e-LADDA Closing Conference

eln pre-summit event

e-LADDA

eln — Founded by COST / Literacy Actions

e-LADDA Book of Abstract

e-LADDA Closing Conference
ELN Pre-Summit Event

Program & Abstracts Book

Advances in the Study of Language Development and Literacy Learning in the Digital Age

October 18-21, 2023

University of Porto

WELCOME TO THE E-LADDA CLOSING CONFERENCE / ELN PRE-SUMMIT EVENT

Despite the rapid change in children's ecology and the rapid advance of technology in everyday life, research on the impact of Digital Technologies (DTs) on children's communication and language development is still scarce and highly fragmented with no unitary approach across disciplines. New technologies create environments that could alter how we process information, the degree to which we take risks, how we socialise and empathise with others and even, how we view our own identity. Parents experience that toddlers can handle digital tools with a level of sophistication that they can only envy. We are immersed in a 'digital ecology' increasingly populated by devices that are both tools and interactive agents with a degree of autonomy which is increasing rapidly. While AI-powered interactive digital platforms are being developed at a fast and unprecedented rate, and schools are spontaneously adopting digital solutions for the acquisition of academic skills, such as literacy, at present, there is no adequate research base documenting the effects of digital tools on language or other learning outcomes in young children. Neither are current software solutions based on developmental, educational or psycholinguistic principles (Hirsh-Pasek et al., 2015; Kolak et al., 2021). On the one hand, it can be expected that this digital ecology may provide new opportunities and ways of (1) enhancing existing learning environments and (2) devising technologies that can improve learning and adjust to the needs of a variety of groups, and in particular, vulnerable and at-risk groups. On the other hand, the new digital environment may hide undesirable consequences for early child development. "Social networking sites could worsen communication skills and reduce interpersonal empathy; obsessive gaming could lead to greater recklessness, a shorter attention span, and an increasingly aggressive disposition; heavy reliance on search engines and a preference for [Web] surfing rather than researching could result in agile mental processing at the expense of deep knowledge and understanding" (Greenfield, 2014, p. 265). Newly published research suggests an adverse impact of screen time on children's cognitive development (Portugal et al., 2021; Madigan et al., 2020). The challenge, then, is to develop a solid and independent multidisciplinary and longitudinal knowledge base to explain under which conditions harmful versus beneficial effects occur in the context of digital environments, so that effective social, educational, health and online safety policies, and practices can be developed.

The main goal of the MSCA ITN e-LADDA project over the past 4 years has been exactly to provide new evidence on the impact of digital ecologies to children's language development and to assess domains where digital environments can positively impact on early development across different groups of children, both in their first and second language, at different ages, as well as children with developmental disorders. The current conference is the first major interdisciplinary scientific event addressing digital ecology in the context of child development and we welcome current perspectives offered from a variety of disciplines.

Mila Vulchanova, e-LADDA Scientific Coordinator

WELCOME FROM THE ORGANIZING COMMITTEE

The Porto Writing Group is deeply pleased to host the e-LADDA Closing Conference and ELN Pre-Summit Event in Porto. We hope that your conference experience is not only enhanced by the delightful ambience of Porto, but also by the intellectually stimulating atmosphere fostered by our exceptional scientific program and joyful social program. We are confident that you will enjoy our thoughtfully curated program, featuring a wide array of paper presentations, engaging workshops, and three enlightening keynote lectures. Over the next three days, you will find yourself at the heart of the e-LADDA ITN Marie Curie community, a collective of researchers passionate about investigating the impact of digital tools, including tablets, mobile phones, and social robots on language development and literacy learning. Furthermore, we will also be celebrating the recent legal establishment of the European Literacy Network Association. We genuinely welcome you and eagerly anticipate an engaging, insightful, and joyful conference.

Theresa Kalchhauser, Rui A. Alves and the Organizing Team

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CONFERENCE COMMITTEES

SCIENTIFIC COMMITTEE

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Leonor Gomes

Vanessa Milena

Eylem Ahiskali

Raquel Rabelo

GENERAL INFORMATION

CONFERENCE VENUE – FPCEUP

The e-LADDA Closing Conference/ELN Pre-Summit Event is taking place at the Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto (FPCEUP). FPCEUP is one of the 14 faculties of the University of Porto, which is currently the largest higher education and research institution in Portugal. Covering a large range of study areas in Psychology and Educational Sciences, FPCEUP is one the most sought after faculties in Portugal. In the course of its 25 years of activity, FPCEUP has always positioned itself as seeking excellence and deeply committed to guarantee high-standards in education, research, and social services.

REGISTRATION & INFORMATION DESK

The registration and information desk is located at the Entrance Lobby. It will be open during all conference days from 9:30 to 18:00. In an urgent situation you can also reach the information desk or a person of the Organizing Team via the emergency phone.

PRESENTATIONS

Individual Papers
Posters

PLENARY SESSIONS

The Opening Ceremony
The Keynotes Lectures
The Round Table

PRESENTATIONS' TECHNICAL FACILITIES

Oral Communications' Presenters
Poster' Presenters

INTERNET ACCESS

1) *User*: e_LADDA
   Password: e.La.Da.2023
2) Accessing *eduroam* as usual.

COMPUTER FACILITIES

Wireless Network
A Computers Room

FOOD & DRINK

Coffee Breaks
Lunch

LECTURE ROOMS

Auditorium 1
Room 250
Room 241
Room 114

About e-LADDA

Modern digital technologies are transforming rapidly the environment in which children are growing up and developing skills. This new digital reality has both changed the nature of the linguistic input provided to young children, but also affords new ways of interaction with communication agents, such as tablets and robots.

The goal of e-LADDA is to establish whether the new and intuitive interactions afforded by digital tools impact on young children's language development and language outcomes in a positive or adverse way. We further aim to identify exactly what factors in both the technology itself and the communication channel advance language learning and growth or may impede it.

This goal will be pursued in e-LADDA from a highly interdisciplinary and cross-sectorial perspective, bridging between research disciplines and methodologies and in collaboration with industry and the non-academic public sector.

e-LADDA has been awarded support for participation in the EU Horizon Results Booster. In collaboration with Trust-IT Services we will ensure fast and efficient communication of our results.

About ELN

The European Literacy Network (ELN) is an international not-for-profit association of individual literacy researchers and practitioners established on the 3rd of October, 2023, by COST Literacy Actions IS1401 (ELN), IS1404 (E-READ), IS1406, IS14010 (DigiLitEY), and CA15221 (WeReLaTe). The Association fosters networking among its members, promotes literacy research worldwide, and aims to bridge the gap between literacy science and education. Networking, advancement of literacy research, and better literacy education are not ends in of themselves, but means to strengthen individual researchers or practitioners' capabilities, improve literacy education worldwide, promote human development, and spread humanistic values.

To achieve its goals the network carries out many activities, including: ELN reports, topic communities, evidence-based recommendations, short-term exchange missions, training schools, workshops, and the Literacy Summit.

Conference Overview

	Wednesday, 18 Oct	Thursday, 19 Oct		Friday, 20 Oct		Saturday, 21 Oct
09:30		Paper presentations (room 250)	Paper presentations (room 241)	Paper presentations (room 250)	Paper presentations (room 114)	Poster presentations (lobby)
11:00		Coffee break		Coffee break		Coffee break
11:30		Jenny Saffran's Keynote (aud 1)		Tony Belpaeme's Keynote (aud 1)		Workshop - Open Science (room 250)
12:30	Registration (lobby)	Lunch (garden)		Lunch (garden)		Lunch (13h30, Douro boat cruise)
14:30	Opening Ceremony Ladislao Salmerón's Keynote (aud 1)	Paper presentations (room 250)	Paper presentations (room 241)	Paper presentations (room 250)	Paper presentations (room 114)	
16:00	Coffee break	Coffee break		Coffee break		
16:30	Paper presentations (room 250) / Paper presentations (room 252)	Workshop - Thesis Writing (room 250)		Round Table - Social Robots & Education (aud 1)		
	ELN Porto d'Honra (18h30, garden)			Conference dinner (20h, Flor de Paranhos)		

Need help?
Ask the people in yellow

e-LADDA CLosing Conference & ELN Pre-Summit Event

Wednesday, 18 October

12:30	Registration					
14:30	Auditorium 1 **OPENING CEREMONY** ---- **Keynote: Did screen reading habits steal children's focus?** By Ladislao Salmerón						
16:00	Coffee break					
16:30	**Room 250**		**Chair:** Hülya Aldemir	**Room 252**		**Chair:** Giulia Zantonello

Paper presentations

| Reading in Print vs. on Screen: Evidence of Screen Inferiority Effect and General Print Exposure Benefit

Aisha Futura Tüchler & Kate Cain | Are there differences between the metacognitive strategies and executive functions in reading comprehension of young deaf and hearing adults?

Marta Ortiz-Gómez, David Saldaña, Fiona Kyle, Ian C. Simpson, & Isabel R. Rodríguez-Ortiz | Assessing reading comprehension in the digital age: Validation of the German Reading Comprehension Test GraLeV in 5th Grade

Susanne Seifert, Lisa Paleczek & Stefan Meier | Modelling Language Learning in Babies and Robots: The role of Embodied Attention and Contextual Learning

Luca Raggioli & Angelo Cangelosi | Active vs. Passive Learning in Child-Robot Interaction: Leveraging Developmental Sciences for Quality Interactions and Learning

Fatih Sivridag & Nivedita Mani | Robot-Assisted Intervention for Word Learning in Children with Autism Spectrum Disorder

Ana Lucia Urrea Echeverria & Isabel R. Rodríguez-Ortiz | The Impacts of Robot's Perceived Age and Number of Learners on Language Learning Outcomes and Robot's Social Role Perception

Alireza M. Kamelabad & Gabriel Skantze |

18:30	**ELN Porto d'Honra**

e-LADDA CLosing Conference & ELN Pre-Summit Event

Thursday, 19 October

09:30	**Room 250**			Chair: Ana Lucia Urrea	**Room 241**			Chair: Karla Zavala Barreda
Paper presentations	**Application of Cluster Analysis to identify different reader groups through their engagement with a digital reading supplement** Yawen Ma, Kate Cain & Anastasia Ushakova	**Visual support and lexical simplification in reading for populations with different ages and levels of reading skill** Miriam Rivero-Contreras & David Saldaña	**Acquiring knowledge through digital differentiated reading material – first results** Lisa Paleczek, Susanne Seifert, Daniela Ender, Yvonne Fasching & Sabrina Kahr	**Spanish children learning English as a Foreign Language: variables involved in spelling acquisition** Carmen Hevia-Tuero, Paz Suárez-Coalla, Cristina Martínez-García & Olivia Afonso	**The Impact of Writing Technology and Gesture Modality on the Advancement of Early Literacy Development** Theresa Kalchhauser, Mariana Silva, Ana Catarina Canário & Rui A. Alves	**Transcription processes in speech-to-text writing by children with and without reading and writing difficulties** Sanna Kraft, Vibeke Rønneberg, John Rack, Fredrik Thurfjell & Åsa Wengelinohn	**Exploratory Studies on Using Machine Learning to Assess Risk for Learning Disabilities** Yusra Ahmed, Connor Cheek, Abdollah Zaker & Elena Grigorenko	**Anticipatory Processing of Orthographic and Motor Information (APOMI) in word writing** Sonia Kandel

