CYPRUS INTERACTION LAB

The Cyprus Interaction Lab (CIL) of the Department of Multimedia and Graphic Arts of the Cyprus University of Technology is an interdisciplinary research lab which specialises in Educational Technology and Human Computer Interaction. The lab was co-founded in 2011 by Panayiotis Zaphiris and Andri Ioannou and is the first of its kind in Cyprus. Even though it is relatively new, it already stands out with high-quality research and facilities.

We design with people and the community in mind, aiming to produce research with real-world impact. We seek to understand the significant supportive and mediating role of technology in promoting learning, communication and collaboration, social change and inclusion in varied circumstances and contexts. Research at the CIL aims towards theoretical and practical frameworks in three thematic areas:

- > Embodied Play and Learning using Technology
- > Interaction Design and Creative Collaboration Spaces
- > Inclusive Design and Social Change using Technology

CIL research draws on:

- > Constructivist and constructionism pedagogy
- > Co-design with educators and stakeholders
- > Human-centered design
- > Authentic learning environments and real-world settings



Inside This Issue:

Welcome note from the Lab Director	1
New Researchers	2
Research projects News, Events & Highlights	3 8
Contact Us	15

Welcome note from the Lab Director











Associate Prof. Andri Ioannou Lab Co-founder & Director

The Cyprus Interaction Lab (CIL), directed by Associate Professor, Andri Ioannou, is the only research facility in Cyprus conducting interdisciplinary research in the areas of Educational Technology and Human Computer Interaction. Our team is growing and we carry complementary expertise in these areas. Once more Year 2019 has been a very productive year with numerous new publications and projects in these areas of research.

CIL is now part of the Social Computing Research Center - SCRC (https://www.socialcomputing.eu/) whilst members of CIL are affiliated with the Research Centre of Excellence in Cyprus focusing on Interactive media, Smart systems and Emerging technologies - RISE (http://www.rise.org.cy). These links have enabled yet more national and international collaboration and cross-disciplinary research for CIL researchers and academics.

CIL is proud to announce that, as of 01/01/2020, the co-founder of the Cyprus Interaction Lab and director of SCRC, Professor Panayiotis Zaphiris, is the Rector of the Cyprus University of Technology. Panayiotis Zaphiris will still be an active member of the lab.

CIL instigates interdisciplinary work and promotes collaboration between industry, academia and research organizations in research areas of global importance. We are proud to engage in research that helps unpack the potential of emerging technologies to positively influence our society.

We hope you will enjoy reading our newsletter which highlights our major achievements of the year 2019.

The Director, Dr. Andri Ioannou

New Researchers





Dora Constantinou

Mrs Dora Konstantinou joined the Cyprus Interaction Lab in September 2019, as a PhD student under the supervision of Dr. Panayiotis Zaphiris. Dora has a Master of Science in Education Leadership and Management (CIIM - Cyprus International Institute of Management) and a Bachelor of Science in Computer Science (University of Cyprus). Dora is also a certified trainer from International Boards like Microsoft and CISCO Networking Academy, with ten (10) years of teaching experience in Higher Education. Her research interests include Digital Making, Makerspaces and Soft Skills Development.

Andreas Tsestos

Andreas Tsestos has recently joined the Cyprus Interaction Lab as a research fellow as part of the research programme "Sustainable Urban Governance through Augmented Reality (SUGAR)", which aims to develop innovative best-practice protocols and guidelines on Sustainable Urban Governance and specifically Public Participation through Augmented Reality. Having completed his MA and BA in Architecture at the University of Sheffield, Andreas is a qualified Architect, with over 4 years of professional experience in both London and Cyprus. His research interests include Architecture, Urban Design, Planning and designing for flood resilience, Biomimetic and Biophilic Architecture.





