to project logic, which emphasizes keywords such as professional capital, reputation, self-training, self-promotion, networks, and relational skills. The professional paths of digital communicators, with their numerous specializations, highlight the importance of hands-on work experience, autonomous participation in in-depth courses and specialization, and the habitual practice of collaborative learning and peer-to-peer interaction within communities of practice.

3. Elements of a New Model

Based on these elements, the characteristics of a lifelong learning engine can be outlined, integrating and connecting the Specializing Master, the specificities of organizational culture and training that characterize the professional dimension, and communities of practice and peer-to-peer collaborative learning. The Master builds a solid foundation through scientific, theoretical, and methodological approaches, enabling self-training capabilities. Organizational culture and the professional dimension contribute to the growth and enhancement of interdisciplinary, social, and behavioural skills. Collaborative learning compensates for disparities related to specialization and products, creating opportunities for the growth of knowledge and professional skills through cross-functional and participatory collaboration. In order to hold these components together in a new lifelong learning approach, it is necessary for the Master's programme to be designed with the integration of these elements in mind, including the definition of hard and soft skills and how they relate to the professional dimension. At the institutional level, a stable and structured connection between the Master and the "Third Mission" (i.e. public engagement) is crucial. This would allow the implementation of post-Master's paths that include personalized courses leveraging flexible and comprehensive learning approaches, periodic events (such as webinars or summer schools) for in-depth research results, changes in scenarios or paradigms for graduates and companies, and the use of professional social networks and self-training tools like MOOCs.

The paper concludes by analysing some crucial aspects: whether managing such a pathway falls within the institutional tasks of universities and whether it is feasible within the university framework, the role of consortium tools for management, and the utility of a "multiple helix" approach involving universities, companies, public administration, and professional associations in the design and financing process.

References

Boniolo, B. (2021). *Tra guru e bricoleur. Storia e futuro del progettista di comunicazione digitale*. Milano: Franco Angeli

Boscaro A., & Porta R. (2015). *Effetto digitale: le nuove professioni, gli strumenti e il personal branding.* Milano: Franco Angeli

Butera F., Bagnara S., Cesaria R., Di Guardo S. (a cura di) (2008). *Knowledge Working. Lavoro, lavoratori, società della conoscenza.* Milano: Mondadori

De Masi D. (2018), *Il lavoro nel XXI secolo,* Einaudi, Torino.

Galletti F., Gualdi F. (2017), *Skills Mismatch in Italia. Analisi e scelte di policy in uno scenario in rapida evoluzione.* Milano: Action Institute

Howkins J. (2013). *The Creative Economy: How People Make Money from Ideas*, Penguin, London.

OpenAI, *Better Language Models and Their Implications,* https://openai.com/blog/better-language-models/

Stigliz, J. E., & Greenwald B. C. (2018), *Creare una società dell'apprendimento*. Torino: Einaudi

Exploring Strengths and Weaknesses of the Peer-to-Peer Observation Tool in Teacher Induction: A Feedback-Based Analysis

Maria Chiara PETTENATI[1], Anna TANCREDI[1], Sara MARTINELLI[2]

[1] INDIRE, Florence (IT)
[2]INDIRE, Torino (IT)

Abstract

Keywords: Peer-to-Peer Observation, Teacher Training, Feedback Analysis, Professional Development in Education

Extended abstract

The importance of high-quality induction and mentoring programs for new teachers has been well established in the literature (Ingersoll & Strong, 2011; Wang et al., 2018). These programs play a crucial role in shaping novice teachers' identities, enhancing their self-efficacy, reducing attrition rates, and ultimately improving the quality of teaching (Tschannen-Moran & McMaster, 2009). Mentorship and peer observation are recognized as pivotal components of these programs (Hobson et al., 2009)

In Italy, a notable attempt to systematize teacher induction programs is the creation of a structured mentorship system, combined with a reciprocal classroom observation tool, as part of new teachers' induction training (Mangione et al., 2016).

The present research investigates the dynamics of the teacher-tutor relationship during the induction training of teachers in Italy, specifically focusing on the use of the peer-to-peer classroom observation tool provided by the Ministry of Education in school year 2022/23 and dedicated to mentors (Allegato A, Ministry Decree 226/2022). As introduced by D.M. 850/2015, the reciprocal classroom observation is an innovative practice aimed at improving teaching strategies and fostering a shared reflection on teaching action. This practice has shown potential for professional development of newly hired teachers, their mentors, and the school as a learning community.

