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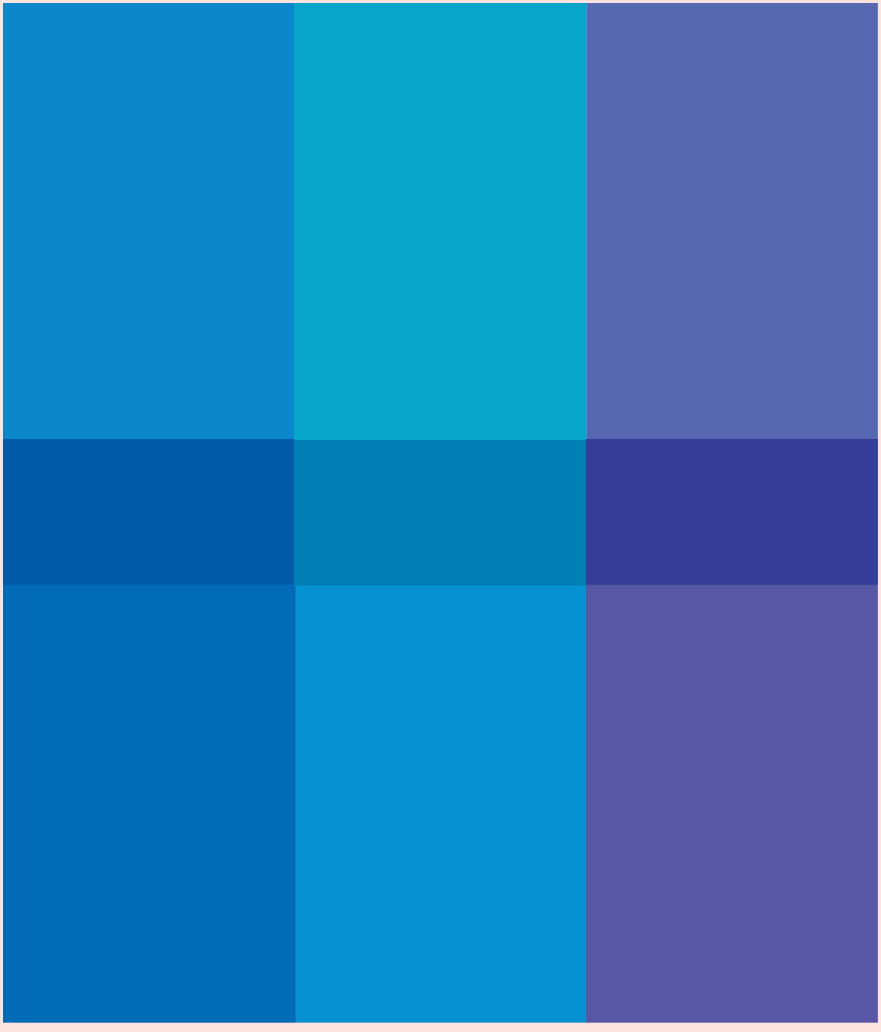

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The CEPS Journal is an open-access, peer-reviewed journal devoted to publishing research papers in different fields of education, including scientific.

Aims & Scope

The CEPS Journal is an international peer-reviewed journal with an international board. It publishes original empirical and theoretical studies from a wide variety of academic disciplines related to the field of Teacher Education and Educational Sciences; in particular, it will support comparative studies in the field. Regional context is stressed but the journal remains open to researchers and contributors across all European countries and worldwide. There are four issues per year. Issues are focused on specific areas but there is also space for non-focused articles and book reviews.

About the Publisher

The University of Ljubljana is one of the largest universities in the region (see www.uni-lj.si) and its Faculty of Education (see www.pef.uni-lj.si), established in 1947, has the leading role in teacher education and education sciences in Slovenia. It is well positioned in regional and European cooperation programmes in teaching and research. A publishing unit oversees the dissemination of research results and informs the interested public about new trends in the broad area of teacher education and education sciences; to date, numerous monographs and publications have been published, not just in Slovenian but also in English.

In 2001, the Centre for Educational Policy Studies (CEPS; see http://ceps.pef.uni-lj.si) was established within the Faculty of Education to build upon experience acquired in the broad reform of the national educational system during the period of social transition in the 1990s, to upgrade expertise and to strengthen international cooperation. CEPS has established a number of fruitful contacts, both in the region – particularly with similar institutions in the countries of the Western Balkans – and with interested partners in EU member states and worldwide.

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Revija Centra za študij edukacijskih strategij je mednarodno recenzirana revija z mednarodnim uredniškim odborom in s prostim dostopom. Namenjena je objavljanju člankov s področja izobraževanja učiteljev in edukacijskih ved.

Cilji in namen

Revija je namenjena obravnavanju naslednjih področij: poučevanje, učenje, vzgoja in izobraževanje, socialna pedagogika, specialna in rehabilitacijska pedagogika, predšolska pedagogika, edukacijske politike, supervizija, poučevanje slovenskega jezika in književnosti, poučevanje matematike, računalništva, naravoslovja in tehnike, poučevanje družboslovja in humanistike, poučevanje na področju umetnosti, visokošolsko izobraževanje in izobraževanje odraslih. Poseben poudarek bo namenjen izobraževanju učiteljev in spodbujanju njihovega profesionalnega razvoja.

V reviji so objavljeni znanstveni prispevki, in sicer teoretični prispevki in prispevki, v katerih so predstavljeni rezultati kvantitavnih in kvalitativnih empiričnih raziskav. Še posebej poudarjen je pomen komparativnih raziskav.

Revija izide štirikrat letno. Številke so tematsko opredeljene, v njih pa je prostor tudi za netematske prispevke in predstavitve ter recenzije novih publikacij.

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Editorial

Teaching English as a Foreign/Second Language Students with Specific Learning Difficulties

Various European Commission policy documents highlight the importance of pluri/multilingual education and provide a number of arguments for such a policy; for example, (1) individuals who learn more languages have better personal and professional opportunities, (2) multilingual societies foster cultural awareness, mutual understanding and social cohesion, and (3) multilingual workers with intercultural competences are a vital resource for helping businesses succeed and grow in global markets (European Commission, 2012). The language that is most taught and assessed as a first foreign language is English: 97% of all young Europeans study English as a first foreign language. Eurydice reports that, in almost all European countries, English is the foreign language learnt by most students during primary and secondary education. It is also a mandatory foreign language in nearly all education systems that stipulate a particular foreign language that all students must study (Eurydice, 2017).

However, when it comes to measuring foreign language competences of secondary school students, the European Survey on Language Competences (2012), which assessed English as a first foreign language (EFL) in 13 out of 16 education systems, revealed that only 42% of the tested pupils overall reached the level of independent user in the first foreign language (B1 level). This means that, after several years of studying a language in school, the majority of young Europeans cannot hold a simple conversation in the language they have studied (European Commission, 2012). One of the potential reasons for such a poor result might be that some of the students find learning English particularly difficult because of their inherent, physiological characteristics. These students are commonly defined as students with specific learning difficulties, and they have only recently come to the attention of EFL researchers (Kormos, 2017a; Kormos et al., 2018; Nijakowska & Kormos, 2017b).

Kormos argues that, although the cognitive factors that influence processes of second language (L2) development have been widely researched, the language learning processes of students with specific learning difficulties have received little attention (Kormos, 2017). Despite the fact that statistics show that one out of ten students might potentially have some form of learning difficulty, (language) teacher education programmes still devote very little attention to enhancing (language) teachers' competences in teaching students with specific learning difficulties. To support students with specific learning difficulties who

learn English as a second/foreign language, all stakeholders involved in language learning/acquisition (preschool teachers, primary teachers, head teachers, teacher trainers, researchers, decision makers, etc.) need to understand how individual differences in cognitive functioning influence second/foreign language acquisition in these students. With this is mind, the editors of the current issue invited authors to investigate the learning and teaching of students with specific learning difficulties in both school and out-of-school contexts where English is taught/used as a second/foreign language. More specifically, this special issue welcomed articles that discuss issues such as memory difficulties and learning/teaching ESL/EFL, organisational difficulties and learning/teaching ESL/EFL, writing difficulties and learning/teaching ESL/EFL, visual processing difficulties and learning/teaching ESL/EFL, reading difficulties and learning/teaching ESL/EFL, auditory processing difficulties and learning/teaching ESL/EFL, time management difficulties and learning/teaching ESL/EFL, sensory distractions and learning/teaching ESL/EFL, identification of specific learning difficulties in learning/teaching ESL/EFL, classroom accommodations for foreign/second language learners with specific learning difficulties, specific learning difficulties and developing phonological and orthographic awareness in learning/teaching ESL/EFL, specific learning difficulties and teaching vocabulary and grammar in the ESL/EFL context, specific learning difficulties and teaching listening and speaking in the ESL/EFL context, specific learning difficulties and teaching reading and writing in the ESL/EFL context, assessment of ESL/EFL learners with specific learning difficulties, ESL/EFL teachers' competences in teaching students with specific learning difficulties, inclusive policies in English language education and similar. We were pleasantly surprised by the enthusiastic response of more than twenty contributors who sent in their abstracts on the topic of teaching EFL/ESL students with specific learning difficulties. After a careful selection process, seven articles were accepted as the focus articles of this issue. Next to these, the issue also brings three varia articles and two book reviews.

The first article, entitled *Disability, Inclusion and Language-in-Education Policy in the Global South: The Colombian Context*, provides arguments and solutions for a more localised approach to meeting the educational needs of English language learners instead of following one single international standard that is commonly decided and designed in the so-called Global North. According to the authors, the suggested model should incorporate local knowledge and practice based on Global South epistemologies to ensure that all students receive culturally and context-sensitive equitable classroom instruction.

In the second article, entitled *The Universal Genre Sphere: A Curricular Model Integrating GBA and UDL to Promote Equitable Academic Writing*

Instruction for EAL University Students, the authors propose an instructional model called the universal genre sphere (UGS) for teaching academic writing, which is especially suitable for learners of English as an additional language (EALs) with or without learning differences. The model is therefore designed for all kinds of learners, which inclusive education is per se. The authors' intention was, inter alia, to bring together three otherwise separated disciplines of research, i.e., second-language writing, English as an additional language and learning differences. The new inclusive and effective (UGS) model has therefore been designed based on the theories of universal design for learning, the genre-based approach and the teaching-learning cycle. How does this look in practice? The model exploits students' interests while breaking the learning process into manageable and adjustable components, thus making academic writing accessible to learners with learning differences, as well. Moreover, the authors encourage other researchers to design their own context-specific implementations of this new model, thus providing practice with more evidence-based data of the efficiency of the model.

The next article, entitled *The Influence of Technology in Educating English Language Learners at-risk or with Disabilities: A Systematic Review*, focuses on the increased development of technological tools in inclusive language education, an area that gained additional momentum during the Covid-19 pandemic. The authors conducted a systematic review of the empirical studies of technology tools for ESL/EFL students with learning difficulties published in the last twenty years. The paper presents the frequent mental and physical difficulties of English language learners, typical technological tools used in and out of school and, more importantly, their effects on student learning outcomes and perceptions. The authors also call for more attention to be devoted to the use of technology, especially for language learners with special needs, and suggest open issues worth investigating in the future.

The article entitled *Meeting the Needs of Learners with Specific Learning Difficulties in Online and Face-to-Face Language Classrooms: Teacher Beliefs and Practices* focuses on language teachers' beliefs, knowledge and practices concerning the provision of high-quality education to learners with specific learning difficulties in different educational contexts around the world. This qualitative study suggests that, regardless of the educational setting, teachers are faced with similar challenges in teaching learners with specific learning difficulties. A lack of specialised training in this area is the common key factor, which further affects the quality of teaching practice. During the pandemic, technology-assisted online instruction was perceived as favourable by learners with certain types of learning difficulties. These findings are important for further research, as well as for teacher practitioners and teacher educators.

The authors of the next article, entitled *Undergraduate and Graduate Students' Beliefs about Dyslexia: Implications for Initial Foreign Language Teacher Education*, employed a convergent parallel mixed methods design and discovered that both undergraduate and graduate students have an almost equal number of misconceptions about dyslexia, with the majority affirming that they need more training in teaching students with dyslexia or other specific learning difficulties. The study also identifies a framework of three main student concerns about teaching students with dyslexia and other learning differences, i.e., teacher beliefs and attitudes, teaching practices and teacher preparation.

The sixth article, entitled *Inclusive Teaching Practices with Learners with Dyslexia: Face-To-Face Training-Induced Changes in Foreign Language Teachers' Self-Efficacy Beliefs, Concerns and Attitudes*, reports on how foreign language teachers' self-efficacy beliefs, concerns and attitudes related to implementing inclusive instructional practices with learners with dyslexia changed as a result of their participation in an intensive face-to-face course on dyslexia and FL teaching. Several potential variables were examined and, interestingly, no significant effects of general teaching experience, experience in teaching learners with dyslexia, teaching context (country), fulltime employment and level of education on self-efficacy beliefs and attitudes were found either before or after the course. However, teaching context (country) and fulltime employment did differentiate participants with regard to how concerned they were about implementing inclusive teaching before the course and these differences prevailed after the course.

The final focus article, entitled *Dyslexia and English as a Foreign Language in Norwegian Primary Education: A Mixed Methods Intervention Study*, reports on the exploration of the effect of specific teaching accommodations for English language learners with dyslexia in a Norwegian primary school. Specifically, the impact of multisensory techniques on spelling skills and motivation was investigated. The findings revealed that all of the participating pupils reported gains in their motivation and improvement in attitude towards learning English. The reader can also find some teaching recommendations in the article for using specific accommodations for EFL learners with dyslexia.

In addition to the focus issue, there are also three articles in the Varia section and two book reviews, one covering the topic of immigrants in Slovenia through the research prism of students at the Faculty of Education, University of Ljubljana, and the other addressing the focus of the current issue, Supporting Learners with Dyslexia in the ELT Classroom. The three varia articles discuss (1) access to intervention programmes for children with poor reading skills, (2) the collaborative wall as a technological means to improve

the teaching-learning process in physics instruction, and (3) some insights into engineering education teaching practice during the Covid-19 pandemic. Readers are warmly invited to engage with all of the engrossing articles collected in the present edition of the CEPS Journal.

Karmen Pižorn and Milena Košak Babuder

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Disability, Inclusion and Language-in-Education Policy in the Global South: The Colombian Context

Rosa Dene David*[1] and Kimberley Brown[2]

This paper calls for a shift related to English language-in-education policy and inclusive education initiatives in Colombia to ensure that English language learners with disabilities receive equitable and inclusive classroom instruction that is context-appropriate. We call for English language initiatives and policies to draw from theories and practices from both the Global South and the Global North in order to teach towards inclusive education. Trends in both English language teaching and inclusive education have drawn upon the Global North for solutions, which cannot be systemised to fit one international standard. Instead, using the Colombian context as an example, the present paper suggests a localised approach to meeting the educational needs of English language learners that incorporates inclusive education at the institutional level. This model would favour the work of scholars within the region to ensure that all students receive equitable classroom instruction that builds in Global South epistemologies and localised ways of knowing.

Keywords: language-in-education policy, Global South, inclusion, disability, English language teaching

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Posebne potrebe, inkluzija in vključenost jezikov v izobraževanju v državah tretjega sveta: kolumbijski kontekst

Rosa Dene David in Kimberley Brown

Članek poziva k premiku glede strategije vključevanja angleščine v izobraževanje in pobud za inkluzivno izobraževanje v Kolumbiji, da bi se zagotovilo, da tudi učenci angleškega jezika s posebnimi potrebami doživijo pravičen in vključujoč pouk v razredu, ki bi bil kontekstualno primeren. Pozivamo, da naj se pobude in načrtovanja v povezavi z angleškim jezikom črpajo iz teorij in praks z vseh delov sveta, in to v smeri poučevanja na ravni inkluzivnega izobraževanja. Trendi pri poučevanju angleškega jezika in inkluzivnem izobraževanju se namreč navezujejo na rešitve razvitih držav, ki jih ni mogoče sistemizirati, da bi ustrezale enemu mednarodnemu standardu. Namesto tega z uporabo kolumbijskega konteksta kot primera ta prispevek predlaga lokaliziran pristop k izpolnjevanju izobraževalnih potreb učencev angleškega jezika, ki vključuje inkluzivno izobraževanje na institucionalni ravni. Ta model bi dal prednost delu regionalnih akademikov, s čimer bi zagotovili, da vsi učenci doživijo pravičen pouk v razredu, ki bi temeljil na epistemologijah držav tretjega sveta in lokaliziranih načinih znanja.

Ključne besede: vključenost jezikov v izobraževanje, tretji svet, inkluzija, posebne potrebe, poučevanje angleščine

Introduction

This paper examines the tensions and divisions occurring between English language teaching (ELT) and inclusive education (IE) in Colombia, acknowledging the lack of interconnectedness between the two fields, which creates a disservice to students and teachers alike. Although there are many factors at play within the Colombian education system, there are three underlying issues that perpetuate the unification of ELT and IE: the lack of a universal definition that seeks to change the learning environment and not the student, the division between the private and public sectors, and the lack of teacher training and support (Anderson & David, 2022; Anderson, et al., 2022; Kamenopoulou, 2018b; OECD, 2016).

As with many governments in the region, the Colombian government has historically understood the need for English education, since English is seen as a means to drive development and internationalisation (Anderson et al., 2022; de Medina, 2002, 2004; Gonzalez, 2010). Inclusion, on the other hand, is often viewed from a medicalised position that aims to fix the 'deficient learner' rather than adjusting the learning environment to make it more accessible to a larger variety of students (Cruz-Velandia et al., 2013; Kamenopoulou, 2018a, 2018b; Vásquez-Orjuela, 2015). Hence, inclusion is often treated as an intervention to encourage the enrolment or retention of at-risk populations of children in school. In Colombia, there is a lack of articulation and interconnectedness between ELT and IE both in education policy and teacher-training initiatives, which in turn trickles down into classroom instruction and creates a disservice to all learners. Especially problematic is the fact that a group of individuals rightfully guaranteed access to English language study by government initiatives is not able to access this schooling. Furthermore, individuals stepping into roles as English language teachers receive little or no instruction in inclusive education for English language learners.

One key issue that arises when looking at IE is the fact that there is no universal definition of IE, nor is there a clear description of how IE should be implemented and specifically whom IE is meant to serve (Florian, 2009; Kamenopoulou, 2018a). It should be emphasised that identifying and responding to the needs of all learners is the main goal of inclusion. While IE is commonly assumed to support children with disabilities, it also supports other disadvantaged groups of children who experience marginalisation based on race, socioeconomic background, religious affiliation, gender identity and so forth (Kiuppis, 2014). However, each of these populations of learners experiences different barriers within mainstream education (Erten & Savage, 2012).

Colombian policies approach inclusion from a medicalised perspective, which creates an ableist framework, further problematising and stigmatising learners who are perceived as different (Kamenopoulou, 2018b).

The Colombian people face adversity and inequality that is further complicated by the lack of social services related to education and educational reform. It is of paramount importance for Colombia to not only work with a universal definition of inclusion, but to localise how to successfully implement this definition. This is not yet being done. At the same time, the development of competence in English is often considered a priority for Colombian children, as English is seen as a way to prepare the next generation to be able to participate internationally in the twenty-first century. The present research seeks to identify the mismatches regarding ELT and IE initiatives in public school classrooms throughout Colombia. It explores the intersection of IE, ELT and English-in-education planning, and the privileging of Global North (GN) theories and practice. We argue that if the Colombian education system is to truly prepare ELT educators to meet the needs of its diverse student populations, it is necessary for English language initiatives to build in dimensions of inclusive education and craft curricula that are grounded in localised and contextualised settings. This must be done while addressing language-in-education planning and teacher education standards.

Theoretical Considerations

The Global South (GS)

This paper explores the Colombian education system through a post-colonial lens, acknowledging the fact that the current global power imbalances that are in place are deeply connected to colonisation and neo-colonialism (Sousa Santos, 2018). The GS is used to describe geographic locations across the world that have and continue to experience economic and political oppression due to structures put into place during the colonial era and the disparity that continues to plague regions around the world that are often referred to as underdeveloped, developing or Third World countries (Dados & Connell, 2012; Comaroff & Comaroff, 2011; Kamenopoulou, 2018a). The economic and political realities of Colombia today do not match most educational settings in the GN; the harsh realities of post-colonialism need to push educators within the region to look for answers in directions that are not necessarily centred on Northern-centric ways of learning.

Inclusive education (IE)

In classrooms around the world, various definitions of equity, diversity and inclusion are being used to shift the learning agenda to meet the needs of all learners, particularly those who are at risk of being marginalised. The latter includes individuals with disabilities, who account for roughly 15 percent of the world's population or 1 billion people (WHO & World Bank, 2011), with 10 percent of the population having some kind of learning disability (Kormos & Smith, 2012). Although increased attention has been devoted to IE initiatives worldwide since the creation of the Convention on the Rights of the Child (UNGA, 1989) and the Salamanca Statement and Framework for Action on Special Needs Education (UNESCO, 1994), the actual implementation of IE practices varies drastically across global contexts (Pijl et al., 1997). IE is commonly understood as an approach to teaching that creates educational opportunities for all learners, especially learners who have traditionally been excluded from the education system, who are at high risk of being excluded or have not received the kind of support they need to succeed in their educational studies (Kamenopoulou, 2018a). However, as there is no universal definition of IE, in some cases where institutions have tried to implement and have failed, IE simply means getting at-risk populations of children into classrooms regardless of the educational outcome (Acuña & Cárdenas, 2017). These conflicting ways of approaching inclusivity are not just problematic for the children themselves, they shed a light on a much larger problem: the need for education reform that begins with the learners themselves and the contexts in which they live.

For many countries rooted in the GS, inclusive instruction may be the only means to meet the needs of diverse learners due to the educational divide between the private and public sectors, as well as limited resources and teachers. Educational initiatives that are easy to employ in the GN may not be accessible in the GS (due to, for example, lack of electricity or consistent internet access). The dichotomy between what IE is and who it serves highlights the need not only for a universal definition, but for a localised definition and a level of attention to policies that seek to support the larger, overarching understanding of IE on the ground. Furthermore, policies need to transfer down to an implementation level, from the macro-level and onward to the micro-level.

ELT and language-in-education policy

ELT models have been situated in a time-space continuum. Popular social science theories at a given moment in time have influenced what is presented to pre-service and in-service teachers. Most recently, communicative language teaching (CLT), content language integrated learning (CLIL),

project-based learning (PBL) and task-based learning (TBL) have been marketed and infused in ELT programmes throughout the world. The problematic nature of this lack of inclusion of locally designed models, theories and practices influences both language-in-education plans and policies crafted at the nation-state level. Bettney (2022) uses the term 'coloniality' to describe drawing only on the works of individuals in the GN. Bohn (2003) acknowledges that in his native Brazil, teachers have not drawn from theory or practice-building from their peers, but rather have turned again towards general GN sources and theories. He comments on the cost of this practice, stating that "Brazilian teachers have become strangers in their own land" (p. 170).

As we will see, the Colombian ELT context parallels the scene described in Brazil. In addition to a lack of promotion of locally crafted theories about language teaching and learning, there is little to no infusion of information and practices aligned with inclusive education for pre-service and in-service teachers (Acuña & Cárdenas, 2017; Correa-Montoya & Castro-Martinez, 2016). CAST co-founder David Rose (2019: xii) problematises in particular the lack of exploration of what he terms 'different ecologies' in different cultures focusing on fossilisations of the framing of Universal Design for Learning (UDL) around the world. Pre-service and in-service teachers are introduced to notions of inclusive education models that may include a set of recommendations that more often than not work best in settings with accessible technology. Such models are unsuitable for most language classrooms in public sectors in Colombia. In the worst-case scenario, pre-service and in-service teachers are never introduced to ideas of disability and difference in the language classroom, instead being left to seek out this kind of information on their own. A brief exploration of recent TESOL methodology texts reveals that very few incorporate chapters related to what it means to have a learning difference or disability (Jian Wang, personal communication 5/9/20).

Language-in-education planning refers specifically to educational planning that focuses on English language education. While this frequently refers to mother tongue and additional language policies in the mainstream classroom, our concern here is how the language situation, the macro-level policy goals and implementation, and the micro-level policy goals and implementation are articulated for the use of teacher education programmes training pre-service and in-service teachers to teach English (Tollefson, 1981). Countries rooted in the GS often approach language policy and planning from a Northern-centric perspective and draw upon the work of scholars situated in the GN or educated in the GN, thus again retaining a possible level of coloniality (Bettney, 2022; Roux, 2012). These mismatches are characteristic not only of the Colombian context, but of many Global South contexts (Pennycook & Makoni, 2020).

Colombian education: A brief overview

Colombia is as culturally, ethnically and linguistically diverse as its geographic landscape. With a population of 50 million (World Bank, 2021), Colombia is home to 64 indigenous languages and two creole languages (Islander and Palenquero), while Spanish is the official language (González & Rodriguez 1999; González, 2010). Present-day Colombia has forged a new path towards reconciliation of its turbulent and violent past with the 2016 signing of a ceasefire accord with the Revolutionary Armed Forces of Colombia (FARC) (UN Peacemaker, 2016). However, with deep social and economic inequalities, ongoing armed conflicts and internal displacement, along with high poverty rates among Afro-Colombian and indigenous populations, children with disabilities are among a long list of children who may experience exclusion (Kamenopoulou, 2018b; OCHA, 2017).

Education in Colombia is understood as a civic right, as the Constitution of 1991 posits that all Colombians have the right to an education. Compulsory education currently spans a ten-year period and requires students to be in school from the age of 5 to 15 (OECD, 2016). Primary education lasts five years beginning at age 6, while secondary education is divided into four years of compulsory basic secondary education encompassing grades 6 through 9 (WENR, 2016). The Colombian education system is divided into the private for-profit sector and the public sector. Many of the private for-profit schools model their curricula around some form of international curriculum that prioritises foreign language education or bilingual language education (usually English) at the expense of the development of competencies in the students' first language (i.e., Spanish) (de Mejía, 2004, 2013). Additionally, these for-profit schools market themselves as international schools and often offer an internationally accepted accreditation such as the international baccalaureate to justify the huge cost of tuition. Although the exact numbers of students attending private schools are rather ambiguous, it is estimated that 19% of Colombian school-age children attend private schools, with 81% of the population attending public schools (OECD, 2016). Uribe et al. (2006) indicate that the differences between the private and public sectors highlight the drastic difference in quality between the public and private sectors. The public sector faces a plethora of obstacles, such as poor school infrastructure, high dropout rates and a lack of qualified teachers (WENR, 2020). The OECD (2016) has indicated that Colombian secondary students have relatively poor learning outcomes, ranked second to last among the 37 OECD countries, and in rural areas and some border regions dropout rates are as high as 11%, with an estimated 35,080 school-aged children

out of school in 2019 (World Bank, 2021). All of this highlights some of the challenges that Colombian education faces. In the continuation, we will focus our analysis on the tensions between ELT and IE.

The Colombian education system: Tensions in ELT

Although Colombia's cultural and linguistic landscape is diverse, bilingualism in the Colombian context is often thought of as "the mastery of Spanish and another Western language, mainly English" (González, 2010, p. 333). Bilingual and multilingual communities where Spanish and an indigenous language (or languages) are spoken and intertwined are often fraught with social and economic disparity and heightened racial and ethnic discrimination (Behrman et al., 2003; González, 2010). It is widely understood that English holds the highest status of any foreign language (de Mejía, 2004). Due to its proximity to the United States, along with Colombia's strong economic ties to the US and a large Colombian population residing within its territory, an American variety of English is often favoured over other varieties of English (British Council, 1989, 2015).

As Colombia has seen a surge in English language programming and English has been integrated into Colombian education in both the private and public sectors, truly bilingual education within the region is generally only available to children from middle to upper-middle class families living in urban areas (de Mejía, 2002; Valencia, 2013). These private schools are typically advertised as international bilingual schools and are tied (sometimes loosely) to some form of an international curriculum (e.g., the International Baccalaureate Organisation, the Cambridge International Examination or the Council of International Schools). In contrast, students within the public sector receive limited English language instruction from teachers who are often given the additional teaching hours merely to fill their schedules, with little, if any, articulation between levels.

The interest in English language education came to fruition in 1994 and has continued to grow with shifts in English language policies and initiatives (Gonzales, 2010). In 1994, foreign language education was first put into legislation with Law 115. This legislation suggested that school-aged children should develop competencies in a foreign language, but it did not establish a policy or programme (Ley 115, 1994), leaving schools to map out their own agendas. This resulted in large numbers of schools (private schools) integrating some form of English language curriculum. In 2004, the Colombian government implemented the National Bilingual Program (PNB, Programa Nacional de Bilingüismo) with the advice and assistance of the British Council (Bettney, 2022;

British Council, 1989, 2015). The programme has undergone several policy and name changes and continues to advance English language initiatives within the region, with the goal of all Colombian citizens being bilingual by 2019, (Bettney, 2021; Usma Wilches, 2015). Sadly, the underlying theories of language education remain those of the GN and do not yet truly reflect the local needs of learners and teachers alike.

Unsurprisingly, the PNB has reshaped the role of English within the nation, going as far as stating that being proficient in English will provide Colombians with more economic advantages. The PNB includes a list of communicative competencies that are based on the Common European Framework of Reference for Languages (CEFRL) and outlines a number of Northern-centric teaching approaches (e.g., CLIL, CLT, PBL, and TBL) that it recommends be adopted to ensure English education meets international standards (Eliecer Benavides, 2021; Usma Wilches, 2015). For the *Ministerio de Educación* (MEN; Ministry of Education), adopting the CEFRL provided a framework to create an English language assessment tool that would become a part of *PRUEBAS SABER*, a standardised knowledge test used to assess all students across various disciplines.

In terms of proficiency, the Ministry set its sights high, projecting that by 2014, 40% of all high school graduates would have a minimum B1 proficiency, and 100% of EFL teachers would have a minimum B2 English proficiency (Eliecer Benavides, 2021). However, the *PRUEBAS SABER* results told another story of English language education in the region. The 2014 and 2017 *PRUEBAS SABER* results indicated that Colombia has a long way to go in terms of reaching its goals. In 2014, 94% of the students nearing graduation had low levels of English proficiency, ranging from below basic proficiency (A-) to A2, while only 4% attained the goal of B1 English proficiency (Eliecer Benavides, 2021). In 2017, the percentage of students spanning low level to basic users decreased by 3%, with 91% of students having A- to A2 English proficiency and 7% meeting the B1 expectation (Eliecer Benavides, 2021). The Ministry has tried to place the onus on the teachers, stating that improving teachers' English proficiency is crucial to raising the national standard, and it continues to implement a series of general English courses aimed at improving English within the region.

In summary, Colombia has had a long and sometimes turbulent relationship with English language education, which, for better or worse, has aligned itself with Northern-centric epistemologies. The current English language policy has set an ambiguous course for its learners and their teachers, leaving both teachers and their students behind without further recourse. In the next section, we look at IE in Colombia.

The Colombian education system: Tensions in IE

There has been relatively little systematic research about IE and the inclusion of learners from different marginalised groups. Moreover, there is a perceptual mismatch at the national level regarding what IE is, who IE is meant to serve and what IE entails inside any given classroom (Acuña & Cárdenas, 2017; Kamenopoulou, 2018a, 2018b; Moreno Angarita & Gabel, 2008). Educational researchers (e.g., Correa-Montoya & Castro-Martinez, 2016; Beltran-Villamizar et al., 2015; Kamenopoulou, 2018b) who have studied inclusion in Colombia have found that even though there are policies that advocate for inclusive practice, the policies related to disability are rooted in medicalised discourse of disability, which is synonymous with looking at disability through a deficiency lens. Current understandings, policies and practices regarding IE, along with a lack of teacher training and support, often lead to misperceptions in general education classrooms and the exclusion of learners from disadvantaged backgrounds (Acuña & Cárdenas, 2017; Kamenopoulou, 2018b).

IE was first entered into law in 1994, as a direct response to the UN's 1994 Salamanca Agreement (Ley 115, 1994), but there have been difficulties executing policies and practices on the ground (Correa-Montoya & Castro-Martinez, 2016; Kamenopoulou, 2018b). *Ley 115* broadly stated that education must be guaranteed to all Colombian citizens and that IE teaching strategies must be used to make education accessible to all learners. In 2011, Colombia furthered its international commitment to inclusion by ratifying the United Nations' 2006 Convention on the Rights of Persons with Disabilities. In 2013, this initiative was strengthened by providing a more detailed set of policies to ensure that the needs of students with differences and disabilities were met through the establishment of six principles: participation, diversity, interculturality, equity, quality and appropriateness. In reality, however, inclusion looks starkly different in Colombia. At the time of publication, to our knowledge, there have only been a handful of initiatives and programmes that have sought to provide access to education to school-aged children who have been identified as members of marginalised and disadvantaged groups, such as the *Escuela Nueva Activa* model (Active New School, ENA), the *Programa Nacional de Etnoeducación* (the National Ethno-education Project, PNE), Educación Inclusiva de Calidada (Quality Inclusive Education, EIDC) and *De Cero a Siempre* (From Zero to Always, DCAS). Each of these programmes and initiatives serves diverse populations in distinctly different ways.

While these kinds of programmes and initiatives show growth in the region, there has been very little research or quality data to analyse the

effectiveness of this kind of programming (MEN, 2013). However, census data can help to paint a more complete picture. In 2014, there were 119,060 students with diagnosed disabilities, although data from the 2005 census indicated that there were 426,425 children aged 0–17 with some form of disability in Colombia (OECD, 2016). The Saldarriaga-Concha Foundation's (FSC) 2016 *Alternative Report* estimated that in 2015 there were approximately 10.3 million children enrolled in school and only 1.34 percent were children with disabilities. Of these students, 85 percent were attending public schools while 15 percent were enrolled in the private sector. The FSC *Alternative Report* (2016) clearly articulates the issue at hand, acknowledging that, "It is estimated that a large number of children in early childhood with disabilities are invisible to the state agenda and programs" (p. 41). Of the students with disabilities who were registered, 33.8 percent did not finish any grade level and only 37.9 percent finished primary school (Correa-Montoya & Castro-Martinez, 2016). This number continues to decrease, with only 20.5 percent of students registered with disabilities finishing high school and only 1.7 percent going on to complete university studies. These numbers indicate that the current efforts being made by MEN are not enough.

The Colombian government continues to invest in IE (Correa-Montoya & Castro-Martinez, 2016). Yet, teacher-training initiatives, classroom resources and materials remain scarce. Kamenopoulou (2018b) found that IE was synonymous with the notion of having a support teacher, meaning that schools were only inclusive if they employed a support teacher(s), or a teacher whose sole purpose is to work with children with disabilities, which is generally beyond the budget of any public school. Moreover, her findings suggested that support teachers did not remove students with disabilities from the general education classroom, that they were not putting enough effort into their work, and that some schools were purposely trying not to be inclusive by avoiding the hiring of support teachers. These findings shed light on two overarching problems: defining IE and the lack of teacher education.

IE is widely misunderstood, and in the case of Colombia it is often treated as if it is synonymous with disability, leaving out other populations of children who are at risk of exclusion (Kamenopoulou, 2018b). The work of Beltrán-Villamizar et al. (2015) acknowledges that there are four additional groups of children in Colombia that are at risk of marginalisation: black Afro-Colombian and indigenous populations; children who are victims of the armed conflict; children being reinstated into society after being somehow involved with the armed conflict(s); and children living at the borders. Yet, in the case of Kamenopoulou's (2018b) work described above, teachers held the common misconception that schools were only inclusive if they had support teachers, and that

inclusion was synonymous with disability. In regard to teacher-education, the most recent findings indicate that special education programmes are on the decline in Colombia, even though in 2015, the Colombian government invested 12.2 million dollars in teacher training, classroom resources and materials (Correa-Montoya & Castro-Martinez, 2016). Furthermore, in 2015, there were a total of 443 teacher-training programmes, but only 18 of these programmes were geared towards special education. Of these 18 programmes, 14 were university teacher-training programmes, 3 were categorised as specialisations (also known as certificate programmes) and 1 was a master's programme (Correa-Montoya & Castro-Martinez, 2016). Under most circumstances, pre-service teacher training does not explore inclusion or special education, as this area is regarded as a matter for special education professionals. Moreover, if pre-service teachers want to develop a background in inclusion, they must choose to specialise in special education (Kamenopoulou, 2018b). This lack of training and support leaves large numbers of Colombian educators without the resources needed to serve their diverse student populations.