More information at: www.cyprusinteractionlab.com/people



FeSTEM: Female Empowerment in Science, Technology, Engineeringand Mathematics in Higher Education



Female Empowerment in Science, Technology, Engineering and Mathematics in Higher Education [FeSTEM 2019-2022; Grant No: 2019-1-CY01-KA203-058407]; Funded to the Social Computing Research Centre - SCRC, Cyprus University of Technology, (P. Zaphiris as coordinator) under the scheme ERASMUS+ KA203 - Strategic Partnerships for higher education. The main objective of the FeSTEM project is to promote an innovative pedagogical approach that will enable Higher Education students to use traditional and computationally rich tools to create common exhibits that will serve as mentoring models to encourage girls and women to remain active in the fields of science, technology, engineering and mathematics (STEM). The project also aims at enhancing equity and inclusion in STEM as well as to promote participation of women in higher-ranks of STEM professional society.

STEM workforce is crucial to Europe's innovative capacity and global competitiveness. Yet women are vastly underrepresented in STEM jobs and among STEM degree holders. The principal objective of FeSTEM project is to allow HE students to use traditional and computationally-rich media to create meaningful, shareable exhibits that will act as mentoring models for encouraging girls and women to remain active in STEM. The novelty of our approach is reflected in the activities that will make use of traditional and computationally-rich media through which we envisage to expose HE students to successful female role models in STEM and encourage the development of networking opportunities for women to establish a peer support system.

ERUM: Enhancing Research Understanding through Media



Enhancing Research Understanding through Media [ERUM 2019-2022; Grant No: 051482]; Funded to the University of Vienna - Austria, (A. Ioannou as local coordinator- Social Computing Research Centre - SCRC) under the scheme ERASMUS+ KA203 - Strategic Partnerships for higher education.

The core objectives of this project lie in the quality of information today, between mis- and disinformation or so-called "fake news". EUR The project aims to: **1**) improve the educational offer on the topic of quality of information in higher education and equip students with transversal skills that are necessary for the exercise of democratic citizenship. **2**) foster structured collaboration between higher education and media and contribute to the policy discussion about the role of universities and media in the knowledge and information society **3**) improve the quality of information with regards to research-based communication.



IRISPHONE-PRO: The ALL inclusive, accessible smart home phone, focused on the promotion of a positive and intuitive lifestyle



The ALL inclusive, accessible smart home phone, focused on the promotion of a positive and intuitive lifestyle [IRISPHONE-PRO 2019-2021; Grant No: ENTERPRISES/ 0618 / 0171]; Funded to the iResTech, (Panayiotis Zaphiris, as local coordinator- Social Computing Research Centre - SCRC) under the scheme RESTART 2016-2020: RESEARCH IN ENTERPRISES of the Research Promotion Foundation.

The proposed project's main objective is to design and develop a novel device, the IrisPhone-Pro, a Smart Home Phone ideally suited for tech illiterate and literate seniors that reflects the emerging ageing population. It has an innovative focus on its ease of usability and intuitive interface through behavioral data analytics, which will require thorough research and validation, due to the advanced algorithms that will form a critical part of the unique user interface and experience.

INCOGNITO: IdeNtity verifiCatiOn with privacy-preservinG credeNtIals for anonymous access To Online services



IdeNtity verifiCatiOn with privacy-preservinG credeNtIals for anonymous access To Online services [INCOGNITO 2019-2023; Grant No: 824015] funded to the University of Piraeus Research Center, (Panayiotis Zaphiris, as local coordinator- Social Computing Research Centre - SCRC) under the European Commission''s Horizon 2020 Research and Innovation Framework program under the Marie Skłodowska-Curie Research and Innovation Staff Exchanges Action.

The overarching goal of INCOGNITO is to combine state-of-the-art technologies in a platform that will allow users to easily understand what is needed to access online services with respect to their privacy and be able to prove specific attributes of their identity or their whole identity. We build on top of the framework that is being developed under the ReCRED project where we use advanced mobile software in order to convert online and physical identity proofs into validated and cryptographically strong proofs of identities that can be used for getting access to Online Services. More information at: https://www.cyprusinteractionlab.com/projects/

Research Projects (selected)



SUGAR: Sustainable Urban Governance through Augmented Reality



The Sustainable Urban Governance through Augmented Reality [SUGAR 2019-2020; Grant No: INTERNATIONAL/USA/0118/0058]; Funded to the Cyprus University of Technology, (Panayiotis Zaphiris, as project coordinator-Social Computing Research Centre - SCRC) under the scheme RESTART 2016-2020: INTERNATIONAL COLLABORATION-DUAL TARGETING of the Research Promotion Foundation.