Monitoring results from various iterations (Pettenati et al., 2022) show that the collaboration time between teacher and tutor often extends beyond the 12 hours prescribed by the training model. The flexibility of the tutors and their willingness for frequent meetings on class management and student relations, leads to a professional support relationship that can last throughout the training period and often beyond.

Research findings show that he most observed aspects by both teachers and tutors are mostly cross-sectional and concern relational dynamics, the teaching context, and teaching methodologies.

Teachers and tutors found the peer-to-peer experience very useful, especially on a human and relational level, but also, albeit to a slightly lesser extent, on a technical and professional level. These aspects contributed to making peer-to-peer observation a key phase of training, one of the most significant stages of the probationary year. This is a very effective teaching-learning method that has its strengths in a situation of parity, since observation is reciprocal among colleagues. The relationship between the two actors, the tutor and the newly hired teacher, is generally empathic and collaborative. At the end of the training process, the tutor seems to lose the characteristics of the supervisor to assume those of mentor and consultant.

Until school year 2022/23, with the introduction of a national standard for accompanying reciprocal observation, the prevalent tool used in the peer-to-peer observation was "free observation", simply recorded with paper and pen.

Until the 2022/23 school year, which saw the introduction of a national standard for accompanying observation, the prevalent tool used in tutors' observation in newly qualified teachers classes was "free observation," simply recorded with pen and paper.

This study aims to analyze the efficacy of these initiatives, focusing on the mentoring relationship and the reciprocal classroom observation tool introduced in school year 2022/23 with "Allegato A", given that this tool was mainly used by tutors and less commonly used by newly qualified teachers.

The research employed a qualitative research methodology, collecting free-text data from several hundreds of teachers acting as mentor, involved in the peer to peer induction program in Veneto region during a regional teachers' training plan aimed at supporting them in improving their mentoring effectiveness.

Data were gathered regarding the positive and negative aspects of using the proposed classroom observation tool. The data analysis involved the use of thematic analysis (McBurney, 2001, seel n.m., 2012), allowing for the identification of patterns of meaning across the dataset.

The results indicated that teachers appreciated the observation tool for its comprehensiveness, clarity, and guidance it provides for focused observation. They found it systematic, user-friendly, and effective in promoting objectivity and facilitating comprehensive monitoring of teaching practices. However, some teachers also expressed concerns related to a lack of clarity in certain areas, the tool's complexity, the perceived irrelevance of some questions to their specific teaching context, and its rigidity. Furthermore, some teachers considered the tool overly long and cumbersome.

The study's findings are expected to contribute to the body of knowledge on teacher induction and mentoring, and inform policy and practice regarding further refinement of the reciprocal observation tool provided in Allegato A as well as to extend its potential also for new teachers' observation in their mentors' classrooms.

Specific insights regarding the dynamics of the teacher-tutor relationship and the use and perception of the classroom observation tool are expected to emerge, allowing for the identification of strengths and areas for improvement.

References

Ministry Decree 226/2022 https://www.miur.gov.it/web/miur-usr-toscana/-/disposizioni-per-formazione-e-prova-docenti-dm-226-2022

McBurney, D. H. (2001). Metodologia della ricerca in psicologia (3. ed). Il mulino.

Hobson, A.J., Ashby, P., Malderez, A., & Tomlinson, P.D. (2009). Mentoring beginning teachers: What we know and what we don't. Teaching and Teacher Education, 25(1), 207-216.

Ingersoll, R.M., & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers: A critical review of the research. Review of Educational Research, 81(2), 201-233.

Mangione, G., Pettenati, M. C., & Rosa, A. (2016). Newly qualified teachers training: analysis of the Italian model in light of scientific literature and international experiences. Form@re - Open Journal Per La Formazione in Rete, 16(2), 47–64.

seel n. m. (2012), Encyclopedia of the Sciences of Learning, Springer, New York.

Tschannen-Moran, M., & McMaster, P. (2009). Sources of self-efficacy: Four professional development formats and their impact on teachers' self-efficacy and implementation of a new teaching strategy. The Elementary School Journal, 110(2), 228-245.

Wang, J., Odell, S.J., & Schwille, S.A. (2008). Effects of teacher induction on beginning teachers' teaching: A critical review of the literature. Journal of Teacher Education, 59(2), 132-152.References

Pettenati, M.C., Tancredi A, Martinelli, S. (2022) Il peer to peer: lo sviluppo professionale attraverso la relazione docente-tutor in Pettenati M.C. (a cura di). L'anno di formazione e prova degli insegnanti dal 2015 ad oggi. Cronistoria di una ballata popolare. Ed. Carocci 2022