This section has described IE in Colombia, acknowledging that current understandings of inclusion have had a negative effect on the overall education system and shedding light on the need for a universal definition, along with teacher-training programmes to help familiarise teachers with what inclusion means and whom it seeks to serve. As described above, IE is meant not only to serve learners with disabilities, but also seeks to recognise and support learners from diverse socio-cultural-ethnic populations as a precursor to equity, diversity and inclusion initiatives. In the following section, we look at how these tensions in and around ELT and IE affect both ELT teachers and the diverse students they serve.

Inclusive education planning in Colombia: A theoretical model

In order to identify what inclusive education in the ELT setting in Colombia could aim for, it is necessary to identify ELT issues that have dominated teacher-education worldwide. As an increasingly globalised world puts all kinds of English speakers together, it is incumbent upon the ELT community to provide the greatest access possible to promote engagement and agency on the part of speakers. Preparatory programmes need to model this. However, the majority of TESOL programmes situated in the Global North, whether for pre-service or in-service teachers, continue to draw upon the privilege of the native speaker: textbooks, theories and practices remain those of the Global North.

Barnawi and Phan (2014, p. 3) believe that TESOL preparatory programmes need to employ what they term "a more consistent and collectively critical approach in TESOL pedagogy and curriculum". Their exploration follows that of Ilieva and Waterstone (2013), documenting practices that do not reflect what Kumaravadivelu terms a 'post-methods' approach (2003). Barnawi and Phan (2014, p. 4) suggest that a post-methodology approach "[...] presupposes that periphery teachers will devise their classroom pedagogy in ways that are compatible with local intellectual conditions". This access is best promoted by teaching teachers how to incorporate techniques, curricula and assessments situated within their own contexts, drawing upon design principles that are adaptable and not necessarily tied to the Global North. Sadly, as Yang in Phan (2017, p. xviii) observes, those educated in the West often return home, as expected, with knowledge situated in that context, but without a comparable reservoir of information for their own contexts.

Philipson (1992) explored the dependency of Global South English language practitioners upon the Global North in his classic *Linguistic Imperialism*, outlining policies and practices that affect language teaching pedagogy. In his analysis comparing centre and periphery, he notes that GN theories, recommendations for models and methods, and even textbooks have not been infused with information from anywhere else. Kubota (2019, p. 8) uses the phrase 'epistemological racism', noting with respect to a Brazilian applied linguist's work:

> Scholarship from the geographically GS was not regarded as 'global enough' or was positioned outside of the 'global context'. The concept of 'global' in turn is made equivalent to northern (i.e. Euro-American) theory and practice.

We suggest there are parallel issues in the areas of inclusion and disability studies, most notably regarding the ELT classroom and preparatory practices for pre-service and in-service teachers. Moreover, the general paucity of preparatory modules examining learner differences in ELT contexts is the default or unmarked parameter in both programmes and texts. For example, a brief exploration of 17 TESOL Method texts from 2001 to 2019 reveals that only 2 contain units on teaching ELLs with learning differences (Jian Wang, personal communication, 5/8/2020).

Underscoring this observation is the dimension of inequality evidenced in theories and practices of this diversity from the GS that are not referenced, or are under referenced, in the general language teaching canon. Paradigms of language teaching have been strongly rooted in the GN, including CLT, this decade's

contemporary darling. If we instead – or even in addition – examine the indigenisation of social science research, international development and English language instruction, World Englishes, language-in-education planning and policy, and IE, this enables us to develop new strategies, policies and ultimately curricula preparing teachers and learners. Hamnett et al. (1984, p. 78) unpack three dimensions of the indigenisation of social science research, focusing on what they term "theoretic, structural, and substantive indigenization". Theoretic indigenisation involves the creation of theories and metatheories framed by local world views; structural indigenisation refers to the creation of institutions and organisations that support local research; and substantive indigenisation relates to the actual content of research: the areas of focus are local.

Within our proposed perspective, theoretic indigenisation would involve the development of an inclusive education approach that consistently takes local context and nation-state parameters into account; additionally, this development of theory would be focused within the nation-state needs (substantive indigenisation). Such theories would bring inclusive education for ELLs into the pre-service and in-service education models in Latin America.

Structural indigenisation would involve the *infusion* of the theories discussed above into think tanks and teacher preparatory institutions, where evidence-based practices would be proposed that fit the context outlined above. In the GS, education ministries are responsible for the goals, policies and practices that educational institutions need to follow for the preparation of language teachers. When leaders in these settings have been socialised into their disciplines via leadership from abroad (e.g., leaders have studied outside their home countries and worked with theories designed in different contexts), they are not always aware of the ideological implications of their work.

For example, while CLT appears to be the default teaching model promoted by most current programmes, there are contexts where it can be problematic. As Chowdhury and Phan (2008, p. 305) suggest, "Even though CLT claims to create a democratic classroom that is responsive to students' needs, it is often inappropriate and incompatible, neither sophisticated nor responsive enough for the complex educational needs and cultures of students in certain settings". Structural indigenisation would attend to what Tollefson terms the "language situation, macro policy proposals and macro policy implementation" (1991) of a nation-state, in our case, Colombia.

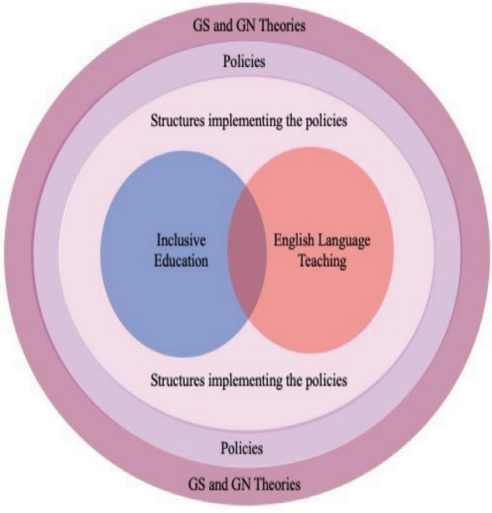
Within the area of IE, numerous authors note the paucity of both grounding theory and case studies with attention to the local context (Grech & Soldatic, 2016; Kamenopoulou, 2018a; Kamenopoulou & Dukpa, 2018). This is the dimension of theoretic indigenisation. Others call for the implementation

of programmes within teacher education that address the needs of learners in local contexts (Schuelka, 2015; Sharma et al., 2013). Our conscious situating of theories, structures and practices in a GS context is related to work in international education and development, as well as the role of English. For us at this point, the key is to attend to both where the theories have originated and the degree to which they can account for and inform what happens in the GS.

Tollefson (1981) lays out the relationship between a general language situation, macro-level policy decisions and implementation, as well as micro-level policy decisions and implementation, focusing on how these dimensions affect second language acquisition. We would take the model further, as it was not originally linked to inclusive education studies or equity. The figure below, adapted from Echeita Sarrionandia and Ainscow (2011), suggests how we view the relationship between these elements. At the outermost circle, we see that both GS and GN theories are represented. At the next level, policies are again introduced from GS and GN perspectives. We then see structures promoting the levels of indigenisation discussed above. The practices promoting the same levels of indigenisation and at the centre of the Venn diagram below reflect the idea that notions of inclusive education play an equal role with ELT policy in creating the best conditions for learners.

Figure 1

Policy Planning Cycle



Note. Implications for equitable design in ELT. Adapted from Echeita Sarrionandia, & Ainscow, 2011.

In order to craft more equitable and context-specific preparation for pre-service and in-service teachers, we believe attention to theoretic, structural and substantive indigenisation is necessary. Theories of inclusive education and English language teaching need to build upon the context of the GS and most specifically the nation-state context. This applies to methods of language teaching and textbook selection as well as curriculum design that builds in dimensions of UDL. Notions of IE that move beyond learning disabilities and specific language differences need to be built into language education preparatory programmes.

Kamenopoulou (2018a) suggests that one way to bring inclusive education into teacher preparatory programmes, in general, is to consider what she terms 'universal' and 'singular' dimensions of the field. For Kamenopoulou, these perspectives emerge from the local context. However, she suggests that the content of teacher education programmes in the GN that send teachers back to their home country contexts needs to include both universal dimensions of the field and country-specific recommendations. For us, an equitable design would first and foremost introduce pre-service and in-service teachers to the notions of inclusive education and equity for ELLs with such needs. This is currently a marked and often unrepresented dimension of English language teacher preparation. Secondly, as Barnawi and Phan (2014) have suggested, building attention to local contexts and needs into language teacher preparatory programmes in the GN will permit English language teachers and teacher educators who are returning to their home countries to actively design programmes and interventions, as they have attended to such things in their graduate programmes. Their home countries' needs have not been invisible. Thirdly, in-service language teacher professional programmes in the GS must include not only the universal but singular dimensions of how to meet the needs of English language learners with both diagnosed and undiagnosed learning differences and disabilities.

Conclusion

We have demonstrated that although GN theories and policies may be necessary, it is not sufficient to draw from them alone in establishing appropriate context-based IE and ELT policies and programmes in Colombia. Inclusion is absolutely paramount for teachers and learners. Drawing upon a universal definition of inclusion creates a learning and teaching environment that relies on changing the environment rather than the student. Working with a localised notion of IE still demands that English language teachers work from policies that build in inclusion from the very start. We suggest that teacher educators

can model what it means for learners to have agency, thus sending forth a generation of English language educators in local contexts who will pass this belief on to their learners. An underexplored dimension of the arguments raised in this paper includes what the long-term effect of this type of agency and inclusion means for other students in these classrooms. In an era of increasing globalisation, both face-to-face and virtual, our classrooms have become active contact zones for the exploration and development of greater intercultural competence and empathy. People in the local context have the right and responsibility to make equitable choices for their learners within their own contexts that are not reliant on the GN. Language teacher preparatory programmes need to draw upon indigenisation and the incorporation of theories and practices related not only to language methodology, but also to inclusive education.

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The Universal Genre Sphere: A Curricular Model Integrating GBA and UDL to Promote Equitable Academic Writing Instruction for EAL University Students

Rosa Dene David*[1] and Carl Edlund Anderson[2]

This paper proposes the design of an instructional model, referred to as the universal genre sphere, for teaching academic writing in a manner appropriate to all learners, but developed especially with consideration for the needs of English as additional language students with or without diagnosed learning differences. Despite growing research on, variously, second-language writing, English as an additional language and learning differences, there has been relatively little work that explores approaches to the intersections of these topics. Thus, the proposed universal genre sphere model is founded on the pillars of universal design for learning and the tenets of the genre-based approach, especially the teaching-learning cycle, to create more equitable and inclusive, as well as effective, learning environments. The universal genre sphere balances inclusive design that draws upon students' interests, while breaking learning into manageable and adjustable segments, thus making academic writing more accessible to a greater number of learners. The combination of universal design for learning and the genre-based approach represents an opportunity to create a shift in second-language writing instruction (and, potentially, in L1 writing instruction) that aligns with the principles of inclusive education by reducing barriers in the classroom and providing students with multiple pathways to participate, which could do much to advance knowledge about more inclusive, equitable and effective writing instruction for all learners.

Keywords: Universal Design for Learning, genre-based approach, second language writing, English language learners, inclusive education

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Univerzalna žanrska sfera: kurikularni model povezovanja žanrskega pristopa in univerzalne zasnove učenja za spodbujanje pravičnega poučevanja akademskega pisanja pri študentih angleščine kot dodatnega jezika

Rosa Dene David in Carl Edlund Anderson

Študija ponuja načrt modela, poimenovanega kot univerzalna žanrska sfera, za poučevanje akademskega pisanja na način, ki bi bil primeren za vse učence, a razvit ob poudarjenem upoštevanju potreb študentov, ki jim angleščina predstavlja dodatni jezik, ne glede na morebitno diagnozo posebnih potreb. Kljub naraščajočemu številu raziskav o pisanju v drugem jeziku, angleščini kot dodatnem jeziku in o učnih razlikah je bilo razmeroma malo študij, ki bi preiskovale presečišča teh tem. Zaradi tega je predlagani model univerzalne žanrske sfere osnovan na postavkah univerzalne zasnove učenja in žanrskega pristopa, predvsem na ciklu poučevanja/učenja, s čimer naj bi se vzpostavljajo pravičnejše in inkluzivnejše, tudi učinkovitejše učno okolje. Univerzalna žanrska sfera uravnoteži inkluziven pristop, ki se navezuje na interese študentov, medtem ko člani navezujejo učenje na obvladljive in prilagodljive odseke, s čimer se naredi akademsko pisanje dostopnejše širšemu krogu ljudi. Ta kombinacija predstavlja priložnost za napredek poučevanja pisanja v drugem jeziku (in morebiti tudi v materinščini), ki je usklajen s principi inkluzivne pedagogike, s tem ko omejuje ovire v razredu in omogoča študentom več poti za sodelovanje. Ravno to lahko bistveno pripomore k napredku znanja o bolj vključujočem, pravičnem in učinkovitem poučevanju pisanja za vse študente.

Ključne besede: univerzalna zasnova učenja, žanrski pristop, pisanje v drugem jeziku, študenti angleškega jezika, inkluzivna pedagogika

Introduction

In classrooms worldwide, the principles of Universal Design for Learning (UDL) have reshaped curricula and instruction to promote more inclusive, equitable and accessible learning environments. However, within the wider realm of English language teaching (ELT), there remains a need to support users of English as an additional language (EALs), especially at the university level (David & Brown, 2020). Developing academic writing skills is often a challenge, not least for university-level students working in an additional language (AL), even more so for learners with disabilities or differences, and there has yet been relatively little research exploring approaches to second-language writing (SLW) that incorporate support for EALs with disabilities (e.g., Firkins et al., 2007; Herbert et al., 2019).

This paper presents a new curricular model, referred to as the *universal genre sphere* (UGS), that integrates principles of UDL and the genre-based approach (GBA) to demonstrate how these two approaches can work in tandem to support the development of SLW skills for all EALs, including those with or without diagnosed or undiagnosed disabilities or differences. UDL is specifically understood to support inclusion by providing accommodations to learners with disabilities/differences that also support learners without disabilities/differences (Delaney & Hata, 2020; Rose et al., 2006; Torres & Rao, 2019), for which reason we incorporate its principles into UGS. Current research on learning differences, EALs and SLW reveals a need for more equitable and inclusive writing instruction, which is perhaps especially urgent at the university level. Although the GBA to writing instruction has been widely adopted, implementing it through UDL principles could offer more inclusive learning opportunities for a wider range of students. More specifically, we propose combining the stages of the teaching-learning cycle (TLC; Rose & Martin, 2012) and the three principles of UDL (Centre for Applied Special Technology, 2022) to scaffold the process of learning for AL academic learners into more manageable segments, thus reducing classroom barriers by providing students with improved pathways to participation.

Theoretical Considerations

Disability and Inclusion in University Settings

The importance of education for all has been at the forefront of education policies and initiatives for well over twenty years, since UNESCO's *Salamanca Statement* (UNESCO & Ministry of Education and Science Spain,

1994), which called upon governments to make inclusive education (IE) the highest priority within their education systems. This commitment built on the United Nations' (1948) *Universal Declaration of Human Rights* (UDHR), which declared that education is a basic human right. IE is broadly understood as a way to reduce potential barriers in the classroom while promoting classroom interactions that provide all students with avenues to participation, including populations of students who are often excluded or at risk of being excluded (Ainscow, 1998; Sapon-Shevin, 2003; UNESCO, 2008). An IE learning environment should essentially enable the participation of each student by embedding instructional design that can be delivered to students of mixed abilities while being responsive to individual needs (Ainscow, 2015; Messiou et al., 2016). Even though IE has received a fair amount of attention in mainstream K-12 education, implementation at the university level remains slow, and, when attempted, it is often beset with challenges (Moriña, 2017; Moriña et al., 2015; Riddell et al., 2004; Strnadová, et al, 2015). These problems of implementation have received attention at the international level in Article 24 of the *Convention of the Rights of People with Disabilities* (United Nations, 2007), which calls for universities, vocational training and adult education programmes to ensure that individuals with disabilities have access to education that does not discriminate and provides reasonable accommodations for all persons with disabilities. Nevertheless, there remain many challenges at the university level, including (but not limited to) the elimination of architectural barriers, the development of pathways to accessible curricula and classroom assessment (Morgado, et al 2016). Many scholars (e.g., Bausela, 2002; Li et al., 2021; Morgado et al., 2016) have concluded that, internationally, universities remain among the most discriminatory of institutions, which results in large numbers of marginalised student populations abandoning their studies (Adler, 1999; Creighton, 2007; Horn et al., 1999; Mamiseishvili & Koch, 2011). In many cases, the most common remedies for the university system have been either to rely on disability resource centres or to sprinkle IE into existing courses developed by individual faculty members without developing continuity throughout the entire programme of study (Moriña, 2017).

In the case of higher education and ELT, there has been relatively little research on inclusion and support for EALs from marginalised backgrounds, and this work has tended to focus on students experiencing marginalisation due to race, ethnicity, immigrant and refugee status, or sexual orientation (e.g., Crump, 2014; Paiz, 2019; Taylor & Sidu, 2011). Although the inclusion of students from all types of marginalised backgrounds is of great importance, there is arguably even less work being done in higher education that addresses

the intersection of English language learning and disability (e.g., Young, 2019; Young & Schaefer, 2019; Zhang et al., 2020). One of the main obstacles is the lack of training within teacher preparation programmes internationally (David & Brown, 2020; Sowell & Sugisaki, 2020; Young, 2019). However, there is a growing body of research that considers how UDL could be used to promote the advancement of all learners, including EALs with disabilities.

In the subsequent sections, we discuss how ELT educators at the university level can build inclusivity into SLW.

(Second-Language) Academic Writing

Even in an age of multiliteracies (New London Group, 1996), the capacity to communicate effectively through writing remains an in-demand, even essential, twenty-first-century skill (Anderson et al., 2015; National Education Association, 2010; Scott, 2015; Wagner, 2008a, 2008b). At the university level, argumentative writing for academic purposes is not only essential for overall academic success, but also implicitly understood – at least by instructors – as laying the foundations for effective rhetorical communication in students' future professional and civic lives. Thus, university-level work requires students to evidence their construction of knowledge through the creation of products that can be evaluated for the effective application of higher-order thinking skills (HOTS; Anderson et al., 2001; Bloom et al. 1956) to solve complex content-related problems (Association of American Colleges and Universities, 2004; Davidson, 2017; Gaebel et al., 2018; National Leadership Council for Liberal Education & America's Promise, 2007). Yet academic writing also requires substantial use of lower-order thinking skills (LOTS) if students are to wrestle successfully with issues such as document and citation formatting, not to mention orthography and grammar. Moreover, academic writing is not merely a medium through which students present what they have learned, but a process by which they make sense of and take ownership of content knowledge (Hyland, 2009). Significantly, however, writing is a modality that must be learned, and communicating effectively through it requires a range of knowledge regarding content, media and genre that challenges even L1 users (e.g., Elander et al., 2006; Graham et al., 2013; Huang, 2013). It can be even more challenging to write effectively in an AL (as in the case of EALs; Benfield, 2006; Flowerdew, 2008; Ma, 2021; Moses & Mohamad, 2019), as well as for those with learning differences (Santangelo, 2014; Simin & Tavangar, 2009; Troia, 2006).

All students – whether working in an L1 or AL, whether affected by learning differences or not – do learn differently and do face different challenges in demonstrating their construction of knowledge in terms of both content

and linguistic/communicative proficiency. Specifically, EALs must learn to convey their ideas in a scripted manner that attends to the expectations of a specific audience, while also learning how to maintain voice and balance their use of functional language and genre knowledge to convey complex ideas through the AL (Tan, 2011). As language abilities are assessed explicitly or implicitly in academic settings, SLW represents a vital tool through which EALs must demonstrate communicative proficiency and achieve academic success. This requires EALs to navigate numerous factors as they seek to express ideas formally within a given genre: they must demonstrate their understanding of given topics using a range of elements from their linguistic repertoires, including a multiplicity of grammatical forms, to express themselves in a coherent manner that also highlights their pragmatic understandings of the AL (Hyland, 2013).

In the case of ELT, much of the research surrounding disabilities, IE and writing instruction is either rooted in the K–12 education system or generally looks at disability from the perspectives of special education, often in bilingual educational settings (De La Paz & Sherman, 2013; Herbert et al., 2019; Jozwik & Cuenca-Carlino, 2020; Viel-Ruma et al., 2010). Furthermore, there are still too few studies exploring tertiary EAL students' experiences in English as a foreign language (EFL) contexts that focus on their development of SLW skills (Aronin & Spolsky, 2010; Firkins, Forey & Sengupta, 2007), and there are even fewer discussions of practical models that teachers could implement in the classroom. Accordingly, we propose just such a model, arguing that a blend of GBA and UDL principles could both increase student participation and reduce exclusion in educational contexts focused on SLW.

The next section analyses how these two approaches (GBA and UDL) can be combined to help all EALs, including those with disabilities, develop their L2 writing skills.

Genre-Based Approach (GBA)

It must be acknowledged that, for EALs with disabilities, the demand to develop academic writing skills could result in demoralising and debilitating experiences if there is insufficient support built in to the process. In this sense, the GBA has been praised for its capacity to provide a "contextual framework for writing which foregrounds the meanings and text-types at stake in a situation" (Hyland, 2003, pp. 27–28). In line with the tenets of both IE and UDL, GBA provides teachers with a set of tools that can reduce potential barriers by helping students discover how to use functional language to see "a recurrent configuration of meanings", which in turn can help EALs develop their academic voices in an AL (Martin, 2009, p. 13).

GBA provides students with different avenues to understand how certain kinds of texts are grouped, so that they can first recognise and then reproduce the features that a given group of texts share (Hyland, 2009). Specifically, GBA introduces EALs to rhetorical structures and foregrounds the need for clear organisational patterns that serve the social purpose of communicating through written text. Additionally, GBA differentiates writing instruction by emphasising the analysis of a whole text; EALs are walked through a series of activities through which they learn to recognise and replicate features of the genre in which they are working (Herazo-Rivera, 2012). In this way, EALs learn to write through sets of tasks that can be scaffolded and differentiated for learners depending on their abilities and needs, while simultaneously providing multiple ways for students to interact with a writing exercise before embarking on the writing of an actual essay. A *genre* in this sense can be understood simply as a staged, goal-oriented social process (Martin, 1984, p. 25). GBA breaks down the writing process into manageable segments, which can potentially help EALs increase their literacy skills while interacting with their AL in written form (Martin & Rose, 2007, p. 8).

The Teaching-Learning Cycle (TLC)

The Teaching-Learning Cycle (TLC) outlined in GBA offers both students and teachers an instructional sequence for constructing meaningful texts in alignment with the norms of a given genre (Martin & Rose, 2012). The three main stages outlined in the TLC – deconstruction, joint construction and independent instruction – provide a balance between explicit instruction and opportunities for EALs to demonstrate what they have learned in different ways. The TLC thus offers a learning experience that is deeply entrenched in the principles underlying IE. Rose and Martin (2012) discuss the three main stages of the TLC:

- *Deconstruction:* The teacher introduces students to the genre that students will be constructing through a series of teacher-led activities in which students reconstruct the message behind the given genre. For example, the teacher can model the specific text and help students organise the different components of the text. By participating in the deconstruction phase, EALs can look critically at the model and identify the metalanguage and patterns embedded in the given genre. This process helps EALs identify what they understand and provides pathways for the teacher to assess what students still need to learn.
- *Joint Construction*: In this stage, teachers have ample opportunities to differentiate writing instruction. For example, students can work

independently, in groups or alongside the teacher to become more familiar with the genre through a series of writing activities that focus on the joint construction of ideas. The premise behind this stage is to support EALs as they "practice using the structure of the model to scaffold a new text, and to discuss as many relevant language features as possible" (Rose & Martin, 2012, p. 210). Hyland (2009) observes that "scaffolding is closely related to the idea that learners develop greater understanding by working with more knowledgeable others" (p. 118), which highlights the importance of differentiating classroom activities. Hence, at this stage, EALs are deeply engaged in a process that provides further support for any who may need additional reinforcement of the overarching learning objectives.

- *Independent Construction*: In the final stage, students participate in a series of sub-stages to achieve the goal of writing an essay. This stage can include writing the text, participating in peer feedback, and/or receiving formative feedback from the instructor. Again, the teacher has the flexibility to hone in on what individual students may need for success in the writing process.

Together, GBA and the TLC create opportunities for all EALs to participate in classroom activities and increase their participation in the writing process. IE underscores the importance of reducing exclusion by providing avenues for all learners to be able to demonstrate what they have learned.

Universal Design for Learning (UDL)

Universal Design for Learning (UDL) initially emerged from the field of architecture as an approach to ensuring individuals with physical disabilities would have equal access to public spaces (Brown, et al., 17; David & Brown, 2020). Subsequently, UDL was transformed into an educational framework to provide learners with better access to classroom curricula. UDL has played a key role in the advancement of IE in educational settings around the world by building on the notion that educators should approach curricula and instruction from an asset-based framework rather than placing the onus of inability on the student (David & Torres, 2020; Meo, 2008).

The UDL framework intentionally and strategically supports all learners – including learners with unidentified and identified disabilities, as well as students from other marginalised communities – through the implementation of four core guidelines that uphold the understandings that each student is unique and that learner variability is the norm (David & Torres, 2020; Rao

& Meo, 2016). For educators serving diverse student populations, one striking tenet of the UDL framework is that "learners with disabilities are often best served by accommodations that can benefit the entire class" (Delaney & Hata, 2020, p. 84). The three principles of UDL are multiple means of engagement, representation, and action and expression (Centre for Applied Special Technology, 2019):

- *Multiple Means of Engagement* (MME): Often referred to as the *why* of learning, as MME is deeply connected to students' motivations for learning (Rose & Myer, 2002). Simply put, MME seeks to connect to learners' interests, while also providing the appropriate amount of challenge to keep them motivated within an educational setting that is non-threatening and welcoming to students of all abilities (Edyburn, 2010).
- *Multiple Means of Representation* (MMR): Often thought of as the *what* of learning, as MMR provides students with numerous ways to acquire and interact with classroom information. For example, students can be given the option of whether to listen to an audiobook, read a text or watch a video (all with similar content) to learn about a given topic. Additionally, the teacher could use visual stimuli to connect with the content. By providing access to such content in a variety of complementary ways, students are less likely to be excluded from the learning process.
- *Multiple Means of Action and Expression* (MMAE): Often referred to as the *how* of learning, as MMAE offers students choices about how they demonstrate what they know. For example, students could be given the option to record a video, write a paper or create a diagram to illustrate what they have learned about a given topic. Providing learners with alternatives for demonstrating their knowledge can help students rely on their strengths, making it easier for them to participate in classroom instruction and assessment.

The implementation of these three principles of UDL at the university level would shift the traditional college setting from what Freire (2000) described as the "banking concept of education" (pp. 72–80), in which students are treated as empty vessels that need to be filled, to an arguably more dynamic approach in which students are actively engaged with their learning processes and direct their own learning. This shift in participation fosters student agency and the collaborative nature of active learning, while providing students with alternative accessible content and formative assessments (Boothe et al., 2018).

In the subsequent section, we explain how UDL can work in tandem with GBA through a model dubbed the *universal genre sphere* (UGS), through

which teachers can reach a larger number of EALs, including those with identified or unidentified disabilities, who may otherwise be at risk of exclusion from the writing process.

Model Proposal: Universal Genre Sphere (UGS)

As discussed in the preceding sections, both UDL and GBA have the potential to reduce barriers for EALs from marginalised backgrounds, including EALs with disabilities, while also increasing classroom participation as a whole (Delaney & Hata, 2020; Rose et al., 2006; Torres & Rao, 2019). However, when UDL and GBA are used in tandem, SLW instruction can create a pedagogical shift that is adaptable in ways that can meet the needs of all EALs in the SLW acquisition process. Comparing and contrasting GBA and UDL shows how the two approaches to teaching can work together to help both EALs with and without disabilities achieve intended curricular outcomes. GBA offers students explicit, step-by-step instructions that break the writing process into manageable segments. Each step of TLC offers opportunities for teachers to differentiate classroom instruction while providing students with ample opportunities to negotiate meaning. A central tenet of UDL is to ensure that students have the support they need to acquire knowledge and demonstrate what they know. Often EALs with learning disabilities have issues retaining large amounts of information, organising their ideas into manageable pieces, and remembering sentence structures and paragraph sequences (Kormos & Smith, 2012). When educators focus on a specific genre and break learning into manageable segments, while simultaneously providing students with choices, different ways of interacting with classroom materials and different ways of demonstrating what they know, then the learning environment is rooted in IE. As David and Brown (2020) emphasise:

> When practitioners in applied linguistics bring UDL principles into their teaching and training, students have options in terms of materials, and piece by piece scaffolding is provided to all learners to help them complete all assignments (p. 299).

By combining GBA (which focuses on writing) and UDL (which seeks to make educational outcomes accessible), learning can become circular – and, thus, a greater number of ELLs, including those who are often left behind, can succeed.

Figure 1
Combining the TLC (GBA) with UDL principles: The Universal Genre Sphere (UGS)

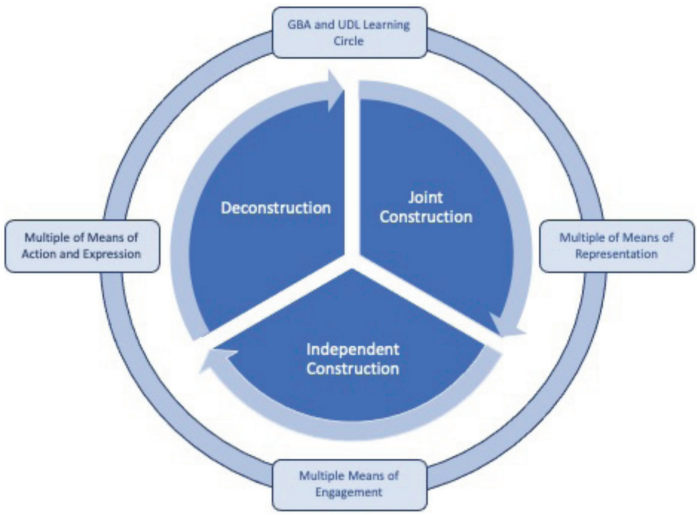

Figure 1 provides a visual representation of how the TLC would look if UDL principles were built into the fabric of its implementation. Note that the outer circle (in Figure 1) connects the three pillars of UDL to denote movement between the pillars of GBA. The outer circle illustrates flexibility in design and instruction, acknowledging the need for curricula to shift in support of student variation at each stage of writing. During each phase of the TLC, teachers can incorporate elements of MME, MMR and MMAE to ensure students have choices about how they engage with classroom materials, and also about how they demonstrate their learning before writing a complete essay.

During the first phase of the TLC, known as the *deconstruction phase*, students begin the learning process by working alongside the teacher to look critically at the specific genre in which they will be writing. Students need to learn to recognise the patterns along with the metalanguage embedded in the given genre in which they are working. EALs are often engaged in activities that look at the social function of the genre along with its schematic features (Callaghan & Rothery, 1988). Through modelling, students can develop an overall understanding of the purpose of the text. To facilitate understanding of the genre, curricula can incorporate MMR into classroom materials, which in turn can build in different modalities so that students have more than one avenue to develop an understanding of the genre with which they are working.

Additionally, in this first phase of the TLC, MME can hone in on students' individual interests, giving them choices about the particular topic that they will be exploring through the given genre. Finally, MMAE can be used to assess the ways that students demonstrate their learning through a series of different formative assessments that may not rely solely on writing as an output. For example, students could give a live presentation on aspects of the given genre's structuring or produce a short video on the same topics; students could even create diagrams that outline key components of what they are learning.

At the joint construction (or practice) phase of the TLC, UDL principles can serve as a guide in the practice, planning and implementation stages of joint negotiation of the text. To focus on choice and student interests, MME and MMR can be used simultaneously to guide EALs into contact with the given genre in various ways, which can be grouped according to the EALs' needs and interests. For example, students could work in groups or individually to make meaning out of classroom tasks and support one another as they research their given topics. Moreover, in this joint construction phase, students provide each other with support through peer review to look critically at what they already know and what they still need to know (Rose & Martin, 2012). Deconstruction provides students with multiple avenues to engage with potentially multimodal and multisensory classroom materials, thereby appealing to a wider student population. Additionally, MMAE can be used to segue toward the final stage of the writing process by helping students think about how they will demonstrate what they know through writing.

In the final stage of the TLC, known as the independent construction phase, students write their own texts. However, each section of an assigned essay can be broken into manageable segments that build in feedback and support before students assemble the complete essay. Students should have choices about how they demonstrate their learning. They can use visual aids to support the organisation of their writing and, additionally, as technology continues to reshape learning, they can incorporate elements of MMR by using speech-to-text software to help them compose. As discussed, UDL offers flexibility in the sometimes rigid writing process by placing an emphasis on asset-based learning rather than taking a one-size-fits-all approach to writing instruction.

Conclusion

This paper fills a gap in the need to design instructional models that provide inclusive additional-language writing instruction for all students by exploring the intersection of IE, ELT, disability and SLW. We show how GBA in

combination with the TLC and UDL can provide additional support for EALs from marginalised backgrounds, including those with disabilities. By combining GBA and UDL to create a shift in L2 writing, the principles of IE would be upheld, specifically through reducing barriers in the classroom and providing students with ample pathways to participate. Future studies should design and test specific implementations based on the theoretical model proposed in this paper; this is something in which the authors are already engaged, but a wider range of practical implementations and relevant results would be obtained if other researchers participated in congruent projects of their own. Such a constellation of empirical endeavours could do much to advance knowledge about more inclusive, equitable and effective writing instruction for all learners.

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The Influence of Technology in Educating English Language Learners at-risk or with Disabilities: A Systematic Review

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With the development of technology, the quantity and quality of electronic devices for students learning English as a second or foreign language (ESL/EFL) are on the rise, especially since the outbreak of the Covid-19 pandemic. To facilitate practices in English language education for students with special needs, the researchers conducted a systematic review of the empirical studies of technology tools for ESL/EFL students with learning difficulties published in the previous two decades. This paper presents the study selection process and findings of the review based on 16 peer-reviewed journal articles and one book chapter. The paper reveals the frequent mental and physical difficulties of English language learning and the typical technology tools employed in and out of class. More importantly, this paper discusses the roles of these technology tools in students' English language acquisition, specifically their effects on student learning outcomes and the students' perceptions toward them. With limited primary sources, this paper calls for more attention to the use of technology in English language learning of ESL/EFL students identified as at-risk and with learning disabilities and raises some implications for future research and instructional practices.

Keywords: educational technology, English language learners, learning difficulties, students with disabilities

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Vpliv tehnologije pri poučevanju angleščine ogroženih učencev ali učencev s posebnimi potrebami: sistematični pregled

Yizhe Jiang, Qian Wang in Zhenjie Weng

Z razvojem tehnologije in zlasti po izbruhu pandemije covida-19 naraščata količina in kakovost elektronskih naprav za učence, ki se učijo angleščino kot drugi ali tuji jezik. Za lajšanje praks pri poučevanju angleškega jezika za učence s posebnimi potrebami so raziskovalci izvedli sistematičen pregled empiričnih študij, objavljenih v zadnjih dveh desetletjih, glede tehnoloških orodij, ki so na voljo učencem angleščine z učnimi težavami. Ta članek predstavlja postopek izbora gradiv in ugotovitve, ki so nastale na podlagi sistematičnega pregleda 16 recenziranih člankov in enega poglavja v knjigi. Prispevek razkriva pogoste duševne stiske in fizične težave pri učenju angleškega jezika ter tipične vrste tehnoloških orodij, ki se uporabljajo pri pouku ali zunaj njega. Še pomembneje, ta članek razpravlja o vlogah teh tehnoloških orodij pri usvajanju angleškega jezika učencev, zlasti o njihovih učinkih na učne izide in dojemanje orodij pri učencih. Z omejenimi primarnimi viri ta članek poziva k večji pozornosti rabe tehnologije pri učenju angleščine kot drugega/tujega jezika učencev, ki so opredeljeni kot rizični oz. z učnimi težavami, ter navaja nekatere možnosti za prihodnje raziskave in učne prakse.