The SUGAR project aims to develop innovative best-practice protocols and guidelines on Sustainable Urban Governance and specifically Public Participation through Augmented Reality, building on the existing collaboration and expertise of two state universities in Cyprus, the Cyprus University of Technology and the University of Cyprus and a world-leading Centre of Excellence in the field from USA, Harvard University.

SUGAR aims to empower both citizens that seek ways to participate in the decision-making process for the design of their cities and neighborhoods and stakeholders that would like to involve the public actively in the process of shaping their environment creating a lasting and meaningful impact.

OPENLANG: The **OpenLang** network

OpenLang Network

The OpenLang network [OPENLANG 2019-2021; Grant No:] funded to the University of Macedonia, (Panayiotis Zaphiris, as local coordinator - Social Computing Research Centre - SCRC) under the European Commission's Erasmus+ KA1.

The aim of the Erasmus KA2 OpenLang project is to develop an Open Language Network to connect and support all Erasmus+ KA1 participants (HE students and staff, VET, Adult, and School education staff, Youth learners, Youth Workers, Youth Entrepreneurs) during their mobilities increasing their language proficiency and also developing their intercultural and digital skills. This project is a collaboration between the Cyprus Interaction Lab of the Cyprus University of Technology -CY, the University of Macedonia – GR (project coordinator), the Open University – UK and PIXEL Associazione Culturale-IT.

Succesfully Completed



INTELed: INnovative Training via Embodied Learning and multi-sensory techniques for inclusive Education

INnovative Training via Embodied Learning and multi-sensory techniques for inclusive EDucation [INTELed 2017-2019; Grant No: 2017-1-CY01-KA201-026733]; Funded to the Cyprus University of Technology, (Andri Ioannou, as project coordinator – Social Computing Research Centre - SCRC) under the scheme under the scheme ERASMUS+ KA202 - Strategic Partnerships for school education, has been successfully completed.

The project's consortium was composed by four partners (Cyprus University of Technology, CESIE, University of Piraeus, University of Valladolid) in four countries (Cyprus, Italy, Greece, Spain). The INTELed aimed to support special and general education teachers in acquiring knowledge and skills about the use of multi-sensory technology for learning and assessment, for addressing the needs of SEN children in inclusive education contexts. This was obtained through an innovative training method, driven by theories of embodied cognition, research on embodied learning, and the premise of multi-sensory technologies. The method was accompanied by evidence of its effectiveness through pilot studies in schools at the four partner-countries. The partners worked on presenting the pedagogical framework, the training model and instructional materials, and the procedures for implementation and evaluation. The project aimed to form a sustainable Community of Practice (CoP) around the INTELed method.

More information at: https://www.inteled.org



Succesfully Completed



ENGINITE: ENGineering and INdustry Innovative Training for Engineers via PBL

ENGineering and INdustry Innovative Training for Engineers via PBL [ENGINITE 2017-2019; Grant No: 2017-1-CY01-KA202-026728]; Funded to the Cyprus University of Technology, (Andri Ioannou, as project coordinator – Social Computing Research Centre - SCRC) under the scheme under the scheme ERASMUS+ KA202 – Strategic Partnerships for vocational education and training, has been successfully completed.

The project's consortium was comprised of 6 partners from 4 different European countries: Cyprus University of Technology (Cyprus), Aalborg Universitet (Denmark), CUBEIE L.L.C (Cyprus), Technical University of Crete (Greece), GrantXpert Consulting (Cyprus), and Useful Simple Projects Limited (UK).