11:00	Coffee break

11:30	**Auditorium 1** **Keynote: Building a lexicon** By Jenny Saffran

12:30	Lunch at the venue

14:30	**Room 250**			Chair: Laura Diprossimo	**Room 241**			Chair: Martina de Eccher
Paper presentations	**Designing a vocabulary learning app for migrant children** Aisha Futura Tüchler, Hülya Aldemir, Karla Zavala Barreda, Martina de Eccher, Ibrahim El Shemy, Luca Raggioli, Alireza Kamelabad, Ziijan Fan & Paula Janjić	**Who is Teaching Kids to Read? A Software Studies Analysis of Apps for Early Literacy** Karla Zavala Barreda, Stefania Milan & Bernhard Rieder	**School entry detection of struggling readers utilising machine learning and process data from a literacy** Njål Foldnes, Per Henning Uppstad, Steffen Grønneberg & Jenny Thomson	**Teaching Foreign Language Adult Learners Creatively: Ways to Bring Fun into English and French Classrooms** Hicham Abdelouafi & Atika Dehimeche	**Speech-to-text for children with reading and writing difficulties – who benefits from using it and who doesn't?** Åsa Wengelin, Sanna Kraft & Fredrik Thurfjell	**Comparing Neural Stimulus Tracking in Children during Face-to-Face and Live Video Communication: An EEG Study** Fatih Sivridag, Mariella Paul & Nivedita Mani	**Child speech phonetic recognition** Zijian Fan	**Social Media Multitasking on a Smartphone Affects Multiple Document Processing and Comprehension** Ymkje Elisabeth Haverkamp, Ivar Bråten, Natalia Latini & Helge Ivar Strømsø

16:00	Coffee break

16:30	**Room 250** **Workshop 1 - Thesis writing** Kate Cain, Nivedita Mani & Kenny Coventry

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Friday, 20 October

09:30	**Room 250**				**Chair:** Fatih Sivridag	**Room 114**		**Chair:** Alireza Kamelabad
Paper presentations	**Compositional Analysis of Technology-Based Writing Interventions: A Meta-Analysis Study** María Victoria González Laguna, Raquel Fidalgo Redondo, Paula López Gutiérrez & Gert Rijlaarsdam	**Situation Model Building of Narrative and Expository Texts in Children** Lara Dilger, Jos Keuning, Marco van de Ven & Eliane Segers	**Practicing writing in an online preschool forum** Dorit Aram & Coral Shachar	**Execution Processes 50+** Esther Odilia Breuer	**Language Development in the Digital Age: Towards Guidelines for Caregivers and Educators** Laura Diprossimo, Karla Zavala Barreda, Martina de Eccher, Paula Janjic & Theresa Kalchhauser	**Exploring the use of digital language learning resources in the UK: Insights from second language teachers** Paula Janjić, Kenny Coventry	**Gender and population-level variables in language learning and use of digital tools** Hülya Aldemir, Paula Janjić, Alireza Mahmoudi Kamelabad, Luca Raggioli & Giulia Zantonello

11:00	Coffee break

11:30	**Auditorium 1** **Keynote: Social robots: science, tech, applications... and Large Language Models** By Tony Belpaeme

12:30	Lunch at the venue

14:30	**Room 250**				**Chair:** Aisha Futura Tüchler	**Room 114**		**Chair:** Luca Raggioli
Paper presentations	**Word Learning via Naturalistic Shared Reading: Effects of Book Format (Print vs Digital) and Child Characteristics** Laura Diprossimo & Kate Cain	**Vocabulary Learning of Deaf/Hard-of-Hearing Children and Adolescents in Tech-Rich Contexts** Hülya Aldemir, Isabel R. Rodríguez-Ortiz & David Saldaña	**Enhancing the vocabulary learning skills of autistic children using augmented reality: a participatory design perspective** Ibrahim El Shemy, Ana Lucia Urrea, Gema Erena-Guardia, David Saldaña, Mila Vulchanova & Michail Giannakos	**Active learning and metacognition when learning words from digital input** Martina de Eccher & Nivedita Mani	**Do individual differences in sensory processing predict language development in Norwegian children?** Giulia Zantonello, Mila Dimitrova Vulchanova & Valentin Vulchanov	**Online applications for the assessment of early language and communication development** Sónia Frota, Marisa Cruz, Marisa Filipe, Pedro Silva & Marina Vigário	**Toddlers, Tech and Talk: 0-3-year-old children's language and literacy learning at home in the UK** Julia Gillen, Rosie Flewitt, Sandra El Gamayel, Karen Winter & Katrina McLaughlin	**Language Development in Young Children During the COVID-19 Pandemic: Factors, Challenges, and the Role of Digital Media** Irene Cadime, Ana Lúcia Santos, María Teresa Martín-Aragoneses, Fernanda Leopoldina Viana & Iolanda Ribeiro

16:00	Coffee break

16:30	**Auditorium 1** **Round Table – What Roles for Social Robots in Education?** Moderation: Theresa Kalchhauser; Discussants: Letizia Jaccheri, Luca Raggioli, Angelo Cangelosi, Mila Vulchanova & Angélica Monteiro

20:00	Restaurante Flor de Paranhos **Conference dinner**

Saturday, 21 October

9:30	Lobby				Chair: Mariana Silva

Posters presentations	HandSpy 3.0: Real-time Writing Analysis in the Classroom Teresa Jacques, Mariana Silva & Rui A. Alves	Mouse trajectories in visual word processing: MouseTracker as a research tool Carmen Hevia-Tuer, Sara Incera, & Paz Suárez-Coalla	Text revision in secondary students: a breakout to promote the improvement of detection and correction skills Paula López, Rubén Díaz-Tejedor, Lourdes Álvarez-Fernández & Olga Arias-Gundín	Links Between Executive Functions and Emergent Literacy Skills: A Longitudinal Study from Preschool to First Grade Marisa Filipe, Tânia Carneiro & Sónia Frota	Treasure in sight!: An instructional breakout to teach writing skills at the beginning of compulsory education María Arrimada, Mª Carmen Álvarez-Moreno, Lorena González & Luis Gutiérrez
	The Relation Between Comprehension of Multiple Digital Texts, Sustained Attention and Digital Media Exposure In Primary School Students: A Longitudinal Study In Progress Anouk Bakker, Marco van de Ven, Jos Keuning & Eliane Segers	Digital breakout to improved metacognitive knowledge about the textual planning process in primary students Patricia Robledo, Vanesa García, Mª Victoria González & Sara Real	How multitasking in multiple devices impacts reading comprehension in early secondary-school students Lidia Altamur & Ladislao Salmerón	CoEN (Cognitive Effort in Noise) App: a serious game application for the assessment of children's ability to focus in noisy environments Gaia Spicciarelli, Flavia Gheller & Barbara Arfé	The Response to Intervention Model (RtI) in writing through ICTs. Mª Carmen Álvarez-Moreno, Raquel Fidalgo & Mark Torrance
	Learning words from a social robot: the effects of feedback Martina de Eccher & Nivedita Mani	Copying Interventions to Improve Copying and Spelling Skills in First-Grade Children Elise Blampain & Marie Van Reybroeck	Validating LEMI: A New Readability Tool for Children's Literature in Romanian Alexandru Oravițan, Mădălina Chitez, Roxana Rogobete, Karla Csürös & Sorin Hagiu	The processes involved in writing and the written product are inseparably related. Can we prove this with the keystroke logging measures? Marina Olujić Tomazin	Impact of excessive blue light on reading: Relevant findings from pre-digital media Stephen Loew, William Coventry & Nigel Vincent Marsh

11:00	Coffee break

	Room 250 **Workshop 2 - Incorporating Open Science Practices on Your Research Workflow** Alessandra S. Souza, Ana Catarina Canário & Teresa Jacques ---- Farewell
11:30	

13:30	Lunch boat cruise

e-LADDA Closing Conference
Social Program

ELN Welcome Drink
Wed, 18 Out, 18H30

What a better way to start the conference than celebrating the recent establishment of the ELN over a Porto d´Honra? Expect delicious canapés, Porto wine, other drinks and great company. This is the perfect time to get to know each other and build relationships. We are already looking forward to it!

Dinner
Fri, 20 Out, 20H

For dinner, we invite you to a cozy, familiar and nearby restaurant, The Flor de Paranhos. With your friends and acquaintances you have made during the conference, you can enjoy the Portuguese cuisine and strengthen the relationships you have made.

Location: Rua da Igreja de Paranhos 162, 4200-326 Porto

Lunch Boat Cruise
Sat, 21 Out, 13H30

See the beautiful and breathtaking views of Porto and Gaia. You will sail through the Douro river with Cruzeiros Douro and experience a mouth-watering meal. Take as many pictures as you want, but remember to savour the moment as much as possible. Boarding at Gaia pier.

The best way to travel trough Porto, live public transit navigation

Free
Paid
Both

moovit
SCAN ME

Suggestions
Downtown Porto

The "Gardens of the Crystal Palace", a beautiful place with peacocks running free. With cafes, restaurants, a library, a children's park and a museum, it is not to be missed. A **13 min walk** takes you to the Lello bookshop, described by The Guardian as "one of the most beautiful bookshops in the world". A historic space with an extravagant neo-Gothic wooden staircase and stained glass windows.

*Next to Torre dos Clérigos

D Next, explore the waiting room of São Bento station, built in 1896. More than a century old, the interior of the Beaux-Arts building is decorated with realistic azulejos, the exquisite blue and white tiles for which Portugal is famous.

Aliados

São Bento

Take the D Metro line to see the unbeatable panoramic views from the belfry of the Torre dos Clérigos. An aerial view of the city, after 225 steps up a narrow spiral staircase, the view is breathtaking.

Pass by Porto Sé Cathedral, which started as a fortified church. Its architectural elements range from Romanesque to Gothic to Baroque. From the square where the cathedral stands, there is a perfect view over the roofs of old Porto.

A day in Porto!

A day's tour could start at a cafe in **Praça da Ribeira**, surrounded by buildings beautifully adorned with azulejos, with views of the port wine lodges across the Douro and the open-air market nearby.

From Praça da Ribeira, it is a short walk to the **Church of São Francisco** in Infante D. Henrique Square.

Behind São Francisco Church, is the **old Stock Exchange Palace (Palácio da Bolsa)**, a pompous 19th-century building with a vast neoclassical facade.

The **Dom Luís I Bridge**, which stretches from the Ribeira district of Porto over the Douro River to Vila Nova de Gaia.

The Serralves Museum of Contemporary Art, designed by the architect Álvaro Siza Vieira, has hosted exhibitions by Paula Rego, Andy Warhol and others. The cultural visit can be rounded off with a stroll through the extensive gardens and green spaces, where oversize outdoor works like Claes Oldenberg's trowel sculpture looms.