Ključne besede: izobraževalna tehnologija, učenci angleščine, učne težave, učenci s posebnimi potrebami

Introduction

The use of technology has received great attention in research and the practices of education in the past few decades. As defined by Huang et al. (2019), educational technology is 'the use of emerging and existing technologies to improve learning experiences in a variety of instructional settings, such as formal learning, informal learning, non-formal learning, lifelong learning, learning on demand, and just-in-time learning' (p. v). In other words, it has been applied to a wide range of learning contexts both in and out of school. Since the outbreak of the Covid-19 pandemic, we have witnessed a growing body of research on educational technology as students have become more dependent on electronic devices, including computers, laptops, tablets, mobile phones, and so forth, which support them in taking lessons from home and communicating with others in every corner of the world (e.g., Al-Maroof et al., 2020; Hebebci et al., 2020). In addition, with the rapid development of science and technology, more and more innovative devices and tools have been implemented in teaching and learning, including, in part, virtual reality, wearable devices, and robots, which encourage researchers and educators to explore their roles in education.

In the field of English as a second or foreign language (ESL/ EFL), technology has also gained great popularity, evidenced by numerous journal articles, book chapters, and dissertations on the subject. For example, a large-scale survey was conducted among Chinese undergraduate students reporting their strong motivation for learning English as a foreign language with the help of mobile-technology devices (Zou & Yan, 2014). A small-scale case study in a primary ESL class using a wiki for collaborating writing shows that such activity facilitates English writing in a creative way (Woo et al., 2011). Even though many publications have focused on technology uses for English language learners (ELLs), how technology tools facilitate students with special needs to learn English remains seldom explored. It is often more difficult for these students, defined as ELLs with learning difficulties owing to cognitive, physical, and sensorial impairments, to learn English compared with those in normal educational settings. Thus, to support these language learners academically, emotionally, and socially, much more research and practice in this realm are strongly in need. To keep abreast of the development of the research regarding applying various technology tools to English language education for students with special needs, we conducted a research synthesis on the empirical studies published as journal articles and book chapters. We adopt the classification of learning difficulties in Ganschow and Sparks' (2001) review, which classifies this term into 'learning disabilities' and 'at-risk'. While the former is based on the professional diagnoses of physical or

mental disabilities, such as hearing impairments and autism spectrum disorders, the latter refers to the inordinate difficulties in language learning at school, such as failure to pass exams. It is our hope to call for more attention to this special group of students and generate some implications of selecting appropriate English learning technology tools and implementing them in instrumental ways for teachers and students in special education contexts. Our review sets out to answer the questions: (1) How did technologies influence ESL/EFL students with special needs in reading? (2) How did technologies influence ESL/EFL students with special needs in vocabulary acquisition? (3) What are the students' perceptions toward their learning experiences with technology tools?

Our paper commences with a review of the research literature about technology for special education and ESL/EFL students with disabilities, followed by the details of the methodology regarding data collection and data analysis of the empirical sources. Next, we present the findings of this research synthesis, highlighting the roles of the technology tools involved in the 17 selected studies, highlighting how the technologies influence the students' English learning outcomes and how the students perceive their learning experiences with the technologies used in and out of the English class. We then discuss the limitations of the existing research and the implications for future research and practices of applying technology to the English language education of students with special needs.

Literature Review

Technology for Special Education

Drawing upon education legislation in the United States, students with disabilities should be offered complete learning materials and utilities in the course curriculum. The No Child Left Behind (2001) specifically requires that all students with disabilities need to receive 'content-based instruction and make progress in academics' (Evmenova & Behrmann, 2014, p. 27). In doing so, technology plays a substantive role in achieving the goal of fostering academic success for students with disabilities. Especially with the rapid advancement of technology, a variety of new devices and programmes have been created to assist students with disabilities in overcoming their learning barriers. Assistive technology (AT) and instructional technology (IT) are viewed as the most effective types that contribute to language literacy, different disciplines, and emotional and behavioural engagement for students with disabilities (Alnahdi, 2014; Evmenova & Behrmann, 2014).

According to Akpan and Beard's (2013) definition, 'AT is any item, piece of equipment, or product system that is used to increase, maintain, or improve

functional capabilities of individuals with special needs' (p. 114, cited by Disabilities Educational Act Amendments). Numerous researchers (e.g., Hecker et al., 2000; Raskind & Higgins, 1995) have witnessed its effectiveness, specifically in language reading and writing. Hecker et al.'s (2002) semester-long study assessed the efficiency of Kurzweil 3000, a text-to-speech programme, in reading comprehension of post-secondary students with attention disorders. According to the results of the questionnaire, at the end of the semester, nearly 80% of the students reported higher reading speed, fewer distractions, and less stress under the condition of reading with this software tool. In Raskind and Higgins's study (1995) on the proofreading efficiency of post-secondary students with learning disabilities, the group with a computer-based speech synthesis system detected 35% of total errors in compositions, whereas the group with another person reading aloud the text and the group with no assistance respectively found 32% and 25% of the errors.

Parallel to AT, IT has also been employed with a supplementary effect. According to Ozguc and Cavkaytar (2014), IT is defined broadly and generally referring to the 'developing instructional materials consistent with teaching methods' (p. 52), such as the SMART Board, projection, and Microsoft Office software. For instance, in Campbell and Mechling's study (2009), the SMART Board as a 'large, interactive whiteboard with touch-sensitive screen' (p. 49) and a 3-second constant time delay procedure were applied to teach letter sounds to three kindergarten students with learning disabilities. According to the results of observational learning and incidental learning, the IT technology facilitated the students in acquiring their target letter sounds and learning some of the other students' target letter sounds.

English language learners with special needs

As Baca and Cervantes (1989) describe, while ELLs face great hurdles at school, ELLs with special needs have to mount much greater challenges to achieve school success. Similarly, in EFL contexts, it is very challenging for students with special needs who have already been struggling with their first language acquisition due to physical, mental, and cognitive disabilities. Furthermore, what adds to this complex picture is that many ELLs with disabilities are from low socioeconomic family backgrounds. Thus, it is particularly important for schools and our society to provide them with various supports both in and out of the classroom. However, according to Maxwell and Shah (2012), schools and teachers usually face great challenges in assessing ELLs' special needs. 'The heart of the problem', they describe, 'is discerning whether students are simply struggling with acquiring English or truly have disabilities that are impeding

their progress' (Maxwell & Shah, 2012, para. 7). As reported by the investigation of Karvonen et al. (2021), many teachers need support from scholars and families to identify English students with disabilities and further provide appropriate and professional instructions.

Many scholars have provided constructive guidance for teaching English to students with special needs. For instance, Hoover and Collier (1989) emphasise the learning materials in alignment with students' specific language proficiency, learning ability, and cultural heritage. Echeverria and McDonough (1993) suggest we create meaningful language learning contexts and pay attention to the cultural and linguistic assets that students bring to the classrooms. de Valenzuela and Niccolai (2004) contend that native language support is beneficial for these students learning second languages. García and Tyler (2010) encourage teachers to lessen the information that students have to generate independently. These recommendations can also be applied to selecting and using technology tools for ELLs with disabilities.

Though of great importance, to our surprise, there is a dearth of data on ELLs with special needs, as pointed out by Artiles and Klinger (2004). Through searching limited empirical data in this area, we have found that the extant studies often centre on students' development in English reading and vocabulary. For example, Swanson et al.'s study (2006) shows that the performance of English reading and working memory of students identified as having reading disabilities are significantly below the performance of students not at risk. A recent study by Knaak et al. (2021) indicates that ELLs with learning disabilities profit from storytelling, flashcards, and rewarding mechanisms in vocabulary learning. Other language skills and competences of these students, however, remain largely unknown. Hence, in the future, we expect to see more studies about various language learning areas, such as speaking, listening, and grammar.

Method

Research synthesis, a relatively new research method, 'investigate[s] and evaluate[s] past findings in a systematic fashion, always explicating the methodology followed in the review so as to enable replication by other reviewers' (Ortega, 2015, p. 225). Ortega (2015, pp. 233–234) specifically identified four steps in doing research synthesis:

- Problem specification
- Literature search and study eligibility criteria
- Coding book development
- Coding of studies

As the problem has been stated above, in the following section, we continue to discuss the literature search and analysis.

Literature Search

There are three processes involved in this source search. We first conducted a comprehensive search of the scholarly literature using a variety of research databases, including Google Scholar, ERIC, Scopus, Web of Science, Ebscohost, and Academic Search Complete. In this stage, a combination of keywords regarding three aspects were employed: educational technology, English language education, and students at-risk or with disabilities. We also consulted the lists of references of selected articles and existing literature reviews. Following the focus of the study, we initially only collected empirical research that discusses technology use in ESL or EFL education for students at-risk and with learning difficulties rather than studies that reviewed literature (e.g., Hockly, 2016; Liu et al., 2013), were conducted in language arts class (e.g., Benmarrakchi et al., 2016; Srivastava & Gray, 2012), and focused on other content classes (e.g., Terrazas-Arellanes et al., 2018). We, therefore, eliminated 41 articles or book chapters from our initial reading list as they did not focus on technology use, ESL/EFL learning, or students with special needs.

Our inclusion criteria are based on the following: (1) the study emphasised the focus of the synthesis; (2) the study was empirical; (3) the study was published in a peer-reviewed journal or published as a book chapter, and (4) the article was published in English. The exclusion criteria include (1) the study was not on ELLs with special needs and technology use in educating the students; (2) the study was a theoretical piece or literature review; (3) the study was published as a conference proceeding or newsletter; and (4) the study was published in another language. Our research was not limited to any particular timeframe or geographical location; hence, the criteria resulted in an international sampling of research on technology use in educating students with disabilities in second or foreign language learning. In total, these criteria resulted in the inclusion of 13 articles, including those of Doughty et al. (2013) and Ludwig (2018). Although the student participants in those two studies were not all disabled, they clearly mentioned that some of their student participants had disabilities. As 13 articles are a very small amount of literature, to enhance the findings of the study, we decided to search in the following targeted journals:

- Journal of Special Education Technology
- Assistive Technology Outcomes and Benefits
- British Journal of Special Education

- Information Technology and Disabilities E-Journal
- International Journal of Disability, Development, and Education
- International Journal of Special Education

Through the targeted search, we found four more pieces of literature. Therefore, we collected 17 sources in total for this review (Alemi & Bahramipour, 2019; Alison et al., 2017; Andujar & Nadif, 2020; Chai et al., 2016; Chiang, & Liu, 2011; Fawcett & Lynch, 2000; Guardino et al., 2013; Jozwik & Mustian, 2019; Liontou, 2019; Ludwig, 2018; Papadima-Sophocleous & Charalambous, 2014; Rivera et al., 2014; Rivera et al. 2013; Savvidou & Loizides, 2016; Ting, 2014; Wicha et al., 2012; Xin & Affrunti, 2019).

Data Analysis

We took the selected sources (n=17) as the basis of our analysis. These studies were analysed regarding their (1) mental and physical difficulties of English language learning, (2) the typical types of technology tools employed in and out of class, (3) major findings on the effectiveness of using technology in facilitating students' reading and writing practices, and (4) major findings on the effectiveness of using technology in facilitating students' vocabulary acquisition, and (5) students' perceptions toward their learning experiences with technology tools. Based on these categories, we created tables to organise the data. To conclude this section, Table 1 summarises the most basic information regarding each primary study.

Table 1

Basic Information of the Selected Studies.

Studies	Types of study	Research Contexts	Student Participants	Disabilities	Technology
Alemi & Bahramipour (2019)	Journal article	Iran	10 adult learners	Down syndrome	Humanoid robot as a teaching assistant
Alison et al. (2017)	Journal article	The United States	Three elementary students	Autism spectrum disorder	iPad 21 using the GoTalk NOW (Attainment Company, 2012) application
Andujar & Nadif (2020)	Journal article	Spain	39 students in two secondary schools	Six participants who suffered from physical and cognitive disabilities: hearing loss, attention deficit hyperactivity disorder (ADHD), and Semantic-Pragmatic Disorder.	Edpuzzle was used as the learning management system (LMS) in which students viewed the videos

Studies	Types of study	Research Contexts	Student Participants	Disabilities	Technology
Chai et al. (2016)	Journal article	The United States	Three young ELLs with disabilities at a rural primary school	Speech and language impairments (SLI) and/or specific learning disabilities and/or developmental delays; one student had difficulty focusing on learning tasks	An iPad app named Touch Sound
Chiang & Liu (2011)	Journal article	Taiwan	15 high school students (all males)	Dyslexia	Kurzweil 3000 software 'include[s] word processing, reminders, and an optical character recognition system (technology that converts print documents into a form that can be read by a computer)' (p. 201)
Fawcett & Lynch (2000)	Journal article	The United Kingdom	Two secondary school children	Dyslexia	RITA, 'a computer-based literacy support system that assists, rather than replaces, the teacher in providing support tailored to each child's profile of reading attainments' (p. 50)
Guardino et al. (2014)	Journal article	The United States	Five hearing-loss students at a state school	Deaf and hard of hearing (DHH)	American Sign Language books on DVDs
Jozwik & Mustian (2020)	Journal article	The United States	Three elementary bilingual students	One with developmental delay; the other two with speech-language impairment; one student was diagnosed as at-risk in learning	Google platform (Read & Write for Google Chrome); digital story map graphic organiser
Liontou (2019)	Journal article	Greece	10 EFL students ranging from 9 to 12 years old	Attention deficit hyperactivity disorder (ADHD)	Computer-based activities, like computer-based quizzes, posting their wikis on a variety of topics
Ludwig (2018)	Journal article	Germany	28 secondary EFL students	One student was diagnosed with dyslexia, and one student was special needs not clearly stated	A mobile vocabulary-learning app named Socrative
Papadima-Sophocleous & Charalambous (2014)	Journal article	Cyprus	Eight university students	Special Learning Difficulties (SFD), like dyslexia, dyscalculia, attention deficit hyperactivity disorder (ADHD	Voice Memo on iPod Touch
Rivera et al. (2014)	Journal article	The United States	A 10-year-old elementary student	A moderate intellectual disability	Multimedia shared stories on iPad created by the application iBook Author

Studies	Types of study	Research Contexts	Student Participants	Disabilities	Technology
Rivera et al. (2013)	Journal article	The United States	Two third-grade Mexican-American elementary students	Moderate intellectual disability	Three English and Spanish multimedia books created and adapted by Microsoft PowerPoint
Savvidou & Loizides (2016)	Book chapter	Cyprus	Young adults in higher education attending an English for specific purposes course	High-functioning disabilities, such as dyspraxia, dyslexia, dysgraphia, attention deficit disorder, articulation, learning difficulties and psychological problems	Assistive technology tools, like Google Drive, Google sites, PowerPoint, Prezi, Wordle, QR codes and Instagram, and more via laptops, iPads, and smartphones
Ting (2014)	Journal article	Taiwan	Two university students and a teaching assistant	The two students with hearing impediments, the teaching assistant with autism	An interactive whiteboard
Wicha et al. (2012)	Journal article	Thailand	Phase one:18 primary school students Phase two: 141 primary school students	Hearing impairments	Two computer software tools: Total Communication with Animation Dictionary (TCAD) for Phase one and Total Communication with Animation Dictionary and Related Lexical Terms (TCAD+) for Phase two
Xin & Affrunti (2019)	Journal article	The United States	Five third-grade students	Learning disabilities or communication impairments	An iPad Application named Learning Touch, First Sight Word Pro

Findings

Based on our review, the main foci of the existing research are (1) the effectiveness of the technology used in English language education for students with difficulties regarding their reading skills and vocabulary acquisition and (2) the students' perceptions toward their learning experiences with these technology tools. Therefore, our findings are constructed based on these two aspects. The first two research questions are related to learning outcomes, and the third is about learners' perceptions.

Research Question 1:
How did technologies influence ESL/EFL students with special needs in reading?

Among the 17 identified studies, four research studies were conducted on students' reading skills (Alison et al., 2017; Fawcett & Lynch, 2000; Jozwik

& Mustian, 2020; Papadima-Sophocleous & Charalambous, 2014). We organise this section based on the types of technology tools. In the year 2000, well before the widespread use of smartphones and tablets, Fawcett and Lynch conducted a controlled study to investigate how two secondary ESL students with dyslexia or other learning difficulties would benefit from the RITA system, a multimedia system installed in Apple Macintosh computers with pictures, graphs, and computer-synthesised or human speech in addition to the texts. After the training session and the ten-week group work with the multimedia system, the two students did not report significant improvement in their reading fluency and accuracy, despite their high motivation of using the tool. One student showed slight progress through pre-and post-tests, whereas the other student was further behind on standardised spelling tests. This study was an early attempt to assess the effectiveness of the technology tools regarding ELLs' reading development. While this study did not indicate the strong effect of the technology tools on ELLs with learning difficulties, the other two studies reported disabled ELLs' reading improvement in different areas.

Focusing on oral reading fluency, Papadima-Sophocleous and Charalambous (2014) assessed the effectiveness of an application on an iPod touch device named Voice Memo. In contrast with the group work in Fawcett and Lynch's research (2000), ELLs with learning difficulties worked independently with the software tool after class. The participants were eight EFL university students diagnosed with special learning difficulties. They were required to listen to and repeat the text in the video form with the application. After the eight-week intervention of repeated reading, a moderate growth in reading rate and prosody was detected.

In Jozwik and Mustian's project, three ESL students with language impairment or developmental delays read the texts with Read&Write, an extension on the Google Chrome web browser installed on their Google Chromebooks. This extension featured voice typing and word prediction. In addition to the Google platform, the researchers provided a digital story map and static cling boards with stickers representing relevant objects, cartoons, and anime characteristics among students. The study reported remarkable improvement in students' reading motivation and accuracy.

Research Question 2:
How did technologies influence ESL/EFL students with special needs in vocabulary acquisition?

According to our synthesis, research focusing on how technology tools influence students' vocabulary acquisition was the most frequently studied,

involving ten empirical studies (Alemi & Bahramipour, 2019; Alison et al., 2017; Chai et al., 2016; Guardino et al., 2014; Ludwig, 2018; Rivera et al., 2013; Rivera et al., 2014; Ting, 2014; Wicha et al., 2012; Xin & Affrunti, 2019). In order to facilitate the target students' vocabulary acquisition and retention, researchers in this area have implemented various types of technology tools, including applications on iPad or smartphones, multimedia books in English, students' native languages or sign language, computer-based learning systems, and robots as teaching assistants. The overall result of this area is mixed, discussed with the types of technology in the following.

Three studies in our database implemented applications on iPads. Chai et al.'s research (2016) focuses on phonological awareness. Three ESL elementary students with impairments of speech, communication, attention, or language participated in the programme. Learning with the application named 'Touch Sound' for three days, they mastered the target phonemes and learned additional vocabulary knowledge with the vocabulary models. After three weeks, the delayed test shows that they were able to generate vocabulary learning skills with various English materials and maintained these skills. For example, one of the participants achieved 100% of accuracy for two sets out of three of correcting his target phonemes and 83.33% accuracy for the other set at the third-week follow-up. Alison et al.'s study (2017) invited three ESL elementary students with autism spectrum disorders to read shared English stories on the application, GoTalk NOW, embedded with definitions and example sentences for the target words. Assisted by this application, all the participants mastered the target six words and maintained their vocabulary knowledge over time. According to the statistical graphs, one of the participants increased her independent corrections to both WH Parings (from 1.4 to 7.9) and comprehension questions (from 1.0 to 4.1). The last study was conducted by Xin and Affrunti (2019) with five ESL elementary students with learning disabilities or communication impairments. According to the researchers, an application called 'Learning Touch, First Sight Words Pro' was used for students learning vocabulary in class with flashcards including audio and visual information. With standardised tests, Xin and Affrunti (2019) assessed the participants' performance during baseline, intervention (eight weeks), and maintenance (one week later) regarding their development in word recognition, comprehension, and application. Their study reported that the participants' abilities in these three areas increased to a great extent and were maintained after the instruction. In general, the percentage of students' correct responses increased from 29% to 57%, 23% to 37%, and 31% to 75%, respectively, in the three areas. All three studies with iPad applications appeared to have similar research designs and results since the participants

showed improvement from pre-test to post-test and presented relatively high scores in the maintained test.

Three studies examine multimedia books instead of applications for learners to study vocabulary. In 2014, Rivera et al. investigated the effectiveness of shared multimedia storybooks in English and Spanish for an ESL elementary student from Panama diagnosed with an intellectual disability (ID). The participant's English vocabulary increased steadily through the intervention phase as he improved a mean of 4.8 correct words within a range of one to nine. Moreover, according to the questionnaire and interview, the instructor stated that such a learning process was engaging for the student. No assessment for the word maintenance was reported in their article. Rivera et al.'s programme (2013) invited two elementary Mexican-American students with moderate ID to study English vocabulary with the English and Spanish multimedia shared storybooks on iPad. The study delivered conflicting results. Within the two-week intervention, the participant showed great improvement since their mean scores of correct English words increased respectively from 1.2 to 13.6 and from 0.4 to 18. However, neither gained an exceptionally high score on measures of maintenance. In Guardino et al.'s study (2014), five EFL elementary students who spoke Spanish at home suffered from hearing loss and learned vocabulary with the assistance of a book presented in DVD format on iPads. Rather than written in Spanish, the book assisted students with American Sign Language. These students correctly signed 90% to 100% of the targeted vocabulary through the intervention, and the maintenance of the skills was also presented.

In Ludwig's project (2018), EFL secondary students with disabilities, such as dyslexia, used the smartphone application, Socrative, for learning vocabulary in eight weeks. According to the author, this application allowed teachers to upload their own learning content, generate quizzes, and follow the students' learning progress. Moreover, it was designed with translation from the learners' first language to English and a simple operating system that could save the learners' time in becoming familiar with the application. However, the number of students using this application decreased, and only 18% of them completed the learning journey. Therefore, this technology tool failed to facilitate the students' vocabulary learning in general. The implications for choosing and implementing the technology generated from this study are discussed later in this paper.

Using a computer to project visual information onto a board, the interactive whiteboard was applied to Ting's (2014) longitudinal research. Two EFL college students with hearing impairments attended the research, with a student with autism spectrum disorder acting as the teaching assistant. The

students learned the vocabulary in real settings and played games such as fill-the-blanks and crosswords with the interactive whiteboard. This indicated that such a technology tool improved students' vocabulary learning ability and made all the students more enthusiastic in the English classroom, especially in choosing their favourite colours and printing the answer with digital pressure (i.e., a touchscreen). Furthermore, the teaching assistant also found the whiteboard interesting and engaging for teaching. The study of Wicha et al. (2012) implemented another computer-based learning system with an e-dictionary for elementary EFL students with hearing loss from Thailand. This system was designed with seven ways of communication: Thai and English sign languages, fingerspelling, lip reading, images, reading, writing, and vocabulary. Two groups of participants with nine in each group, were enrolled in the first phase of this study. In terms of vocabulary learning ways, Group A used an e-dictionary system named Total Communication with Animation Dictionary (TCAD) while Group T followed the traditional ways of learning, such as translation of verbal language to sign language and flashcards. The t-value of the independent t-test calculation regarding the long-term post-tests of the two groups was 2.95, statistically different at the 95% confidence interval.

Given that no significant difference was found between the pre-test scores of the two groups, Group A remarkably outperformed Group T in vocabulary acquisition and retention. In the second phase of this project, an adapted e-dictionary system with situated learning (TCAD+) was used for 141 students to learn vocabulary. Students with this technology tool made great progress in maintaining their vocabulary. According to the researchers, only 25% of the students scored 15 out of 30 on the pre-test, while over 50% made it on the post-test. Moreover, during the two phases, the instructors observed that students proficient in operating computers often offered help to peers and teachers with limited computing skills, showing enthusiasm and collaboration in interacting with these technological tools.

Compared with the aforementioned studies based on computers and portable devices, Alemi and Bahramopour's (2019) study was a creative one in which the robot acted as an English teaching assistant. It echoed the rapid development of artificial intelligence and inspired our future research in language education with innovative technology. The study involved ten Iranian adult English learners with Down Syndrome who were struggling with both language learning and short-term memory. The robot in this project was installed with a text-to-speech engine and the functions of speech recognition as well as image recognition. In this study, five students learned English vocabulary in the traditional way while the other five students were assisted by the robot. According

to the independent sample t-test, there was a noticeable difference between the experimental group with the robot (M = 12.40, SD = 1.51) and the control group without the robot (M = 8.4, SD = 1.81) from the pre-test to the post-test. Also, Cohen's effect size of 2.36 was deemed a significant effect between those groups. Thus, it can be concluded that the students with the robot assistant outperformed their counterparts to a large extent in vocabulary learning, suggesting the wider use of artificial intelligence in the intersection of language learning and special education.

Research Question 3:
What are the students' perceptions toward their learning with technology tools?

Eight studies (Andujar & Nadif, 2020; Chiang & Liu, 2011; Jozwik & Mustian, 2020; Liontou, 2019; Ludwig, 2018; Rivera et al., 2014; Savvidou & Loizides, 2016; Xin & Affrunti, 2019) from our database discussed the students' perceptions toward their learning experiences with technology tools. In this section, we illustrate our findings based on students' positive and negative attitudes.

Students with disabilities spoke highly of different technology tools in boosting their language learning from different perspectives. Students with physical disabilities, hearing loss, and ADHD strongly confirmed the usefulness of Edpuzzle (a learning management system) in Andujar and Nadif's (2020) study. The researchers employed a questionnaire, the Technology Acceptance Model (TAM), to obtain quantitative data regarding satisfaction with the use of Edpuzzle. The descriptive statistics showed that 'the future use of the platform', 'the perceived ease of use', and 'the perceived usefulness' were evaluated as high mean scores, with M = 4.83, M = 4.67, and M = 4.67, respectively (p. 16). To further comprehend the students' perceptions towards the use of Edpuzzle, Andujar and Nadif (2020) conducted a structured interview. Drawing upon the in-depth interview, the students indicated that Edpuzzle provided easy steps to access the contents and the opportunities of rewinding the videos anytime and from any location. For instance, one of the participants illustrated that 'we find it very useful because we can watch the video several times at home' (p. 17).

The results were mirrored in Jozwik and Mustian's (2020) study that testified to the effectiveness of using a Google platform in language literacy for students with speech impairment. From the students' points of view, the Google platform made the learning procedure more manageable. Moreover, the students showed high motivation in their subsequent language learning. Through a baseline research design, the study also found 'increases in the number of words read correctly during technology-supported LEA instruction,

respective to baseline performance levels' (Jozwik & Mustian, 2020, p. 430). Savvidou and Loizides (2016) also examined Google platforms (e.g., Google Drive and Google Sites) and other technology tools (e.g., PowerPoint, Wordle, Prezi, and QR codes) with students who were suffering from dyspraxia, dyslexia, dysgraphia, attention deficit disorder, learning difficulties and psychological problems. Most of the participants stated that Google Drive and Google Sites had priority in storing different documents and files, which were the most practical and user-friendly. Prezi was voted the most 'attractive and memorable' (p. 416), and QR codes were chosen as the most pleasant and effective technological medium, with all students participating in the classroom activities. Other studies, including Liontou (2019), Ludwig (2018), Rivera et al. (2014), and Xin and Affrunti (2019), respectively illustrated a high level of satisfaction in using computer-based activities with ADHD, adopting a mobile vocabulary learning application with dyslexia, applying iPad multimedia shared story with moderate intellectual disabilities, and employing iPad App-learning Touch with learning disabilities. According to Liontou (2019), the majority of young ADHA students, including 30% of students who agreed and 40% of students who strongly agreed, perceived that online classes were more enjoyable and motivating than face-to-face classes. Further, it was also shown in the survey that 80% of the students felt that 'computer-based reading comprehension texts included annotated texts and electronic dictionary use' enabled ADHD students 'to overcome any vocabulary difficulties while processing their online texts or answering reading questions' (p. 227). In the research of Rivera et al. (2014), the only participant expressed that he enjoyed learning English vocabulary using iPad, with music and videos embedded in the stories as his favourite parts of learning. As reported by Xin and Affrunti's (2019) survey, 100% of the participants were willing to use iPads for vocabulary learning.

By contrast, according to these studies, students with disabilities also conveyed some negative attitudes toward technology tools in their language learning. Chiang and Liu (2011) conducted a qualitative study to investigate students' perceptions of the usefulness of the Kurzweil 3000 software. Drawing upon the data from interviewing their participants, the findings showed that even though the Kurzweil 3000, 'a talking computer with text-to-speech capabilities" (Chiang & Liu, 2011, p. 200), surely boosted students with dyslexia in reading comprehension, reading speed, vocabulary spelling, and pronunciations, the students still complained that the software did not provide a dictionary for translating English into Chinese. For this reason, the students might encounter difficulties while reading. Similarly, students with disabilities in Savvidou and Loizides's (2016) study also reported the obstacles in tracing

the words while using Wordle as one of the technology tools in their language learning.

In short, the application of technology tools certainly enhanced students with different disabilities in English language learning classrooms. According to our synthesis, some students described their dissatisfaction toward certain technology tools, such as Wordle, mostly due to the imperfect design of the tools. With the advancement of technology, we believe that students with learning difficulties will merit a higher level of enjoyment in their language learning.

Discussion

Pedagogical Implications

It is critical to recognise that language teachers need to choose appropriate technological tools for students with disabilities. Other than considering the tools with the easier login process and fewer distractions from some unnecessary online notifications, language teachers also need to think about the level of difficulty of the content for their students (Andujar & Nadif, 2020; Ludwig, 2018). In addition, while educating students with disabilities, the focus should be on their strengths rather than their deficiencies in order to strengthen their confidence in their ability to learn. For example, teachers can establish a communicative environment for students with learning impairments and autism by using visual-based resources to interact and improve their language abilities (Ting, 2014). In order to minimise possible anxiety while learning, it is also significant to define a suitable learning aim and provide assistance based on individual requirements.

Furthermore, the assignments to the students with disabilities should be tailored to students' cognitive and language abilities, with fewer questions per activity and shorter quizzes rather than longer assessments. Last but not least, both students and teachers require instruction on how to use technology in language courses. Teachers must make the process of using a new technological tool clear and well-organised for students with disabilities (Liontou, 2019).

Research Implications

The research implications based on this review are manifold. First, most selected studies were conducted only over a few weeks (e.g., Papadima-Sophocleous & Charalambous, 2014; Xin & Affrunti, 2019), whereas the long-term influences of these technology tools were hardly investigated. In the

future, much more longitudinal empirical studies are strongly in need. Second, as shown in Table 1, the sample sizes of the previous research were relatively small. For instance, Guardino et al.'s programme (2014) involved five students, and only three English language learners participated in Jozwik and Mustian's study (2020). Hence, we anticipate more empirical studies with larger sample sizes to provide guidance for a wide range of English language learning contexts involving students with learning difficulties. Third, regarding the target language skills, only reading ability and vocabulary were studied, which calls us to be attentive to other language skills and competences, such as listening, speaking, writing, and even cultural knowledge. Fourth, as language education technology is developing at an accelerating pace, we embrace the future with more innovative technologies to be studied, such as wearable devices and virtual reality technology tools. Moreover, what remains seldom discussed among these empirical studies is the ethical issues related to technology utilisation. As presented by Huang et al. (2019), while implementing research involving technology, we have to pay specific attention to the security and privacy of the data, since others might collect learners' usernames, passwords, and other personal information through the internet.

Conclusion

Taken together, this paper presents some key aspects of the current stage of the empirical research at the intersection of language learning technology and ESL/EFL students with special needs (i.e., the influences of technology on ESL/EFL students with special needs in reading and vocabulary acquisition, and students' perceptions toward their learning with technology tools). Not only does it review the main types of technology tools and learning difficulties investigated in the existing research literature, but also discusses the roles of these technology devices regarding the students' learning outcomes and their perceptions toward learning experiences assisted by technology. The benefits of these technology tools are well documented in the selected sources, in particular for English reading and vocabulary. However, we have heard a few different voices from the participants in some studies as they experienced inconveniences of using technology tools, such as the disturbance from the online messages and the lack of dictionary. Both the positive and negative roles of technology provide implications for our future practice and research design. It has to be pointed out that the sample size of this review is relatively small based on our selection criteria, and we do not centre on the methodology of the extant primary research. Future review works could fill these voids to deepen

our understanding of research on technology utilisation in English language education for students at risk or with disabilities.

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Meeting the Needs of Learners with Specific Learning Difficulties in Online and Face-to-Face Language Classrooms: Teacher Beliefs and Practices

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Drawing on communities of practice and social cognitive learning theories, this paper explores language teachers' beliefs, knowledge and practices concerning the provision of high-quality education to learners with specific learning difficulties in various educational settings around the world. The data sample for this paper comprises qualitative data (video-recorded interviews and teaching resources) collected from six teachers working across various educational settings (primary, secondary, college and university) across several geographical areas (Europe, Middle East, and Southeast Asia). Thematic analysis was adopted to analyse the data. The findings suggest that teachers continue to experience challenges in educating learners with specific learning difficulties regardless of the educational setting. Limited opportunities for receiving specialised training in this area have been identified by several teachers as one of the key factors affecting the quality of their practice. The change in the mode of instruction from face-to-face to online was not always reported as negatively affecting the quality of educational provision to learners with specific learning difficulties. Technology-assisted online lesson delivery was seen as being advantageous to learners with some types of learning difficulties. Findings from this paper can be useful to teacher-practitioners and teacher-educators who are interested in improving the quality of language education for learners with specific learning difficulties.

Keywords: second language learning, online teaching and learning, assessment, instructional accommodations, specific learning difficulties, teacher beliefs and practice

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Zadovoljevanje potreb učencev s posebnimi učnimi težavami pri poučevanju jezika na daljavo in v živo: prepričanja in prakse učiteljev

Oksana Afitska in Nur Ehsan Mohd Said

Na podlagi teorij izkustvenih skupnosti in socialnega kognitivnega učenja ta članek raziskuje prepričanja, znanje in prakse učiteljev jezikov v povezavi z zagotavljanjem visokokakovostnega izobraževanja učencem s specifičnimi učnimi težavami v različnih izobraževalnih okoljih po vsem svetu. Vzorec podatkov za ta članek obsega kvalitativne podatke (videoposnetke intervjujev in didaktična gradiva), zbrane pri šestih učiteljev, ki delajo v različnih izobraževalnih okoljih (osnovna, srednja, višja in visoka šola) na več zemljepisnih območjih (Evropa, Bližnji vzhod in jugovzhodna Azija). Pri tem je bila uporabljena tematska analiza podatkov. Ugotovitve kažejo, da se učitelji ne glede na izobraževalno okolje še naprej spoprijemajo z izzivi pri izobraževanju učencev, dijakov in študentov s posebnimi učnimi težavami. Omejene možnosti za pridobitev specializiranega usposabljanja na tem področju je več učiteljev opredelilo kot enega ključnih dejavnikov, ki vplivajo na kakovost njihove prakse. Sprememba načina poučevanja iz dela v živo v spletno izvedbo ni vedno negativno vplivala na kakovost izobraževanja za učence, dijake in študente s specifičnimi učnimi težavami. S tehnologijo podprto spletno izvajanje lekcij je bilo ocenjeno kot koristno za učence, dijake in študente z nekaterimi vrstami učnih težav. Ugotovitve tega članka lahko koristijo učiteljem praktikom in izobraževalcem učiteljev, ki jih zanima izboljšanje kakovosti jezikovnega izobraževanja za učence, dijake in študente s specifičnimi učnimi težavami.

Ključne besede: učenje drugega jezika, poučevanje in učenje na daljavo, izobraževalne prilagoditve, specifične učne težave, prepričanja in prakse učiteljev

Introduction

In today's globalised world, which promotes student diversity and inclusivity, teachers must adjust their practice and continually upgrade their knowledge to educate their students effectively. Teachers' practices are informed by their professional knowledge, beliefs, and environment. All these components are active, dynamic, and fluid; they carry bidirectional influences and create reciprocal relationships and mutual causation between one another (Eun, 2019).