ENGINITE focused on the design, development and establishment of a new industrial-oriented postgraduate vocational training programme, which used synchronous methods to set a higher standard level for engineering training. In its essence, ENGINITE aimed at changing the way in which engineers are trained; in turn, industry and economy are benefited. At the same time, the existing gap between academia and industry was bridged by integrating 'theory' with 'practice' using the Problem Based Learning (PBL) approach for teaching and learning. Furthermore, ENGINITE strengthened the recruitment potential of the participants and leverages the industry's quest for high qualified engineers. Thus, young engineers had the opportunity to enhance their competences and capabilities, apply their industrial-based knowledge provided so far and gain real working experience.





News, Events & Highlights



SUGAR Public event



The SUGAR team, in collaboration with NGO Oxygono and the Youth Council of Cyprus, have organised a two-part discussion panel series under the theme of "Limassol 2040", which aim to discuss how a long-term plan for a city can come to fruition through the participation of citizens, the community and the authorities. The second part of the discussion took place on the 5th of December 2019 at the Cyprus University of Technology in Limassol. The invited speakers were Nicos Nicolaides (Mayor of Limassol), Pantelis Eutixiou Georgiou (Mayor of Ypsonas) and Charalampos Theopemptou (MP of the Ecologists – Citizens' Coalition Movement). The discussion revolved around five main themes, including local government reform, tall buildings, sustainable strategic planning, future challenges and the long-term plan for Limassol. At the end of the discussion, the audience had the opportunity to ask the invited speakers a series of questions in relation to the topics discussed as well as their views on the future of the city.

The ENGINITE final dissemination event at Cyprus





The ENGINITE multiplier event took place at the Cyprus University Cyprus, in Limassol, Cyprus. The multiplier event aimed at disseminating the ENGINITE european project and its goals, as well as the ENGINITE postgraduate Vocational Education and Training (VET) programme which was based on Problem Based Learning (PBL) pedagogy. The event was entitled "Bridging academia and industry by integrating 'theory' with 'practice' using the PBL approach in Engineering Education". It was co-organized by the Social Computing Research Centre (SCRC) via the Cyprus Interaction Lab (CIL) of the Cyprus University of Technology, CUBEIE LLC and GrantXpert consulting, and was supported by the Research center on Interactive media, Smart systems and Emerging technologies (RISE). The event was attended by graduate and undergraduate young engineers, VET educators, members of industrial and VET associations, representatives from companies and academics.

News, Events & Highlights



The INTELed final dissemination event at Cyprus



The INTELed multiplier event took place at the Cyprus University of Technology in Limassol, Cyprus, aiming to disseminate the theoretical and pedagogical framework of INTELed, the philosophy and goals as well as the main outcomes of the INTELed European project. The event was entitled "Promoting inclusive education via embodied learning technologies: The INTELed Teacher Professional Development programme" and was was co-organized by the Cyprus Interaction Lab of the Cyprus University of Technology, the Research center on Interactive media, Smart systems and Emerging technologies (RISE) and the Cyprus Association of Teachers for the use of Information and Communications Technologies. The event was attended by pre-service and in-service teachers, special education therapists, academics, policy-makers, parents, and representatives of teacher associations, who were interested in finding out more about the project and its main outcomes.

ACM-W Celebration of Women in Maker Cultures





The ACM-W Cyprus Celebration of Women in Maker Cultures concluded with particular success on 13 July 2019. The event was co-organized with the Youth Board of Cyprus and Youth Makerspace Larnaca, and resulted in a day full of engaging interactive workshops, and keynote speeches. Dr Antigoni Parmaxi, Cyprus University of Technology, gave a keynote speech entitled "Women in the Maker Movement: Gender Culture and Technology", and provided an overview of a UNDP-funded research project ,"WomenPower", which highlighted the need for the sharing of skills and knowledge, putting forward principles of inclusiveness, mentoring, and promotion of women's empowerment, equality and social coherence. Dr Yiota Demetriou, Pervasive Media Studio, interrogated our understanding of culture and the cultural itself, in her talk "Interrupting and Hacking Culture and the Language of Making". She spoke about the power of personal, often lost, stories and the potential of technology and performativity to emotionally connect people, as well as challenge normative culture through co-creation.