Take the F Metro line to the irregularly shaped building designed by architect Rem Koolhaas. It stands out for its modern lines and the variety of cultural programmes it offers throughout the year. The Casa da Música also offers guided tours. Don't miss the chance to see a live music show in one of its stunning concert halls.

Have a late night drink in the Galerias de Paris at the centre of downtown Porto.

The Galerias de Paris street is the centre of the city's night life with dozens of open-air bars.

Try a Francesinha at the Cervejaria Brasão.

The Francesinha is a local sandwich of ham, beef, sausage and cheese with a warm tomato beer sauce and is perhaps the most popular "bite" in Porto. Do not leave Porto without trying it!

Go on a guided tour at a Port wine cellar.

The Port Wine Cellars in Vila Nova de Gaia continue to be a major attraction for visitors, offering tastings of Port Wine and guided tours.

Casa da música

F

Useful Contacts

Porto Police
National emergency number: 112
Local Police - Tel: 00351 222 081 833

Porto Tourism Office
Central Tourist Information Office
25 Rua Clube Fenianos, Porto
Tel: 00351 223 393 472

Travel Information
Sá Carneiro Airport - Tel: 00351 229 432 400
Invicta Radio Taxis do Porto - Tel: 00351 225 076 400
Subway: https://www.metrodoporto.pt

OPENING CEREMONY

Welcome to the e-LADDA Closing conference 2023!

Welcome by

Pedro Nobre, Director of FPCEUP

Rui A. Alves, Conference Manager

Mila Vulchanova, e-LADDA ITN Coordinator

Musical moment by a String Trio

Pedro Oliveira (Violin), Theresa Kalchhauser (Violin) and Tiago Mendes (Violoncello)

G. F. Händel: Water music, Hornpipe

A. Vivaldi: Four Seasons, Largo

J. Pachelbel: Canon

A. Vivaldi: Concerto in G-Major, 1st movement

KEYNOTE LECTURE

Ladislao Salmerón's

Did screen reading habits steal children's focus?

University of Valencia, Spain

The last decade has seen rapid digitisation of reading, which has come with relevant educational implications. Recent meta-analyses evidence a small effect favoring print over screen reading comprehension (e.g. Delgado et al., 2018). A common explanation for this effect relies on the shallowing hypothesis, the idea that as readers interact with digital media they develop a mindset favoring rapid, short, and immediate gratification consumption of information. Such mindset, developed through extensive digital reading habits, may prevent readers from deploying advanced reading comprehension processes (Baron, 2017). Still, the causal link between digital habits and lower comprehension has not been specified. In this talk I will present our current efforts to test an explanatory model that considers that attentional factors mediate such association (concentration-deterioration hypothesis). I will rely on data from a cross-sectional sample of 2771 Primary school students from 4th to 6th grade, which includes measures of reading habits, inhibitory control and reading comprehension.

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Reading in print vs. on screen: Evidence of screen inferiority effect and general print exposure benefit

Aisha Futura Tüchler & Kate Cain

University of Latvia, Latvia
University of Lancaster, United Kingdom

Numerous studies have investigated the impact of different presentation formats on reading comprehension, giving rise to the term "screen inferiority effect". However, it is still unclear under which circumstances this effect arises and what factors contribute to its magnitude. Current evidence suggests that the screen inferiority effect is more pronounced when reading expository as opposed to narrative texts. Yet, it remains to be clarified if the effect varies based on the structure of expository text, and how factors such as print and digital exposure might influence it. The present study investigates how different presentation formats (prints vs. digital) influence text comprehension, and if this influence is affected by different structures of expository text (linear vs. hierarchical), print and digital exposure, and age. Reading comprehension is measured by multiple-choice questions, and reading fluency, vocabulary, print and digital exposure are assessed. Participants are 4th to 6th graders from different primary and secondary schools in Germany. Results indicate that reading comprehension is inferior in the digital condition, but no text structure effect could be evidenced. Furthermore, print exposure was found to have positive effect on reading comprehension irrespective of the format.

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Are there differences between the metacognitive strategies and executive functions in reading comprehension of young deaf and hearing adults?

Marta Ortiz-Gómez, David Saldaña, Fiona Kyle, Ian C. Simpson & Isabel R. Rodríguez-Ortiz

University of Seville, Spain
University College of London, United Kingdom
University of Granada, Spain

Reading performance of deaf students varies according to multiple factors. A large proportion of deaf readers tend to score lower than their hearing peers, and these differences are maintained over time. Recent work highlights the fundamental role of higher-level cognitive components, such as self-regulation and executive functions, in reading performance in the general population, although this had been explored much less in the deaf population. The purpose of the study was to investigate the different role of executive functions in reading comprehension and the different use of metacognitive strategies in severely and profoundly deaf and hearing participants aged 18-35 from the UK, Ireland and the USA. We implemented an online experimental study of two independent samples to test for differences in reading performance and executive function and supervision tasks between young deaf adults (n = 37) and young hearing adults (n = 48), to explore the relationships between these variables in each sample. The experimental task consisted of the Tower of London, N-Back, Go/No Go, Wisconsin Flash Cards, Raven's Progressive Matrices, Adult Reading Test, and the Metacognitive Awareness of Reading Strategies Inventory. We compare and discuss the relationship of executive function and reading in both groups of participants.

*Keywords***:** Reading comprehension monitoring, Executive functions, Deafness

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Assessing reading comprehension in the digital age: Validation of the German Reading Comprehension Test GraLeV in 5th Grade

Susanne Seifert, Lisa Paleczek & Stefan Meier

University of Graz, Austria

To adequately support each student in reading lessons, it is necessary to assess their reading skills. Using digital assessments can support teachers in the process of (repeated) assessment, especially when preparing, conducting, evaluating and documenting assessments. A digital assessment tool for assessing German reading comprehension skills in Grades 3 to 4 was recently adapted for the use in Grade 5. This reading assessment covers three domains referring to reading comprehension on word-, sentence- and text-level. Text-level is assessed via two subtests (Subtest I: presentation of nonsense-stories and corresponding questions, and Subtest II: maze selection), while the other levels consist of one subtest each. This paper focusses on a validation study (data collection: 02/2023-03/2023) of this digital test (N = 218 students). The results are discussed in the light of teachers' needs for and assets and challenges of standardized digital assessments to ease identification of students needing tailored support in reading.

*Keywords***:** reading comprehension, digital assessment, validity, grade 5

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Modelling language learning in babies and robots: The role of embodied attention and contextual

Luca Raggioli & Angelo Cangelosi

The University of Manchester, United Kingdom

Developmental Robotics can provide valuable means to study and understand the language learning process in infants and robots, by describing key mechanisms of language development, such as the role of embodiment, the impact of the attention during an object naming event, or the variety of contexts in which a concept appears before it is learnt. Robots allow computational representation of a phenomenon observed in early learning scenarios by interacting with environment to update its model of it. In this work we investigate how a cognitive architecture relying on data collected with a humanoid robot manages to capture and describe two important factors in early language acquisition: the role of embodiment and attention towards naming moving objects, and the impact of different levels of contextual diversity. The cognitive architecture employed in these experiments is an extension of a connectionist architecture which has been shown to model well human inspired robotic learning tasks. In this extension we manage capturing temporal relationship in moving objects using a dynamic and cumulative learning rate. Our results are in line with observations from experimental sessions with children in the literature and demonstrate how it adapts very dynamically to different learning problems.

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Active vs. passive learning in child-robot interaction: Leveraging developmental sciences for quality interactions and learning

Fatih Sivridag & Nivedita Mani

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Child-robot interaction (cHRI) literature has shown that children can establish joint attention with social robots under certain conditions just by following robot's gaze and learn new material more easily during joint attention episodes. On the other hand, research from developmental psychology suggests that children learn better when they actively choose what to learn compared to when the content is chosen by another agent. In this study, we aim to show how the findings from developmental psychology research can be used in cHRI for higher quality interactions and better learning outcomes. To this aim, after an introduction to the robot, children saw two pictures on a screen and the robot either randomly attended to one of the pictures and started talking about it (passive learning) or followed the child's gaze and gave information about the one the child was attending to (active learning). Based on the literature, we expect to see that children can easily follow the robot's gaze and understand which object it refers to from gaze information only. We also anticipate finding differences in learning scores between active and passive learning conditions. Finally, translation of findings in developmental sciences to cHRI is discussed.

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Robot-assisted intervention for word learning in children with autism spectrum disorder

Ana Lucia Urrea Echeverria & Isabel R. Rodríguez-Ortiz

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Children with autism spectrum disorder may show delays in vocabulary development. Vocabulary delay has been addressed by different technology-based interventions, such as computer-assisted and tablet- assisted interventions. Although the use of robot-assisted interventions has increased, their effectiveness requires further study to be employed as an intervention for word learning in children with autism. Our objective is to explore how social robots and tablets can be used to teach word learning. More specifically: a) to what extent the social robot and the tablet influence word learning, b) if the children benefit more from using a physical robot than a virtual robot, and c) the use of different roles of social robots in word learning interventions. This series of studies shows the effectiveness of robot-assisted intervention compared to a tablet and the traditional intervention method (e.g., one-on-one instruction). In three within-subject experiments, we manipulate conditions which include the robot as a teacher, the robot as a peer, a video of a robot, the use of tablet, and direct human instruction in word learning. This study concludes with preliminary results, an outline of discoveries, and discussion of adaptations for practical use in robot-assisted intervention.

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The impacts of robot's perceived age and number of learners on language learning outcomes and robot's social role perception

Alireza M. Kamelabad & Gabriel Skantze

KTH Royal Institute of Technology, Sweden

Recent studies have extensively investigated the use of social robots as a tool for language learning, focusing on their effectiveness and comparing them with other technologies. However, less attention has been paid to the impact of the robot's appearance and interaction setting. As educational robots are expected to appear in household or school environments, understanding how their designed persona and interaction dynamics affect learning outcomes is crucial. Additionally, in such environments, children may engage in activities individually or collaboratively, with or without an adult present. This paper explores how the appearance and setting of a social robot affect children's language learning outcomes. We designed a word learning game with the Furhat robot and manipulated two factors: the robot's perceived age (adult or child) and the number of learners (one or two). We conducted a between-subject experiment with 75 middle school students and measured their word retention, speech activity, and perception of the robot. We found that solo learners performed better and anthropomorphized the robot more than pair learners. We also found that the robot's age did not influence children's behavior, unlike in human-human interactions. We discuss the implications of these findings for designing educational robots for different environments and scenarios.

Keywords: social robot, word learning, collaborative learning

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Wednesday, 18:30
Entrance, Faculty

ELN Porto d'Honra

To close the first day of the Conference, you are invited to have a taste of Porto Wine at the entrance of the Faculty.