Social cognitive learning theory (Bandura, 1997) and communities of practice learning theory (Wenger, 1998) aid in understanding these relationships better and enable us to examine teacher practices and their underlying motives more thoroughly. The social cognitive learning theory emphasises cognitive processes in human-environment interactions, with 'self-efficacy' and 'outcome expectations' being its two main constructs (Bandura, 1997). In the field of education, the term 'teacher efficacy is used, referring to 'teachers' beliefs of their capabilities to affect changes that improve students' learning, even [in circumstances] beyond teachers' control, such as home environment, intelligence, and other external factors' (Eun, 2019, p. 77).

Eun (2019) argues that 'the cognitive construal of [teachers'] past performances, situational factors, and their knowledge and skills all influence how much [teachers] will perceive to be capable of [achieving in specific circumstances]' (p. 76). Indeed, when ordinary teachers are placed in educational contexts where they need to work with unfamiliar groups of learners, such as second language learners or learners with specific learning difficulties (SpLD) in mainstream classrooms, their levels of self-efficacy (i.e., their perceptions about their capabilities to educate these groups of learners effectively) as well as their outcome expectations (i.e., judgments about the likely consequences their actions or inactions might produce) may be low. Access to specialised training and resources, as well as ongoing professional support within their educational contexts, becomes crucial in these situations. To help us better understand the beliefs, and practices influenced by beliefs, of teachers who work with learners who have specific learning difficulties, we will draw on Wenger's (1998) communities of practice learning theory, which explores concepts of (teacher) identity, professional and social interaction and practice in (educational) settings that have shared enterprises.

Specific learning difficulties (the term 'disorders' is used in specialised literature) are 'neurodevelopmental disorders typically diagnosed in early school-aged children, although may not be recognized until adulthood' (American Psychiatric Association, n.d.). In this paper, we will use the term 'difficulties' instead of 'disabilities' to highlight the interactional view of disabilities

(in educational contexts) as opposed to the deficit view (in clinical contexts). SpLDs are present in people who experience persistent difficulties in at least one of three areas: reading, written expression, and/or math. In this paper, we will focus on learning difficulties that affect the development of learners' literacy skills (i.e., reading, writing, and speaking).

Dyslexia is the most common type of SpLD. It affects twenty per cent of the population (Shaywitz et al., (2021) and can occur in people with a range of intellectual/cognitive abilities (Rose, 2009, p. 10). The International Dyslexia Association (2002) defines dyslexia as 'difficulties with accurate and/or fluent word recognition, poor spelling and decoding abilities'. These difficulties may lead to 'secondary consequences [which] include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge'.

In second-language classrooms, dyslexic learners require support with the development of all language skills, including communication, not just reading and writing, as per the requirements of The Common European Framework of Reference for Languages (CEFR, 2001) which is used as a reference document for standardised accreditation of learners' second language proficiency.

Apart from dyslexia, other learning difficulties that are relevant to this paper are dysgraphia (difficulties with spelling, grammar, punctuation, and handwriting), visual and hearing impairments, and attention deficit hyperactivity disorder (ADHD). It is common for SpLD to share specific features across them. For example, 'processing speed difficulties occur in both dyslexia and ADHD' (Carroll et al., 2020, p. 19).

Research evidence suggests that poor phonological awareness, among other factors, can affect dyslexic learners' literacy skills (Carroll & Breadmore, 2018; Carroll et al., 2016; Geva & Massey-Garrison, 2013; Pennington et al., 2012). Therefore, recommendations are made for the provision of instructed training for dyslexic learners in phonological awareness to improve their literacy skills (Bus & Ijzendoorn, 1999; Melby-Lervag et al., 2012). Furthermore, guidance for effective education of learners with dyslexia (Inclusion in Europe through Knowledge and Technology, 2015) encourages the use of learner-centred, communication and action-oriented approaches, which account for learners' 'specific characteristics, needs, interests, differences in learning styles [and] the specifics of their natural language[s] and culture[s]' (p. 9).

Furthermore, learning becomes more difficult and teaching more challenging when classrooms include learners with SpLD who come from culturally and linguistically diverse backgrounds. The challenge of addressing the needs of various groups of learners has been long addressed by the introduction

of differentiated instruction techniques into mainstream classrooms (Gavish, 2017; Hemmings & Woodcock, 2011).

However, to date, research that unpacks how differentiated instruction can be used with SpLD learners, and how teachers could be better supported with effective implementation of this technique in SpLD contexts remains scarce (Hoover & de Bettencourt, 2018; Reddig et al., 2021). Specifically, research showed that mainstream teachers, who participated in pre-service and in-service training courses, were insufficiently prepared for the application of suitable and effective inclusive educational strategies in classes with SpLD learners (Forlin & Sin, 2017; Gavish, 2017; Hoover & deBettencourt, 2018). Moreover, teachers believed that limited access to appropriate resources had hindered them from developing the right attitude, beliefs, and understanding of SpLD learners' needs, which are crucial for becoming inclusive experts (Forlin & Sin, 2017). Fisher (2013), in her study to investigate the extent of general education teachers' preparation in primary schools, included teacher-participants who worked with learners with special educational needs in the general classroom. The teachers managed learners with a) autism, b) language or speech disorders, c) SpLD, and d) emotional disabilities. Using a multiple-method quasi-experimental design, Fisher applied an original instrument called the General Educators Preparedness for Inclusive Education among 52 third-, fourth-, and fifth-grade teachers in south Mississippi in the United States. The quantitative data demonstrated that general education teachers were mostly uncertain about their preparedness to accommodate the requirements of special needs learners. However, of the four special educational needs, teachers considered themselves to be better prepared in assisting learners with SpLD than those with autism, language/speech disorder, or emotional disabilities. Meanwhile, the qualitative data indicated teachers' lack of belief in handling learners with exceptionalities in the mainstream or general education classroom.

Teachers also noted that having more practical hands-on experiences, opportunities for collaboration with special education personnel, and assistance with instructional materials' development were a part of their expectations to help them successfully accommodate the needs of learners with SpLD in their classrooms (Fisher, 2013). Other studies have also indicated an increase in teachers' self-efficacy when they took the initiative to proactively accommodate the needs of their SpLD learners (Hoover & de Bettencourt, 2018). This initiative, in turn, led to teachers developing a good rapport with their SpLD learners and to creating positive relationships with them (Reddig et al., 2021).

Furthermore, research indicates that collaborative efforts between general education teachers and special education teachers can lead to the establishment of productive and successful learning environments for these learners. Olson et

al. (2016) researched 12 educational personnel (school administrators, special education teachers, and general education teachers) in order to gather their views on how they defined and provided access to students with severe disabilities in the general education curriculum. The data were collected via questionnaires, interviews, observations, observation reflections, and artefacts. The findings revealed that the school personnel construed multi-dimensional interpretations of access for learners with severe disabilities to the general education curriculum. The interpretations informed complex educational practices, with 'shared responsibility' for the provision of support across various educational levels and roles being identified as one of the core units of practice.

With regard to the best location for access, the school personnel believed that the general education context would benefit learners with disabilities the most. Access to general education classrooms entails access to general education teachers who are considered content experts. As such, the teachers were expected to transcend the regular role of curriculum and content experts and to learn to perform tasks that were traditionally completed by special educators through differentiation, accommodations, and modifications.

In a more recent study by Reddig et al. (2021) that examined special and general education teachers' perceptions of culturally and linguistically diverse students with disabilities, 13 teachers from three urban high school settings were interviewed in a focus group to obtain their perceptions of the academic performance of students with mild disabilities in an inclusive setting. The main findings include the positive attitude and acknowledgement of sufficient collaboration of special education and general education teachers in which the general/mainstream education teachers displayed respect towards the special education educators and accepted them fully in the classroom. The study also reported the practice of team teaching, which (despite the term's meaning) mainly involved the general education teachers getting advice from the special education teachers.

This paper, thus, aims to contribute knowledge to the strand of the ELT field concerned with the exploration of second language teachers' perceptions and practices (teaching, assessment, and use of instructional resources) while working with learners with SpLD. It also aims to provide insights into how teachers' practices change when the medium of instruction shifts from face-to-face to online learning mode. Thus, the three research questions informing this paper are:

1. What are the second language teachers' beliefs about educating learners with specific learning difficulties, including their self-perceived readiness to work with this group of learners?

2. What are the second language teachers' actual and/or reported practices (teaching, assessment, and selection of instructional resources) in classes including learners with specific learning difficulties?
3. Has the shift to that online mode of teaching delivery had any impact on their practice? If so, what was the impact?

Method

The study reported in this paper adopts a small-scale qualitative research design. Its data is comprised of 45–60-minute long video-recorded interviews with six TESOL teachers, samples of lesson plans and teacher-devised or adapted materials for SpLD learners.

Participants

The participants for this study were recruited using a convenience population sampling method. Each researcher drew on their own professional contexts and links within them to approach potential appropriate participants for the study.

Table 1

Participant profiles

Teacher	Region and Country	Education phase[2]	Gender	Years of teaching experience	Formal SEN[3] Training	SENCo[4] Responsibility
Adam[1]	Middle East Bahrain	Primary	Male	14 years	Yes	Yes
David		Secondary	Male	18 years	Yes	No
Aina	Southeast Asia Malaysia	Primary	Female	11 years	No	No
Nazim		Secondary	Male	15 years	Yes	No
Kamila	The UK England	College	Female	10 years	No	No
Christina	Europe Germany	University	Female	15 years	Yes (basic)	No

Note. [1]Teachers' real names were substituted with pseudonyms; [2]Educational phase on experiences from which the interviewees were drawing; [3]Special Educational Needs and [4]Special Educational Needs Coordinator.

When the participants were identified, detailed research information sheets and consent forms were shared with them for closer familiarisation with the research procedures and objectives and for form signing, by which participants consented to participate in this study. In some cases, invitation letters were sent to educational establishments to fulfil their internal administrative procedures

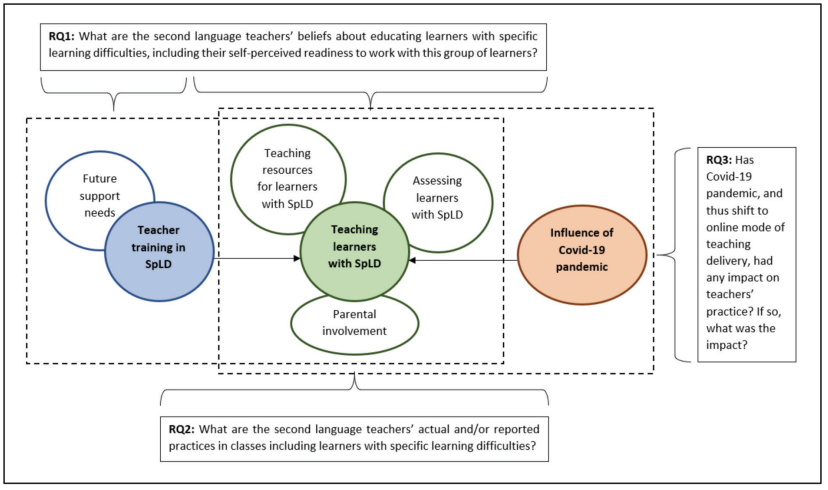
for participation in academic research. The research project obtained full ethical approval from the lead university prior to its commencement. Participants from four geographical locations were recruited for this research: Europe, the Middle East, and Southeast Asia. Their details are outlined in Table 1. All participants needed to have fulfilled the following criteria: (1) be a second-language teacher, (2) work with learners with specific learning difficulties or those believed to have specific learning difficulties (in some contexts, it is still uncommon and/or difficult for parents to get formal acknowledgement/accreditation of their children's SpLD condition), (3) work in either primary, secondary, college or university levels of education. Teacher participants were not required to have formal training in working with learners with SpLD prior to participation in this study.

Research procedure

The study was conducted remotely due to social restrictions imposed by the Covid-19 pandemic in 2020–2021. Each teacher participant was interviewed once using either Skype or the MS Teams interactive platform. Following the interviews, teachers were encouraged to share samples of their lesson plans and teaching materials adapted to the needs of SpLD learners with the researchers. Teachers with SENCo (Special Educational Needs Coordinator) responsibilities were also encouraged to share samples of their SpLD training materials with the research team. Three core themes and four sub-themes were identified as target areas for analysis, with each theme/sub-theme aligned to a particular research question (Figure 1).

Figure 1

Research framework



Instrument

Semi-structured interviews were used to collect the data. The questions were grouped thematically to facilitate data analysis at a later stage. All interviews were transcribed verbatim for analysis and blindly coded by members of the research team. The rate of inter-rater coding reliability was 92%. Figure 2 gives an overview of the guiding questions used for teacher interviews.

Figure 2

Guiding questions for teacher interviews

No	Question
1.	Do you have any special training in working in SpLD context?
2.	How many learners with SpLD do you have in your class? What type(s) of SpLD do they have?
3.	What activities do learners with SpLD tend to find the easiest in your second language classes?
4.	What activities do learners with SpLD tend to find the most difficult/challenging in your second language classes?
5.	How do you know/notice that learners are struggling with one or another activity or aspect of it? What do you do to help them?
6.	How do you assess the SpLD learners' knowledge of second language?
7.	Which resources / materials do you use in your second language lessons with SpLD learners?
8.	Do you use any additional (self-created / self-found) resources? How effective are these resources?
9.	Would you want any other resources to be available to you? If so which?
10.	Do you set up second language homework to your class / SpLD learners? How do you decide what material to give as homework?
11.	Do you check homework of SpLD learners at the next lesson? How?
12.	How do you see the role of parents/peers in helping learners with SpLD with their second language homework? Would you want parents/peers to be involved at all?
13.	How/to what extent?
14.	How important/helpful do you see group work / peer-work for SpLD learners in the classroom?
15.	Have your practices of working with SpLD learners been affected by Covid pandemic? If so, how?

Results and discussion

Teacher experiences and beliefs

The first research question aimed to explore TESOL teachers' beliefs about educating learners with specific learning difficulties and the extent of their self-reported readiness to work with this group of learners. The findings revealed that all interviewed teachers had a positive attitude towards educating learners with SpLD, despite some not having received formal training in this. Kamila noted that, in the beginning, it was difficult for her to identify learners

with SpLD despite her having a degree in a related subject area. However, over time she became skilled at doing this, identifying SpLD learners even prior to records about their needs being shared with her via the institutions' formal channels. Teachers' positive attitudes, however, were not universal. Teachers noted that some of their colleagues would prefer not to have SpLD learners in their classes, while others would teach them but would do it the same way they teach the rest of their students, pretending that SpLD learners did not have any special needs. Other teachers felt that they should not teach this group of learners since they had no training in SpLD.

> *Many teachers feel they are not trained for that area [SpLD]. They've got this presumption that it's like a very specialist area and if I haven't got a qualification I can't do anything* (Adam, 15/09/2020, 16.00–16.11).

> *Teachers don't always come forward with the student who's got [SpLD]. They might just try to see it out, or they might take action to try to sort of hide that up, so they do not always come to us voluntarily* (Adam, 15/09/2020, 15.04–15.10).

The use of avoidance strategies and the expression of negative attitudes by teachers may be due to many factors. Some teachers might not know what the distinguishing features of cognitive and physical behaviours of SpLD learners are. In the Malaysian National Curriculum for schools, for example, there is no differentiation between the teaching of non-SpLD and SpLD learners. Nazim noted that, in his context, teachers were required to teach SpLD learners using a mainstream learner curriculum with the same evaluation rubrics and learning objectives for SpLD and non-SPLD learners. Other teachers might be able to identify SpLD learners in their classes but not know how to address their needs due to limited or no training in SpLD instruction. Yet other teachers might be willing to learn about the teaching of SpLD learners but might not have opportunities to do this.

> *Sometimes teachers generally might not notice the difference. I've had had like, for example, we get teaching assistants. A teaching assistant has made an observation about a student that the teacher hasn't noticed himself. And I've gone into the class and I've been really surprised that, why did the teacher not notice this? How is this coming to me from the teaching assistant? So you can get some people where they just don't notice* (Adam, 15/09/2020, 16.26-16.52).

Interestingly, Kamila, Christina, and Aina reported having self-educated themselves about SpLD learning and teaching. Some drew on their professional knowledge obtained as part of their bachelor's degrees; others reported attending short voluntary SpLD training sessions provided by their institutions, and yet others admitted searching the internet in the hope of finding answers to their questions. Having received initial training only in mainstream English education, Aina was nonetheless later required to teach SpLD children. She admitted that she had to acquire sign language from her learners:

> *When I was assigned to my first school and realising that I had no prior training in Special Education, I learnt from YouTube but later took the opportunity to spend time with the pupils after school to learn from them. They were my first mentors before a group of teacher trainees came along who helped me when I had questions related to sign language... I felt embarrassed at first when the pupils were better at signing than me but in my second year of teaching I caught up and improved tremendously* (Aina, 14/10/21, 17.48-21.15).

Despite the current fragmented provision of SpLD training in many institutions, it is encouraging to see that in some educational settings, shifts are starting to take place for better provision of systematic and continuous SpLD support as part of in-service teacher training.

> *I feel we're making a lot of progress. I mean, in terms of us in the region, I know that other [second language teaching]centres looked at us, and they're taking our example, which shows that we're making some progress* (Adam, 15/09/2020, 16.26–16.44).

The interview data has also revealed that, in many educational contexts, it is still common for teachers without formal SEN training and SEN coordinators to perform in-house diagnostic observations and assessments to identify learners with SpLD, as many SpLD learners continue to come to schools without formal certification of their condition. In light of this fact, providing specialised training and raising teachers' awareness about the effective education of SpLD learners becomes even more paramount.

The findings presented above echo findings obtained by other scholars working in the field of teacher education and teacher cognition. Kormos and Kontra (2008) interviewed a group of Hungarian second-language teachers, special education teachers and speech therapists and found that teachers,

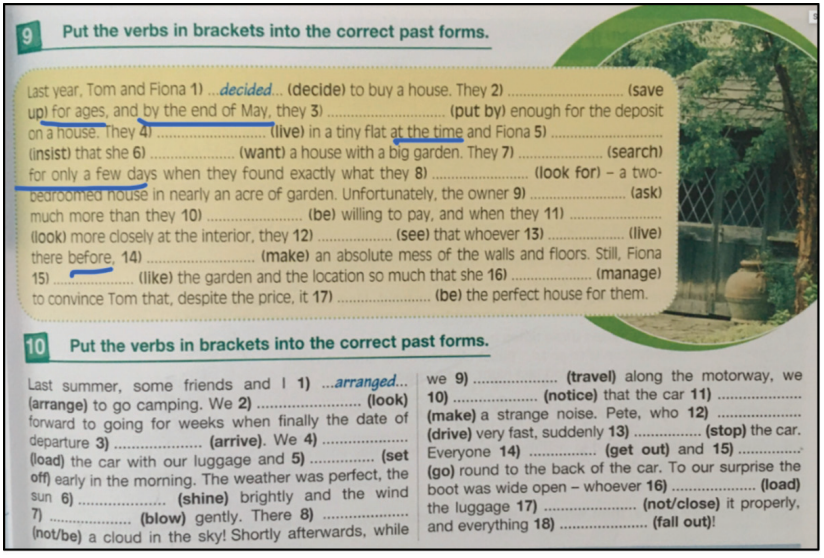
regardless of their professional roles, believed that dyslexia was an influencing factor affecting all aspects of SpLD learners' second-language learning experiences, and not only those concerned with the development of their spelling and reading skills. Despite these findings in many other, less specialised educational contexts, teachers of SpLD learners do not always know how to teach them effectively and how to integrate them into their classrooms (Kormos et al., 2009). This lack of professional knowledge among teachers, together with the lack of support from educational settings, leads to increased rates of anxiety in learners with SpLD, their unwillingness to engage with second language learning process and negative attitudes towards it (Csizér et al., 2010; Kormos & Czizer, 2010). On the topic of the importance of professional teacher development courses, Nijakowska (2014) notes that 'successful inclusive teaching needs to be *underpinned by a solid knowledge base* about the nature of [SpLD]. Only by understanding the cognitive, emotional and social issues associated with SpLD can teachers make *informed pedagogical decisions* and effective adaptations in their teaching, and form positive attitudes to inclusive teaching practice' (p. 107; our emphasis). In recent years more professional development courses have become available for teachers working with learners with SpLD. A recent study by Kormos and Nijakowska (2017) investigated teachers' beliefs and perceptions about their use of inclusive educational practices with dyslexic students. The findings revealed that teachers who engaged meaningfully with the course by either completing more tasks in it or by posting more comments demonstrated increased post-course self-efficacy beliefs and reported lower levels of worry about the implementation of inclusive language teaching practices, respectively.

Teaching practices

Our second research question examined teachers' contemporary practices concerning the education of learners with SpLD in mainstream TESOL classrooms. In terms of teaching practices, teachers reported using various accommodations to account for their SpLD learners' diverse needs. Drawing on her experience of working with learners with dyslexia who often misspell words, have difficulties with pronunciation, and issues with reading comprehension, Kamila noted that she would expand texts' reading times, enlarge texts' font if necessary and highlight certain parts in texts to help students pay specific attention to their specific parts (Figure 3).

Figure 3

Accommodation in a language coursebook for SpLD learners: highlighting for better focus and comprehension



9 Put the verbs in brackets into the correct past forms.

Last year, Tom and Fiona 1) ...*decided*... (decide) to buy a house. They 2) ..... (save up) for ages, and by the end of May, they 3) ..... (put by) enough for the deposit on a house. They 4) ..... (live) in a tiny flat at the time and Fiona 5) ..... (insist) that she 6) ..... (want) a house with a big garden. They 7) ..... (search) for only a few days when they found exactly what they 8) ..... (look for) – a two-bedroomed house in nearly an acre of garden. Unfortunately, the owner 9) ..... (ask) much more than they 10) ..... (be) willing to pay, and when they 11) ..... (look) more closely at the interior, they 12) ..... (see) that whoever 13) ..... (live) there before, 14) ..... (make) an absolute mess of the walls and floors. Still, Fiona 15) ..... (like) the garden and the location so much that she 16) ..... (manage) to convince Tom that, despite the price, it 17) ..... (be) the perfect house for them.

10 Put the verbs in brackets into the correct past forms.

Last summer, some friends and I 1) ...*arranged*... (arrange) to go camping. We 2) ..... (look) forward to going for weeks when finally the date of departure 3) ..... (arrive). We 4) ..... (load) the car with our luggage and 5) ..... (set off) early in the morning. The weather was perfect, the sun 6) ..... (shine) brightly and the wind 7) ..... (blow) gently. There 8) ..... (not/be) a cloud in the sky! Shortly afterwards, while we 9) ..... (travel) along the motorway, we 10) ..... (notice) that the car 11) ..... (make) a strange noise. Pete, who 12) ..... (drive) very fast, suddenly 13) ..... (stop) the car. Everyone 14) ..... (get out) and 15) ..... (go) round to the back of the car. To our surprise the boot was wide open – whoever 16) ..... (load) the luggage 17) ..... (not/close) it properly, and everything 18) ..... (fall out)!

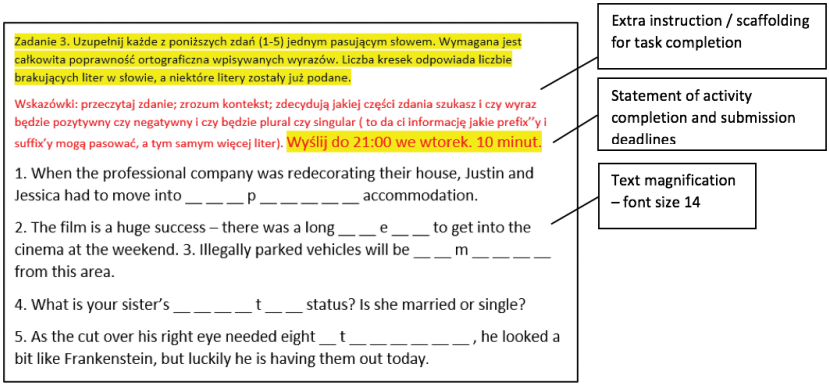
For writing activities, she would break texts for summarising down into shorter paragraphs and offer learners synonymous expressions to help them express themselves more freely and clearly in writing. For speaking activities, Kamila would allow her dyslexic learners to use prompt cards, encourage them to rehearse their spoken texts or share these texts with her for informal checking and feedback prior to the class. She would also support her learners' listening comprehension by allowing learners to listen to a spoken text several times, noting that this practice would be adjusted accordingly if learners were preparing for formal exams. Furthermore, in the interview, Kamila mentioned stretching her dyslexic and dysgraphic students to take notes during her classes, noting that they could do them on a computer if that were helpful to them. Where computers were not available to support writing activity, Kamila would encourage her dysgraphic students to write in capital letters. Despite this activity being time consuming, Kamila said that it helped her considerably in decoding and comprehending her learners' written work, which otherwise could have been incomprehensible in many places. Another issue that Kamila raised in her interview relates to difficulties that dyslexic students have in lessons where they acquire subject-specific content through the medium of a second language. This is a challenging situation for any learner, let alone for a learner with dyslexia. Kamila commented:

> *Dyslexic students struggle with their ability to understand terminology. There are more words [on one page] than [should be] allowed for them not to understand [in order to comprehend the text], then they are learning a language [in addition to learning the subject matter] and they don't really understand what the meaning behind it is. So, it's a much more slow process for them than for everybody [else]' (Kamila, 25/09/2020, 25.25-22.57)*

Adam echoed Kamila's practice and highlighted the importance of explicitly teaching phonics to dyslexic students through the use of pure sounds and employment of effective instructional techniques, such as Engelmann's direct instruction approach.

Figure 4

Accommodation in a language study book for SpLD learners: text magnification, provision of extra scaffolding for task completion, clear setting of activity timing and submission deadlines.



With regards to teaching language to learners with visual impairments, David noted making enlargements to reading texts, using audio tracks instead of visual clues to provide supportive cognitive stimuli about objects to students (e.g., using a sound of 'something grilling' as a representation of a 'barbeque' image), and significantly increasing amount of teacher speaking time during lessons, despite general ELT advice being in favour for reducing teacher talk time in second language classrooms. David explained that teachers with visually impaired learners need to:

> *[…] think very, very carefully about every single thing that [they] say, and not only things that [they] say, but [also] noises in the classroom, and*

> *positioning, and where people are sitting, and anything unusual that happens in the classroom. […] I found that the best way to do it was to simply have a running commentary from myself of everything that was happening. […] If I did anything on the board I would say 'now I'm going to stand up, and go to the board and I'm just going to draw a table for us to decide where to put these verb forms'* (David, 07/10/2020, 08.46–10.20).

Furthermore, Christina, Adam, and Nazim commented on their experiences working with learners with hearing impairments. Nazim spoke favourably about the use of tablets and group work activities to capture the attention of learners with hearing difficulties. Christina and Adam noted the importance of clear articulation of sounds and careful monitoring of their unobstructed projection to students (such as teachers keeping hands away from their mouths) when teaching pronunciation. Christina also highlighted the importance of agreeing to wear a special microphone that transmits sounds from the speaker (for example, a teacher) to the student's hearing device, which allows them to comprehend and process spoken language. Furthermore, Christina pointed out that teachers need to be aware that learners with hearing implants not only learn a second language through them but also learn how to use their assistive devices to process and understand speech sounds per se (let alone in a foreign language), making this task doubly complex and requiring extra time and patience on the part of both the learner and the teacher. As with visually impaired learners, constant attention to various input channels, such as language production by other learners in class, and their aural echoing was also noted as important for learners with hearing difficulties. Finally, Christina highlighted lip-reading technique as a useful tool for learners who have hearing difficulties in learning second language phonemes as well as in processing their teacher's speech more generally. She said:

> *Clearly enunciating, making the lip movements, wearing lipstick really helped her. Just because the lips were clearer, she could see clearer, or something […] she did a class on pronunciation […] she could see the lip shapes, and we did a lot of work with [me] looking in the mirror and trying to describe, you know, the positions of the tongue and this kind of thing, because she couldn't particularly find out differences between certain phonemes, especially when the German phoneme was similar, so we made a lot more emphasis on the visualising and feeling'* (Christina, 24/11/2020, 10.28–11.49).

With regards to teaching learners with ADHD, David commented that he would give these learners variety of tasks and would do a quick turnover of them to keep learners focused and engaged. For example, when practising handwritten letter formation with them, he would let students trace letter shapes first, then give them the option to colour the letters and then an option to draw. Kamila noted that to support her autistic students, she would encourage them to note down things they would like her to explain in more depth individually. She would also pay specific attention to explaining idiomatic expressions and phrasal verbs to these learners.

All teachers noted the importance of parental support when teaching learners with SpLD. However, some teachers highlighted that parents did not always come forward to support their children in learning, believing that this was the responsibility of their teachers and schools.

> *Some parents will say something like 'you are a teacher - you do it'. My child is there, everything should happen at school […] If I see that the parent can't really participate in his or her child's learning process, I usually ask my students to send me their homework* (Kamila, 25/09/2020, 18.49–22.17).

Teachers named four ways in which parents could support SpLD students in learning: (1) go over an upcoming lesson's content, such as reading a text or exploring a visual, with the student prior to the lesson, (2) help a student rehearse or practise their answer to a particular task prior to the class, (3) monitor student's timely completion of homework tasks in small blocks, or (4) act as a connecting link between a student and a teacher by sharing student's belatedly completed work with the teacher outside of lesson's time. Interestingly, Adam noted that sometimes parental support could become a disruptive rather than supportive resource to learners' education, particularly when parents do not follow the instructional approach used by the teacher:

> *I don't feel it's always that useful, especially not at the literacy level. Because what often happens is when [learners] are at home in their home environment, the one who's helping them with their homework might undo everything that was done in the classroom. If you're trying to teach a particular approach to phonics, and then the parent hasn't learned that, they delete that, and send their child back [to class] with less what you have sent them home with (Adam, 15/09/2020, 41.03-41.54).*

Practices described by teachers in this research have also been noted as being beneficial for the education of learners with SpLD in other scholarly literature. For example, in 'Inclusion in Europe through Knowledge and Technology' (2015), teachers are advised to use 'structured, sequential and multisensory teaching approaches, making frequent use of repeated positive feedback' (p. 10). Indeed, Nijakowska (2008) found that a group of second language learners with SpLDs, who were taught using multisensory structured language instruction, significantly outperformed the control group of learners who had no SpLDs in a second language word-reading and spelling post-test. Similar findings were obtained by Ganschow and Sparks (1995) and Sparks et al. (1998). Despite these positive findings, the multisensory structured language approach has yet to make its way into regular second language classrooms as 'foreign language teacher training programs do not focus on how to best address struggling foreign language learner needs through explicit instruction' (Pfenninger, 2015, p. 113). In terms of more specific language skills-related practices, teachers in scholarly literature are advised to use bi-modal presentation (i.e., a presentation that requires the use of read-aloud assistance) when giving more challenging reading comprehension texts to learners with SpLD (Košak-Babuder et al., 2018). Furthermore, to support gifted dyslexic readers, Van Viersen et al. (2017) recommend allowing them to use alternative reading strategies, such as sight-word reading or processing words in larger orthographic units. Finally, Farukh and Vulchanova (2016) and de Bree and Unsworth (2014) recommend that exposure to bilingual education programmes can potentially benefit learners with dyslexic-type reading and lexical difficulties.

Assessment practices

On the subject of assessing the language development of learners with SpLD, teachers focused on discussion of three key areas. Firstly, David raised the importance of teaching assistants' support in the accurate and thorough assessment of language the progression of learners with specific learning difficulties. David said that his teaching assistant's help was crucial in allowing timely assessment of the SpLD learner's progression, without taking away his instructional time and attention from the class:

> *The benefit of having a dedicated TA was fantastic […] You can monitor students when you go around, but with this particular student [student with visual impairment] it was very difficult, partly because she was so shy and partly because she spoke so quietly and I would have had to have really just focused on her for it to assess her in fluency, or cohesiveness, or*

grammar range. So, I got feedback from the TA, who I would give instructions to in advance of the class and say can you just check that she can do this? Can you see how she is with this? Can you check her fluency, whether she's using any synonyms […] (David, 07/10/2020, 25.06–26.39)

Secondly, Adam raised the issue of inclusivity in assessment for SpLD learners and use of appropriate accommodations in assessment practices for them. For example, he noted that visually impaired students could still be assessed on their mastery of written (as opposed to spoken) language. This could be done by giving them tasks requiring the production of creative language, for example. This language could be, and indeed is, used in writing, but in the case of these learners, it would be elicited verbally from them. Adam also spoke highly supportively in favour of appropriate assessment accommodations in listening comprehension activities, which would not unfairly differentiate or disadvantage learners with hearing difficulties from other students in the class. He specifically noted making scripts of CD recordings available to SpLD learners during listening tasks. Parental support could also be seen as a form of learning accommodation. Aina noted that care should be taken to ensure that parental support with the completion of SpLD learners' homework (which is later to be assessed by their teacher) does not invalidate or skew the accuracy of the learners' independent performance.

Thirdly, Christina raised the issue of teachers' limited awareness about the necessity to use adjusted marking scales or marking criteria when assessing the work of SpLD learners. She gave an example of a situation where dyslexic learners' spelling tests were marked in the same way as the work of their peers who did not have SpLD. Colleagues from the SEN team drew teachers' attention to the need to adjust exercised practices to make assessments for dyslexic learners fairer. In consultation with teachers, the decision was reached to disregard dyslexic learners' spelling errors so long as they did not interfere with the assessor's comprehension/recognition of the tested word.

With regards to feedback on learners' assessed work, Kamila noted that she would offer feedback to her dyslexic learners using bullet points lists, rather than sets of paragraphs containing long sentences. She also noted paying particular attention to the function of her feedback, prioritising scaffolding feedback over evaluative.

Review of scholarly literature on the topic of assessment of learners with SpLD reveals findings similar to those reported in this paper. Additionally, a couple of other recommendations are worth mentioning here. Gajar (1987) recommends using the Modern Language Aptitude Test (MLAT) (Carroll &

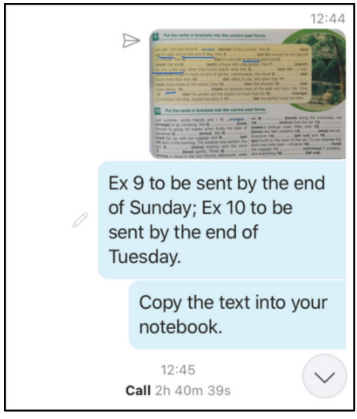
Sapon, 1959) as a diagnostic instrument for identifying learners with language learning difficulties, as this test differentiated well between learners with SpLD and those with no SpLD. Sparks et al. (1989) argue in favour of using cognitive and linguistic assessment tools in addition to the MLAT test to identify learners with SpLD. Kormos, Csizér and Sarkadi (2009) highlight the importance of using assessment tasks that do not emphasise accuracy and spelling in SpLD learners' written work, as this helps to minimise anxiety in this group of learners. Abrams (2008) argues in favour of alternative assessment tasks and weekly tutorial sessions to assist SpLD learners in learning a second language. The author also notes that this practice requires substantial additional resources and relies on effective collaboration between a teaching team and learning support services. The advantages of using dynamic language assessment procedures alongside multisensory structured language instruction have also been noted by the ELT scholars researching SpLD contexts. Schneider and Ganschow (2000, p. 72) define dynamic (cognitive) assessment as 'an ongoing diagnostic prescriptive approach to instruction, which allows for the continuous interaction between teacher and learner that needs to occur in order for some individuals to discover solutions to learning problems'. The authors (ibid) highlighted the importance of using guided-discovery procedures, which incorporate elements of dynamic assessment, to help SpLD learners develop explicit knowledge of the second language.

Materials' accommodations

The extent of support with accommodating materials for learners with SpLD needs varied depending on the context in which the interviewed teachers worked. Kamila noted that, in her context, teachers, despite being informed about the nature of SpLD learners' needs, were not instructed about how to teach them - 'it [was] up to every teacher to modify and prepare lessons accordingly' (Kamila, 25/09/2020, 04.24-04.29). In Adam's content, support was available, but only some teachers chose to make use of it – 'Some [teachers were] really enthusiastic [about making accommodations to their teaching materials], some really went for them, [however] some, just saw it as more work and as soon as you turned around they'd just go back to the normal approach' (Adam, 15/09/2020, 35.26-35.44). All interviewed teachers noted the following materials' accommodations as being helpful to SpLD learners: increasing the font size of resources, printing them on coloured paper, highlighting parts of text and keywords in materials, simplifying texts by paraphrasing, removing complex structures or content, including extra visual or aural support into original activities and materials (Figure 4).