News, Events & Highlights



The 17th IFIP TC.13 International Conference on Human-Computer Interaction – INTERACT 2019



The 17th IFIP TC.13 International Conference on Human-Computer Interaction – INTERACT 2019 was held from 2 – 6 September, 2019 in Paphos, Cyprus.

INTERACT 2019 (http://www.interact2019.org/) was the latest of a series of conferences on Human-Computer Interaction organized under the aegis of the Technical Committee 13 of the UNESCO International Federation for Information Processing (IFIP). The IFIP TC 13 aimed at developing the science and technology of the interaction between humans and computing devices.

INTERACT 2019 runn-cooperation with the ACM Special Interest Group on Human-Computer Interaction (SIGCHI).

The 2019 conference was hosted by the Cyprus University of Technology (Cyprus Interaction Lab) and supported by Tallinn University.

In 2019, the Cyprus Interaction Lab has published a total of 35 papers in prominent journals and conferences. For a full list of our publications, please visit our google scholar page at: <u>http://tinyurl.com/jb4efd9</u>.

Below you can find details of a selection of our 2019 publications.



FROM BEHAVIOUR TO DESIGN: IMPLICATIONS FOR ARTIFACT ECOLO-GIES AS SHARED SPACES FOR DESIGN ACTIVITIES

Researchers are increasingly exploring collaborative behaviour in complex socio-technical systems through in-the-wild investigations to understand, evaluate and technology. The space configuration and tools available in such activities are crucial for the successful collaboration of a group. This work offers an in-the-wild examination of six groups tackling a design project working in an artifact ecology, a space rich in physical and digital artifacts. We delve into the physical and digital space of each of the groups during a 3-month duration to obtain a rich understanding of their collaborative activities. The aim of this work is two-fold; provide summative narrations of each one of the five models of DiCoT to extract design implications and evaluate the usefulness of DiCoT as an analytical tool for understanding artifact ecologies. Through a rich dataset – interviews, focus groups, reflective diaries, online interactions, and video recordings – we construct a summative description of the group behaviour based on the methodological framework of Distributed Cognition for Teamwork. Drawing on these narrations, we provide design implications on the use of an artifact ecology as a shared space for design activities. Both outcomes are then used to evaluate the usefulness of DiCoT as an analytical tool for an artifact ecology as a shared space for design activities.

Vasiliou, C., Ioannou, A., & Zaphiris, P. (2019). From behaviour to design: implications for artifact ecologies as shared spaces for design activities. Behaviour & Information Technology, 1-18.



International Journal of

A CROSS-ORGANIZATIONAL ECOLOGY FOR VIRTUAL COMMUNITIES OF PRACTICE IN HIGHER EDUCATION

This work investigates Communities of Practice (CoPs) that support social learning in higher education. While most CoP research has taken place in single-stream contexts (e.g. in a university), this study reports on the ecology of a cross-organizational community (university and industry stakeholders) in the context of the formal curriculum. The work examines the role of technology configurations in supporting CoPs in Design and related studies. It also reports on the type and level of technology adoption, focusing on the learner perspective. This study's CoP is made up of 21 third-year university students and ten external stakeholders (mentors, clients and industrial experts). The study concludes with a set of guide-lines for the design and evaluation of similar CoP technology configurations. Key guidelines suggest a) supporting enhanced awareness of identity, space and time, b) enabling roles and permissions on-demand according to the requirements of the activities carried out in shared spaces and c) facilitating fluid interoperability between the domain-specific and mainstream/generic productivity tools used by the community. The outcomes of this work can assist instructors, researchers and practitioners in the design or similar technology configurations for CoPs in the formal curricula of their respective Design or relevant fields.

Mavri, A., Ioannou, A., & Loizides, F. (2019). A Cross-organizational Ecology for Virtual Communities of Practice in Higher Education. International Journal of Human–Computer Interaction, 1-15.