Application of Cluster Analysis to identify different reader groups through their engagement with a digital reading supplement

Yawen Ma, Kate Cain & Anastasia Ushakova

Lancaster University, United Kingdom

This study focused on the identification of reader profiles that differ in performance and progression in an educational literacy app. A total of 19,830 students in Grade 2 from 347 elementary schools located in 30 different districts in the United States played the application from 2020 to 2021. Our aim was to identify unique groups of readers using an unsupervised learning technique – cluster analysis. Six indicators generated from the students' log files were included to provide insights into engagement and learning across four different reading-related skills: phonological awareness, early decoding, vocabulary, and sentence comprehension. Our secondary aim was to evaluate the implementation and performance of Gaussian Mixture Models, k-means, k-medoids, Clustering Large Application and hierarchical clustering, alongside provision of detailed guidance that can benefit researchers in the field. K-means algorithm performed the best and identified nine groups of readers. Children with low initial ability showed more engagement with code-related games (phonological awareness, early decoding) taking longer to master the games, whereas children with high initial ability showed more engagement to meaning-related games (vocabulary and sentence comprehension). Our findings can inform further research that aims to understand individual differences in learning behaviour over time across various cohorts of children.

Keywords: cluster analysis, engagement, big data

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Visual support and lexical simplification in reading for populations with different ages and levels of reading skill

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Cognitive accessibility requires the adaptation of written texts to an easy-to-read format. Visual support and lexical simplification are two relevant adaptations for texts in this format. These types of written document are usually designed for people with some kind of comprehension difficulty, but anyone can benefit from them. However, its application in an educational context is rarer. This study examined the influence of visual support and lexical simplification in an experimental task with three populations with different reading profiles: 40 university adults with and without dyslexia, 60 adults with different levels of education, and 55 adolescents with different levels of reading. The experimental task presented 60 sentences: half contained a picture related to the text and half did not; in turn, half contained a low-frequency target word and half a high-frequency target word. The results showed a slightly different impact of visual support and lexical simplification on sentence-level processing in the three populations, and a similar impact of these two word-level adaptations in the two adult populations. It is concluded from this research that visual support is useful for different populations but lexical simplification might only be so for adults.

Keywords: visual support and lexical simplification, adults with dyslexia, adults with a low level of education

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Acquiring knowledge through digital differentiated reading material – first results

Lisa Paleczek, Susanne Seifert, Daniela Ender, Yvonne Fasching & Sabrina Kahr

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In the cooperative project RegiNaDiff (https://regional-nachhaltig-differenziert.uni-graz.at/en/), we developed differentiated (4 reading levels) digital reading materials, enriched with reading comprehension and cooperative tasks for use in inclusive lessons in Grades 4 and 5. Through differentiation, students should be able to acquire knowledge together on the same topic, regardless of their individual reading abilities. In order to investigate whether this knowledge acquisition could be successfully ensured, the students (N = 136) were asked to note down what they knew about the respective topics before and after two of the lessons. In addition, interviews were conducted with the participating teachers (N = 9) on the use of the materials in inclusive lessons. Initial calculations indicate knowledge gains for all students and across all levels of differentiation (T = -13.83, p = <.001), with students with the highest reading level showing the most knowledge gains (T = -10.01, p = <.001). In the presentation, detailed results on students' knowledge gain at all reading levels and preliminary results of the interviews regarding use of the materials in inclusive reading lessons will be presented. In addition, the advantages and limitations of the material will be discussed.

Keywords: differentiated materials, digital materials reading comprehension, knowledge acquisition

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Spanish children learning English as a Foreign Language: Variables involved in spelling acquisition

Carmen Hevia-Tuero, Paz Suárez-Coalla, Cristina Martínez-García & Olivia Afonso

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Universitat Oberta de Catalunya, Spain
Oxford Brookes University, Spain

Learning to spell in English as a Foreign Language (EFL) is a challenge for Spanish children. They need to rely on different sources of lexical and sublexical information. However, this may vary across grades. In this study we investigated the spelling acquisition in EFL by Spanish children, and which variables are more determinant. Through a spelling-to-dictation task of English monosyllabic words, we assessed the role of P-O consistency, lexical frequency, word length, and children's semantic knowledge (translation to Spanish). Spelling accuracy, written latencies, and writing durations were collected. Our results showed differences between grades. Word length only influenced younger children; while lexical frequency, consistency and semantic knowledge facilitated performance in older children. These findings suggest that cumulative exposure to English may lead to an improvement in spelling due to vocabulary growth and sensitivity to new spelling patterns and regularities. Such development occurs despite differences between the orthographies of the native and foreign language, and a lack of explicit instruction in EFL spelling.

Keywords: —

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e-LADDA CLosing Conference & ELN Pre-Summit Event

The impact of writing technology and gesture modality on the advancement of early literacy development

Theresa Kalchhauser, Mariana Silva, Ana Catarina Canário & Rui A. Alves

University of Porto, Portugal

The skill to write and read is a fundamental part of education. As technology continues to replace analogue writing media, examining the effectiveness of these changes is crucial. Furthermore, along with these changes, the gesture modality of handwriting is in decreasing use. Do these changes have an impact on early literacy development? We conducted an intervention study to answer this question by exploring which writing media and gesture modalities are most effective in fostering literacy skills in children. We systematically manipulated writing medium [paper vs tablet] and gesture modality [handwriting vs tapping] across an ecologically valid intervention to teach kindergarteners cursive letters. Therefore, we used a 2 x 2 experimental design, comparing four experimental groups (n = 88) to a non-intervention control group (n = 33). Regarding writing media the results show that paper or tablet had a similar impact on kindergarteners' letter learning. Regarding gesture modality, the pairwise comparison indicated that younger kindergartners seem to profit more from tapping, whereas the older benefited similarly in both gesture modalities. The study delivers concrete findings in this research area and provides both print and digital instructional materials for future educational applications.

Keywords: writing, literacy, children, technology

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Transcription processes in speech-to-text writing by children with and without reading and writing difficulties

Sanna Kraft, Vibeke Rønneberg, John Rack, Fredrik Thurfjell & Åsa Wengelin

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University of Stavanger, Norway
Linnaeus University, Sweden

Children with reading and writing difficulties have difficulty in achieving fluent transcription due to spelling difficulties. Speech-to-text (STT) has been proposed to possibly facilitate their transcription by bypassing the spelling process. To investigate this, we examined transcription and error correction processes and their relation to production rate in a sample of Swedish 10–13-year-olds with and without reading and writing difficulties using STT for writing. We determined the effects of individual abilities: working memory, spelling, decoding and general STT skill on burst length, burst accuracy and production rate. Production rate was predicted by working memory capacity, burst length and burst accuracy. In addition, burst accuracy was only predicted by general STT skill (in test), but not by any of the other individual abilities. Dictating more than one word at a time and combining STT and keyboard use were identified as two useful transcription strategies. The results suggest that producing text using STT is a cognitively complex process that makes heavy demands on working memory, and that STT skill (the combined effect of the technical capabilities of the STT tool and the participant's output) is crucial to achieving fluent transcription without unnecessary interruptions.

Keywords: writing processes, reading and writing difficulties, speech-to-text

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Exploratory studies on using machine learning to assess risk for learning disabilities

Yusra Ahmed, Connor Cheek, Abdollah Zaker & Elena Grigorenko

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University of Houston, USA

Two preliminary studies employ machine learning (ML) techniques to assess the risk of learning disabilities (LD) in students in upper elementary to middle school. The first study leverages ML algorithms to analyze code-based handwriting features as potential indicators of LD risk in a sample of 146,000 student essays. We employ advanced digital image processing techniques to preprocess these handwriting images, enhancing their visual quality for more accurate recognition. Unique visual attributes are subsequently extracted from the optimized images using saliency maps and attention mechanisms, enabling us to distinguish between LD and typical development (TD). The second study, focusing on a subset of 1,534 students, utilizes both ML and natural language processing (NLP) to explore meaning-based features vital for evaluating higher-order reading and writing skills. We extract a comprehensive set of approximately 800 NLP features, covering aspects such as grammar, cohesion, syntactic complexity, lexical sophistication, and lexical diversity. Rooted in the principles of literacy research and translational science, these studies aim to bridge the gap between cutting-edge computational methods and evidence-based educational practices. By synergizing these advanced computational approaches with educational expertise, we aspire to establish a new benchmark for precision and inclusivity in educational assessments and interventions.

Keywords: —

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Anticipatory Processing of Orthographic and Motor Information (APOMI) in word writing

Sonia Kandel

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I will present the APOMI model of word writing (Anticipatory Processing of Orthographic and Motor Information). It is based on fine-grained writing data acquired with digitizers. In this new theoretical framework, word writing is the result of a topdown activation flow from central orthographic processes to peripheral motor processes. APOMI supposes that writers continuously anticipate information on different aspects of the letters of a word. At the orthographic level, they anticipate letter chunks before starting to write the word. Once they start to write, while producing the initial letters of the word, they activate information on the following letter chunks. There is a double route system in which a lexical procedure processes the spelling of a word by anticipating linguistically-significant letter chunks that refer to the morphological, syllabic and graphemic components of the word. There is also a phonological route responsible of segmenting the word into syllables and phonemes. Both procedures continuously generate inputs to the motor processing levels. When the information reaches the lower processing levels, the anticipatory processes concern effectorindependent and effector-dependent informational units that are involved in the production of the writing movements. These anticipatory processes stop at the end of the word.

Keywords: —

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KEYNOTE LECTURE

Jenny Saffran's

Building a lexicon

University of Wisconsin-Madison, US

Early word learning is driven by numerous factors. Some reside in the input (the words and worlds that infants experience), and some reside in the child themself (the words and worlds that infants actually attend to). In my presentation, I will consider some of the factors that drive the acquisition of early word meanings and emerging semantic networks, including active sampling, prediction, real-world contexts, and alignment between parental beliefs and child lexical knowledge.

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Thursday, 14:30 – 16:00

Room 250 - Paper Presentations

Slot5

Designing a vocabulary learning app for migrant children

Aisha Futura Tüchler, Hülya Aldemir, Karla Zavala Barreda, Martina de Eccher & Ibrahim El Shemy

University of Latvia, Öatvia
University of Seville, Spain
University of Amsterdam, Netherlands
University of Göttingen, Germany

Across Europe, half of the population is either multilingual or lives in a multicultural and multilingual environment. Meanwhile, a portion of children do not speak the language of school instruction at home. Insufficient language skills in the early years can potentially have a far-reaching and long-lasting impact on children's educational trajectory. To address this issue, a tablet-based application was developed to promote early vocabulary acquisition among migrant children, drawing on insights from various disciplines. The design process started with stakeholder interviews to explore the potential uses of an app to support vocabulary learning in migrant preschool children. The structure and content of the app was designed according to insights from developmental science research, considering theories on vocabulary learning, and educational principles for designing apps that facilitate language acquisition. The novelty of this contribution lies in its goal of evaluating whether allowing children to make choices about what they learn enhances learning outcomes compared to passive reception of learning content. A prototype was created and tested in a pilot study with preschoolers. This contribution will present preliminary results from pilot testing and discuss insights gained from the design process. Additionally, directions for improvement will be identified and discussed.