Teachers also noted the following instructional accommodations as being useful: inviting learners to explain new terms in their own words instead of merely copying their definitions from a dictionary, encouraging them to put new grammatical structures into their own sentences, allowing students to work independently and at their own pace so that not to overstress them, giving students options about how to complete their tasks (e.g., by drawing, colouring, singing), providing students with handouts outlining structure of the lesson and order of its activities, ensuring that students have access to online resources and to assistive tools required for their learning, breaking down longer and more demanding tasks in smaller sections and setting up separate submission deadlines for them to ensure their timely completion by learners with SpLD (Figure 5).

Figure 5
Instructional accommodation: scaffolding task completion by managing its size and completion route



Finally, Christina highlighted the need to draw on SpLD students' strengths to allow them to engage with tasks alongside other learners, yet not be disadvantaged by these tasks' requirements. She said:

> *[…] particularly listening is interesting. What I have done is, instead of playing the listening from CD for everybody, I got the transcript and asked the student who has difficulties with hearing to read it, so that other [students] could get listening practice, because they listened to her. And she could still do comprehension or spotting language features or whatever, because she has had access to the text* (Christina, 24/11/2020, 13.02–13.26).

Teaching online and its impact on teaching practice

The third research question explored whether shift to online mode of teaching delivery had any impact on teachers' instructional practice and, if so, what that impact was. Interestingly, teachers' views on this topic varied. Adam noted that teaching learners online, both SpLD and non-SpLD, was challenging in at least two regards. Firstly, many students, and teachers alike, did not have sufficient level of digital literacy to engage with online mode of teaching and learning effectively. This was particularly true for younger learners who 'would depend on how capable their brother or their parents were in helping them use the device' (Adam, 15/09/2020, 22.19–22.26). Another issue related to the teacher's reduced ability to control and manage the class and individual learners in it virtually. Adam said:

> *In an online environment, I lose a lot of [control over] my classroom management because they [a child with ADHD] might be sitting in a room with their parent, so that the child is no longer looking at me for cues as to how he should behave. They're taking cues from their parents. What their parent might find acceptable I might not find acceptable. It's difficult to kind of negotiate that* (Adam, 15/09/2020, 22.45–23.05).

Similarly, Kamila noted that due to her lack of control over learners' group- and pair-work interactions in online activities she had to significantly reduce number of these types of interactions in her digital classes. She also observed high levels of stress in her learners due to increased screen time and mitigated this by setting up screen-free tasks for her learners involving reading, creating, and thinking. Furthermore, Christina mentioned reduced non-verbal interaction and response on the part of her learners during online lessons as many of them had their cameras switched off. This made it difficult for Christina to assess how well learners followed her instruction and prevented her from making timely adjustments to her practice. It also made it difficult for her learners suffering from hearing loss to comprehend what their pairs were saying, as they could no longer do lip reading.

David commented that the absence of social and in-person interactions in online classes affected his learners' well-being and levels of participation. This was particularly true for his visually impaired student.

However, all teachers identified several advantages of technology-assisted teaching and learning. Adam specifically highlighted the usefulness of such functions as 'dictate' and 'immersive reader' for supporting learners with SpLD and noted that he would put extra effort into making sure that both his SpLD

learners and fellow teachers knew about these functions and how to use them. Christina noted the usefulness of subtitle-generating software for assisting students with hearing difficulties in processing digitally recorded lessons. Kamila noted that technology-assisted lessons allowed her learners to keep better notes of their work, including questions to the teacher. These notes helped Kamila to monitor her learners' progress better and provide them with more detailed written and oral feedback. She also noted that online space was useful not only for storing students' work but also for systematically storing her own resources, which learners could access at any time during the lessons and to which they could come back at a later stage if needed. Talking about the impact of the Covid-19 pandemic, David commented that one positive consequence of it was that it 'has brought [teachers] closer together in terms of people trying to collaborate more' (David, 07/10/2020, 42.50–42.59).

Conclusion

Three core findings emerged from our research. Firstly, regardless of the geographical location in which teachers practise, all teachers (apart from SENCO coordinators) seem to be only partly prepared for teaching learners with SpLD if sufficient preparation is measured by the availability, accessibility, and regularity of provision of SpLD-tailored CPD courses for non-SpLD teachers. Secondly, despite a lack of knowledge and professional preparation for working with SpLD learners, teachers continue to make efforts to educate these groups of learners as effectively as they can through self-education initiatives and voluntary training in SpLD instruction. Thirdly, an obligatory shift to online teaching triggered by the Covid-19 pandemic has boosted teachers' awareness and use of technology-assisted tools to effectively educate SpLD learners. It has also united teachers in their efforts to educate learners during challenging times and increased their professional collegiality in some contexts. The major limitation of this study is that it collected views and explored practices from only a small group of teachers, making its findings largely non-generalisable. Conducting a similar study but on a larger scale would enable validating or to calibrating this study's findings further.

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Undergraduate and Graduate Students' Beliefs about Dyslexia: Implications for Initial Foreign Language Teacher Education

Alma Žero*[1] and Karmen Pižorn[2]

The purpose of this study was to explore undergraduate and graduate students' beliefs about dyslexia at the Department of English Language and Literature of the University of Sarajevo in Bosnia and Herzegovina and subsequent implications for initial foreign language teacher education. The study follows a convergent parallel mixed methods design. A questionnaire was used to gather quantitative data on students' beliefs about dyslexia and to consider potential variances at different levels of study. A group interview was used to gather qualitative findings for further consideration in initial teacher education on dyslexia and other specific learning difficulties. The findings have shown that both undergraduate and graduate students have an almost equal number of misconceptions about dyslexia, with the majority (96.03%) affirming that they need more training in teaching students with dyslexia or other specific learning difficulties. Furthermore, the study follows an emergent framework with reference to three main themes: *(1) teacher beliefs and attitudes, (2) teaching practices, and (3) teacher preparation*, which also reflect the main areas of undergraduate and graduate students' concerns in teaching students with dyslexia and other specific learning difficulties.

Keywords: dyslexia, foreign language learning and teaching, inclusive education, initial teacher education, specific learning difficulties

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Prepričanja dodiplomskih in magistrskih študentov glede disleksije: posledice za začetno izobraževanje učiteljev tujih jezikov

Alma Žero in Karmen Pižorn

Namen te študije je bil raziskati prepričanja dodiplomskih in magistrskih študentov o disleksiji na *Oddelku za angleški jezik in književnost* Univerze v Sarajevu (Bosna in Hercegovina) ter poznejše posledice za začetno izobraževanje učiteljev tujih jezikov. Študija sledi zasnovi paralelnega modela kombiniranega raziskovalnega pristopa. Z vprašalnikom smo zbrali kvantitativne podatke o prepričanjih študentov o disleksiji in upoštevali morebitne razlike na različnih stopnjah študija. Skupinski intervju pa je bil uporabljen za zbiranje kvalitativnih ugotovitev za nadaljnjo obravnavo o disleksiji in drugih specifičnih učnih težavah znotraj začetnega izobraževanja učiteljev. Izsledki so pokazali, da imajo dodiplomski in magistrski študentje skoraj enako število napačnih predstav o disleksiji, pri čemer večina (96,03 %) trdi, da potrebujejo več usposabljanja za poučevanje študentov z disleksijo ali drugimi specifičnimi učnimi težavami. Poleg tega študija sledi nastajajočemu okviru s sklicevanjem na tri glavne teme: *1) prepričanja in stališča učiteljev; 2) prakse poučevanja; 3) priprava učiteljev*, kar sočasno odraža tudi glavna področja skrbi dodiplomskih in magistrskih študentov glede poučevanja učencev z disleksijo in drugimi specifičnimi učnimi težavami.

Ključne besede: disleksija, učenje in poučevanje tujih jezikov, inkluzivna pedagogika, začetno izobraževanje učiteljev, specifične učne težave

Introduction

Underpinned by the principles of inclusive pedagogy, inclusion values diversity and challenges all exclusionary policies and practices (Florian & Black-Hawkins, 2011). With UNESCO's *World Declaration on Education for All* (1990) and the *Salamanca Statement* (1994), the international commitment to inclusive education is grounded in the human rights perspective and the notion that education is central to individual and collective well-being (UNICEF, 2012). While the general consensus emphasises support for legislation and policy in widening access and promoting opportunities for all, research (see Avramadis & Norwich, 2002; Kormos & Kontra, 2008; Sharma et al., 2008; Woodcock & Vialle, 2016) has provided ample evidence that teacher preparation is a crucial concern in ensuring inclusive education. Teacher knowledge, skills, beliefs, and attitudes have been particularly emphasised, with an increasing focus on preservice teachers (see Jordan et al., 2009; Kagan, 1992; Ng et al., 2010; Pajares, 1992; Pintrich, 1990; Reinke & Moseley, 2002; Symeonidou & Phtiaka, 2009).

Consequently, the current study looks at Bosnian Herzegovinian preservice teachers' beliefs about dyslexia as a specific learning difficulty and subsequent implications for initial teacher education for inclusion. Specific learning difficulties (SpLDs) are among the most common disorders in school-age children, with approximately 5–15% prevalence rates (APA, 2013). Based on the DSM-5, learning difficulty is considered 'a neurodevelopmental disorder with a biological origin that includes an interaction of genetic, epigenetic, and environmental factors, which affect the brain's ability to perceive or process verbal or nonverbal information' (APA, 2013, p. 68). For several decades, research on SpLDs in education has been based on two perspectives and subsequent models. While the medical/deficit model locates disabilities and barriers within an individual to be met by specialised educational institutions, the social model focuses on SpLDs as socially constructed barriers that can be deconstructed by a change in the environment to meet the needs of all (Kavkler et al., 2015; Kormos, 2017; UNICEF, 2012). Due to its complexity, dyslexia has been described on multiple levels, with the underlying brain mechanisms identified at the biological level, mind and mental processes at the cognitive level, and manifestations such as poor reading and spelling, motion sensitivity, and poor rapid auditory processing specified at the behavioural level (Nijakowska, 2020). Lack of social, emotional, and academic support for children with dyslexia may result in anxiety, depression, reduced self-confidence, and lower academic achievement, followed by higher rates of unemployment (Diakakis et al., 2008; DSM-5, APA, 2013). Nonetheless, despite the difficulties that children with dyslexia

experience, some describe it as a gift often accompanied by creativity, intuition, and problem-solving skills (Martinelli et al., 2018). The International Dyslexia Association (IDA, 2017) acknowledges that the definition of dyslexia is evolving with ongoing research; however, as a language-based SpLD, dyslexia clearly impacts foreign language learning, specifically word-reading skills and reading comprehension skills (see Crombie, 1997; Helland & Kaasa, 2005; Kormos, 2017; Košak Babuder et al., 2019). Teachers need knowledge and skills to address such learner differences in an inclusive way. Therefore, initial teacher education for inclusion has become a critical concern (see Forlin et al., 2011; Ilić et al., 2006; Nijakowska, 2014, 2020; Spratt & Florian, 2013) and pre-service teacher beliefs about dyslexia an intriguing research focus (see Košak Babuder & Jazbec, 2019; Martan et al., 2017; Nijakowska et al., 2018; Wadlington & Wadlington, 2005; Washburn et al., 2013; Woodcock, 2013). In fact, increasing diversity in the classroom requires extensive research into the beliefs of pre-service teachers (PSTs) in order to help them develop as self-regulated, critically reflective professionals (Ng et al., 2010).

Decades ago, Kagan (1992) suggested that 'the more one reads studies of teacher belief, the more strongly one suspects that this piebald of personal knowledge lies at the very heart of teaching' (p. 85) and thus affirmed the need to investigate teacher beliefs critically. As a deeply personal concept, measuring and developing teacher beliefs is challenging: they are not always objectively reasonable; they can be tenacious; and they are bound up with emotional experiences (Rosenfeld & Rosenfeld, 2008). PSTs' beliefs play a pivotal role in their subsequent teaching behaviour when unexplored entering beliefs may perpetuate ineffective teaching practices (Pajares, 1992; Pintrich, 1990), which is of particular interest to this study in relation to teaching students with dyslexia. Common misconceptions among PSTs include the belief that dyslexia is a visual perception difficulty (Washburn et al., 2013), that word reversal is the major criterion in the identification of dyslexia, and that individuals with dyslexia exhibit the same characteristics with similar degrees of severity (Wadlington & Wadlington, 2005). PSTs' beliefs such as these can lead to a deficit model in approaching students with dyslexia in the classroom, ranging from low student expectations and perceptions about student laziness to low levels of teacher commitment (Gwernan-Jones & Burden, 2009). In addition, teacher efficacy beliefs are reported to impact students' own sense of self-efficacy (Tschannen-Moran & Wolfok-Hoy, 2001) and PSTs' preparedness to include students with dyslexia in the classroom. Indeed, in exploring initial and continuing foreign language teacher education, Nijakowska (2020) suggests that:

> Foreign language teacher preparedness to successfully include dyslexic learners in mainstream classrooms is composed of two underlying factors, namely 1) teachers' *beliefs* about their possessed knowledge of dyslexia and their self-efficacy concerning inclusive instruction-related teacher classroom behavior towards dyslexic learners (knowledge and skills) and 2) *beliefs* about inclusion of dyslexic learners in mainstream classrooms in general (attitude/stance). (p. 263)

In addition, Nijakowska et al. (2018) confirm the relevance of contextual variables in exploring teacher beliefs and their preparedness to teach students with dyslexia, such as the country, level, and aims of teacher training, specific requirements by the national education systems, prevailing social attitudes, and the pre-service and in-service teachers' motivation to personally seek out professional development. Košak Babuder and Jazbec (2019) found that perceptions about dyslexia further impact views on adapted instruction and meaningful assistance to students with dyslexia, encouraging more practical initial and continuing teacher training. In fact, the importance of educational practice, hands-on experience or 'fieldwork' is a fairly frequent recommendation in improving initial teacher education to challenge pre-service teachers' beliefs, attitudes, and perceptions (see Forlin et al., 2011; Nijakowska, 2020; Wadlington & Wadlington, 2005). Given the complexity and scope of pre-service language teacher beliefs, extensive research may inform teacher educators in determining programme direction and help reveal how pre-service teachers define the goals of teacher education (Pajares, 1992), and in this particular context, initial foreign language teacher education for inclusion.

Research problem and research questions

The purpose of this study is to determine Bosnian Herzegovinian undergraduate and graduate students' beliefs about dyslexia and their preparedness in teaching students with dyslexia, with implications for initial foreign language teacher education. Bosnia and Herzegovina (BiH) started the process of inclusive education in 2004 (FOD, 2013), but considerable challenges have delayed it since then, such as a decentralised education sector with multiple administrative levels, architectural and attitudinal barriers, insufficiently prepared teachers, lack of inter-sectoral cooperation, and low levels of family-school support (Kafedžić, 2015; Žero, 2022). In 2006, DUGA reported that university courses on teaching students with SpLDs were almost non-existent. More recent reports and studies (Abadžija, 2015; Demirović et al., 2015; Kafedžić et al., 2014) suggest that the situation is not much different today and particularly

in subject-specific courses, including initial English language teacher education in which pedagogical-psychological content is isolated from the general course material, resulting in a lack of cross-curricular harmonisation (Žero, 2022). Two additional questions have been raised in recent years with regard to initial teacher education in BiH. First, teacher qualifications and requirements are not harmonised on the national level and students who complete the bachelor's general programme are eligible to teach in primary schools across different regions (Abadžija, 2015), which is why both undergraduate and graduate students are viewed as pre-service English teachers in this study. Second, there is no diagnostic protocol for SpLDs and data collection is fragmented. Data on the prevalence rates of dyslexia in BiH and the Sarajevo Canton is non-existent or inconclusive at the time of writing this paper. Without early systemic identification of SpLDs, the education system results in a large number of unidentified students with dyslexia, although unofficial projections by experts say that almost every tenth child in BiH shows signs of dyslexia (Duranović, 2016). At the moment, it is not known how that impacts pre-service teacher training and in-service teacher practices. Nevertheless, a law recognising students with developmental dyslexia has been passed in three of BiH's ten cantons but without operational guidelines (Duranović et al., 2018). The Framework Law on Primary Education of the Sarajevo Canton has recently included students with dyslexia in Article 66 in relation to the right to support for students with disabilities (Ministry of Education, 2021); however, it is not clear how support is provided without diagnostic protocols or subject-specific teacher training on teaching students with SpLDs in inclusive settings. Research on pre-service and in-service teacher beliefs about dyslexia in the Sarajevo Canton is non-existent or inconclusive at the time of conducting the current study.

Consequently, the research questions of the study are as follows

1. What are undergraduate and graduate students' beliefs about dyslexia?
2. What factors impact undergraduate and graduate students' beliefs and preparedness in teaching students with dyslexia?
3. What are the implications of the study for initial foreign language teacher education?

With additional hypotheses to guide the quantitative analysis:

1. Both undergraduate and graduate students have a significant number of misconceptions about dyslexia.
2. Undergraduate students in different years of study have significantly different levels of understanding regarding dyslexia.

Method

Since the purpose of this study is to determine undergraduate and graduate students' beliefs about dyslexia, a mixed-methods approach was used in order to gather rounded, reliable data and a fuller understanding of the research problem, as suggested by Cohen et al. (2007). The research follows a convergent parallel design with both data collected at roughly the same time, after which it was integrated into the discussion of the overall results (Creswell & Creswell, 2018). A questionnaire was used to investigate beliefs about dyslexia, while a more fine-grained analysis was achieved through a focus group discussion.

Participants

All 157 students from the Department of English Language and Literature of the University of Sarajevo were invited to participate in the study. Undergraduate students (N=143) are enrolled in Years 1 to 3 of the bachelor's general programme. Graduate students (N=14) are enrolled in Years 4 to 5 of the university programme (i.e., Years 1 to 2 of the master's programme in teaching.

The response rate to the questionnaire was satisfactory at N=126 (80.2% of the total N=157), and the respondents' profiles are assumed to be indicative of the actual population. As expected, there was a substantially higher proportion of female respondents, N=106 (84.1%) than males, N=20 (15.9%), which also reflects the current teaching population. Table 1 gives a more detailed demographic overview of the questionnaire respondents.

The focus group included a sample of 14 students from the larger sample that participated in the quantitative data collection. The distribution between undergraduate and graduate students who participated in the focus group was equal (7 vs 7), and all of them were considering becoming English teachers. Except for one male graduate participant, all participants were female. Most of the participants were aged 20–25 (N =12), while two were aged 18–19.

Table 1
Questionnaire respondents' demographics

	Undergraduate students (N=113)		Graduate students (N=13)		Total (N=126)	
	Frequency	%	Frequency	%	Frequency	%
Gender						
Male	19	17	1	8	20	15.9
Female	94	83	12	92	106	84.1
Age						
18–19	17	15			17	13.5
20–25	92	81	9	69	101	80.2
> 25	4	4	4	31	8	6.3
Year of study						
1	34	30			34	27
2	27	24			27	21.4
3	52	46			52	41.3
4			6	46	6	4.8
5			7	54	7	5.5

Instruments

The students' beliefs about dyslexia were measured by a questionnaire (Appendix 1), which consisted of two parts: 1) personal background, and 2) scale on beliefs about dyslexia. The scale was based on the Dyslexia Belief Index (DBI) by Wadlington and Wadlington (2005) and the dyslexia scale from the DysTEFL2 training materials (Nijakowska et al., 2016) and adapted to the aims and hypotheses of this research. A Likert scale was used for 12 statement items with responses ranging from *true*, *probably true*, *probably false*, and *false*. One question required a yes-no answer, and it was about the students' general belief in their preparedness to teach students with dyslexia. The instrument was piloted on a small sample of students, and their comments were taken into consideration in designing the final questionnaire.

The students' reflections on dyslexia, their preparedness in teaching students with dyslexia, and recommendations on how to improve the initial teacher education programme were collected with a semi-structured focus group (Appendix 2). Focus group questions were designed in line with the research aims and loosely based on the *DysTEFL2* needs open-ended analysis questions (Nijakowska et al., 2016). The focus group is a valuable instrument in gathering data about the more intangible aspects of research on values, assumptions, beliefs, and problems (Cohen et al., 2007), such as the current study.

Procedure and data analysis

The study followed a two-phase procedure. In the first phase, the questionnaire was distributed via a Microsoft Forms link to all undergraduate and graduate students. Participation was on a voluntary basis. The link was shared in January 2021 and remained open for three weeks. The statistical analysis of the questionnaire mostly runs in parallel to the analysis from the paper by Wadlington and Wadlington (2005). The difference is in the types and the number of items (12 vs 30), and in the approach to testing the first hypothesis. Data analysis was performed using the STATISTICA v.12 software. Internal reliability was ensured through Cronbach's alpha and McDonald's omega. In order to ensure validity, an exploratory factor analysis was performed on the 12 questionnaire items. The factor analysis results will be reported as part of the results section.

In the second phase, an invitation to participate in the focus group was sent to all undergraduate and graduate students with the aim of selecting a small sample. After consulting the institution about restrictions due to the Covid-19 pandemic, a joint session for both undergraduate and graduate students was conducted in a space that allowed for all epidemiological measures to be followed. The focus group lasted 70 minutes, in line with the health guidelines limit. The number of students who applied to participate in the focus group was 14, also in line with the health guidelines limit of 15 participants. Participation was entirely voluntary and based on the students' availability. The qualitative data analysis process was based on the work of Creswell and Creswell (2018). The discussion was audio-recorded and transcribed verbatim. The coding process followed a deductive coding strategy at first. An inductive coding procedure then led to a more exploratory approach when new topics emerged, which were coded under the heading of emerging themes and dimensions. The ATLAS.ti qualitative software was used to sort and organise codes, themes, and dimensions. After the quantitative and qualitative data analyses were completed, a side-by-side comparison was used for the mixed methods data analysis with the results merged in the discussion section.

Ethical considerations

All study participants were asked to participate on a voluntary basis and to give informed consent. Questionnaire respondents were asked to submit their consent with the questionnaire (see Appendix 1), while focus group participants were asked to sign consent forms before the beginning of the session (see Appendix 3). All participants were assured that their responses would remain anonymous and confidential. Focus group participants were additionally

informed of the rules of discussion. Summary notes of the transcribed data were shared with each participant. No participant asked for any transcribed text to be removed from the official data findings. In addition, data collection was conducted in accordance with set epidemiological measures due to the Covid-19 pandemic.

Results and findings

In the following section, the quantitative and then the qualitative analysis results will be presented, as per the study procedure.

Quantitative analysis results

The descriptive analysis will be followed by factor analysis results; means, standard deviations and t-test results of items; and in the end, the ANOVA results.

First, the participants were asked to rate their current level of knowledge of dyslexia on a scale of 1 ('Not knowledgeable at all') to 4 ('Very knowledgeable'). The mean result was 2.28 (SD=0.61). Only eight participants (6.4%) reported not being knowledgeable at all, most participants reported being slightly (N=78, 61.9%) or moderately knowledgeable (N=37, 29.4%), while only three (2.4%) reported being very knowledgeable. Then, the participants were asked to share if they felt prepared to teach students with dyslexia. A 2×2 chi-square test with Yates correction was performed, and no significant difference was found between undergraduate and graduate students (χ^2=0.01, df=2, p=0.98), with 121 (96.3%) of the total 126 respondents feeling insufficiently prepared to teach students with dyslexia.

After that, the mean, median, and standard deviations were calculated for each of the twelve items in the questionnaire. Furthermore, the relative frequencies of each answer were reported (See Table 2). Consistent with the aims and hypotheses of the study, the items were treated as a measurement of personal beliefs about dyslexia. This means that false statements were not reverse-coded except when testing hypotheses.

Table 2

Parameters and the relative frequency of responses to the questionnaire measuring personal beliefs about dyslexia

Items		Level of agreement (1-4)			Relative frequency of responses			
		M	*C*	*SD*	False (1)	Probably false (2)	Probably true (3)	True (4)
1	Children can outgrow dyslexia.	2.06	2	0.80	25.4%*	46.0%[a]	25.4%	3.2%
2	Dyslexia is caused by visual perception problems.	2.48	3	0.88	16.7%*	27.8%	46.0%[a]	9.5%
3	Dyslexia can be caused by a literacy-poor home environment (for example, parents not reading to their children).	2.17	2	0.86	25.4%*	36.5%[a]	34.1%	4.0%
4	Children with dyslexia need more systematic and explicit reading instruction than their peers with typical development.	3.36	3	0.57	4.8%	54.7%[a]	40.4%	4.8%*
5	People with dyslexia have difficulty with decoding/word recognition.	3.45	4	0.70	2.4%	4.8%	38.1%	54.8%*[a]
6	Dyslexia is a learning disability that affects language processing.	3.10	3	0.88	5.6%	17.5%	38.1%	38.9%*[a]
7	Children with dyslexia also have problems with spelling.	3.26	3	0.79	3.2%	11.9%	40.4%	44.4%*[a]
8	Dyslexia can be inherited.	2.41	2	0.82	12.7%	42.1%[a]	36.5%	8.7%*
9	Children who have dyslexia tend to have lower IQ scores than children who do not have dyslexia.	1.58	1	0.70	52.4%*[a]	38.9%	7.1%	1.6%
10	Certain medications have been found to be effective in treating dyslexia.	2.44	2	0.68	7.9%*	42.9%	46.8%[a]	2.4%
11	Dyslexia is more frequent among boys than girls.	2.21	2	0.79	15.9%*	53.2%[a]	24.6%	6.3%
12	Seeing letters and words backwards is a characteristic of dyslexia.	2.89	3	0.84	4.8%*	27.0%	42.9%[a]	25.4%

Note. Mean = *M*, median = *C*, standard deviation = *SD*, * – correct answer, [a] – the most frequent answer, grey shade – items 1 and 10 were excluded from the questionnaire after factor analysis.

After that, an exploratory factor analysis was performed on the twelve questionnaire items using an oblique (oblimin) rotation, and the estimation method of principal axis factoring (as is the case in Wadlington & Wadlington, 2005). A one-factor solution was found for the twelve items. However, due to low loading levels (<0.1) of Items 1 and 10, the decision was made to exclude them and to perform another exploratory factor analysis on the remaining ten items. Two had very high loadings: Items 7 (0.717) and 6 (0.621), indicating they are the most representative of the extracted factor (beliefs about dyslexia). The score of each participant was represented as the mean of the 10 items. The

10-item scale has an internal reliability of 0.6 (Cronbach's alpha) and 0.62 (McDonald's omega), indicating a low-to-moderate reliability.

For the purpose of the hypotheses testing, items with false statements were reverse-coded. Thus, the questionnaire was treated as a de-facto test for the purpose of this study, in particular, because of the empirical evidence for the truth claims of the statements.

In order to test the first hypothesis (*Both undergraduate and graduate students have a significant number of misconceptions about dyslexia*), 11 single-sample t-tests needed to be performed. As in the Wadlington and Wadlington (2005) study, 90% as a cut-off for expert knowledge was used (a mean score of 3.6/4). One departure from the Wadlington and Wadlington (2005) study is that in the present study every single item was tested independently, as well as the mean score. In all cases, a significant departure from the 90% score was found. In some cases (Items 8 and 12), the mean score was under 2.5. These results emphatically affirm the first hypothesis (i.e., that both undergraduate and graduate students have a significant number of misconceptions about dyslexia). Table 3 presents the results of 11 t-tests.

Table 3

Means, standard deviations and t-test results of items (and the average score) of the personal beliefs about dyslexia scale

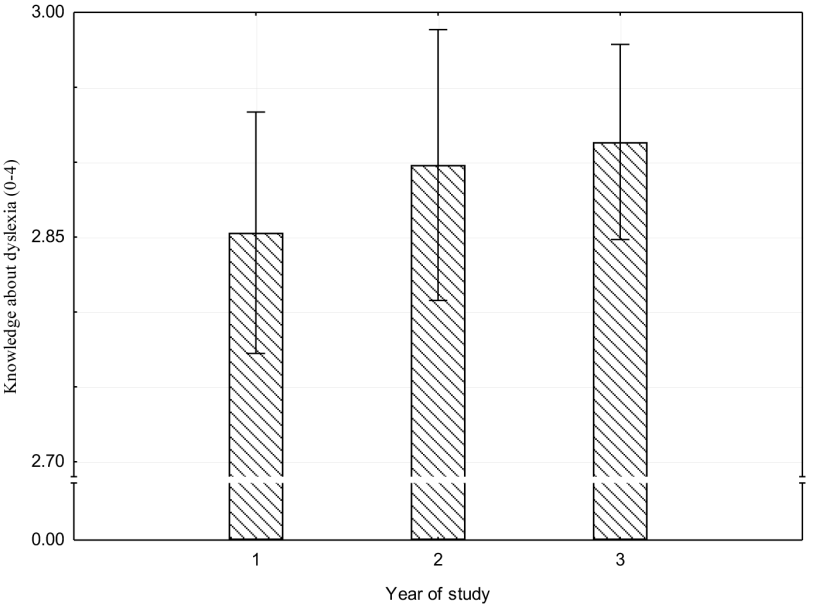
Items	*M*	*SD*	*t*	*df*	*p*
2 Dyslexia is caused by visual perception problems.	2.52	0.88	13.78**	125	0.00
3 Dyslexia can be caused by a literacy-poor home environment (for example, parents not reading to their children).	2.83	0.86	10.06**	125	0.00
4 Children with dyslexia need more systematic and explicit reading instruction than their peers with typical development.	3.36	0.57	4.76**	125	0.00
5 People with dyslexia have difficulty with decoding/ word recognition.	3.45	0.70	2.37*	125	0.02
6 Dyslexia is a learning disability that affects language processing.	3.10	0.88	6.31**	125	0.00
7 Children with dyslexia also have problems with spelling.	3.26	0.79	4.79**	125	0.00
8 Dyslexia can be inherited.	2.41	0.82	16.21**	125	0.00
9 Children who have dyslexia tend to have lower IQ scores than children who do not have dyslexia.	3.42	0.70	2.89**	125	0.00
11 Dyslexia is more frequent among boys than girls.	2.79	0.79	11.63**	125	0.00
12 Seeing letters and words backwards is a major characteristic of dyslexia.	2.11	0.84	19.87**	125	0.00
TOTAL SCORE	2.90	0.25	32.14**	125	0.00

Note. * - $p<0.05$, ** - $p<0.01$

In order to test the second hypothesis (*Undergraduate students at different years of study have significantly different levels of understanding dyslexia*), an ANOVA was performed between the average scores of the three years of study. No significant group main effect was found between the three years of undergraduate students in their level of misconceptions about dyslexia (F=0.68, df=2/110, p=0.51), indicating that they have similar levels of knowledge about the topic of dyslexia. However, the levels do seem to increase somewhat between the years of study, although the differences are statistically insignificant (see Figure 1). This indicates a possibility that there is, in fact, a real-life difference in their beliefs about dyslexia, which corroborates the need for a further in-depth investigation through the focus group.

Figure 1

Results of ANOVA on beliefs about dyslexia among undergraduate students



Qualitative analysis findings

Qualitative data analysis followed a deductive coding procedure at first, based on the research questions and directed by two initially extracted themes from the DysTEFL framework (Nijakowska et al., 2016): 1) Understanding dyslexia and 2) Understanding the effect of dyslexia on foreign language learning.

After numerous uncategorised codes emerged, a more exploratory approach was used with an inductive coding procedure. The findings show a very interesting correlation with the literature review. Specifically, the focus group participants exhibited strong inclinations in discussing their beliefs as represented by either one of the two most prominent perspectives on dyslexia. As a result, a thematic framework (Creswell & Creswell, 2018) was designed with two broad dimensions: *1) Dyslexia through the deficit model* and *2) Dyslexia through the social model*, both of which were reflected in three themes: *1) Teacher beliefs and attitudes*, *2) Teaching practices*, and *3) Teacher preparation*. For an easier presentation of the findings, undergraduate students are coded under US (1–7) and graduate students under GS (1–7).

The discussion confirmed that most participants were exposed to the deficit perspective in beliefs and attitudes toward dyslexia and students with dyslexia, which then shaped their own *beliefs and attitudes*. Most of the participants' understanding of dyslexia and its effect on language learning is viewed through the prism of 'problems' or 'issues' within the individual that they have to overcome with the help from others (US 6: 'we were just told to help them when they're having difficulties, which put pressure on us too'). Students with dyslexia or other SpLDs were either neglected and referred to as 'those students' by teachers or teased and avoided by their peers. In addition, participants agreed that SpLDs are not a priority in ensuring quality education for all in BiH. The most frequent response was that 'specific learning difficulties… are not a prominent topic in conversations at college or in everyday life'. Findings show that undergraduate and graduate students are impacted by the general negligence of students with SpLDs, leading to a lack of interest in exploring their own knowledge, beliefs, and attitudes.

Nevertheless, a number of participants exhibited a social perspective in their reflections; in fact, findings confirm that a higher number of graduate students recollect experiences and subsequent beliefs and attitudes through the social model. They demonstrated an understanding of the importance of inclusive language, continuous professional development, and individual responsibility in ensuring inclusion. GS 3 shared that they would 'definitely choose an elective in inclusive education… in primary school I've noticed that teachers handled inclusion very poorly with terrible attitudes. It didn't seem like they put effort in their own learning to support all students.'

Since the group consisted of students who planned on becoming English teachers, they seemed much more engaged whenever they would highlight an aspect of *teaching practices*. Particular focus was on socio-affective factors, in particular when discussing how dyslexia impacts foreign language learning

and subsequent teaching strategies. Responses were almost equally reflective of both the deficit and the social model, with two distinctive views (i.e., subthemes) on teaching practices. The first view was in relation to the participants' observations of their former teachers' practices in class which impacted the classroom atmosphere (US 4: 'there was no talk about dyslexia… teachers didn't really know what strategies to use'); the students' sense of belonging (GS 2: 'students with dyslexia… developed anxiety in speaking in front of others or reading out loud… The students then became shy and introverted or even isolated from other students'); and frustration with self in students (GS 7: '[students with dyslexia] felt discouraged from learning further because they'd be stuck on one thing while their peers move on in the class. Teachers would usually lack the patience when that happens'). The second view on teaching practices was related to the participants' personal concerns about what practices they would employ as teachers in similar situations. Although all participants have shown an important sense of self-reflection and consideration, they still mostly contemplated how practices can be adapted to particular students with dyslexia or other SpLDs. When GS 1 shared, 'my fear is that I will not know how to divide attention [and] time between the student with dyslexia… and other students', most participants nodded in agreement. In addition, two graduate students raised the question of assistants in inclusive classrooms, where the deficit perspective was further emphasised by implying that an assistant's role consists of two purposes: to 'help' the student with a disability with the tasks or to support the teacher in managing tasks. The participants did not explore the view on the assistant's role in supporting the whole class and acting as a partner to the teacher. However, a considerable number of participants took into account the asset of diversity or the benefit of an approach inclusive of all students in language learning and teaching. Most of the participants pointed out that language learning is inherently inclusive, highlighting values, the need for self-confidence in reading, different attention span levels, and adaptations in the speed of teacher talk.

The third theme that emerged from the qualitative analysis is *teacher preparation*. Both undergraduate and graduate students felt deeply about their initial teacher education and its impact on their beliefs about dyslexia. The general consensus among participants was that vast inconsistencies exist in the realisation of teacher preparation, with the bachelor's and master's programmes acting as separate units. Two sub-themes were extracted from the findings reflective of 1) the participants' belief about their preparedness to teach students with dyslexia and 2) the participants' recommendations on how to improve foreign language teacher preparation in meeting the needs of all students.

Participants have shown a consistent response in feeling insufficiently prepared to teach students with dyslexia, with all undergraduate students mentioning the lack of courses, modules, or topics that address inclusion and teaching students with SpLDs. Graduate students, in contrast, exhibited a lack of confidence in their efficacy as teachers. However, a couple of undergraduate students shared that they did feel somewhat prepared to teach students with dyslexia because they learnt how to experiment with various methods and because the study programme focuses extensively on how to treat students with respect in an understanding way, which they feel is important in inclusive education.