LESSONS LEARNED FROM A DESIGN-BASED RESEARCH IMPLEMENTA-TION: A RESEARCHER'S METHODOLOGICAL ACCOUNT

This paper describes aspirations and contributions that grew out of a developmental cycle of design-based research (DBR) implementation conducted over a three-year project. DBR engineers new learning environments and improves learning in context whilst communicating usable knowledge for learning and teaching in complex settings. This project employed constructionism as an overarching framework, a theory of learning, teaching, and design, which supports that learning occurs more effectively when learners understand the world around them by creating meaningful artifacts that can be probed and shared. In an attempt to infuse elements of constructionism in the use of social technologies, groups of learners were assigned to construct an artifact within social technologies. The main data collection tools employed were students' and instructor's reflections, a questionnaire, semi structured interviews and observation of groups' activity within social technologies. Such an inquiry revealed both strengths and challenges with regard to implementing DBR and reporting how designs function in real-life settings. This paper brings forward considerations related to reporting intentionally designed interventions, potentials and limitations of DBR and implications for future DBR implementations.

Parmaxi, A., & Zaphiris, P. (2019). Lessons learned from a design-based research implementation: a researcher's methodological account. International Journal of Research & Method in Education, 1-14.



IMPLEMENTING EMBODIED LEARNING IN THE CLASSROOM: EFFECTS ON CHILDREN'S MEMORY AND LANGUAGE SKILLS

The relationship among bodily movements, cognitive abilities, and academic achievement in children is receiving considerable attention in the research community. The embodied learning approach is based on the idea of an inseparable link between body and mind in learning, aiming for teaching methods that promote children's active engagement in the classroom. This study implements embodied learning as a part of the classroom curriculum in a real classroom environment using motion-based games. A total of 52 elementary students engaged in embodied learning in-class activities for four months. The dataset included standardized pre-post testing for children's cognitive and academic performance, general learning analytics from games' usage, interviews, and observations from the teachers involved. Findings showed significant effects both on children's cognitive abilities (i.e., short-memory skills) and academic performance (i.e., expressive vocabulary). This article contributes to the educational technology community by providing an example of implementing embodied learning via use of motion-based technologies in a real classroom environment.

Kosmas, P., Ioannou, A., & Zaphiris, P. (2019). Implementing embodied learning in the classroom: effects on children's memory and language skills. Educational Media International, 56(1), 59-74.

12



TEACHERS' CONCERNS ABOUT ADOPTING TECHNOLOGY-ENHANCED EMBODIED LEARNING AND THEIR MITIGATION THROUGH PROFES-SIONAL DEVELOPMENT

Technology-enhanced embodied learning is argued to have the potential to revolutionize K-12 education. Despite the affordances of technology-enhanced embodied learning, its integration in mainstream education is currently at slow pace. Slow adoption of technological innovation is not a new issue in the education arena. Several factors are contributing to why in-service teachers are being reluctant to adopt educational innovations. This study investigated the concerns of 31 in-service primary education teachers about adopting technology-enhanced embodied learning using the Concerns Based Adoption Model (CBAM). A Professional Development (PD) programme composed of two phases - a Training phase (including experiential workshops) and a Practical phase (including teachers' enactment of technology enhanced embodied learning in their classrooms) - allowed for the mitigation of these concerns. The study documents also the impact of the PD programme on the effective adoption of technology-enhanced embodied learning in teachers' classrooms. Overall, this study elaborates on the use of the CBAM model and provides a rich description of a successful PD programme, which can inform future efforts in this area. Taking into account and addressing teachers' concerns through PD lays the groundwork for the successful adoption of technology-enhanced embodied learning to nourish education.

Georgiou, Y., & Ioannou, A. (2019). Teachers' concerns about adopting technology-enhanced embodied learning and their mitigation through professional development. Journal of Technology and Teacher Education, 27(3), 335-370.