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Who is teaching kids to read? A software studies analysis of apps for early literacy

Karla Zavala Barreda, Stefania Milan & Bernhard Rieder

University of Amsterdam

Apps for early literacy are one of the most popular genres of educational apps aimed at young children. Research into this app genre is dominated by education and children's development literature with a focus on apps' content and the effects of use and exposure during early childhood. Although insightful, this research does not consider the socio-technical conditions under which apps are produced, distributed, and consumed. This paper adopts a software studies perspective to explore how early literacy apps are distributed on app stores and how platforms govern apps for children. First, by analysing scraped app store search results for Apple and Google, it critically scrutinises the platform's distribution conditions for children's educational content. Second, by means of a comparative walkthrough analysis of how the two app stores frame the Kids category, the paper investigates the platform's infrastructures as they are intended for two publics: developers and users. By approaching apps for early literacy as sociocultural objects, this research fills a gap in the current literature on educational apps by (1) providing insights into the role platforms and algorithms play in the development and circulation of educational apps, and (2) contextualizing them within larger sociocultural trends of digital media.

Keywords: educational apps, socio-cultural, early literacy

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School entry detection of struggling readers utilising machine learning and process data from a literacy

Njål Foldnes, Per Henning Uppstad, Steffen Grønneberg & Jenny Thomson

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BI Norwegian Business School, Norway
University of Sheffield/Norwegian National Reading Center, University of Stavanger, Norway

Current methods for reading difficulty risk detection at school entry rely on few behavioural datapoints, and remain error-prone. We present a novel approach utilising machine learning analysis of data from a fun and pedagogical serious literacy app for "stealth detection". The GraphoGame app was played in class daily for ten minutes by 1676 Norwegian first graders, over a five-week period during the first months of schooling, generating rich process data. Combined with results from the end-of-year national screening test conducted 5-6 months after the completion of gameplay, machine learning modelswere trained on the process data to identify learners with risk of developing reading difficulties. The best performing machine learning models correctly identified approximately 75% of the students at risk for developing reading difficulties. Such a level of sensitivity is promising and to our knowledge, this study is one of the first to investigate the potential of predicting emerging reading difficulties using machine learning on game play data collected in an ecologically valid educational setting.

Keywords: early years education, data science application in education, games

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Teaching foreign language adult learners creatively: Ways to bring fun into English and French classrooms

Hicham Abdelouafi, Atika Dehimeche

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University of Jean Jaurès Toulouse II, France

Standard foreign language education methods have witnessed continuous change. Nowadays, in the digital age, the language classroom must modernize its teaching methods to develop the language and literacy of learners, and encourage them to acquire any language enthusiastically and appropriately. Therefore, our study aims to motivate adult learners to improve their literacy: vocabulary and pronunciation (phonetics), in English and French, through music. Therefore, we interviewed teachers of phonetics and oral expression at University of Mostaganem in Algeria: 2 English teachers and 2 French teachers (n = 4) and targeted university students (n = 20), 10 from Algeria and 10 from France, to compare between language acquisition in the two countries. Practically, we played songs (e.g., R&B, Hip-Hop, and Rap) in virtual classrooms to engage some Algerian university students in such an experiment. Results revealed that French students, Algerian students and their teachers showed their enthusiasm and interest towards the use of music as an approach to memorize new vocabulary and enhance their pronunciation levels. They were motivated to consider the implementation of music to improve pronunciation and acquire vocabulary in both languages. Songs have proven that the process of foreign language teaching/learning can be much easier and fun provided that songs are selected purposefully.

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Thursday, 14:30 – 16:00

Room 241 - Paper Presentations

Slot6

Speech-to-text for children with reading and writing difficulties – who benefits from using it and who doesn't?

Åsa Wengelin, Sanna Kraft, Fredrik Thurfjell

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Writing is challenging for most children with reading and writing difficulties, and poor spelling is often cited as their main problem. Allowing them to use speech-to-text (STT) technology to dictate their texts instead of typing or handwriting could be a viable solution to avoid that struggling with spelling impedes higher-level processing, and hence results in unnecessary poor texts. However, we have limited knowledge of the impact of STT on children's writing processes and written texts, especially for languages other than English. Our paper explores the benefits of using speech-to-text technology (STT) and focus, in particular, on how spelling and decoding skills affect its efficacy. We compared texts (N = 149) written by 10-13-year-old Swedish children (N = 57) with and without spelling and decoding abilities using either keyboard or STT. We used linear mixed models to analyse the interaction between group membership (no difficulties, only spelling difficulties and both spelling and decoding difficulties) and input modality, on text length, vocabulary diversity, syntactic complexity, and text quality. We found that children with both decoding and spelling difficulties, but not those with only spelling difficulties, demonstrated higher quality and productivity when using STT. Theoretical and practical implications of this will be discussed in our presentation.

Keywords: reading & writing difficulties, speech-to-text, spelling

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Comparing neural stimulus tracking in children during face-to-face and live video communication: An EEG study

Fatih Sivridag, Mariella Paul & Nivedita Mani

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Numerous studies have shown that there is a correlation between the physical qualities of an auditory stimulus and the neural response of a brain listening to it. This correlation has been observed in several different listening conditions with different populations. However, there has not been much research on whether there are qualitative and quantitative differences in neural tracking between face-to-face and online video communication in children, whose use of online video communication has increased significantly in recent years. To address this gap in the literature, we collected electroencephalogram (EEG) recordings from 30 5-year-old children while they listened to children's stories read aloud by an adult storyteller either face-to-face or via live video in a within-subject design. During pre-processing, EEG recordings were cleaned from noise and synchronised with the audio recordings. We used multivariate temporal response function to compare children's neural stimulus tracking in both media of communication. In our preliminary analyses we have observed that stimulus tracking emerges in both types of communication. Implications of the results for online video communication and future directions are discussed.

Keywords: Stimulus tracking, Online Communication, Temporal Response Function

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Child speech phonetic recognition

Zijian Fan

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Recently End-to-End models have shown significant improvement in child speech recognition, however the character-based CTC decoding often generates some words out of vocabulary. These words may have similar pronunciation with the correct words. To investigate the performance of phonetic level performance, we propose a phonetic level fine-tuning method to improve the performance of wav2vec2 on the task of child speech phoneme recognition. We find out a high correlation between the quality of recorded speech and PER. For the good quality speech, the PER is often below 10%, while for the bad quality speech the PER is often above 30%. We also find out high PER often indicates there are mistakes from the transcriptions. The PER can be further reduced after correcting these mistakes.

Keywords: child speech recognition, end-to-end models, PER

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Social media multitasking on a smartphone affects multiple document processing and comprehension

Ymkje Elisabeth Haverkamp, Ivar Bråten Natalia Latini & Helge Ivar Strømsø

Department of Education, University of Oslo, Norway

Media multitasking refers to simultaneous engagement in two activities, or the act of switching between multiple activities, of which at least one is a media activity. Based on this definition, we had 134 undergraduates read four partly conflicting texts on sun exposure and health on a computer in order to write a report on the issue, with half of the participants (randomly assigned) receiving and reading short, authentic social media messages on a smartphone while reading the documents, and the other half reading the documents without being sent any such messages. Further, we manipulated what participants did after reading each document paragraph, with half of the participants (randomly assigned) briefly summarizing the main idea of each paragraph in writing, and the other half just rereading each paragraph. Participants' processing strategies were assessed with a task-specific self-report measure and their comprehension of the documents was assessed by means of post-reading written reports on the issue in question. Results indicated that social media multitasking on a smartphone disturbed both the processing and the comprehension of the documents, with main idea summarization mitigating or counteracting these negative effects of multitasking. Implications of this study will be discussed in the conference.

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Workshop

Thesis writing

Kate Cain, Kenny Coventry & Nivedita Mani

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University of Göttingen, Germany

Writing a doctoral thesis can be a challenge for different people for different reasons. Writing a doctoral thesis is also an opportunity: many of the habits and skills you practise and develop when writing your thesis are important for other forms of dissemination in an academic career, such as job applications and funding proposals. In this workshop, we'll discuss some common pitfalls, share some top tips, and introduce some activities that can help the writing process.

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Compositional analysis of technology-based writing interventions: A meta-analysis study

María Victoria González Laguna, Raquel Fidalgo Redondo, Paula López Gutiérrez & Gert Rijlaarsdam

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Previous meta-analyses show that the use of Information and Communication Technologies (ICT) benefits writing skills, but do not provide an in-depth analysis of writing interventions' instructional designs. Our aim was to analyze compositionally different technology-based writing interventions focused on improving students' writing. Eleven studies met our criteria, of which we identified the instructional principles, instructional activities, and kinds of feedback and scaffolding. Each variable was coded as: not specified, present by teacher, present by ICT, or present by teacher and ICT. Then, overall effect size and meta-regression analyses were performed in SPSS. Results show a large general effect size ($g = 1.08$, $se = .51$, $p < .03$) with large heterogeneity between studies. The integration principle and brainstorming, modeling, provide writing spaces, and publication activities were significantly related to differences in effect size; generally showing a larger effect when they were realized by the teacher and ICT jointly. Regulative feedback and metacognitive scaffolding were significantly related to differences in effect. In summary, ICT cannot replace the teacher, but its use to support interventions seems to be effective in improving students' writing skills. This paper is supported by project TED2021-132647B-I00 and a pre-doctoral grant from JCyL awarded to María Victoria González-Laguna.

Keywords: meta-analysis, instructional activities, writing competence

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Situation model building of narrative and expository texts in children

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Although children are known to better comprehend narrative versus expository texts, a recent study by Wannagat and colleagues (2021) showed that when children listened to either a narrative or expository story about the same content, they did not show a difference in memory between the two. Possibly, established differences in comprehension between text types are due to individual variation in prior knowledge rather than text characteristics. Therefore, we examine to what extent children differ in situation model as well as textbase building while reading expository versus narrative texts, in a setting where the topic is kept constant across both text types. As multiple choice tests mainly assess the textbase model, we will use two additional tests aimed at assessing the situation model as well as the textbase model: a relatedness judgement task and a sorting task. In a between-subjects design, about 180 fifth-graders read a narrative or an expository text. Afterwards they will be asked to perform the three tasks to assess their comprehension. Data collection is ongoing. We expect enhanced comprehension when reading a narrative compared to an expository story. Results as well as their implications will be discussed.

Keywords: reading comprehension, situation model building, text genre

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Practicing writing in an online preschool forum

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Activities involving screens and keyboards are commonplace in preschoolers' life. Technology is a meaningful learning environment in which writing (using a keyboard) becomes accessible for preschoolers. The study combined children's screen activities with parental home literacy support and created closed internet forums within preschools.

The study aimed to learn how the extent of parent-child participation in these online forums predicts children's interest in early literacy and early literacy skills (letter knowledge, phonological awareness, word spelling, and vocabulary). Participants were 174 preschoolers (M = 65.57 months) and their parents from eight preschools. Parents participated in a 3-hour workshop where they learned about developmentally appropriate writing support. They were asked to help their children write at least one new post and one response to a friend's post every week. Each preschool's closed forum was online for ten weeks.