Considering recommendations on how to improve initial language teacher education to meet the needs of all children, undergraduate and graduate students' perspectives overlapped in the need for both theoretical knowledge and practical experience. However, undergraduate students put greater emphasis on theoretical knowledge (US 5: 'I find it not enough to only practice because there has to be some theoretical knowledge about the topic'), with almost all undergraduate students agreeing with the following statement:

> It is probably a necessity to have… subjects throughout our Bachelor studies that introduce us to the most important theories [in inclusive education]. Even if we cannot work in high schools with a bachelor degree, we can work in primary schools in different parts of Bosnia. I think that this component of teaching English is neglected in our Bachelor studies. (US 1)

Graduate students pointed out that practical experience in teaching students with dyslexia and other SpLDs was crucial in initial teacher education for inclusion. They highlighted humanistic and constructivist perspectives in pre-service teacher training (GS 5: 'teachers are human beings. We are not just robots that receive information and then reproduce it… We need to see how it works') and differentiated approaches to instruction (GS 3: 'not every approach works with every student. And in that case, theory will come with practice'). Nevertheless, more than half of the participants view teacher preparation as a prescriptive mechanism in equipping teachers with the most effective strategies and techniques to be used with students with dyslexia and other SpLDs, or the 'correct approach/ manner/ method'. While the participants do seem to be moving towards social-constructivist perspectives, a considerable number still expect that teacher preparation addresses education for all as education for particular students. In that sense, initial teacher education is once again viewed through a deficit model.

In the end, an important sub-theme made its way into the students' discussion quite naturally: individual and collaborative reflection. Both undergraduate and graduate students never mentioned the word 'reflection', but their comments indicate that personal inquiry and collaboration with in-service (practising) teachers and professionals with the purpose of exchanging experiences and discussing challenges is an essential component of both initial and continuing language teacher education for inclusion (GS 4: 'we need the support of other teachers who have already experienced what's it like to teach in inclusive classrooms and know some of the challenges that we could encounter'; US 3: 'It's so important to think about these things together, to talk about them, and to share with each other').

Discussion

In addressing *RQ1: What are undergraduate and graduate students' beliefs about dyslexia?*, quantitative data confirmed that most students have a significant number of misconceptions. The most frequent misconceptions are 1) Dyslexia is caused by visual perception problems (55.5%), 2) Children with dyslexia do not need more systematic and explicit reading instruction than their peers with typical development (59.5%) (reverse scored), and 3) Seeing letters and words backwards is a major characteristic of dyslexia (68.3%). In contrast, the most frequently believed correct items were 1) People with dyslexia have difficulty with decoding/word recognition (92.9%), 2) Children with dyslexia also have problems with spelling (84.8%), and 3) Children with dyslexia do not have lower IQ scores (91.3%) (reverse scored). Although almost 90% of the students responded that they are slightly or moderately knowledgeable about dyslexia, qualitative data confirms that participants understand dyslexia as simply a word-based difficulty. Based on this understanding, a considerable number of participants confirmed that they considered questionnaire items as true solely on the basis of their relation to words and reading such as 'word recognition' or 'spelling'. A further indication is that most students do not believe that systematic reading instruction is recommended in teaching students with dyslexia, which additionally confirms that the majority of participants did not take into consideration language learning processes in students with dyslexia.

RQ2: What factors impact undergraduate and graduate students' beliefs and preparedness in teaching students with dyslexia? resulted in multi-layered findings. Both undergraduate and graduate students believe that they need more training in teaching students with dyslexia and other SpLDs. Qualitative data corroborated quantitative findings and correlated much of what students

believe about dyslexia and teaching students with dyslexia to the lack of systemic teacher education, among others. However, both quantitative results and qualitative findings do imply that, first, the levels of understanding dyslexia somewhat increase with each higher level of study (see Figure 1) and, second, that graduate students and undergraduate students in the last year of study are more familiar with the potential effect of dyslexia on foreign language learning. That does not necessarily mean that students at higher levels of the study programme are more knowledgeable about dyslexia, but it does suggest that their understanding and beliefs change the more insight they gain into the language learning and teaching processes through general pedagogical-psychological and didactic-methodological (PPDM) courses. Eventually, the participants' reflections about dyslexia were clustered around three main themes: *(1) teacher beliefs and attitudes*, *(2) teaching practices*, and *(3) teacher preparation*. The themes also demonstrate the main areas of undergraduate and graduate students' concerns and factors that impact their overall sense of preparedness in teaching students with dyslexia and other SpLDs. Nevertheless, two extracted dimensions suggest that in the context of BiH, pre-service teachers view each theme through either the social and/or the deficit model. While the deficit perspective was predominant in the students' reflections on teacher beliefs and preparation, both the social and deficit perspectives were prevalent in the students' discussions on practices in teaching students with dyslexia.

In addressing *RQ3: What are the implications of the study for initial foreign language teacher education?*, this section will explore several aspects that were highlighted by the participants or inferred from the data collection, while general implications will be summarised in the conclusion. Both undergraduate and graduate students emphasise practical in-service experience as a fundamental factor in understanding students with dyslexia. Jordan et al. (2009) affirm that it is challenging to transform teachers' beliefs since the development of pedagogical skills in the interactive aspects of teaching depends on field experiences. The findings also confirm Nijakowska's (2020) conclusion on teacher beliefs about self-efficacy and the inclusion of students with dyslexia; however, in the current study graduate students are more concerned about their efficacy and skills while undergraduate students predominantly reflect on the general perceptions and attitudes towards students with dyslexia. This is an interesting result to consider for further investigation. In addition, the findings imply that practical experience is more relevant to graduate students, while learning about theory and principles was predominantly suggested by undergraduate students. Finally, both undergraduate and graduate students show an emergent understanding of reflective practice that extends to multiple settings and subsequent

perspectives, from pre-service teacher preparation to teacher collaboration and school support. Reflection offers a chance to challenge pre-service teachers' beliefs, and teacher educators are urged to ensure the time and space to reflect on assumptions that inform those beliefs.

Limitations of the research study

The current study is not without limitations. It was conducted on an unequal sample of undergraduate (N=113) and graduate students (N=13) at one university programme in the capital city of Bosnia and Hercegovina. Conducting broader research with fairly equal samples of participants is recommended, with students from other universities, or a cross-country investigation, which is probably the next step in exploring the current research. Since only one focus group with both undergraduate and graduate students was conducted due to the participants' availability and epidemiological concerns, it is beyond the aims of this study to anticipate the level of impact that both groups may have had on each other's perceptions and consequently their responses in the discussion. Another limitation includes the focus on one factor in the quantitative data collection (beliefs about dyslexia). Pre-service teacher beliefs were at the core of the current study, but the need remains for future research to investigate how beliefs are enacted in the classroom and how they may impact teaching goals and learning outcomes. In addition, future studies may consider the exploratory sequential research design.

Conclusion

As future decision-makers who draw on personalised and context-sensitive networks of knowledge, thoughts, and beliefs (Borg, 2009), pre-service teachers are at a constant crossroads between what is already expected and what is emergent and changing; consequently, their belief system becomes part of a wider educational ecosystem (more on educational ecosystems in Andriushchenko et al., 2020). As discussed, exploring pre-service teachers' beliefs about SpLDs offers multiple benefits, which is why the current study suggests it be integrated into initial language teacher education for inclusion. The short questionnaire on dyslexia (Appendix 1) is practical for classroom use. However, teacher educators are cautioned to combine the questionnaire as a lead-in with follow-up reflections on teacher beliefs and attitudes, teaching practices, and teacher preparation, meaning the more tacit aspects of our understanding. In synthesising the wider implications of beliefs for initial language teacher education, the study proposes three interrelated principles. First, *a values-based approach* (Forlin, 2010)

in programme planning since it encompasses pre-service teachers' underlying beliefs and attitudes that inform their actions. A values-based approach goes hand in hand with the UN-advanced human rights-based approach but allows for broader investigations in context-embedded situations. In addition, reflective practice as an emergent theme throughout the study suggests that pre-service teachers feel naturally inclined to perceive *teaching as inquiry*, individual and collaborative inquiry within and across learning and teaching contexts. In order for pre-service teachers to develop their own commitment to inclusion, it is implied that teacher educators must strive to provide opportunities for inquiry-based learning that leads to informed changes in classroom choices. Finally, the study recommends *a transformative framework* in policy planning with a values-based approach and teaching as inquiry as supporting foundation blocks, considering that pre-service teachers still mainly understand inclusive education through the deficit model. Indeed, teacher preparation for inclusion has to become an integral part of initial foreign language teacher education programmes. With the focus on the development of a core identity as an inclusive practitioner (Hollenweger et al., 2015), inclusive education must not be considered a marginal issue on how to integrate some students, such as students with dyslexia, but how to transform education systems and learning environments in order to respond to all diversities, and certainly initial teacher education itself.

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Appendix 1

Questionnaire on Dyslexia for Undergraduate and Graduate Students

You are invited to participate in the Questionnaire on Dyslexia designed by [redacted] as part of the study "Undergraduate and Graduate Students' Beliefs about Dyslexia: Implications for Initial Foreign Language Teacher Education". The questionnaire is anonymous and participation is entirely voluntary. You will be asked about factors related to your beliefs and perceptions about dyslexia. It will take you approximately 5 minutes to complete. You can stop completing the questionnaire at any time or choose not to answer any of the questions. We believe that there are no known risks associated with this research and your answers will remain entirely confidential and anonymous. No personally identifiable information will be collected and responses cannot be traced back to the respondent. The obtained data and reporting of results will only be used for research purposes.
If you have any questions, please contact the researcher at [redacted]

By submitting this questionnaire, you agree to the above and give your consent that the obtained information may be used in the research study.

Personal background

(1) Please indicate your gender:
□ Male □ Female □ Other

(2) Please indicate your age:
□ 18-19 □ 20-25 □ Above 25

(3) Please indicate your current year of study:
□ 1 (B.A.) □ 2 (B.A.) □ 3 (B.A.) □ 4 (M.A.) □ 5 (M.A.)

(4) How would you characterize your knowledge of dyslexia?
□ Very knowledgeable
□ Moderately knowledgeable
□ Slightly knowledgeable
□ Not knowledgeable at all

(5) Do you feel that your training has prepared you to teach students with dyslexia?
□ Yes □ No

Scale on dyslexia

Please indicate whether you think the following statements are true or false.

Item	False	Probably false	Probably true	True
1. Children can outgrow dyslexia.				
2. Dyslexia is caused by visual perception problems.				
3. Dyslexia can be caused by a literacy-poor home environment (for example, parents not reading to their children).				
4. Children with dyslexia need more systematic and explicit reading instruction than their peers with typical development.				
5. People with dyslexia have difficulty with decoding/word recognition.				
6. Dyslexia is a learning disability that affects language processing.				
7. Children with dyslexia also have problems with spelling.				
8. Dyslexia can be inherited.				
9. Children who have dyslexia tend to have lower IQ scores than children who do not have dyslexia.				
10. Certain medications have been found to be effective in treating dyslexia.				
11. Dyslexia is more frequent among boys than girls.				
12. Seeing letters and words backwards is a characteristic of dyslexia.				

Appendix 2

Focus group protocol

Introduction: You are about to participate in a focus group as part of the study "Undergraduate and Graduate Students' Beliefs about Dyslexia: Implications for Initial Foreign Language Teacher Education". I am [redacted] and I will be facilitating our discussion today. The purpose of this study is to explore your beliefs about dyslexia and your experiences with students with dyslexia. We will also talk about your level of training and preparedness in teaching students with dyslexia. I am particularly interested in your recommendations for initial teacher education in teaching students with dyslexia and specific learning difficulties. We want to secure a safe space so I kindly ask you to actively listen to other participants, to respect their opinions and to speak one at a time. Please stay focused on the topic. If you do not understand a question, feel free to ask for clarification. We also want to assure you that your answers will remain entirely confidential and anonymous. No personally identifiable information will be collected unless you offer it voluntarily. You may also decline to answer questions you are not comfortable with and you may withdraw from the focus group at any time. If there are no further questions, we will begin with introductions.

Background questions:

- Age
- Study program / Year of study

Warm-up:

1) How prepared would you say are you in teaching students with dyslexia?
2) How many other specific learning difficulties can you name? What impacts your level of familiarity with specific learning difficulties?

Specific questions:

3) How do you think does dyslexia impact a student's language learning process? (Think back to experiences with students with dyslexia)
4) In what ways do you think would the language learning process of a student with dyslexia impact your teaching practice?
5) What type of content would you like a course on dyslexia (and other specific learning difficulties) to offer? (e.g. theoretical background, practical advice…)
6) How could a course on dyslexia and teaching students with dyslexia impact your teaching skills in general?
7) What are your recommendations on how initial teacher education can improve for future English language teachers to meet the needs of students with dyslexia?
8) What are your recommendations on how initial teacher education can improve for future English language teachers to meet the needs of all students?

Wrap-up:

9) Take a minute to reflect on what we discussed today about dyslexia and teaching students with dyslexia. Of all the things shared and mentioned, what made you think / was the most important to you / stood out to you?
10) Once again take a minute to reflect on what we discussed today. Have we missed anything?

Thank you very much for your participation. We will now stop recording.

Appendix 3

Focus group consent form

Please, read this document and ask questions you have before beginning the focus group.

Purpose: You are invited to participate in a focus group as part of the study "Undergraduate and Graduate Students' Beliefs about Dyslexia: Implications for Initial Foreign Language Teacher Education". The study is conducted by [redacted] Prior to the focus group, you were asked to complete a questionnaire on dyslexia. The purpose of the study is to explore undergraduate and graduate students' beliefs about dyslexia and implications for initial teacher education.

Procedure: The focus group will last approximately 60-90 minutes. With your permission, the conversation will be audio recorded. During the focus group, you will be asked about your knowledge of dyslexia and specific learning difficulties, your previous experiences with students with dyslexia, your level of training and preparedness in teaching students with dyslexia, and your perceptions on and recommendations for initial teacher education in teaching students with dyslexia and specific learning difficulties. You are kindly asked to follow the rules of focus group discussions:

- Actively listen to other participants
- Speak one at a time
- Treat other participants and their opinions with respect
- Minimize side conversations
- Keep focused on the topic and/or question
- If you do not understand a question, please feel free to ask for clarification

Risks: We believe that there are no known risks associated with this research and your answers will remain entirely confidential and anonymous. Your responses will be strictly coded and no personally identifiable information will be collected. The obtained data and reporting of results will only be used for research purposes.

Withdrawal: You may withdraw from the focus group at any time or choose not to answer questions you are not comfortable with.

I have read the information provided on this form and I consent to participate in the focus group. I give my consent that my responses may be used in the research study.

Name in print

_____

Signature

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Inclusive Teaching Practices with Learners with Dyslexia: Face-To-Face Training-Induced Changes in Foreign Language Teachers' Self-Efficacy Beliefs, Concerns and Attitudes

Joanna Nijakowska[1]

The survey research reported in this paper aimed to show how foreign language teachers' (N = 69) self-efficacy beliefs and concerns related to implementing inclusive instructional practices with learners with dyslexia, as well as their attitudes to inclusion in foreign language education, change as a result of the teachers' participation in an intensive face-to-face course on dyslexia and foreign language teaching. The pre-post comparisons identified a statistically significant improvement in self-efficacy beliefs and attitudes, with large and medium effect sizes, respectively, as well as a decrease in concerns, with a small effect size. Moreover, the perceived level of knowledge of dyslexia reported by course participants after the course increased significantly compared to pre-course knowledge, with a large effect size. The perceptions of knowledge were crucially related to pre-course self-efficacy beliefs and concerns, as well as to post-course self-efficacy beliefs. The impact of several background variables on self-efficacy beliefs, concerns and attitudes was investigated. We found no significant effects of general teaching experience, experience in teaching learners with dyslexia, teaching context (country), full-time employment and level of education on self-efficacy beliefs and attitudes both before and after the course. The initial effect of previous training on self-efficacy beliefs disappeared in the post-course questionnaire. No significant effects of previous training were observed for pre-course and post-course concerns and attitudes. The initial effect of level of education and experience in teaching a foreign language to learners with dyslexia on concerns disappeared in the post-course questionnaire. Teaching context (country) and full-time employment differentiated participants with regard to how concerned they were about implementing inclusive teaching before the course, and these differences persisted after the course. Age differentiated participants in the attitudes to inclusion they held before the course, but

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this difference disappeared after the course. Finally, teacher trainers differed significantly from other course participants regarding pre-course self-efficacy and post-course concerns, with a small to medium effect size.

Keywords: foreign language teacher training, dyslexia, inclusive teaching practices, teacher self-efficacy beliefs, teacher attitudes, teacher concerns

Prakse inkluzivnega poučevanja učencev z disleksijo: spremembe, spodbujene z izobraževanjem v živo, glede samoučinkovitosti v prepričanjih, skrbeh in v stališčih učiteljev tujih jezikov

Joanna Nijakowska

Namen anketne raziskave je bil pokazati, kako se prepričanja o samoučinkovitosti učiteljev tujih jezikov (N = 69) in njihove skrbi v povezavi z izvajanjem inkluzivnih učnih praks z učenci z disleksijo ter njihov odnos do inkluzije v tujejezikovnem izobraževanju spremenijo zaradi udeležbe učiteljev na intenzivnem usposabljanju v živo o disleksiji in poučevanju tujih jezikov. Primerjave pred začetkom in po koncu usposabljanja so pokazale statistično pomembno izboljšanje prepričanj o lastni učinkovitosti in stališč z veliko do srednjo velikostjo učinka ter zmanjšanje zaskrbljenosti z majhno velikostjo učinka. Poleg tega se je zaznana raven znanja o disleksiji, o kateri so poročali udeleženci usposabljanja po njegovem zaključku, v primerjavi z znanjem pred usposabljanjem pomembno povečala, pri čemer je bila velikost učinka velika. Zaznavanje znanja je bilo ključno povezano s prepričanji o lastni učinkovitosti pred usposabljanjem in skrbeh ter s prepričanji o lastni učinkovitosti po usposabljanju. Raziskan je bil vpliv več osnovnih spremenljivk na prepričanja o lastni učinkovitosti, skrbi in stališča. Ugotovili smo, da splošne pedagoške izkušnje, izkušnje pri poučevanju učencev z disleksijo, okoliščine poučevanja (država), zaposlitev za polni delovni čas in stopnja izobrazbe ne vplivajo pomembno na prepričanja o lastni učinkovitosti ter stališča pred usposabljanjem in po njem. Začetni učinek predhodnega usposabljanja na prepričanja o lastni učinkovitosti je v vprašalniku po usposabljanju izzvenel. Pri skrbeh in stališčih pred usposabljanjem in po njem ni bilo opaziti pomembnih učinkov predhodnega usposabljanja. Začetni učinek stopnje izobrazbe in izkušenj pri poučevanju tujega jezika učencev z disleksijo na zaskrbljenost je izzvenel v vprašalniku po usposabljanju. Kontekst poučevanja (država) in zaposlitev za polni delovni čas sta udeležence razlikovala glede tega, kako zaskrbljeni so bili pred usposabljanjem glede izvajanja inkluzivnega poučevanja, te razlike pa so se ohranile tudi po usposabljanju. Starost je razlikovala med udeleženci glede odnosa do inkluzivnega poučevanja,

ki so ga imeli pred usposabljanjem, vendar so te razlike po usposabljanju izzvenele. In končno, učiteljice in učitelji usposabljanja so se pomembno razlikovali od drugih udeležencev usposabljanja glede samoučinkovitosti pred usposabljanjem in zaskrbljenosti po njem, pri čemer je bila velikost učinka majhna do srednja.

Ključne besede: usposabljanje učiteljev tujih jezikov, disleksija, inkluzivne prakse poučevanja, prepričanja učiteljev o samoučinkovitosti, stališča učiteljev, skrbi učiteljev

Introduction

Inclusive instructional practices constitute a prerequisite for high-quality education and an equitable, supportive learning environment. Successful inclusion helps to remove barriers to learning by minimising inequalities related to presence, accessibility, participation and achievement in education (OECD, 2020; UNESCO, 2017). In education, we strive for valuing diversity in the classroom, welcoming unique student characteristics and abilities, responding to varied learning needs and engaging all learners effectively, and this is also the case in foreign language (FL) teaching (Coady et al., 2016; European Agency for Development in Special Needs Education, 2012; Loreman et al., 2011; Nijakowska & Kormos, 2016).

Research findings confirm that inclusive instructional practices are most effectively implemented in the classroom by self-efficacious teachers, that is, teachers who believe they have the competence (skills and knowledge) to implement such practices successfully, who have favourable attitudes towards inclusion, and who have few concerns and worries. High self-efficacy beliefs give teachers greater confidence in exploiting instructional strategies that are inclusive and thus create the basis for successful inclusive teaching (De Neve et al., 2015; Forlin & Sharma et al., 2014; Sharma & Sokal, 2016). Tschannen-Moran and Woolfolk Hoy (2001, 2007) define teachers' self-efficacy beliefs as their self-reported evaluations of how capable they are to induce the expected learning outcomes. This involves teachers' perceived competence to successfully employ inclusive instructional practices with students of diverse abilities and characteristics, including learners who have special educational needs (SEN), such as FL learners with dyslexia (Kormos, 2017a, 2017b, 2020). Research shows that teachers' sense of self-efficacy related to inclusive teaching, the attitudes they hold towards inclusion and their classroom behaviour are interlinked (e.g., Forlin & Sharma et al., 2014). Feeling more self-efficacious about implementing inclusive instructional practices tends to translate into greater effort, commitment and readiness to offer high-quality support to students, as well as perseverance in dealing with difficulties and failure (Forlin & Sharma et al., 2014; Tschannen-Moran & Woolfolk Hoy, 2001).

Many teachers tend to be concerned that implementing inclusive instructional practices may pose additional challenges and demands on them with regard to increased workload and time required for lesson preparation, availability of resources and classroom management in the context where multiple and diverse student needs should be catered for (Forlin & Cooper, 2013; Indrarathne, 2019). A greater sense of self-efficacy and more positive attitudes towards inclusion can alleviate these concerns (Forlin & Sharma et al., 2014).

Several studies have investigated the impact of training on teachers' preparedness, self-efficacy beliefs, attitude and concerns about inclusion and inclusive instructional practices (e.g., Coady et al., 2016; Chao et al., 2016; Forlin & Loreman et al., 2014; Forlin & Sharma et al., 2014; Kormos & Nijakowska, 2017; Lai et al., 2016; Sharma & Nuttal, 2016; Sharma & Sokal, 2015). The findings of these studies show that offering sound (adequate and sufficient) teacher training on inclusion can boost teachers' self-efficacy beliefs, foster positive attitudes and lower concerns about the successful inclusion of students with special educational needs (SEN) (Sharma et al., 2008), as well as enhancing teachers' preparedness to implement inclusive instructional practices (Hettiarachchi & Das, 2014; Robinson, 2017).

However, few studies have focused on these issues in the context of FL teaching. Russak (2016) examined FL teachers' practices and attitudes towards the inclusion of students with SEN and found that teachers felt that students with SEN should be taught in special educational environments rather than in mainstream settings. Coady et al. (2016) investigated how teacher preparation on inclusion translates into classroom instructional practices, observing that teachers who completed such training used some generic accommodation strategies but rarely incorporated FL context-specific practices to facilitate FL development. Nijakowska (2014, 2015) investigated FL teachers' training needs with regard to inclusive teaching practices with learners with dyslexia. Nijakowska et al. (2018, 2020) researched between-country FL teachers' perceptions of their preparedness (self-efficacy, knowledge and attitudes) for the successful inclusion of FL learners with dyslexia, the effect of demographic variables on these beliefs and professional training needs. These studies indicated a pronounced need for FL teacher professional development across countries. They showed that, unlike overall teaching experience and completed level of education (degree), teaching experience with FL learners with dyslexia (involving direct contact and personal involvement) and availability of specialist training (professional development) seem to play a role in shaping FL teachers' self-efficacy beliefs. Studies investigating predictors of self-efficacy beliefs related to inclusive teaching in the general education context also highlight the positive role of direct experience in teaching learners with SEN (Malinen et al., 2013; Peebles & Mondaglio, 2014). Other demographic variables whose effect on teachers' perceptions of self-efficacy have been investigated include years of education, knowledge, training on inclusion, the school at which the teachers taught and the age group they taught (Forlin et al., 2009; Kormos & Nijakowska, 2017; Leyser et al., 2011).

A specialist training programme for FL teachers – DysTEFL – was designed (Nijakowska & Kormos, 2016; Nijakowska et al., 2016) and piloted with

an international audience in different training modes, including face-to-face, online interactive (Moodle) and online self-study options. The materials were also used in a massive open online course (MOOC) on dyslexia and foreign language teaching. The study conducted within this framework (Kormos & Nijakowska, 2017) showed that the training was successful in boosting favourable attitudes to inclusion in FL education, increasing participants' self-efficacy beliefs and lowering concerns related to implementing inclusive teaching with learners with dyslexia. The demographic variables investigated in this study, such as the school at which the teachers taught, the age group they taught and teaching experience (in years), did not have significant effect on the participants' post-course self-efficacy beliefs, attitudes and concerns. However, previous training, self-reported knowledge about dyslexia and experience in teaching learners with dyslexia were significantly related to pre-course self-efficacy beliefs.

Against this background, the purpose of the study reported in the present paper was to investigate how attitudes towards inclusive FL education, as well as self-efficacy beliefs and concerns about employing inclusive instructional practices in FL teaching of in-service EFL teachers and teacher trainers, change as a result of their participation in a short, international, face-to-face and extremely intensive course. Moreover, the aim was to verify the effect of several demographic variables on pre-course and post-course self-efficacy beliefs, concerns and attitudes. To this end, the study addressed the following research questions:

RQ1: How do attitudes to inclusion in FL education, self-efficacy beliefs and concerns regarding inclusive FL teaching to students with dyslexia change in the context of an intensive face-to-face course on dyslexia and FL teaching?

RQ2: How are previous training, experience in teaching FL to learners with dyslexia, participants' status (teacher vs teacher trainer) and full-time employment (primary, secondary or higher education) related to pre-course and post-course attitudes to inclusion in FL education, self-efficacy beliefs and concerns about inclusive FL teaching to learners with dyslexia?

RQ3: How are general teaching experience, knowledge about dyslexia, teaching context (country), level of education and participants' age related to pre-course and post-course attitudes to inclusion in FL education, self-efficacy beliefs and concerns about inclusive FL teaching to learners with dyslexia?

Method

Participants

The participants in the study were 69 in-service EFL teachers of three nationalities: 15 (21.7%) came from and worked in Greece, 20 (29%) came from and worked in Slovenia and 34 (49.3%) came from and worked in Poland. A total of 68 of the participants were women and 17 (24.6%) were teacher trainers. The full-time employment of most of the participants – 40 (58%) – was in primary education, while 16 (23.2%) worked in secondary education and 15 (21.7%) were employed in higher education institutions. Only one of the teachers worked in early childhood education, while 4 (5.8%) indicated that their full-time employment involved special education. Of the participants, 21 (30.4%) indicated that a bachelor's degree was their highest level of education, while 37 (53.6%) had a master's degree and 11 (15.9%) had a doctorate. Only 4 (5.8%) of the teachers were 25 years old or younger, 18 (26.1%) were between 26 and 35 years old, 20 (29%) were from 36 to 45 years old, while the 27 (39.1%) teachers who were 46 or older constituted the largest group.

The majority of the course participants were experienced teachers: 48 (69.6%) had more than 10 years of teaching experience, 12 (17.4%) had taught EFL for 5 to 10 years, and 9 (13%) reported teaching experience of less than 5 years. As many as 52 (75.4%) of the participants had some experience of teaching EFL to learners with dyslexia and 27 (39.1%) reported that they had had some previous training on teaching learners with dyslexia. As far as their pre-course knowledge of dyslexia was concerned, most of the participants – 37 (63.6%) – assessed it as average, while 22 (31.9%) evaluated it as poor and 8 (11.6%) believed it was good. Only one teacher (1.4%) claimed that she had a very good knowledge of dyslexia, while one teacher claimed she had no knowledge. The participants' perception of their knowledge of dyslexia after the course changed significantly, with 44 (63.8%) believing it was good, while the number of teachers who claimed it was average or very good was identical – 12 (17.4%) – and only one teacher perceived her post-course knowledge as poor.

Instruments

The questionnaire used to collect data in both the pre-course and the post-course surveys was adapted from the *FLIPD – Perceptions about Inclusive Practices in Teaching Foreign Languages to Dyslexic Language Learners* (Kormos & Nijakowska, 2017, pp. 38–39). It consisted of 24 items, divided into two

parts: A and B. The demographic part of the questionnaire (Part A) included ten questions that asked about the participants' country of origin, whether they were teacher trainers, their full-time employment (early childhood/primary/secondary/special/higher education), gender, age, education, teaching experience, teaching experience with learners with dyslexia, perceived knowledge of dyslexia, and previous training on teaching learners with dyslexia.

Part B of the questionnaire included 14 six-point Likert scale items aimed at assessing the participants' attitudes to inclusion in FL education, their self-efficacy beliefs and their concerns related to the application of inclusive FL instructional practices with learners with dyslexia. The scale was originally used to investigate how language teachers' self-confidence, self-efficacy and concerns about using inclusive educational practices with students with dyslexia, as well as their attitudes to inclusion in language education, differ before and after participation in a massive open online course (MOOC) (Kormos & Nijakowska, 2017) (see Table 1 for the Part B items).

The survey participants were asked to indicate the extent to which they agreed with the statements on a scale from 1 to 6. In the self-efficacy and attitudes subscales, 1 = *strongly disagree* and 6 = *strongly agree*, meaning that the higher the overall score, the greater the teacher's self-efficacy beliefs and the more favourable their attitudes. For the concerns, the scale was reversed, 1 = *strongly agree* and 6 = *strongly disagree*, meaning that the higher the overall score, the lower the teacher's concerns.

Research design

The study took place within the context of an international short intensive face-to-face training programme on dyslexia and foreign language teaching, designed as part of the EU-funded DysTEFL2 project. Four identical courses were organised within this framework. The training programme was international in terms of location, course participants and trainers. Participating in this training programme involved travelling abroad and engaging in intensive five-day academic study. In-service EFL teachers from Greece, Slovenia and Poland took part in courses organised in these three countries, with each course welcoming 15–20 teachers from the three countries. The trainers were internationally recognised specialists in FL teaching and dyslexia, experienced teacher trainers and materials writers. All of the courses lasted five days, were delivered face-to-face in English, and had the same agenda and content. The participants and trainers stayed on site for the duration of the course. The course was extremely intensive, packed with academic sessions and accompanied by social activities and integration

events. The course goal was to enhance understanding of dyslexia and associated specific learning difficulties and how they can affect FL learning. The aim was to familiarise teachers with effective inclusive FL instructional practices and language teaching techniques that can assist and support the learning processes of FL learners with dyslexia. The participants were requested to complete three pre-course assignments before the course started, then, when the course began, they were actively involved in two or three two-hour training sessions a day, which involved the study of ten modules of the *DysTEFL – Dyslexia for Teachers of English as a Foreign Language Course* (Nijakowska et al., 2016). The modules covered the following content: the nature of dyslexia, specific learning difficulties associated with dyslexia, identification of dyslexia, the effects of dyslexia on foreign language learning, classroom accommodations for foreign language learners with dyslexia, techniques for developing phonological and orthographic awareness, techniques for teaching vocabulary and grammar, techniques for teaching listening, speaking, reading and writing, and, finally, the assessment of language learners with dyslexia. Each module consisted of several instructional steps and tasks, followed by reflection activities. The training sessions for each unit were followed by self-study time, group work and quiz time.

Participation in the survey was voluntary and anonymous, and no identifying information was collected from the respondents. Both before and after the course, the questionnaire was administered on site, in a pen and paper version. All of the participants generated unique codes so that their pre-course and post-course responses could be matched. The pre-course survey was completed during the first day of the course before the classes started, and the post-course survey was administered during the last day of the course, after all of the course activities had been completed. The data were manually introduced into IBM SPSS Statistics software and analysed.

Results and discussion

Pre-course vs post-course attitudes to inclusion in FL education, self-efficacy beliefs and concerns regarding inclusive FL teaching to learners with dyslexia

Our first research question asked about how attitudes to inclusion in FL education, self-efficacy beliefs and concerns regarding inclusive FL teaching to students with dyslexia change in the context of an intensive face-to-face course on dyslexia and FL teaching. In order to answer RQ1, principal component analysis was conducted to investigate the structure of a set of variables, to identify clusters of variables across two datasets (pre-course and post-course) and to check

whether the derived solutions differed. Then, the non-parametric Wilcoxon rank-sum test was used to verify whether the differences between pre-course and post-course latent variables (factors) were statistically significant (Field, 2009). PCA was performed on all data (14 items) across the two samples (pre-course and post-course responses) with orthogonal rotation (varimax). It turned out that one item (Q10) did not work as expected: it loaded primarily on different factors across samples and loaded on more than one factor. It was decided to remove this item from further analysis and rerun the PCA with 13 items across both datasets. The Kaiser-Meyer-Olkin measure verified the sampling adequacy. The KMO was .764 for the pre-course and .731 for the post-course dataset, which is well above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity was significant for both datasets (pre-course: $\chi^2(78) = 314.870$, $p < .001$; post-course: $\chi^2(78) = 324.048$, $p < .001$) and indicated that correlations between items were sufficiently large for PCA. The communalities were all above .3 in both the pre-course and post-course samples, indicating that each item shared some common variance with other items.

Three-factor solutions were reached for both the pre-course and post-course datasets. In the pre-course data, the eigenvalue for Factor 1 was 4.167, while for Factor 2 it was 1.965 and for Factor 3 it was 1.621. The initial eigenvalues showed that the first factor explained 32.06% of the variance, the second factor 15.14% of the variance, and the third factor 12.47%. In the post-course data, the eigenvalue for Factor 1 was 4.195, while for Factor 2 it was 1.903 and for Factor 3 it was 1.712. The first factor explained 32.27% of the variance, the second factor 14.64% of the variance, and the third 13.17%. Overall, these three factors explained 59.64% of the variance in the pre-course sample and 60.08% in the post-course sample. Scree plot analysis showed that the scree flattened out and tailed downwards after the third factor in both datasets. All of the items had primary loadings over .33, and some of the items presented cross-loadings across both datasets.

Identical three-factor solutions were derived for the pre-course and post-course datasets, involving the following factors: Factor 1 (F1) self-efficacy beliefs related to implementing inclusive FL instructional practices with learners with dyslexia (6 variables included, cut-off point for pre-course .701 and for post-course .620); Factor 2 (F2) concerns about implementing inclusive FL instructional practices with learners with dyslexia (4 variables included, cut-off point for pre-course .574 and for post-course .572); and Factor 3 (F3) attitudes to inclusion in FL education (3 variables included, cut-off point for pre-course .582 and for post-course .509). Table 1 shows the factor loadings after rotation, along with item means and standard deviations for the pre-course and post-course samples.