Smart Computing and Intelligence Series Editors: Kinshuk - Ronghuai Huang - Chris Dede

Paloma Díaz Andri Ioannou Kaushal Kumar Bhagat J. Michael Spector *Editors*

Learning in a Digital World

Perspective on Interactive Technologies for Formal and Informal Education LEARNING IN A DIGITAL WORLD: PERSPECTIVE ON INTERACTIVE TECH-NOLOGIES FOR FORMAL AND INFORMAL EDUCATION

This book aims at guiding the educators from a variety of available technologies to support learning and teaching by discussing the learning benefits and the challenges that interactive technology imposes. This guidance is based on practical experiences gathered through developing and integrating them into varied educational settings. It compiles experiences gained with various interactive technologies, offering a comprehensive perspective on the use and potential value of interactive technologies to support learning and teaching. Taken together, the chapters provide a broader view that does not focus exclusively on the uses of technology in educational settings, but also on the impact and ability of technology to improve the learning and teaching processes.

The book addresses the needs of researchers, educators and other stakeholders in the area of education interested in learning how interactive technologies can be used to overcome key educational challenges.

Díaz, P., Ioannou, A., Bhagat, K. K., & Spector, J. M. (Eds.). (2019). Learning in a Digital World: Perspective on Interactive Technologies for Formal and Informal Education.

13

Smart Computing and Intelligence Series Editors: Kinshuk - Ronghuai Huang - Chris Dede

Paloma Díaz Andri Ioannou Kaushal Kumar Bhagat J. Michael Spector *Editors*

Learning in a Digital World

Perspective on Interactive Technologies for Formal and Informal Education



EMBODIED LEARNING IN A DIGITAL WORLD: A SYSTEMATIC REVIEW OF EMPIRICAL RESEARCH IN K-12 EDUCATION

There is a widespread assumption that technology-enhanced embodied learning environments, which are grounded on the notion of embodied cognition, can promote learning. The current study reviews the empirical basis of this assumption by examining literature published from 2008 to 2017 which employed technology-enhanced embodied learning environments in K-12 education. Overall, 41 journal articles were included in the review study; these were indexed in four databases (Education Research Complete [via EBSCO], ERIC, JSTOR, and Scopus) as well as in Google Scholar, or were identified via the ancestry method. As part of our analysis, we focused on the type of technology-enhanced embodied environments utilized for educational purposes, the research methods adopted for their evaluation, and the educational contexts in which they were implemented. At the core of this review study, we investigated students' learning outcomes across the cognitive, affective, and psychomotor domains, while we examined the learning effectiveness of technology-enhanced embodied environments, as compared to other interfaces and forms of instruction. In general, the review revealed positive outcomes about the use of technology-enhanced embodied learning environments in K-12. Most of the reviewed studies were contextualized in STEM education, adopted gesture-based technologies, and evaluated students' learning using retrospective measures grounded on pre-post-testing. Cognitive outcomes were dominant in the reviewed studies, while the evaluation of affective and psychomotor outcomes received less attention. Most of the reviewed comparative studies reported that students in the embodied learning condition had increased learning gains, when compared to their counterparts in the control or comparison groups. However, these findings should be treated with caution due to a set of methodological concerns that this review identified. We conclude this chapter with a synthesis of our findings in the form of emerged implications and we provide a set of guidelines for future research and practice in the field of technology-enhanced embodied learning environments.

Georgiou, Y., & Ioannou, A. (2019). Embodied learning in a digital world: a systematic review of empirical research in K-12 education. In Learning in a Digital World (pp. 155-177). Springer, Singapore.

Contact us



POSTAL ADDRESS

Cyprus Interaction Lab Department of Multimedia and Graphic Arts Cyprus University of Technology P.O. Box 50329 3603 Limassol Cyprus

INTERNATIONAL TELEPHONE

+357 25 002276

INTERNATIONAL FAX

+357 25 002673

EMAIL info-at-cyprusinteractionlab.com

http://www.facebook.com/CyprusInteractionLab



http://twitter.com/InteractionLab

https://goo.gl/cn5j0s

LOCATION

The Lab is located on the 2nd Floor of the Micrologic Building, at 31 Le Corpusier Street, 3075 Limassol. Please use the map below for directions.