Results showed that the extent of children's participation in the forums (number of words) predicted growth in their literacy skills while controlling for SES, the child's gender, self-regulation, interest in literacy before the intervention, and the pre-test score on each literacy measure. Children's participation in the forums predicted growth in their literacy interest beyond SES, child's gender, self-regulation, and literacy interest before the intervention.

Keywords: Early literacy, Home Literacy environment, Online forums

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Execution processes 50+

Esther Odilia Breuer

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Due to digitization, writing has become one of the most important forms of communication. For the growing elderly population, actively using writing to support cognitive processes could be a promising option. However, this can only be successful as long as the motoric execution works in an automated way. To analyse whether the patterns of execution processes change with age, we conducted a study with 419 participants between the ages of 55 and 84. They underwent a test battery of their cognitive abilities and then a copy-task test using the keylogging program InputLog. In this test, participants were presented with strings of characters, phrases, and sentences which they had to copy as quickly as possible. The analysis of the speed and accuracy of performance showed that the fluency of motoric execution diminishes with age. Although the error rate seemed to stay stable over the years, a combinatorial analysis of the influence of age and speed on the correctness of performance, one could see that slow typing only had a positive effect on correctness in the younger group, but with growing age, descent in speed went hand in hand with ascent in errors.

Keywords: Execution, copytasks, age

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Language development in the digital age: Towards guidelines for caregivers and educators

Laura Diprossimo, Karla Zavala Barreda, Martina de Eccher, Paula Janjic & Theresa Kalchhauser

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Children are surrounded by portable digital tools that afford novel and quite intuitive interactions. Yet, the evidence on how digital technologies influence language development is sparse and inconsistent, with a lack of clear guidelines for caregivers and educators. Here, we take a first step and synthesize the evidence around the links between the use of digital technology and language development. Critically, our goal was to ensure that this emerging evidence is made accessible to stakeholders. Literature review and informal interviews confirmed the need to provide clear guidelines on this issue. We identified three critical areas for recommendations to caregivers and educators. These evidence-based recommendations were embedded in an engaging and accessible video format, allowing relevant stakeholders to easily access these recommendations and make informed decisions around when, what, and how digital content can promote children's language development. This contribution provides an example of how research findings can be summarised and communicated to the general public by presenting evidence-based recommendations in an engaging and accessible video format. This approach could serve as a basis for the development of more comprehensive guidelines and recommendations.

Keywords: language development, digital media, guidelines

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Exploring the use of digital language learning resources in the UK: Insights from second language teachers

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A significant increase in the number of digital technologies for second language learning is changing traditional ways of language learning, both at the individual level and within classrooms. However, their use across the UK classrooms is not well understood. To address this, a survey was conducted among a stratified sample of language teachers with the goal of obtaining insights into their use of digital technologies and the properties of the resources used. Features of individual software were rated by teachers based on principles from educational and language learning theories. The findings indicate an extensive use of digital language learning resources. However, a more detailed evaluation of individual software used revealed that they vary in fulfilling the learning requirements set out by language learning theories. Further qualitative analysis also identified the main barriers to use. This study provides valuable insights showing that these tools are indeed becoming an integral part of language learning pedagogy. However, there are still obstacles present that could be avoided at different stages of design and implementation. Receiving this type of input from expert end-users helps to evaluate existing technologies and to emphasize the need for continued research and development of digital language learning resources.

Keywords: language learning and teaching, second language acquisition, language learning software

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Gender and population-level variables in language learning and use of digital tools

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Data on household composition, children's media exposure, language environments and language habits can be a valuable tool for obtaining a deeper understanding of the factors related to the children's early language and cognitive development. While obtaining a comprehensive dataset with this information poses a challenge, it is crucial as an informative resource that can provide guidance to parents, educators, and policymakers on the appropriate use of digital media. This project aims to provide an overview of media exposure in households across different countries, including the type and duration of content consumed on various platforms. This will allow us to examine how media exposure, content, and mode of consumption are associated with household composition, parental education, and the languages spoken within the family unit. Moreover, we seek to explore possible hidden correlations between the collected measures and demographic and other population-level indices. To this goal, responses to a specifically designed questionnaire are currently being collected across countries (Germany, United Kingdom, Norway and Spain). In this contribution, we discuss challenges concerning the questionnaire design, data collection and storage, and present preliminary results on children's media exposure in a variety of household settings.

Keywords: Survey, digital tools, language learning

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e-LADDA CLosing Conference & ELN Pre-Summit Event

KEYNOTE LECTURE

Tony Belpaeme's

Social robots: Science, tech, applications... and Large Language Models

Tony Belpaeme, Ghent University, Belgium

The study of Human-Robot Interaction focuses on how people respond to interacting with robots and how we can build the technology to meet the expectations of a flowing and natural interaction with robots. In the past decade, we not only understood more about how people perceive and respond to these robots, but the social robots coming out of this research have been used in a range of applications. I will offer examples of the technology we develop, some of the insights from our empirical work we do, and give an overview of recent applications in education and healthcare. The talk finishes on some speculation on where the new breakthroughs in AI, and specifically in Large Language Models, will take the development of social robots.

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Word learning via naturalistic shared reading: Effects of book format (print vs digital) and child characteristics

Laura Diprossimo, Kate Cain

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Shared book reading provides unique opportunities to foster children's vocabulary development. Yet, the factors contributing to word learning via naturalistic shared reading are still poorly understood. The Reading Medium and Meaning (READ2ME) study examined 1) whether book format (print vs digital) influences young children's acquisition of new word meanings via naturalistic shared reading; and 2) whether book format interacts with child characteristics to shape word learning outcomes. British English-speaking caregivers and their 4- to 5-year-olds took part in this pre-registered study [Ndyads = 100]. In a cross-sectional, within-subject design, dyads completed two shared reading activities: one with a print book, and one with a digital book, with the order of presentation counterbalanced across participants. Two custom storybooks with embedded low-frequency words were created in print and digital format, so that each book served as the digital condition for half of the participating dyads, and the print condition for the other half. After the shared reading episodes, children were tested on target vocabulary knowledge and completed broader assessments of vocabulary, visual attention, and working memory capacity. Results offer new insights into how book format and child characteristics interact to shape the acquisition of new vocabulary via naturalistic shared reading.

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Vocabulary learning of deaf/hard-of-hearing children and adolescents in tech-rich contexts

Hülya Aldemir, Isabel R. Rodríguez-Ortiz & David Saldaña

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Deaf/Hard-of-Hearing (DHH) persons might show delays in language development compared to their hearing peers due to lack of sufficient support in access to language input. Vocabulary development is one of the ways to improve their general language skills. Our previous systematic review (Aldemir et al., in press) revealed that many aspects of vocabulary teaching for young DHH populations are still lacking, such as little use of different visual aids (e.g gestures or lipreading). In response to this, we have developed a series of eye-tracking studies on a tablet and computer for DHH participants aged 8-16 in which we use visual aids such as (1) static and dynamic images with corresponding gestures, (2) lipreading, and (3) sentences including target words with an image reflecting the context. Moreover, we investigate the exposure of participants to digital media to see whether their interaction with visual support on technological devices is facilitated by their previous experience. We will discuss the results we obtained so far and compare them with previous research to provide an overview of advances and suggestions for future research on teaching vocabulary to young DHH populations.

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Enhancing the vocabulary learning skills of autistic children using augmented reality: A participatory design perspective

Ibrahim El Shemy, Ana Lucia Urrea, Gema Erena-Guardia, David Saldaña, Mila Vulchanova & Michail Giannakos

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University of Seville, Spain

Many autistic children face challenges with word learning. Augmented Reality (AR) has the potential to improve their learning process by leveraging their visuo-perceptual strengths. However, there is a gap in the literature on how AR solutions should be designed, and what guidelines should be considered. Extant solutions supporting autistic children in vocabulary learning using AR have been created without taking into consideration insights from children, their parents, or experts. This paper explores the potential of AR in enhancing word learning in autistic children through a participatory design approach. Involving experts with a background in psychology, pedagogy, speech therapy, and special education, as well as autistic children and their parents, resulted in a better understanding of the underlying mechanisms used to teach vocabulary and the interaction modalities offered by AR to engage the children. This work will facilitate the design of an AR technology to support word learning in autistic children.

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Friday, 14:30 – 16:00

Room 250 - Paper Presentations

Slot9

Active learning and metacognition when learning words from digital input

Martina de Eccher & Nivedita Mani

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With the increasing presence of digital devices in young children's lives, there has been a surge of educational apps promising to foster children's learning. Research has been aiming at identifying the features that make apps suitable for children learning. Among these features, active learning seems to boost learning, allowing children to adapt their learning experience to their current knowledge state, thereby filling knowledge gaps. However, to be able to select learning materials that would fill knowledge gaps, children need to be aware of what they know and what they don't know. Throughout preschool years, children develop their explicit metacognitive abilities, and by around 5 years of age, they have some ability to accurately report that they don't know something, although they tend to overestimate their knowledge. In this study, we use a tablet-based word-learning task to examine whether preschool- and school-aged children accurately estimate their knowledge of newly learned word-object associations and whether they use these estimates to actively elicit information to reduce gaps in their knowledge. Furthermore, we investigate whether such behaviour leads to improved accuracy at test. Findings of this study will be presented, discussing the role of active learning and metacognition in word learning in digital environments.

Keywords: active learning, metacognition, word learning

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Do individual differences in sensory processing predict language development in Norwegian children?

Giulia Zantonello, Mila Dimitrova Vulchanova & Valentin Vulchanov

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Statistical learning (SL) has been proposed to subserve language acquisition and development in children. According to this account, individual differences in the ability to extract statistical information from the environment might explain children's language variability. Most of the studies testing the association between SL abilities and language development have focused on lexical skills and therefore it is unknown whether this association holds for other language domains. The aim of this study is to advance the current understanding of how sensory processing impacts language development in preschoolers, an age range that was found to be understudied in literature. Particularly, we seek to disentangle the predictive effects of SL skills in the auditory modality on preschoolers' language outcomes across various domains (lexicon, syntax, morphology, and phonology). To reach this goal, behavioral and electrophysiological measures were collected from a group of children from 4 to 6 years old, using both a battery of cognitive tests and electroencephalography (EEG) brain signals recorded when participants were exposed to auditory stimuli. Preliminary results of the study will be presented. Outcomes from this work will contribute to the understanding of how children learn language and could be useful in applied research and interventions with children.

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Online applications for the assessment of early language and communication development

Sónia Frota, Marisa Cruz, Marisa Filipe, Pedro Silva & Marina Vigário

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The timely assessment of language and communication skills is crucial for effectively addressing the needs and challenges of inclusive societies. In this study, we present a novel approach that utilizes well-established assessment tools through online applications, allowing for convenient on-screen evaluations using computers, tablets, or smartphones. This approach enables flexible and accessible screening, monitoring and intervention in a wide range of contexts and for various users, including practitioners, educators, researchers, and caregivers. Our novel approach includes app versions for European Portuguese of the MacArthur-Bates Communicative Development Inventory Short forms (CDI) and the Communication and Symbolic Behavior Scales Developmental Profile (CSBS-DP) Infant-Toddler Checklist. These apps provide automatic scoring and percentile profiles for individual infants and toddlers, together with information guidelines for caregivers and detailed reports for health care providers, making the assessment process efficient and user-friendly. Given that these tools cover key abilities in early language and communication development, their unrestricted availability allows routine developmental screening and facilitates early identification of risks for language and communication impairments, leading to early diagnosis and intervention. This, in turn, results in individual, social, and economic benefits by addressing developmental delays and promoting language and communication skills from an early age.