Table 1

Factor loadings after rotation for self-efficacy beliefs (F1), concerns (F2) and attitudes (F3); means and standard deviations for the pre-course (N = 69) and post-course (N = 69) samples

Items	Pre-course factor loadings			Post-course factor loadings			Pre-course		Post-course	
	F1	F2	F3	F1	F2	F3	M	SD	M	SD
13. I am confident in designing language learning tasks so that the individual needs of students with dyslexia are accommodated.	.822			.620			3.48	1.22	4.77	.94
12. I know how to modify the way teaching materials are presented to accommodate the needs of learners with dyslexia.	.817			.714			3.90	1.09	5.26	.61
8. I am able to provide an alternate explanation or an example when learners with dyslexia are confused.	.787			.693			4.41	1.06	5.23	.77
4. I can use a variety of assessment strategies for evaluating the foreign/additional language knowledge of learners with dyslexia.	.750			.786			3.96	1.31	5.07	.81
3. I know how to create an inclusive atmosphere in the language classroom for students with dyslexia.	.746			.579			4.01	1.11	5.12	.65
11. I can improve the learning of a student with dyslexia who is experiencing difficulties with a foreign/additional language.	.701			.755			4.43	1.14	5.20	.66
14. Other students suffer because of having learners with dyslexia in their classes.		.820			.572		4.71	1.09	5.06	1.00
9. I am concerned that I will be more stressed if I have students with dyslexia in my language classes.		.766			.859		3.91	1.43	4.32	1.33
6. I am concerned that students with dyslexia will not be/are not accepted by the rest of the students in the language classroom.		.723			.828		4.26	1.26	4.43	1.29
5. I am concerned that my workload will increase if I have students with dyslexia in my language classes.		.574			.760		2.94	1.41	3.35	1.44
7. Students with dyslexia should be taught foreign/additional languages in mainstream classes.			.801			.879	4.22	1.10	4.70	1.28
2. Students who frequently fail in various subjects should be taught foreign/additional languages in mainstream classes.			.745			.906	4.00	1.13	4.58	1.16
1. Students who need an individualised academic programme should be encouraged to learn foreign/additional languages.			.582			.509	4.91	.76	5.26	.70
10. You have to be a specially trained teacher to teach a foreign/additional language to learners with dyslexia. *										

Note. Factor loadings < .3; cross-loadings are suppressed. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation. *Note: Item 10 was removed from the scale and from further analysis

The reliability of the subscales ranged from minimally reliable to highly reliable. The self-efficacy beliefs subscale had a high internal consistency both in the pre-course (α = .870) and post-course (α = .807) datasets. The concerns subscale was internally consistent both in the pre-course (α = .711) and post-course (α = .796) samples. The attitude subscale was minimally reliable for the pre-course (α = .567) and reliable for the post-course (α = .720) (Cohen et al., 2011).

The distribution of data for the pre-course concerns and post-course self-efficacy beliefs, concerns and attitudes was non-normal. A non-parametric Wilcoxon rank-sum test was used to check whether the course participants' self-efficacy beliefs, concerns and attitudes differed before and after the course. Statistically significant differences were found between the pre-course (M = 4.03, Md = 4.17, SD = .90) and post-course (M = 5.11, Md = 5.00, SD = .53) self-efficacy beliefs (Z = -6.90, $p < .001$, r = -.59). A considerable increase in self-efficacy beliefs was observed after the course, with a large effect size (Field, 2009). Similarly, pre-course (M = 3.96, Md = 3.75, SD = .95) and post-course (M = 4.29, Md = 4.50, SD = 1.01) concerns differed significantly (Z = -2.91, $p = .004$, r = -.25). Participation in the course reduced teachers' concerns, with a small to medium effect size. Finally, attitudes to inclusion, already very favourable before the course (M = 4.38, Md = 4.33, SD = .74), were boosted even further by participation in the course (M = 4.85, Md = 5.00, SD = .86). The analysis showed that this change was statistically significant, with medium to large effect size (Z = -4.16, $p < .001$, r = -.35) (Table 2).

Table 2

Differences between pre-course and post-course self-efficacy beliefs, concerns and attitudes

Scale	Sample	N	Mean	SD	Z	*p*	r
Self-efficacy beliefs	Pre-course Post-course	69 69	4.03 5.11	.90 .53	-6.90	.001*	-0.59
Concerns	Pre-course Post-course	69 69	3.96 4.29	.95 1.01	-2.91	.004*	-0.25
Attitudes	Pre-course Post-course	69 69	4.38 4.85	.74 .86	-4.16	.001*	-0.35

Note. *Statistically significant result

It can be concluded that a short but very intensive face-to-face training programme proved effective in strengthening and boosting positive attitudes to inclusion, in increasing FL teachers' self-efficacy beliefs and in reducing their concerns about inclusive FL teaching to learners with dyslexia. This finding is

consistent with the outcomes of an earlier study researching the same latent variables in the context of FL teacher training, where the training was delivered entirely online via the MOOC (Kormos & Nijakowska, 2017). It is also in line with the results of studies demonstrating the effectiveness of (relatively long and intensive) general education pre-service teacher training courses delivered face-to-face in enhancing self-efficacy beliefs and attitudes to inclusion and in lowering the level of anxiety and concerns about implementing inclusive teaching practices (e.g., Peebles & Mondaglio, 2014; Sharma & Nuttal, 2016).

The format of the course did not allow opportunities for observation of successful inclusive FL teachers in action in schools or enable teaching practice, which could have supported the increase in the teachers' self-efficacy beliefs and attitudes and further lowered concerns. This drawback was partially compensated for by interactions within the course community of experienced teachers, who actively participated in discussions, readily shared their teaching experiences related to learners with dyslexia and learned from each other. Despite this drawback, the effect size of the pre-post course change in self-efficacy beliefs was large. The effects were smaller in the case of attitudes and concerns, being medium and small, respectively. This can be explained by the fact that the initial attitudes were already very high, so their increase could not be as pronounced as in the case of self-efficacy beliefs. The course participants were interested in the topic and motivated. All of them volunteered to join the project and participate in the course, which required hard work and intensive study, including pre-course assignments. The teachers were prepared to accept the challenge because they were determined to improve their knowledge and skills so that they could more effectively respond to the needs of their dyslexic FL learners. The pre-course concerns were relatively low, and they diminished slightly after the course. The relatively low initial concerns might have been linked to experience in teaching learners with dyslexia (reported by over 75% of the course participants).

The effect of previous training, experience in teaching FL to learners with dyslexia, participants' status (teacher vs teacher trainer), and full-time employment (primary, secondary or higher education) on pre-course and post-course attitudes to inclusion in FL education, self-efficacy beliefs and concerns about inclusive FL teaching to learners with dyslexia

In our second research question, we asked how previous training, experience in teaching FL to learners with dyslexia, participants' status (teacher vs teacher trainer) and full-time employment (primary, secondary or higher education) were related to pre-course and post-course self-efficacy beliefs, concerns

and attitudes to inclusion in FL education. In order to answer RQ2, the Mann-Whitney U test was used to investigate whether the between-group differences were statistically significant. The course participants who had some previous training on inclusive FL teaching to learners with dyslexia (N = 27, M = 4.41, Md = 4.5, SD = .73) had more positive self-efficacy beliefs before the course than teachers who had no previous training (N = 42, M = 3.79, Md = 3.83, SD = .92). The Mann-Whitney U test showed that this difference was statistically significant, with a medium to large effect size (U = 342.50, p = .006, r = -.33). Previous training proved to have significant impact on how the course participants perceived their self-efficacy before they joined the course, but this effect disappeared after the course. Participation in the course boosted the self-efficacy beliefs of all of the participants, particularly those who reported no previous training and felt significantly less self-efficacious before the course than teachers who had had some training on dyslexia before they joined the course. Previous training had no effect on pre-course and post-course concerns and attitudes. Similar findings were reported by Kormos and Nijakowska (2017) regarding online training in the MOOC context.

The effect of experience in teaching FL to learners with dyslexia was evident only in pre-course concerns. Teachers who had some experience in teaching FL to learners with dyslexia (N = 52, M = 4.10, Md = 4.13, SD = .91) were less concerned about implementing inclusive FL instructional practices with learners with dyslexia than those who did not report such experience (N = 17, M = 3.51, Md = 3.25, SD = .97). The Mann-Whitney U test showed that this difference was statistically significant, with a small to medium effect size (U = 274.00, p = .019, r = -.28). The course proved effective in alleviating the concerns of all of the participants, but especially in levelling up the concerns of teachers who had not had experience teaching learners with dyslexia before joining the course. No effect of this variable was observed for post-course concerns or for pre-course and post-course self-efficacy beliefs and attitudes, while other studies have indicated significant effects of teaching experience with FL learners with dyslexia (SEN) (involving direct contact and personal involvement) on FL teachers' self-efficacy beliefs (Kormos & Nijakowska, 2017; Malinen et al., 2013; Nijakowska, Tsagari, & Spanoudis, 2018, 2020; Peebles & Mondaglio, 2014).

We wanted to find out whether being a teacher trainer had any impact on the reported pre-course and post-course self-efficacy beliefs, concerns and attitudes. The Mann-Whitney U test showed that teacher trainers differed significantly from the other course participants regarding pre-course self-efficacy (U = 291.00, p = .035, r = -.25) and post-course concerns (U = 298.50, p = .045, r = -.24), with a small to medium effect size. Teacher trainers (N = 17, M = 3.61, Md = 3.67,

SD = .96) felt less self-efficacious before the course than the other participants (N = 52, M = 4.17, Md = 4.33, SD = .85), as well as reporting greater post-course concerns (N = 17, M = 3.81, Md = 3.75, SD = 1.12) than the other participants (N = 52, M = 4.45, Md = 4.75, SD = .92). These findings indicate that the course was successful in boosting the sense of self-efficacy among teacher trainers after the course, so that this initial difference in self-efficacy beliefs was levelled. However, even though fewer worries were reported after the course by all participants, the teacher trainers still finished the course more concerned than the other participants. This finding was consistent with the effect of full-time employment on concerns.

The effect of full-time employment (primary, secondary or higher education) on pre-course and post-course self-efficacy beliefs, concerns and attitudes was only evident in the case of concerns expressed by participants working in higher education, both before and after the course. The majority (58.8%) of the teacher trainers participating in the course worked in higher education institutions. The teacher trainers constituted 66.7% of all of the teachers working in higher education, 5 (33.3%) academic teachers were not teacher trainers, but some of the courses they conducted were also offered to university students in teacher training programmes. The Mann-Whitney U test showed that participants whose full-time employment was in higher education (N = 15, M = 3.35, Md = 3.25, SD = .92) were significantly more concerned before the course than teachers who did not work in higher education (N = 54, M = 4.13, Md = 4.13, SD = .90) (U = 208.00, p = .004, r = -.35). The difference remained statistically significant after the course (U = 210.00, p = .004, r = -.34). After the course, teachers working in higher education (N = 15, M = 3.55, Md = 3.75, SD = 1.11) still had more worriers related to implementing inclusive instructional practices with learners with dyslexia than teachers working at other levels of education (N = 54, M = 4.50, Md = 4.75, SD = .88). The effect sizes of these differences, both before and after the course, were medium to large.

Apparently, the considerable increase in self-reported post-course self-efficacy, confidence in implementing inclusive teaching practices and knowledge of dyslexia did not sufficiently mitigate all of the worries of teacher trainers and participants working in higher education. The greatest concern that both groups – teacher trainers and teachers working in higher education – had before the course was about the increased workload related to teaching students with dyslexia, and this concern grew even more after the course, even though other concerns were initially low or moderate and were successfully alleviated after the course. This finding can be partially explained by the fact that these course participants found themselves in a relatively more demanding professional context

that placed a great deal of responsibility on them. As teacher trainers and academic teachers, they were expected not only to successfully include students with dyslexia in the classes they taught but also to adequately educate and prepare the trainee (and in-service) teachers they worked with in various academic and teacher training programmes for the challenges of inclusive teaching. Holding favourable attitudes and feeling more aware and self-efficacious about implementing inclusive instructional practices might have fuelled the commitment and readiness to offer high-quality inclusive teaching and training about inclusion. At the same time, this need and ambition to follow high standards, paired with responsibility, might have triggered the belief that this would pose additional demands in terms of workload.

The effect of general teaching experience, knowledge about dyslexia, teaching context (country), level of education and the participants' age on pre-course and post-course attitudes to inclusion in FL education, self-efficacy beliefs and concerns about inclusive FL teaching to learners with dyslexia

Our third research question looked at how general teaching experience, knowledge about dyslexia, teaching context (country), level of education and participants' age are related to pre- and post-course self-efficacy beliefs and concerns about inclusive FL teaching to learners with dyslexia, as well as to attitudes to inclusion in FL education. In order to answer RQ3, the non-parametric equivalent of analysis of variance, Kruskal-Wallis one-way ANOVA for three or more independent samples, was calculated for each demographic variable. Multiple (pairwise) comparisons were performed if the overall test showed significant differences across samples. The significance values were adjusted by the Bonferroni correction for multiple tests (Field, 2009). Epsilon squared was calculated to denote effect sizes of identified differences (Tomczak & Tomczak, 2014).

No effect of general teaching experience was found for pre-course and post-course self-efficacy beliefs, concerns and attitudes. This means that there were no statistically significant differences between the course participants who had less than five years of teaching experience (N = 9), those who had between five and ten years of teaching experience (N = 12) and those who had more than ten years of teaching experience (N = 48). This is consistent with Kormos and Nijakowska's (2017) findings concerning online FL teacher training on inclusive teaching.

The Wilcoxon test showed that the perceived level of knowledge of dyslexia reported by the course participants before the course (N = 69, M = 2.80, Md = 3.00, SD = .72) was much lower than after the course (N = 69, M = 3.97,

Md = 4.00, SD = .64), with a statistically significant difference (Z = -6.55, $p < .001$, r = -0.56). This means that the participants' evaluation of their knowledge changed radically after the course and the effect size of this change was large. Their assessments after the course were much more favourable: the teachers believed they were considerably more knowledgeable than before the course. The analysis showed that these perceptions of knowledge were crucially related to pre-course self-efficacy beliefs and concerns, as well as to post-course self-efficacy beliefs. Pre-course and post-course perceived knowledge of dyslexia was measured on a scale from 1 to 5, where 1 = none and 5 = very good. Since the extreme categories were either not selected or indicated only by one respondent, the variables were recoded to include three categories, where for pre-course knowledge 1 = poor (N = 23), 2 = average (N = 37), 3 = good (N = 9) and for post-course knowledge 1 = average (N = 13), 2 = good (N = 44), 3 = very good (N = 12). The two recoded variables were used for analysis.

The Kruskal-Wallis one-way ANOVA showed that pre-course perceptions of knowledge of dyslexia moderately influenced the participants' pre-course self-efficacy beliefs ($H(2) = 10.369$, $p = .006$, $\varepsilon^2 = .15$) and concerns ($H(2) = 8.225$, $p = .016$, $\varepsilon^2 = .12$). The Mann-Whitney U test was used to follow up this finding. Pairwise comparisons revealed statistically significant differences in pre-course self-efficacy beliefs between the participants who assessed their knowledge as poor (N = 23, M = 3.59, Md = 3.67, SD = .96) and those who believed it was average (N = 37, M = 4.16, Md = 4.33, SD = .83) (U = -12.198, $p = .022$), as well as between those who assessed their knowledge as poor and those who claimed it was good (N = 9, M = 4.63, Md = 4.83, SD = .46) (U = -23.686, $p = .003$). Participants who perceived their pre-course knowledge of dyslexia as good had fewer pre-course concerns (N = 9, M = 4.81, Md = 4.75, SD = .48) than those who perceived their pre-course knowledge as average (N = 37, M = 3.82, Md = 3.5, SD = 1.01) (U = -20.884, $p = .005$). Moreover, those who perceived their pre-course knowledge of dyslexia as good were less concerned than teachers whose perceived knowledge of dyslexia was poor (N = 23, M = 3.85, Md = 3.50, SD = .86) (U = -19.570, $p = .013$). These results show that participants with higher levels of perceived pre-course knowledge (average and good) reported greater pre-course self-efficacy beliefs than teachers who perceived their pre-course knowledge of dyslexia as poor. Similarly, the teachers with the most favourable perceptions of their pre-course knowledge of dyslexia (good) were less worried about implementing inclusive instructional practices with learners with dyslexia than those who believed their knowledge of dyslexia was average or poor. No impact of self-reported knowledge of dyslexia was shown for pre-course and post-course attitudes. These results are in line with earlier findings in the FL context demonstrating

no impact of knowledge of dyslexia on initial and post-course attitudes and indicating that less self-perceived knowledge of dyslexia was linked to greater concerns, and that self-reported knowledge on dyslexia was a significant predictor of pre-course self-efficacy beliefs (Kormos & Nijakowska, 2017).

The Kruskal-Wallis one-way ANOVA showed that post-course perceptions of the level of knowledge of dyslexia had a moderate effect on post-course self-efficacy beliefs ($H(2) = 7.747$, $p = .021$, $\varepsilon^2 = .11$). Post-course self-efficacy beliefs of teachers who assessed their post-course knowledge as average (N = 13, M = 4.74, Md = 4.67, SD = .58) differed significantly from those who believed their knowledge was good (N = 44, M = 5.17, Md = 5.17, SD = .44) (U = -15.067, $p = .017$). Similarly, those teachers who evaluated their post-course knowledge of dyslexia as average differed significantly from those who perceived their post-course knowledge as very good (N = 12, M = 5.26, Md = 5.50, SD = .65) (U = - 20.609, $p = .010$). The greater the level of post-course perceived knowledge teachers reported, the more self-efficacious they believed they were. This relationship between post-course perceived knowledge of dyslexia and post-course self-efficacy beliefs was not evident in the context of online training (Kormos & Nijakowska, 2017).

The effect of teaching context – the participants' country of origin – was not statistically significant for pre-course and post-course self-efficacy beliefs and attitudes. This means that there were no differences in pre-course and post-course self-efficacy beliefs and attitudes between the participants from Greece, Slovenia and Poland. However, the pre-course and post-course concerns were affected by the teaching context – the participants' country of origin. A statistically significant moderate difference regarding pre-course concerns was found between teachers from different countries ($H(2) = 10.117$, $p = .006$, $\varepsilon^2 = .15$). A Mann-Whitney U test was used to follow this finding. Pairwise comparisons indicated that there was a statistically significant difference ($U = 17.463$, $p = .002$) between participants from Poland (N = 34, M = 3.60, Md = 3.50, SD = .84) and Slovenia (N = 20, M = 4.43, Md = 4.50, SD = .82), with Polish teachers being initially considerably more concerned than their colleagues from Slovenia. These relatively strong differences prevailed after the course and were statistically significant ($H(2) = 11.680$, $p = .003$, $\varepsilon^2 = .16$). Pairwise comparisons revealed that after the course, the participants from Poland (N = 34, M = 3.88, Md = 3.88, SD = .99) were more concerned than the teachers from Slovenia (N = 20, M = 4.65, Md = 4.88, SD = .84) ($U = 15.319$, $p = .007$) and Greece (N = 15, M = 4.73, Md = 5.00, SD = .91) ($U = 17.727$, $p = .004$).

These findings are consistent with our findings about the intensity of concerns of teacher trainers and teachers working in higher education in comparison

to teachers working at other levels of education, in that the majority (86.7%) of the teachers in our sample working in higher education, and 47% of the teacher trainers, were from Poland. This means that the effect of the participants' country of origin on pre-course and post-course concerns could be partially linked to these two variables. However, the teachers from Poland who were not teacher trainers and did not work in higher education were also more concerned than their Greek and Slovenian colleagues in all of the researched aspects of concerns. Despite favourable attitudes and high self-efficacy beliefs, the Polish teachers were more concerned than the other course participants. Interestingly, most of the Polish course participants (79.4%) claimed they had some experience teaching learners with dyslexia, 61.8% reported average or good pre-course knowledge about dyslexia and 85.3% believed their post-course knowledge about dyslexia was good or very good, which could have been expected to positively influence and limit their concerns. However, this seems not to have been the case. One possible explanation for this finding might involve educational environment-related issues rather than teacher-related concerns. It seems that the worries of Polish teachers might have been intensified by an awareness of the barriers and challenges imposed on them by the requirements of the education system and policy-related issues. However, this would require further investigation.

The moderate effect of level of education was statistically significant for pre-course concerns ($H(2) = 6.011$; $p = .05$, $\varepsilon^2 = .09$). Before the course, those who held a bachelor's degree ($N = 21$, $M = 4.38$, $Md = 4.50$, $SD = .83$) had significantly lower concerns related to implementing inclusive practices with FL learners with dyslexia than those who held a master's degree ($N = 37$, $M = 3.76$, $Md = 3.50$, $SD = .88$) ($U = 13.043$; $p = .017$), but not in comparison with those who held a doctorate ($N = 11$, $M = 3.80$, $Md = 3.50$, $SD = 1.22$) ($U = 11.835$; $p = .111$). The effect disappeared for post-course concerns ($H(2) = 5.428$; $p = .066$). The effect of level of education was not statistically significant for pre-course and post-course self-efficacy beliefs and attitudes.

Age differentiated participants in the attitudes to inclusion they held before the course, with a moderate effect size ($H(3) = 7.948$; $p = .047$, $\varepsilon^2 = .10$). Pairwise comparisons showed a statistically significant difference between one pair of participants ($U = -16.981$; $p = .005$), namely, older participants – 46 years and older ($N = 27$, $M = 4.59$, $Md = 4.67$, $SD = .68$) – demonstrated more favourable attitudes towards inclusion in FL education before the course than younger teachers (between 26 and 35 years old) ($N = 18$, $M = 4.02$, $Md = 4.17$, $SD = .60$). This difference disappeared after the course. It can therefore be concluded that the course contributed to boosting positive attitudes to inclusion in FL education among younger teachers.

Conclusion

The present study contributes to our understanding of the role of training in modifying in-service teachers' self-efficacy beliefs and concerns about implementing inclusive instructional practices with learners with dyslexia and attitudes to inclusion in FL education. Using a matched design and a self-report instrument distributed before and after the training, we showed that a short, very intensive, face-to-face course on inclusion and dyslexia contributed to statistically significant increases in self-efficacy beliefs, attitudes and knowledge, as well as to alleviation of teachers' concerns. This mode of training, along with the content it covered, can thus be recommended for foreign language teacher professional development and training. These are promising findings because teachers' classroom practices and actions can be induced by their self-efficacy beliefs. Teachers with a greater sense of self-efficacy in implementing inclusive practices with learners with dyslexia, more positive attitudes and fewer worries are more likely to use inclusive strategies in their daily teaching practice and demonstrate greater readiness and stamina in facing challenges related to inclusion (Forlin & Sharma et al., 2014; Tschannen-Moran & Woolfolk Hoy, 2001, 2007). Teachers' perceptions of how self-efficacious they are can also influence student self-efficacy beliefs, motivation to learn and academic achievement (Guo et al., 2012).

The study verified the impact of several demographic variables on initial and post-course self-efficacy beliefs, concerns and attitudes. It confirmed earlier findings concerning the FL teaching context (Kormos & Nijakowska, 2017) demonstrating that teachers with more favourable perceptions of pre-course knowledge of dyslexia showed greater pre-course self-efficacy beliefs and lower concerns. It also demonstrated that the greater the level of perceived post-course knowledge teachers reported, the more self-efficacious they believed they were after the course. Knowledge about dyslexia proved closely linked to self-efficacy beliefs related to inclusive FL teaching to learners with dyslexia. This has important implications for course developers and teacher trainers.

As far as the effect of previous training is concerned, it was significant only for pre-course self-efficacy beliefs and disappeared after the training. General teaching experience, experience in teaching learners with dyslexia, teaching context (country), full-time employment and level of education were not significantly related to self-efficacy beliefs and attitudes either before or after the course. The initial effect of level of education and experience in teaching FL to learners with dyslexia on concerns disappeared after the course. The only variable that impacted the participants' attitudes was their age – older teachers held more favourable attitudes to inclusion in FL education than their younger colleagues

– but this difference was no longer present after the course.

Overall, the greatest impact of various demographic variables was observed in relation to participants' concerns. Teaching context (country) and full-time employment differentiated participants with regard to how concerned they were about implementing inclusive teaching before the course, and these differences prevailed after the course. Polish teachers and teachers working in higher education were the most concerned. Moreover, teacher trainers demonstrated significantly greater post-course concerns than other course participants. Importantly, most of the course participants with full-time employment in higher education, and roughly half of the teacher trainers, were Polish. Further research is needed in order to explain the possible causal links between these variables. Qualitative data collected during follow-up interviews with the course participants can shed light on this as well as on other important details that were not apparent in the quantitative analysis. This will in turn further support our understanding of the effect that selected demographic variables can have on the effectiveness of the type of training discussed in this paper.

It is important to note that the levels of teachers' attitudes, concerns, knowledge and self-efficacy were assessed based on the course participants' self-reported beliefs and perceptions, which were not verified by the observation of actual classroom practices. This limitation carries the risk of overestimation or underestimation, as teachers' stated beliefs and perceptions might be incongruent with their classroom practices (Basturkmen, 2012). Nevertheless, the findings have important implications for teacher training institutions regarding FL teacher training on inclusion. Relatively short but very intensive courses can bring the desired effects of boosted self-efficacy beliefs and attitudes and lowered concerns related to inclusion of FL learners with dyslexia. Incorporating this type of training into the teacher training and professional development offer can therefore be recommended.

More research is needed on how the effects of training on FL teachers' self-efficacy beliefs, attitudes and concerns translate into actual teacher behaviour in the classroom related to the implementation of inclusive instructional practices. In addition, more knowledge and understanding should be gained on how inclusive teaching influences the beliefs and achievements of FL learners.

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Dyslexia and English as a Foreign Language in Norwegian Primary Education: A Mixed Methods Intervention Study

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The current study explored the effect of specific teaching accommodations for English language learners with dyslexia in a Norwegian primary school. Specifically, this single group intervention project investigated the impact of a range of multisensory techniques on spelling skills and motivation. Participants included a special education teacher and five dyslexic pupils from the fifth and sixth grades. Pre- and post-tests were administered to observe development in spelling, while data were also collected via a pupil evaluation questionnaire and a teacher interview after the intervention. The findings revealed that the intervention was quite successful. The group exhibited substantial differences in mean scores between the pre- and post-test. However, there were individual differences in scores and comorbid disorders appeared to impact the effectiveness of the intervention. Nonetheless, all of the pupils reported gains in their motivation and improvement in their attitude towards learning English, which was confirmed by their special education teacher. The paper concludes by offering specific didactic suggestions regarding accommodations for English language learners with dyslexia.

Keywords: dyslexia, English as a foreign language, intervention, multisensory learning approach

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Disleksija in angleščina kot tuji jezik v norveškem osnovnošolskem izobraževanju: intervencijska študija kombiniranega raziskovalnega pristopa

Christopher Flaten Jarsve in Dina Tsagari

Ta študija je preučevala učinek posebnih učnih prilagoditev za učence angleškega jezika z disleksijo v norveški osnovni šoli. Natančneje, enoskupinski intervencijski projekt je raziskoval vpliv nabora veččutnih tehnik na črkovanje in motivacijo. Udeležence predstavljajo specialni pedagog in pet učencev petega in šestega razreda z disleksijo. Pred- in potesti so bili izvedeni z vidika opazovanja napredovanja črkovanja pri učencih, pri čemer so bili podatki zbrani tudi prek vprašalnika za ocenjevanje učencev in intervjuja z učiteljem, ki je sledil fazi intervencije. Ugotovitve so pokazale, da je bila intervencija precej uspešna. Pri izbrani skupini so bile zaznane bistvene razlike v povprečnih rezultatih pred- in potesta, vendar pa je prišlo tudi do posameznih razlik v rezultatih, pri čemer se zdi, da pridružene motnje vplivajo na učinkovitost intervencije. Kljub temu so vsi učenci poročali o povečanju motivacije in izboljšanju odnosa do učenja angleščine, kar je potrdil tudi njihov specialni pedagog. Na koncu članka so podani konkretni didaktični predlogi glede prilagoditev za učence angleškega jezika z disleksijo.

Ključne besede: disleksija, angleščina kot tuji jezik, multisenzoren pristop k učenju

Introduction

Dyslexia refers to "difficulty in learning to read and write by the methods normally used in the classroom" (Montgomery, 2017, pp. 1–2). This statement implies that if appropriate teaching methods are offered, the difficulties can be remedied. Moreover, dyslexia is a universal condition independent of the language one speaks, e.g., dyslexia has been observed in writing systems with ideographs, such as Chinese, in addition to alphabetic systems, like Norwegian and English (Montgomery, 2017). Dyslexia can be comorbid with other neurodevelopmental disorders (Snowling et al., 2020): developmental language disorder (DLD), attention deficit hyperactivity disorder (ADHD) and Tourette Syndrome, among other disorders, can appear in comorbidity with dyslexia (see Aas, 2021; Cravedi et al., 2017; Hulme & Snowling, 2016; Snowling et al., 2020). Comorbid disorders can affect behavioural patterns of dyslexics and impact the effectiveness of interventions (Snowling et al., 2020).

Dyslexia and EFL teaching and learning is not as thoroughly researched as dyslexia and first language learning (Nijakowska, 2010). The consensus is nonetheless that learning a second/foreign language, e.g., English (EFL), presents dyslexic learners with an overwhelming task (Helland, 2012; Kormos & Smith, 2012; Nijakowska, 2010). However, research has shown that an alarming number of EFL teachers seem insecure in their abilities to accommodate the language needs of their dyslexic pupils and have expressed a need for training and support (Kormos & Nijakowska, 2017; Nijakowska et al., 2018).

Norwegian EFL teachers face similar issues. Teachers are obliged to address the challenges of accommodating dyslexic learners, e.g., identifying reading and writing difficulties and adapting their teaching for dyslexic pupils (National Council for Teacher Education, 2016), in accordance with the Norwegian educational law § 1-3 (Opplæringslova, 1998). Research on the effect of various educational methods on Norwegian dyslexic EFL learners is limited, and the few studies and interventions that exist focus mainly on reading (Montgomery, 2017). Consequently, spelling is generally overlooked in intervention research in Norway (Helland, 2012).

Motivated by the current situation, the present study investigates the effect of an intervention that aimed to develop the spelling skills of a group of Norwegian dyslexic learners. The paper does not provide a full systematic literature review, nor does it offer a comprehensive answer to how dyslexic EFL learners should be supported in their EFL learning, but rather presents and discusses an attempt to accommodate dyslexic pupils' spelling needs through a specifically designed intervention. We hope more studies will be undertaken in

the Norwegian education system and elsewhere to help children with specific learning difficulties (SpLDs, Nijakowska, 2010).

Dyslexia and English language learning

The ability to communicate in a foreign language is essential in a multitude of contexts (Kormos, 2018). As such, English plays two important roles: it is the most widely taught foreign language (Crystal, 2012) and it serves as a lingua franca between speakers of different first languages (Seidlhofer, 2008).

In Norway, English is taught in schools from the first grade onwards (Helland & Morken, 2015). In addition, as part of extramural learning (Sundqvist, 2022), Norwegian learners are exposed to English through films, TV series, games and music (Dahl & Vulchanova, 2014). Despite the strong presence of English in Norway, Norwegian learners face several obstacles in learning EFL (Helland, 2012), e.g., the irregular nature of English orthography, which leads pupils to apply their L1 phonology when spelling English words (Helland & Kaasa, 2005; Kristoffersen, 2000), the frequent confusion caused by the English and Norwegian alphabet, etc. (Kristoffersen, 2000; Nilsen, 2010; Simonsen, 2018).

Despite the difficulties associated with learning English, dyslexic pupils who learn English as an additional language have an advantage over L1 learners. Having a different L1 helps dyslexic learners achieve advanced language skills within their L1, too (Siegel, 2016). With English as a compulsory subject in the Norwegian school curriculum, dyslexic learners may need proper interventions and accommodated teaching (Kormos & Smith, 2012). Furthermore, it is suggested that about 5–7% of the Norwegian school population is dyslexic, and that there is at least one dyslexic learner per class (Aas, 2021). These pupils have a legal right to accommodations in education, and this has implications for EFL practitioners in terms of teacher accommodations.

Nevertheless, a substantial number of educational contexts seem unprepared to accommodate the needs of dyslexic learners. Nijakowska et al. (2018) found that teacher education programmes in Cyprus, Greece and Poland, for example, were inadequate in training teachers for integrating dyslexic pupils, and participants in their study programmes expressed a need for more information regarding effective EFL teaching methods for dyslexic learners. The authors conclude that the EFL teacher development programmes that train teachers in including dyslexic learners in their classrooms need improvement. Kormos and Nijakowska (2017) report similar findings in the context of an international four-week online course for EFL teachers of dyslexic pupils. The massive number of participants illustrates the high demand for training in EFL teaching for dyslexic learners.

In general, dyslexic students require specific interventions to develop their literacy (Nijakowska, 2010). While reviewing and analysing an extensive list of previously conducted intervention studies, Galuschka et al. (2020) found that children who took part in spelling interventions improved their spelling skills substantially compared to children who attended regular lessons. The relationship between phoneme and grapheme should be made explicit in any intervention (Montgomery, 2006), while special emphasis should be placed on spelling, which seems to be a persistent difficulty for dyslexic learners, including those in Norway (Helland & Kaasa, 2005). Ideally, each programme or intervention should be adapted to each pupil's specific needs (Snowling & Hulme, 2011). The suggested remediations for dyslexia often include phonological interventions, as these have proven successful for reading accuracy and spelling development across orthographies (Ferraz, et al, 2018; Helland, 2012; Lim & Oei, 2015; Nijakowska, 2010; Torgesen et al., 2010). In fact, interventions that include phonological training seem to be the most effective treatment option to date (Snowling et al., 2020). Furthermore, multiple intervention studies have presented evidence that interventions consisting of 'multisensory' teaching activities can be beneficial for dyslexic learners' reading and writing skills (Nijakowska, 2010).

The Multisensory Learning Approach (MSL)

The Multisensory Learning Approach (MSL, also referred to as the Orton-Gillinghan approach, see Kormos & Smith, 2012) is a teaching method that is often encouraged when teaching dyslexic learners. MSL techniques are meant to compensate for impairments in auditive or visual sensory channels through the stimulation of other senses (Høien & Lundberg, 2012). Teaching must be direct and should involve several senses at once, such as the tactile (touch), kinaesthetic (movement), auditory and visual senses (Nijakowska, 2010).

Words are stored in the lexicon with phonologic, articulatory, orthographic, semantic and motoric identities. For learners with dyslexia, the phonologic and orthographic identities of vocabulary items are unspecified. Using MSL to teach EFL establishes kinaesthetic, tactile and articulatory identities for words (Høien & Lundberg, 2012). Phillips and Kelly (2016) state that engaging many senses at once aids the automaticity and speed of retrieval, because each of the senses store the information in specific locations in the brain. The MSL approach also establishes links between these locations and can help transfer information from the short-term memory to the long-term memory (see Daloiso, 2017 for practical suggestions). Finally, movement is suggested because it can stimulate sight, hearing and touch. The Total Physical Response (TPR)

method (Daloiso, 2017) in MSL can accentuate intensity and repetition (Richard & Rodgers, 2014) and increase the possibility of learners recalling learning objectives.

MSL research has been implemented in many contexts. Nijakowska (2010) conducted a small-scale MSL-based intervention study in Poland to examine whether dyslexic EFL learners could improve reading and spelling skills on the word level. The researchers reported that the experimental group performed substantially better than the control group in the reading and spelling post-tests.

In Singapore, Lim and Oei (2015) conducted a year-long MSL intervention study on 39 Singaporean dyslexic English language pupils, aged 6–15 years. The analysis of the pre- and post-test data showed that the dyslexic pupils improved significantly in spelling and reading after one year of intervention. The authors suggest that early identification of dyslexia and early intervention is crucial to the individual's literacy.

Use of technology

Various researchers and practitioners stress the importance of Information and Communication Technology (ICT) for dyslexic pupils, as it can be beneficial for learning EFL and can improve motivation (Galuschka et al., 2020; Helland, 2012; Kormos & Smith, 2012; Pfenninger, 2016). ICT was found to be useful for pupils while practising spelling (Philips & Kelly, 2016). Certain software or apps, such as spellcheckers, have been used as learning support, while others provide practice for reading speed or orthography practice (Lyster, 2012). Moreover, ICT provides an opportunity for more intensive practice and repetition. When the teacher is unable to provide dyslexic pupils with the amount of overlearning that they require, ICT can be beneficial. Dysleksi Norge (2017), for instance, strongly recommends that Norwegian EFL teachers of dyslexic pupils use iPads and recommends apps such as Book Creator with a font specifically designed for dyslexic learners (OpenDyslexic), as it can serve as a substitute for notebooks with multimodal functions. Finally, in a recent study, augmented reality (AR) proved effective in teaching English vocabulary for pupils with intellectual disability (e.g., Rapti et al., 2022). Thus, AR might be effective for self-practice at home. AR in spelling interventions could be a great focal point for future research with dyslexic learners.