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Toddlers, Tech and Talk: 0-3-year-old children's language and literacy learning at home in the UK

Julia Gillen, Rosie Flewitt, Sandra El Gamayel, Karen Winter & Katrina McLaughlin

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Manchester Metropolitan University, United Kingdom
Queen's University Belfast, Ireland

Most children in contemporary society are born into homes where digital technologies feature prominently in their families' everyday language and literacy practices. Even the youngest children begin to observe and use language in authentic contexts that include digitally-mediated activities, such as reading digital books, playing on screen, finding information online and interacting with distant family and friends. Digital technologies offer rich opportunities to promote early talk and literacy yet many parents, educators and caregivers are unsure how to support very young children's engagement with new media in meaningful and playful ways that benefit their learning and their futures, or how to manage young children's digital safety and security. We report on the design and findings from the first stage of a major ESRC funded research project across the UK. In phase 1 we conducted a systematic literature review. We ran a survey, translated into 13 languages, of parents and guardians to enquire about attitudes and practices involving digital media with their young children. At this conference we will be able to reveal our findings. Subsequent project phases will include interviews N = 60 of families and education and care professionals and finally N = 40 detailed case studies in homes using a qualitative methods palette.

Keywords: very young children, digital age, UK

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Friday, 14:30 – 16:00

Room 114 - Paper Presentations

Slot9

Language development in young children during the COVID-19 pandemic: Factors, challenges, and the role of digital media

Irene Cadime, Ana Lúcia Santos, María Teresa Martín-Aragoneses, Fernanda Leopoldina Viana & Iolanda Ribeiro

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The COVID-19 pandemic and the measures implemented to contain it have posed new challenges for children's care and education. This study aimed to investigate the language development of children who were born during the pandemic and the factors associated with it. Data was collected from 402 children, aged between 30 and 41 months, living in all seven regions of Portugal. The data was collected through parental reports, using the CDI-III and a questionnaire to assess family practices and gather sociodemographic information. Results showed that 34.3% of the children were below the 10th percentile in vocabulary, and 19.2% were below the 10th percentile in syntax when compared to pre-pandemic norms. Current media use had a marginally negative effect on vocabulary and syntax. Mothers who worked remotely during the second lockdown read books more frequently to their children, but those also had higher educational levels than mothers in other work regimens. A higher frequency of book reading during the pandemic was associated with better current language development. These findings provide an overview of children's language skills in the post-pandemic period and can inform the development of strategies to promote children's language development.

Keywords: vocabulary, syntax, digital media use

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Round table

What roles for social robots in education?

Moderation: Theresa Kalchhauser

Letizia Jaccheri, Luca Raggioli, Angelo Cangelosi, Mila Vulchanova & Angélica Monteiro

Our daily lives are becoming unimaginable without the presence of robots. For instance, digital assistants provide cooking recipes, several Apps offer the fastest travel routes, or the Da Vinci Surgical Robot handles complex surgical procedures. How does the situation unfold in the field of education?

This panel discussion aims to explore the current state and future implications of using social robots in educational settings. In the context of education, social robots ought to be perceived as representations or portrayals of agents, rather than actual agents themselves. In the discussion, experts from both academia and practical fields will engage in an insightful conversation. By bringing together diverse perspectives, we want to explore the potential benefits that social robots offer in education. However, we will critically assess the likely drawbacks and challenges associated with their implementation. By engaging in a thoughtful dialogue, educators and researchers can weigh the benefits against the potential drawbacks and develop strategies to maximize the benefits while softening the risks of using social robots in education.

Friday, 18:30

Conference dinner

We invite the e-LADDA conference participants to a typical Portuguese dinner.

Poster presentations

Chair: Mariana Silva

HandSpy 3.0: Real-time writing analysis in the classroom

Teresa Jacques, Mariana Silva & Rui A. Alves

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Writing involves creating content and presenting it in a way that fits the needs of a reader and is germane to the ideas of the writer. Cognitively this involves a variety of processes, making it extremely complex and cognitively demanding, including transcription, planning and revising. Transcription is a particularly important component for children's writing development, including both spelling and handwriting. Real-time logging of writing is currently a prime method for making inferences about the cognitive processes in writing. One idea behind real-time analysis is that burst-pause dynamics and writing fluency can reveal underlying cognitive processes during writing. HandSpy 3.0 is a free web-based application for recording and analyzing handwriting in real time. For data collection, HandSpy 3.0 requires two tools: smartpens and microdotted paper, thus preserving a natural writing environment. HandSpy 3.0 can be used for several purposes in the classroom, for example to better understand the development of writing throughout schooling, to analyze spelling or it could be an on-line writing tool providing feedback to the writer. This makes HandSpy 3.0 an environmentally friendly, reliable and powerful tool for large-scale to use in educational settings.

Keywords: Writing, analysis, logging tool

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Mouse trajectories in visual word processing: MouseTracker as a research tool

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Reaction times and accuracy are valuable measures in psycholinguistics research. However, by using participants' computer mouse movements as they respond to a task, information about online processing can be collected. MouseTracker (Freeman & Ambady, 2010) is an open-source software based on the mouse-tracking paradigm, which collects errors, reaction times, mouse trajectories, and numerous other variables. This software is useful to explore the timing of the cognitive processes underlying participants' responses to linguistic tasks (e.g., visual lexical decision tasks using pseudohomophones, letter detection tasks). As findings from both tasks suggest (Hevia-Tuero et al., 2021; Hevia-Tuero et al., 2022), MouseTracker is a helpful tool to investigate the unfolding of cognitive processes and behavioral patterns beyond traditional overall measures of performance.

Keywords: —

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Text revision in secondary students: A breakout to promote the improvement of detection and correction skills

Paula López, Rubén Díaz-Tejedor, Lourdes Álvarez-Fernández & Olga Arias-Gundín

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The European Commission has recently published a plan to foster the implementation of ICT in education (European Commission, 2023). Digital methods have been recognized as particularly useful tools for the teaching of writing (Limpo et al., 2020). However, implementing evidence-based practices through ICT is not always straightforward. This study describes a breakout designed in a digital environment to work on the revision skills of students in secondary education (12-16 years). Based on students' difficulties with revision (MacArthur, 2016) the breakout consists of three instructional modules. In the first one, the instruction focused on improving students' audience awareness. In the second, students are instructed in the PIENSO revision strategy, which represents the different aspects that students must revise (Initial Plans; Ideas; Structure; Links; Syntax; Spelling). In the third module the instruction focused on error correction strategies. All modules are based on effective instructional approaches and methods for the teaching of revision (MacArthur, 2012). In addition, an initial and a final assessment module, were included to evaluate students' revision skills. Scientific and educational contributions of this digital tool will be discussed at the conference. This work is part of the project Reference: TED2021-132647B-I00, funded by CIN/AEI/10.13039/501100011033 and by the European Union "NextGenerationEU"/PRTR".

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Links between executive functions and emergent literacy skills: A longitudinal study from preschool to first grade

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Despite progress in understanding the link between emergent literacy skills and executive functions (EFs), which refer to a set of skills involved in goal-directed activities crucial for the regulation of thoughts and actions, the need for further research on the extent and directionality of this link is undeniable. This study employs a longitudinal design to examine the link between emergent literacy skills and EFs in typically developing children. Data were collected from preschool to 1st grade, with assessments conducted at two time points. A total of 80 typically developing children were included in the study. The emergent literacy skills were assessed using measures of phonological awareness, rapid naming, letter reading, and word and pseudoword reading. EFs were assessed using measures of flexibility, inhibitory control, and working memory. The data is being collected until the end of June 2023 and will be analyzed until the end of July 2023. Cross-lagged longitudinal structural equation modeling will be applied to examine between-measure correlations at each time point as well as longitudinal paths across adjacent grades, including within-measure autoregressive paths and between-measure cross-lagged paths. This will provide a comprehensive and rigorous analysis of the relationships between EFs and emergent literacy skills.

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Treasure in sight!: An instructional breakout to teach writing skills at the beginning of compulsory education

María Arrimada, Mª Carmen Álvarez-Moreno, Lorena González & Luis Gutiérrez

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Colegio Maristas San José, Spain

Literature reviews (McArthur, 2005; Williams & Beam, 2019) emphasize significant benefits of computer-mediated writing instruction in students' composing processes, engagement and motivation. Provided that ICTs seem to be a valuable tool to teach writing, this study describes a writing instructional software to teach handwriting, spelling and narrative planning at the beginning of compulsory education. The software presents a gamified design set in a pirate environment and it contains 3 modules, one for each writing process. Instructional activities' design is based on empirically-validated instructional practices to teach handwriting (Hoy et al., 2011), spelling (Williams et al., 2017) and composing (Koster et al., 2015). Instructional practices in the handwriting module include modelling and self-assessment, used to practice alphabet knowledge, letter strokes and fluency. The spelling module includes word analogies, modelling, goal setting, self-assessment, word lists and systematic study of spelling strategies. These are oriented to learn spelling rules and the use of suffixes and prefixes. The planning module aims to teach planning strategies for narrative writing through cognitive self-regulated instruction. The software can be divided into instructional sessions according to teacher's criteria and classroom needs. Contributions of these tool will be discussed at the conference. Educational resource supported by project TED2021-132647B-I00.

Keywords: breakout, handwriting, spelling

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Digital breakout to improved metacognitive knowledge about the textual planning process in primary students

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Technologies can support writing instruction (Strobl et al., 2019). The aim of this study was to design a digital breakout, set in a police theme, oriented to improved metacognitive knowledge about the textual planning process in primary students. The breakout is based on effective strategic and self-regulated practices for teaching writing (CSRI, Fidalgo & Torrance, 2018) and includes different instructional components (direct instruction and modeling), learning activities (missions) and examples of quality text, in a gamified environment. Also, the breakout includes two questions to assess declarative and procedural knowledge about planning, which are integrated at the beginning and at the end of the plot. These act as pretest-posttest assessment. Answers are analyzed using the category system proposed by Fidalgo & García (2003), which allows to know students' metacognitive awareness about the planning process and other writing processes (monitoring, revision, mechanics or emotional). Results of the pilot application with a sample of 155 students (52.9% female) in grades 4th-5th (n = 70) and 6th (n = 85) are being analyzed and will be presented at the conference, along with the conclusions and implications of the work. Project: TED2021-132647B-I00.

Keywords: breakout, instruction, metacognition

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e-LADDA CLosing Conference & ELN Pre-Summit Event

The relation between comprehension of multiple digital texts, sustained attention and digital media exposure in primary school students: A longitudinal study in progress

Anouk Bakker, Marco van de Ven, Jos Keuning & Eliane Segers

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The digitization of society has instigated questions about digital reading comprehension. Many challenges and opportunities arise when trying to Comprehend Multiple Digital Texts (CMDT). It is unclear whether children can focus on what they read and reach deep levels of reading comprehension when confronted with the many opportunities and challenges accompanying digital reading. We are conducting a longitudinal study into the complex task of CMDT in children in middle primary grades. The main focus of our study is the predictive value of cognitive linguistic abilities and digital exposure to CMDT, as well as the development of CMDT. Our poster will show the preliminary findings of our study's first and second waves. We have collected data for roughly 200 third-grade children and used eye-tracking in a subsample of approximately 50 children. We expect cognitive-linguistic abilities (i.e., sustained attention, working memory, decoding ability, vocabulary, basic computer knowledge, prior knowledge, topic interest) and analogue print exposure to positively predict CMDT. Furthermore, we are keen to examine whether digital exposure has a negative or positive predictive value of CMDT. By better understanding CMDT, we hope to inform and improve educational practice regarding digital reading comprehension.

Keywords: comprehension of multiple digital texts, digital media exposure, sustained attention

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Copying interventions to improve copying and spelling skills in first-grade children

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Purpose. At school, the copying task is considered a technique for learning to spell. However, despite its daily use, it is rarely taught explicitly, and few studies focused on it. The present study aimed to evaluate the effectiveness of two copying interventions on the copying performance and spelling skills of primary-grade children.

Keywords: copying, intervention, written language

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How multitasking in multiple devices impacts reading comprehension in early secondary-school students

Lidia Altamur & Ladislao Salmerón

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Multitasking is a pervasive behavior in current digital media landscape. Recent meta-analytical evidence has found greater disruption of multitasking on reading comprehension in print compared to digital formats (Clinton-Lisell, 2021). Despite the unclear nature of this effect, two potential explanations exist. Firstly, in the original multitasking studies, participants in print-reading conditions usually engage in multitasking using a different device, while those in digital-reading conditions use the same screen. Secondly, digital reading prompts more multitasking and distractions compared to print (Delgado & Salmerón, 2021), something readers could be accustomed to nowadays. To test these possibilities, the current study followed a 2 (media: print or digital reading) x 2 (multitasking: experimental or control) design. The experimental multitasking condition mimicked instant messages conversations and interrupted the reading of 4 expository texts, forcing students to switch between media settings, regardless of their reading medium. Moreover, while research has focused mainly on superior education, we focused on secondary-school education: 191 Spanish students of 7th grade participated in the study. The objective is to identify the effect of multitasking across different reading media and examine the relationship with individual readers' differences (self-regulation measures, reading comprehension, inhibition control, multitasking habits, reading media preferences).

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CoEN (Cognitive Effort in Noise) App: A serious game application for the assessment of children's ability to focus in noisy environments

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Children spend most of their time in schools. Unfortunately, classrooms do not always provide an optimal acoustic environment for learning, due to the presence of noise (whether external or internal) and reverberation. It has been widely demonstrated that noise has negative consequences on children's learning (on reading and math) and cognition (on attention and working memory). CoEN (Cognitive Effort in Noise) is an App developed to easily assess children's executive functions when exposed to noisy environments. The App, available for tablets, contains six standardized neuropsychological tests adapted in the form of engaging games. Verbal working memory, visual attention and non-verbal inhibition skills are assessed in quiet and noise. In this paper, we will present the design and evaluation of the app. The tests performed in the evaluation phase involved 233 primary school children, with and without learning disabilities or sensory impairments. Preliminary results showed that CoEN was easy to use, engaging and enjoyable for the children. It also captured individual differences in children's response to noise. Overall, the app provides a promising tool for children, as well as for teachers, parents or professionals, who wish to evaluate their cognitive abilities to cope with noise in an easy and engaging way.

Keywords: serious game, noise, executive functions

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The Response to Intervention Model (RtI) in writing through ICTs

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The Response to Intervention (RtI) model is an effective approach for the prevention of learning disabilities (LD). The application of the RtI model has focused almost exclusively on the prevention of reading and mathematics, with writing taking to a secondary role. At the same time, RTI empirical evidence on its application emphasised the difficulties experienced by teachers in preparing and implementing the model in the classroom (Powell et al., 2019). Based on these limitations, two complementary technological educational software tools are presented that focus on the application of the RtI model in writing. The first consists of the early identification of at-risk students of LD through the monitoring of the student's learning curve in terms of handwriting, spelling and planning. The second, based on instructional practices with scientific evidence, focuses on the teaching of handwriting, spelling and planning skills, through two levels, I aimed at the class group, and II aimed at at-risk students of LD. These software will be empirically contrasted through a comparative study with control and experimental groups, evaluating the degree of prevalence of at-risk students of LD in writing who received the instruction educational software and the control group that received a traditional teaching of writing.

Keywords: RtI Model, Educational software, Writing

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Learning words from a social robot: The effects of feedback

Martina de Eccher & Nivedita Mani

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The potential use of social robots for education has gained increasing interest in research on child-robot-interaction. A widely debated subject centers around the potential benefits of physical robots for learning, compared to non-embodied technologies like computers or tablets. In this context, the effects of feedback provided by social robots on children's learning assume an important role. The embodiment of robots, combined with the ability to provide social cues such as gaze and facial expressions, might enhance the attention to the feedback and increase retention of corrected information. This study aims at comparing learning outcomes of 6-10-year-old children who engage in a word-learning task using a combination of a social robot and a touchscreen versus only a touchscreen device. Specifically, we employ Furhat, a talking robot head, to teach children new word-object associations. The interaction between the children and the social robot occurs through a touchscreen, where novel objects are presented and where children are tested on their knowledge of the newly learned word-object associations. We present our findings on the effects of feedback on learning outcomes in the two conditions as well as the potential differences between learning from a social robot and learning from a touchscreen.

Keywords: child-robot interaction, feedback, word learning

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e-LADDA CLosing Conference & ELN Pre-Summit Event

Validating LEMI: A new readability tool for children's literature in Romanian

Alexandru Oravițan, Mădălina Chitez, Roxana Rogobete, Karla Csürös & Sorin Hagiu

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The increased rates of school dropout and functional illiteracy in Romania are reflected in Romanian students' poor PISA test results (OECD 2019). Considering this, a team of linguists from the West University of Timișoara, Romania, initiated a research project focusing on the linguistic complexity assessment of the texts that schoolchildren read. The project resulted in the development of LEMI, a literacy support tool which has been created in partnership with representatives from the Romanian school system and an educational NGO. LEMI offers several functionalities, among which: a searchable children's literature repository and an interface for the automatic assessment of short reading text complexity. This paper showcases the classroom trial stage of the readability levels according to which texts are distributed in the digital repository. By asking children to evaluate the difficulty of the texts we proposed to them and by comparing their evaluation with our automatically generated text complexity reports, we were able to calibrate and consequently validate the readability and complexity formulas designed for the tool's pilot version. Thus, within the wider frame of tool development, we demonstrate how both linguistic research and user-generated data can be employed to enhance reading motivation and promote autonomous learning among schoolchildren.

Keywords: readability assessement tool, children's literature, corpus based readability tool for Romanian language

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The processes involved in writing and the written product are inseparably related. Can we prove this with the keystroke logging measures?

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Text writing is about assembling sentences into a unique, coherent, and cohesive larger structure - the text. At the same time, there are many processes going on in the background (planning, reviewing, decision making, choices, etc.) that are more or less under the author's control. But is it easy to prove this connection? The aim of this study is to provide insight into the relationships between process variables (pauses, revision, fluency) measured with the Keystroke Logging Tool (KSL) and text quality characteristics.

A total of 48 adults (age: M = 27 (± 4.58) years; gender: M = 27, F = 21), native Croatian speakers, participated in the study. Language skills and NVIQ were average. Process variables were measured using the KSL Inputlog (Leijten and van Waes, 2013), the direct real-time method. The linguistic features of the text were analysed directly, while the text quality was assessed by independent examiners.

The correlation analysis between many different KSL process and product variables will be discussed. In addition, the results show that the texts were rated good to very good in all indirect measures of text quality. The direct analysis of the texts shows that adults make more mechanical and spelling errors than grammatical errors.

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Impact of excessive blue light on reading: Relevant findings from pre-digital media

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Reading involves complex phonological processes. Yet reading can only begin when the retina receives photons reflected or emitted from the written media. Consequently, reading efficacy is influenced by three external factors: the amount of illumination, the spectral properties of the illumination, and the reflectance/emittance properties of the media being read (e.g., contrast; brightness). Moreover, adjustments to any factor can enhance or reduce visual comfort and thus reading efficacy. In modern classrooms, however, these fundamental factors affecting reading have changed substantially. In this presentation we examine the details and magnitude of such changes. We then present a reanalysis of data from our earlier study of visual stress in proficient readers. We found that participants wearing reading glasses (CR39 lenses) reported significantly less visual stress than participants without reading glasses. The finding that even clear optical spectacles can have spectral-filtering benefits may provide further evidence that the current trend towards increased blue light content in modern illumination and visual media (for brightness effect) has similar effects upon visual and reading comfort as the well-documented detrimental effects of over-illumination. These findings may be pertinent to the fact that PISA statistics consistently show declining trends in student literacy for most OECD nations.

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Workshop

Incorporating open science practices on your research workflow

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The aim of this workshop is to present an introduction to open science practices, highlighting their benefits for the researcher, the scientific community, and the society at large. Open science practices enable the sharing of any kind of output, resource, material, method, or tool produced throughout the research workflow. Their advantages include the increase in transparency, robustness, and rigor of the conducted research, as well as added accessibility and magnified impact of the different research outputs produced during the lifetime of a project beyond the traditional focus on the publication of manuscripts. Based on this framework, the current workshop will provide an overview of the different open science practices and how they fit into the research workflow, while specifically offering resources and examples regarding the practices of sharing materials and methods (*open materials*), data (*open data*), and manuscripts as pre and post-prints (*open access*), and finally of preregistering of research plans. Information on the open science practices will be framed and presented in line with the European Commission recommendations, and the examples will be demonstrated using the Open Science Framework (OSF) platform (www.osf.io), which will also be followed by practical exercises. At the end of the workshop, attendees will be able to: (a) list the benefits of including open science practices in their research workflow, (b) use the OSF to share their data, materials, and manuscripts, and (c) know the templates for the preregistration of different types of research (quantitative, qualitative, systematic reviews, secondary data reuse, etc). Researchers are encouraged to bring their laptops to work on the proposed exercises live during the session.

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Farewell

Saturday, 13:30

Lunch boat cruise

We will conclude the conference by enjoying a boat lunch along
the scenic Douro River.

e-LADDA CLosing Conference & ELN Pre-Summit Event

Ground Floor

114

Computers Room

Aud 2B   Aud 2C

Aud 2A

Aud 1

Upper Floor

250   252

241

Library

Entrance
Registration and Help Desk
Lunch and Coffe Breaks Area
Auditorium and Room
WC
Posters

Rooms
WC