To conclude, the aforementioned studies highlight the importance of phonological awareness and support utilising MSL as well as ICT when working with dyslexic learners. However, EFL teachers express concerns regarding their preparedness to support their dyslexic pupils, resulting in a high demand for training on the subject. Given that, at least to the knowledge of the current researchers,

there are no Norwegian evidence-based studies that focus on the impact of specific English didactics for dyslexic learners, the present study explores the use of MSL techniques combined with the use of ICT tools in the context of a Norwegian primary school. The study addresses the following research questions:

1. Does teaching EFL through MSL combined with ICT improve the spelling skills of Norwegian dyslexic pupils in the fifth and sixth grades?
2. What implications does the MSL spelling intervention have for dyslexic pupils' motivation and learning?

Method

The study has a single-group before-and-after design (Check & Schutt, 2012), whereby participants are exposed to an experimental treatment and are tested prior to and after an intervention.

Participants

The participants of the study were five Norwegian primary school pupils officially diagnosed with dyslexia from grades five and six. These years are critical because learners often experience failures with respect to learning outcomes and their struggles become more apparent (Høien & Lundberg, 2012). The sample was chosen purposively because they were relevant to the study.

For reasons of confidentiality, only basic information regarding the pupils will be shared in this paper. Three of the participants were 10 years old and recruited from the fifth grade (two boys and a girl), and two were 11 years old and recruited from the sixth grade (a boy and a girl). The male participants were diagnosed with comorbid disorders, as well, as seen in Table 1.

Table 1

Overview of the dyslexic pupils

	P1	P2	P3	P4	P5
Gender	Female	Male	Female	Male	Male
Grade	6th	6th	5th	5th	5th
Comorbidities	-	Comorbid DLD	-	Comorbid Tourette Syndrome DLD	Comorbid ADHD

The Norwegian Centre for Research Data approved the data handling procedures used in the study. The head teacher of the school was informed of the project and gave permission, while the participants' parents received a

consent form including information about the project and notifying them of their right to withdraw their consent at any time.

A female special education teacher (SpEd) was invited to participate in the study. She had over 10 years of experience as an SpEd teacher and was therefore an asset to the study. The SpEd teacher was informed about the aims of the study and was invited to implement the intervention and help recruit pupils who were known to have dyslexia at her school. Before the pre-tests were administered, the SpEd teacher was presented with the intervention curriculum and rationale in detail. She agreed to implement and execute the intervention as designed. This helped maintain the researchers' roles as observers.

Nature of data collection

The present study was carried out as a mixed-methods approach (Ellis, 2012). When statistics (quantitative data) are combined with stories and personal experience (qualitative data), the data collection gives a better understanding of the topic ('convergent' design, Creswell, 2015). Furthermore, an intervention study with quantitative and qualitative data is powerful in investigating language teaching because it allows the researcher to investigate the process (Ellis, 2012). As such, it is possible to explain the results of the pre- and post-tests. Collecting qualitative data was particularly important because it showed how our participants experienced the activities and helped us to modify the intervention.

- The quantitative and qualitative data collected in the study are summarised below:
- Quantitative: results of pre- and post-tests of spelling, pupil evaluation questionnaire (see Appendix 1 and 2)
- Qualitative: semi-structured interview with the SpEd teacher (see Appendix 3).

Table 2

Overview of the research design and analysis

Pre-intervention	Intervention	Post-Intervention	Type of analysis
Pre-tests of spelling (n = 5)	A series of lessons based on MSL and ICT (see Table 3)	Post-tests of spelling (n = 5)	Descriptive Statistics
		Pupil (n = 3) post-questionnaire interview	Descriptive Statistics and Content analysis
		Teacher (n = 1) interview	Content analysis

The results of the pre- and post-tests of spelling comprised the main data. These tests aimed to measure the intervention's effect. The spelling test consisted of a selection of high frequency words from the McNally Wordlist (McNally & Murray, 1962), a collection of 250 high frequency words. Some 70% of the texts that children and young adults read in English are composed of these 250 high frequency words (Holmberg, 2019). To ensure that the test was not too long, only 16 items were chosen from the McNally Wordlist. These were considered sufficient to display spelling development. Since the pupils seemed insecure in their alphabetic knowledge, an additional focus point of the intervention was the alphabet. Therefore, two test items were letter names (see Appendix 1).

Testing and administration procedures

The tests were administered by the SpEd teacher in collaboration with the researchers as 'dictation', e.g., each word was read aloud once followed by a supporting phrase with the word. Finally, the word itself was read aloud one last time. The pupils were given clear instructions not to write anything until after they had heard the word a final time.

Measures were taken to ensure valid test results. Factors such as the time of the school day, the physical surroundings of the testing environment, including the temperature of the room, noise and the level of formality, were all considered (Cohen et al., 2011; Helland, 2012). The pre- and post-tests were administered in either the first or second period of the pupils' daily school programme when their attention and concentration was still strong (Raviv & Low, 1990). Moreover, the participants took both tests individually in a separate room and were given the opportunity to take a break, as well.

In the analysis, the results of the pre- and post-tests were calculated for the whole group as well as for individual pupils. A qualitative interview with the SpEd was conducted to obtain detailed descriptions of the intervention's implementation and to explain the spelling development of each pupil (Kvale & Brinkmann, 2015).

The intervention

The spelling intervention was designed and executed in the form of a series of lessons. The intervention was also aligned with the English subject curriculum and its competence aims (Ministry of Education, 2020), for example:

- use simple strategies for language learning, text creation and communication;
- follow rules for spelling, word inflection and syntax.

The spelling intervention maintained a multisensory approach featuring a focus on letter names through auditory and visual presentation and practice through hands-on and online training. Phonological awareness was practised through explicit instruction, worksheets and sorting activities. In the more explicit spelling-oriented activities, the pupils were expected to colour, build or paint words in their distinct sounds. The pre-test results helped adapt the intervention materials to the needs of the participants.

The implementation stage, as in many other intervention studies (Domagała-Zyśk & Podlewska, 2018; Liontou, 2018), was met with challenges. The school that had originally offered to participate withdrew just before the intervention was set to launch and a new school was not arranged until after the intervention was scheduled to commence, which delayed the project. The process of acquiring new consent forms signed by parents caused a further delay. Consequently, the intervention had to be reduced from 16 to 8 lessons. Table 3 presents an overview of the eight intervention lessons used in the study.

Table 3

Intervention Overview

Lesson number	Activities	Purpose
Lesson 1	Alphabet song with visuals Small and capital letter puzzle Monster Mansion Alphabet Match	Repetition of the alphabet and letter sounds.
	Sound-letter correspondence explanation and worksheet	To practise understanding of sound-letter-correspondence.
Lesson 2	Monster mansion match	Repetition
	Sound-letter correspondence explanation and worksheet Colouring worksheet Painting words	To practise understanding of sound-letter-correspondence and segmenting.
Lesson 3	Rhymes instruction Odd one out activity Book Creator rhyming task Ninja Board Game	To practise identifying and manipulating sounds.
Lesson 4	Guessing activity: writing words on each other's backs Building words with WikkiStix Book Creator: WikkiStix pictures, text and recording of words	To practise spelling explicitly.

Lesson number	Activities	Purpose
Lesson 5	Explanation of minimal pairs Distinguishing worksheet Odd one out worksheet Minimal pairs bingo	To practise distinguishing between and spelling minimal pairs.
Lesson 6	Power E: presentation through rule card Silent E song English Sounds Fun: Power E worksheet Auditory practice Silent E song writing task	To practise spelling words with the silent E spelling pattern.
Lesson 7	Explanation of the two "th" sounds Th sounds instruction and practice Auditory discrimination Smart Notebook sorting activity WikkiStix/Painting activity	To practise distinguishing between "th" sounds and other sounds and spelling words with "th".
Lesson 8	Look-Trace-Cover-Write-Check Quizlet practice	To practise spelling explicitly.

Validity and reliability

The current study had a sample of five participants, so it was important to investigate whether the data complied with prior relevant evidence in order to ensure the validity of the study (De Winter, 2013).

Convergence of evidence collected through various methods is likely to enhance validity of research data (Biesta, 2012). Triangulation controls for bias because it ensures that the observed results are not the product of one specific method if the different methods yield the same results. This triangulated study sought to explain the complexity of human behaviour by studying the phenomenon from various angles (Cohen et al., 2011). The differences in scores between the pre- and post-tests were analysed and compared. The findings from the pre- and post-tests were supported and explained through the evaluation interview and the pupil questionnaire results.

Another way of enhancing validity is to check the reliability of the test results, e.g., to analyse internal consistency (Cohen et al., 2011). In the current study, we determined that our spelling test yielded reliable results. We calculated Cronbach's alpha, which was estimated at 0.919, a very high value. Muijs (2010) states that a measure of 0.7 and above implies that the test is internally consistent and thus reliable.

The results from the triangulated data collection are presented and discussed in the following subsections.

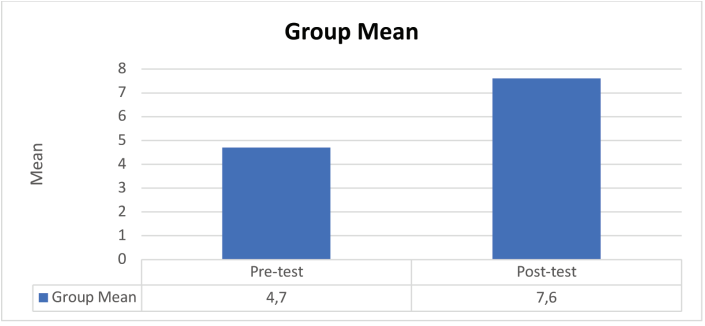
Presentation of the results

Pre- and Post-test analysis

Figure 1 shows the group mean value from the pre- and post-tests of spelling (i.e., before and after the intervention).

Figure 1

Group Mean Development

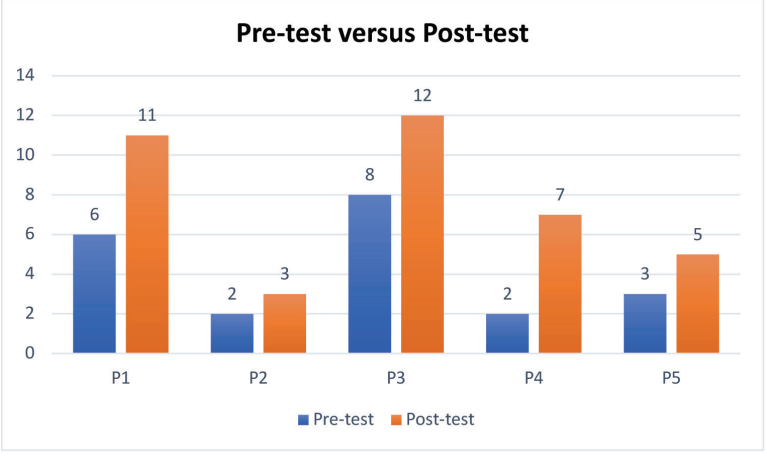


The pre-test mean was 4.7, compared to 7.6 in the post-test. This represents a 2.9 point difference in means, or a 38% increase, indicating a positive development in the group overall after the intervention.

Further analysis of the test results showed individual differences in development (see Figure 2).

Figure 2

Pre-test vs post-test scores of individual pupils



The finding presented in Figure 2 corresponds with prior studies that have found individual differences between dyslexics (Helland & Kaasa, 2005; Nijakowska, 2010). Despite individual variation, all of the participants exhibited positive development.

Qualitative analysis of the differences between the pre- and post-tests for individual dyslexic pupils yielded interesting findings. Overall, the participants seemed to be facing different challenges and produced different spelling representations of the same vocabulary items.

Table 4

Representative performances

	P1		P2		P3		P4		P5	
Words	**Pre-**	**Post-**	**Pre-**	**Post-**	**Pre-**	**Post-**	**Pre-**	**Post-**	**Pre-**	**Post-**
letter: H	A	H	A	H	H	H	E	H	L	H
letter: I	I	I	I	I	I	I	A	E	A	I
on	ond	on	on	ån	an	on	å	one	on	on
the	the	the	ve	ve	the	the	de	de	de	dhe
do	do	do	du	do	do	do	do	du	du	du
come	kom	com	km	kon	kam	kom	kam	komm	kam	kom
said	sed	ced	sed	sed	shed	sedd	ced	sed	-	sed
what	whot	watt	vat	vt	hvat	hvat	wat	what	wat	vat
there	wher	ther	VL	dr	ther	there	der	der	-	dher
two	to	to	to	to	two	two	to	too	tu	to
little	litel	litol	llt	tlo	lidle	litle	litor	little	litol	lital
are	are	are	rar	ar	are	are	ar	are	ar	ar
that	thet	that	VT	dat	thot	thet	det	det	det	dat
with	fif	fif	vit	vit	hvish	hvish	vis	vecos	vits	vith
and	eand	and	ed	æd	and	and	end	end	and	and
have	hav	have	hev	hvd	heav	have	hev	have	hav	hev
one	one	one	VN	one	von	one	one	one	one	von
he	he	he	hei	hi	he	he	hi	he	hei	he

Although all of the items in Table 4 (first column, left) should be familiar to any pupil in the sixth grade, P1 misspelled many of them in the pre-test. In the post-test, the spelling of some of the words was closer to the English orthography than in the pre-test. Although the pupil improved, her spelling attempts of words like "with" illustrate that she was still not completely aware of how the sound is spelled. This could be explained by the fact that she was absent

during the latter half of the intervention consisting of a lesson targeting specific sounds. However, her overall development in spelling skills is quite positive considering the fact she only received half of the intervention.

Assessing the development of P2 is difficult, because no significant development is evident, especially quantitatively. P2 struggled particularly in comparison to his peers. He seems to lack a basic knowledge of English and Norwegian orthography and phonology. Although he showed some improvement in getting letter names correct, he struggled with spelling words and demonstrated his difficulties with English orthography by using Norwegian letters (e.g., *å* and *æ*) in the post-test.

Unlike other pupils, P3 did not use Norwegian letters in the pre-test, but struggled with spelling several words, such as "have" and "one". After the intervention, however, P3 spelled these words correctly. She seemed more aware of the silent 'e', as shown by her correct post-test spellings of the words "there", "have" and "one". Evidently, there was a positive development in her spelling skills after the intervention.

Pre-test spellings of the words by P4 were adjusted to Norwegian phonology, e.g., the Norwegian letter å was used. In the post-test, he did not use any of the Norwegian letters and his spelling was closer to that of the English orthography. He was also more aware of sound-letter correspondence, as well as the silent *e* in words like "are" and "have". However, he still struggled to spell words with the /θ/ and /ð/ sounds, both of which are absent in Norwegian phonology.

P5 showed the least development. He omitted words in the pre-test but attempted to spell all of the words in the post-test, which is positive. However, as is apparent from the examples of his attempts, he still struggled with the English orthography and some of the words that he had written correctly in the pre-test were written incorrectly in the post-test. During the post-test, he even struggled with writing the letter p and asked how it was supposed to be written.

The following section summarises the results from the semi-structured interview with the SpEd teacher conducted after the post-test in the teacher's native language, i.e., Norwegian. Her exact words have been translated into English.

Semi-structured interview

When asked for her overall opinion of the intervention, the SpEd teacher spoke very highly of it, e.g., "the lessons contained varied and very interesting multisensory tasks". She added that even though most of the learners within the group struggled with their attention, the tasks motivated them. As for the level

of difficulty of the tasks, she stressed that these were appropriate. The teacher explained that in terms of task activities, the WikkiStix tasks were the most useful, because "the pupils have to use their creativity and use vocabulary that was presented beforehand". She further explained that the pupils "learned a lot from instruction when they coloured and became familiar with the sounds".

The teacher also described each pupil and elaborated on their development. She noted: "I think everyone made huge progress, especially P4. This was a surprise. He had the greatest development, which was surprising because of a lack of focus due to his disorder".

Furthermore, the teacher observed an increased awareness in sound-letter correspondence among the sixth graders. Regarding P5, the teacher added "He makes a lot of mistakes because of his dyslexia and his ADHD". The teacher further described P5 as quite thorough in his work and creative, e.g., "he learned a lot and is very interested in the connection between sounds and letters". Notably, P5 asked the teacher for more similar lessons.

The SpEd teacher also explained that P2 "developed his skills a lot but, in a way, he was the most difficult case. He had a lot of specific language impairments in addition to dyslexia". However, the teacher reported positive development in terms of phonological awareness: "I noticed that after the first lesson, he thought more about where the sounds came from. He did not do that in the other lessons where I worked with him."

Overall, the teacher stressed that there was positive feedback regarding the intervention. She felt that there was an enormous development in motivation, especially for P3. She said that the pupil "feared English lessons before, but now she looks forward to them". In addition, she said "for Pupil 4, they were the best lessons he has been in for a long time". This surprised her, because P4 is rarely positive towards English classes and tends to describe them as "boring". The teacher added that P4 does not put much effort into regular classes, so she was surprised by his encouraging efforts during the intervention.

Finally, the teacher proposed that the intervention activities could be employed in a whole class setting, as well. As the lessons were clear and structured, she suggested that many pupils could respond well to the activities regardless of whether they have SpLDs or not.

Questionnaires

The group completed the questionnaire after the post-test was administered.

Figure 3
Motivation towards learning EFL

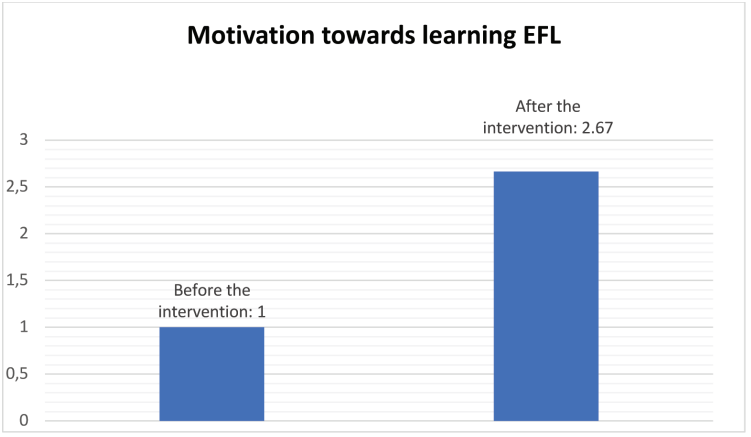
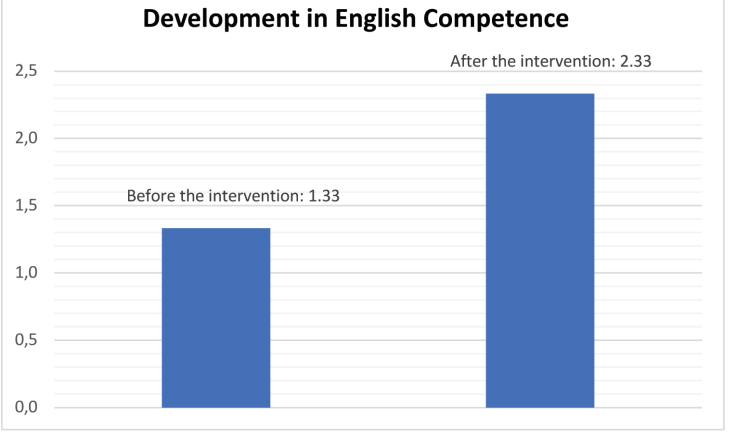


Figure 3 shows positive responses towards the intervention. Evidently, all of the participants reported improvement in their motivation towards English after the intervention. Given the positive responses, it is fair to say that the intervention tasks were interesting and motivating.

The participants' evaluation of their level of competence in English before and after the intervention is illustrated in Figure 4. There was an increase from 1.33 to 2.33 in means, which indicates that the group thinks that they benefited positively from the intervention.

Figure 4
Development in English competence



Finally, each pupil was asked to rate the intervention. All of the pupils were positive towards the lessons, as they chose the 'happy face' option (see Appendix 2), which further supports the success of our intervention.

Discussion and concluding remarks

The current study, undertaken in the interface between English didactics and special education, investigated the benefits of a multisensory spelling intervention for dyslexic learners, as reported in prior studies (Lim & Oei, 2015; Nijakowska, 2010). The overall group score of the statistically reliable spelling pre- and post-tests yielded a 38% increase in mean scores, improving from 4.7 in the pre-test to 7.6 in the post-test. Considering the relatively short duration of the intervention (only eight lessons), it can be concluded that this evidence provides a positive outlook for incorporating MSL methodology while teaching dyslexic students. Other studies that have investigated the use and effects of MSL and phonological interventions in spelling skills strongly indicate that dyslexic learners can increase their spelling abilities (Galuschka et al., 2020; Lim & Oei, 2015; Nijakowska, 2010; Snowling et al., 2020). The findings are also in agreement with the consensus that dyslexic learners require specific interventions to compensate for their deficits (Kormos, 2017, p. 118).

Although our dyslexic participants improved their performance after the intervention, they exhibited individual differences. Their scores on the pre- and post-tests were quite dispersed, as was the detailed analysis of individual performances (also in Helland & Kaasa, 2005). This might be due to several factors. In the current study, three of our five participants experienced comorbidity of dyslexia and other learning inhibiting disorders, which is in accordance with previous research (Snowling et al., 2020). The pupils with the highest spelling scores exhibited no comorbidities. Comorbid disorders seem to alter the behavioural patterns of dyslexia and render intervention more complicated. As such, it seems reasonable to suggest that dyslexic learners require specific tailored interventions based on their learning difficulties (Snowling & Hulme, 2011). Nevertheless, individuals with comorbidities can benefit from MSL as well, as multisensory techniques had a positive impact on their motivation. The motivation and sense of achievement generated by the current intervention is particularly encouraging. The pupil questionnaires and the interview with the SpEd teacher corroborated the fact that the intervention positively impacted aspects such as motivation and attitude towards learning EFL. This is an accomplishment, since all of the learners reported reluctance to engage in EFL prior to the intervention.

Another aspect of the study was the use of technology, which was also encouraged through prior studies (Torgesen et al., 2010; Pfenninger, 2016). ICT can be successful in providing an opportunity for the overlearning required by dyslexic learners when practising spelling (Lyster, 2012; Philips & Kelly, 2016). It can also be a useful alternative or supplement to individual or small-group interventions (Galuschka et al., 2020). Our study employed technology, e.g., Book Creator, Quizlet, an alphabet game, and a smartboard activity, and the pupils seemed positive about this. However, it was not employed as extensively as originally planned, so future research and experimentation may be needed to provide a more detailed account of this aspect.

Finally, despite the unexpected challenges faced during the implementation of the study, there is strength in the diversity of the data material. The triangulation of the data enhanced the validity of the current study and provided an extensive inquiry into the effect of the intervention. The data also seem to align with findings from previous studies, which further validates the findings of the current study.

The very promising evidence in favour of an MSL spelling intervention supports further inquiry into its effectiveness. The pupils involved in this project exhibited a significant increase in correctly spelled words after only eight lessons, which is quite promising and encourages longer and larger future studies. In addition, the results appear to confirm the success of technological intervention, much as in previous studies (see Pfenninger, 2016; Torgesen et al., 2010).

Conclusion

The main purpose of the study was to explore how EFL teachers can support their dyslexic students. As such, the study has several implications for EFL teachers.

Lim & Oei (2015) argue that early identification and intervention is crucial for literacy development of learners with dyslexia. Dyslexia should accordingly be diagnosed during the first years of schooling and an intervention should be implemented as early as possible. Norwegian dyslexic students struggle with EFL acquisition (see Helland & Kaasa, 2005). Unless these learners receive proper, explicit instruction, they will undoubtedly suffer extensive academic failures, especially in EFL. It is therefore vital that dyslexic learners are identified properly throughout these formative years.

Dyslexic learners should be accommodated and supported properly, as well. The current study showed that interventions based on the MSL approach can yield significant positive results regarding spelling development, while

motivational and emotional aspects can also be impacted positively. We therefore recommend that teachers of EFL teach spelling explicitly through MSL by practising phonological awareness and spelling patterns. In their interventions, teachers should not encourage their pupils to simply write vocabulary items; pupils should colour, build or paint words in their distinct sounds to make them more aware of the spelling patterns and sound-letter correspondence. Additionally, pupils should practise phonological awareness through worksheets and sorting activities, as well as through distinguishing tasks, such as bingo with the /ʃ/ and /tʃ/ sounds. Hands-on activities, such as moveable cards, could also prove helpful, while technology such as Quizlet could provide dyslexic learners with a necessary opportunity for overlearning.

Despite the fact that the current study investigated an important area, there are some limitations that need to be addressed, especially in future research. For example, even though the current investigation is an in-depth study based on case studies, the group of five learners is admittedly a small sample. Future researchers need to collaborate with larger numbers of participants. Moreover, in future research and practice, the age of the children and age-appropriate training need to be considered rather than grade level. Furthermore, an ideal future intervention study should carefully consider the dynamics within the group and adopt a mixed method approach orientation, as the triangulation of data collection can confidently validate its results. Finally, intervention studies with SpLD students present the need for an age-matched dyslexic control group to account for external variables in order to be able to compare the effect of multisensory and phonological instruction with common EFL teaching methods.

Although the factors impacting on an inclusive learning environment should not be underestimated, dyslexic learners will likely require extra support outside the classroom, as well. The environment in which the extra support is executed should also be considered, as dyslexic learners require a peaceful environment to enhance their learning, so distracting factors should be avoided, if possible. Moreover, learners with severe spelling problems would probably benefit more from assistive technologies such as word processing, spell-checkers or speech-to-text technology.

The role of EFL teachers and teacher trainers in facilitating and supporting learning development for dyslexic learners is very important. The Norwegian educational law clearly establishes that all students have a right to adapted education. There is, therefore, a high demand for training of EFL teachers to accommodate the learning needs of dyslexic learners. Consequently, teacher students enrolled in teacher education programmes should be trained to identify dyslexic students and adapt education to their SpLD learners.

Finally, we would like to invite future researchers from the field of dyslexia and foreign language learning to further investigate the effects of MSL and phonological training, as well as the benefits of using technology for the teaching of spelling and other language skills to dyslexic learners in order to accumulate evidence that will help accommodate and support learning for this special group of learners.

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Appendix 1

		Age pre-test:	Age post-test:	Date of pre-test: Date of post-test:		
Item #	**Word/letter**	**Attempt pre-test**		**Attempt post-test**	**Score pre-test**	**Score post-test**
1	H					
2	I					
3	On					
4	The					
5	Do					
6	Come					
7	Said					
8	What					
9	There					
10	Two					
11	Little					
12	Are					
13	That					
14	With					
15	And					
16	Have					
17	One					
18	He					
					/18	/18

Spelling test

Appendix 2

Self-assessment

Tick the box for what you consider as correct

					
Attitude and motivation	Before the intervention, this was my attitude and motivation towards English:				
	After the intervention, this is my attitude and motivation towards English:				
	The activities I participated in were motivating.				
Learning development	How was your competence level in English before the intervention?				
	How is your competence level after the intervention?				

		
What is your opinion of the intervention?		

Appendix 3

Interview Questions with the Special Education Teacher

1. What is your opinion of the intervention's success?
2. What do you think of the activities and their difficulty?
3. How would you describe the development of each pupil?
4. What is the feedback from the pupils and their parents?

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Participation in Intervention Programmes of Children with Poor Reading Skills in Hungary

Zsóka Sipos*[1] and János Steklács[2]

In this century, the value of information has become more significant; reflecting this change, focus has shifted to preparing pupils for the functional use of reading. Therefore, the latest international assessments of reading literacy are set up to address this kind of knowledge. Significant numbers of individuals are performing below the minimum level in these assessments in Hungary, signalling lower capacity for participation in the community. When attempting to eliminate functional illiteracy, it is crucial to analyse the present support system, and the efficiency of recognising reading problems in the early stages, in order to improve the provision of education systematically. When examining the probable causes of the struggle to comprehend texts, one of the prerequisites of understanding written language is appropriate decoding. This research focuses on investigating the access to intervention programmes of 5th-grade children with poor reading skills. The speed and accuracy of the aloud reading of 957 pupils attending mainstream classrooms were measured and compared to the data regarding the participation in rehabilitation programmes. The most relevant finding of the research was that only less than half of the children with poor reading skills receive help to improve their performance; 55% of slow readers and 60% of non-accurate readers were left without support, even though their performance is significantly worse than that of their peers. This finding indicates the need to revise the screening system and necessitates more extensive and less diagnosis-based access to intervention programmes.

Keywords: reading fluency, reading accuracy, reading test, screening, intervention

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Sodelovanje v programih pomoči, namenjenih otrokom s slabimi bralnimi zmožnostmi, na Madžarskem

Zsóka Sipos in János Steklács

V tem stoletju je vrednost informacij narastla; sprememba se odraža v pozornosti, ki se usmerja k pripravi učencev na funkcionalno rabo branja. Zato so najnovejša mednarodna ocenjevanja bralne pismenosti zasnovana tako, da obravnavajo tovrstno znanje. Na Madžarskem precejšnje število posameznikov pri teh preverjanjih dosega rezultate pod minimalno ravnjo, kar nakazuje na manjšo zmožnost sodelovanja v skupnosti. Ključnega pomena je, da pri odpravljanju funkcionalne nepismenosti preučimo obstoječi podporni sistem in učinkovitost prepoznavanja bralnih težav v zgodnjih fazah, predvsem za to, da bi sistematično izboljšali izobraževanje. Ob pregledovanju verjetnih vzrokov za otežkočeno razumevanje besedil je eden izmed predpogojev za razumevanje pisnega jezika ravno ustrezno dekodiranje. Ta raziskava se osredinja na preučevanje dostopa do programov pomoči za petošolce s šibkimi bralnimi sposobnostmi. Izmerili smo hitrost in natančnost glasnega branja pri 957 učencih, ki obiskujejo redni program osnovne šole, nazadnje pa to primerjali s podatki o sodelovanju v rehabilitacijskih programih. Najpomembnejša ugotovitev raziskave je bila, da je manj kot polovica otrok s šibkimi bralnimi sposobnostmi deležna pomoči, ki bi izboljšala njihovo zmogljivost; 55 % počasnih bralcev in 60 % nenatančnih bralcev je ostalo brez podpore, čeprav so njihove zmožnosti precej šibkejše od njihovih vrstnikov. Ugotovitev kaže na potrebo po reviziji sistema odkrivanja in zahteva obsežnejše programe pomoči, katerih dostop ne bi več tako močno temeljil na diagnozi.

Ključne besede: tekoče branje, natančnost branja, bralni test, odkrivanje, posredovanje

Introduction

As the rationale behind the work presented in this study is the growing percentage of low-performing Hungarian pupils in international assessments of reading literacy, the concept of these surveys and the premisses of reading comprehension, especially fluent reading, needs to be examined first. After that, the current screening and diagnostic practice in Hungary for the detection of reading problems should be examined. The research highlights that numerous children remain without adequate provision under the current measurement system regardless of the severity of the reading difficulty, the type of settlement of the pupil, or the educational level of the parents. The assessment was performed with a test widely used in the Hungarian diagnostic protocol for measuring the technique of reading. It can be emphasised that systematically measuring reading fluency at different levels of schooling, especially in the early years of learning to read, would be the first step in providing a focused prevention of functional illiteracy.

The definition of reading and reading comprehension started to be transformed alongside the technological and industrial development in the second half of the 20th century. This change came from two directions: a theoretical direction appears due to the increasing interest of various scientific fields in reading, while the practical direction is a consequence of the attempts of international organisations to solve global social problems. Recognising the social dysfunctions of literacy and reading skills, in 1956 the United Nations Educational, Scientific and Cultural Organization (UNESCO) defined functional illiteracy as 'A person is functionally literate when he has acquired the knowledge and skills in reading and writing which enable him to engage effectively in all those activities in which literacy is normally assumed in his culture or group' (Gray, 1956, as cited in Wagner, 1990, p. 6.).

In the 1990s, a new approach appeared in the definition of reading. Growing problems with reading comprehension came to light worldwide, and many countries realised that the rate of people struggling with reading had never been so high considering the growing expectations in the field of communication using written language. This phenomenon cannot be separated from the expansion of digital literacy and the internet (Forzani & Leu, 2012; Leu et al., 2013).

Accordingly, by the year 2000, the new definitions of reading went far beyond the simple decoding of graphic signs. Most essential definitions of reading, comprehension and reading literacy were set as a result of a wide international professional cooperation and consensus, leaning on practical experiences, primarily on the results, findings and specifications of international

assessments. The broadest survey examining reading literacy is the Programme for International Student Assessment (PISA).

PISA is designed to measure the performance of 15-year-old students in science, mathematics, and reading comprehension; in 2003, thinking skills were added. The last two assessments were in 2018 and 2021. Before the first measurement in 2000, the preparation of the framework had begun in 1997. Every three years, the theoretical background is evaluated and revised prior to the upcoming assessment, including the definitions of the key terms of the survey. The testing method has been adjusted to the growing importance of digital literacy; therefore, children have been answering questions on computers since 2018.

In the PISA 2018 Framework (PISA, 2018), the term 'reading' was replaced by the term 'reading literacy' to differentiate between the observed phenomenon and the idiomatic term used by non-experts referring to simple decoding. The new term includes cognitive and linguistic competencies, integration of the knowledge about the world and metacognitive competencies. 'The term "reading literacy" is intended to express in this framework: the active, purposeful and functional application of reading in a range of situations and for various purposes' (PISA, 2018, p. 12).

Considering the changes of the last few years, one can observe that the definition, the bases, and the features of reading and reading literacy, as well as their role in society, have been transformed significantly (Fox & Alexander, 2011). To fulfil new requirements, children first need to acquire the basic skills that are (according to the studies of the conditions of reading comprehension (Cromley & Azevedo, 2007; Price et al., 2016)) sufficient for understanding texts. One of the bases on which higher, more complex skills, such as reading comprehension, are built is fluent reading (Fuchs et al., 2001; Kim et al., 2010; Perfetti & Hogaboam, 1975), which is the technique of reading itself. It includes speed, accuracy and prosody of pronunciation (i.e., translating written text to spoken language at a conversational rate) (Hudson et al., 2005). Pupils with non-fluent reading need to use most of their cognitive capacities for decoding, which pulls their attention away from understanding meaning (Fuchs et al., 2001; LaBerge & Samuels, 1975). Therefore, in many countries, regular screenings are interpreted for the sake of early detection of problems in reading fluency (e.g., The No Child Left Behind Act in the United States (Shepard et al., 2017) or the National Reading Plan in Portugal (da Costa et al., 2013).

PISA results in 2015 and 2018 showed that the trends of the academic performance of Hungarian pupils of the previous decade presented a realistic picture emphasising that without crucial changes in our curriculum, the frame

of schooling (inclusive versus segregated schools, the number of pupils in a classroom, the use of various teaching methods, etc.), addressing learning difficulties and improving the system of teacher training, it is impossible to halt the decline (Csapó, 2015; Csapó et al., 2014). In 2015, 27.5%, in 2018, 25.3% of 15-year-old children performed below the minimum level, which means that a quarter of Hungarian pupils is functionally illiterate (OECD, 2016, 2019; Ostorics et al., 2016). Moreover, there were large differences based on socioeconomic factors among the pupils. The first step of planning the strategy to solve this problem is to examine the current status to find the main areas of intervention. However, the most important question is how these children could be recognised during primary schooling in order to help them in the process of learning to read.

The Inchon Declaration and Action Plan of UNESCO (UNESCO, 2015) stated a goal of abolishing functional illiteracy by 2030 to ensure a prerequisite for lifelong learning for sustainable development. It promotes relying on the results of the international and national assessments in education policy decisions and the introduction of continuous monitoring and controlled intervention programmes supporting the learning of reading of at-risk children. The regular monitoring should focus on basic skills, reading and numeracy performance. Early recognition and intervention prevent or alleviate the lagging behind in the learning process, where, in the case of reading, the instruction first focuses on decoding, after that on the comprehension of not only lengthened but also more and more complex texts, finally requiring the ability to use reading as an instrument for gaining information and learning from texts.

In Hungarian preschools, children are assessed through standardised screening methods twice: first at the age of 3 and then at the age of 5 by speech-language therapists; there is no other screening test later to prevent or detect learning disabilities. In elementary school, the first generalised, obligatory assessment is at 6th grade, focusing on children's competencies in mathematics and reading comprehension. Between these two measurement points, pupils are assessed within the subject content areas of the national curriculum with tests constructed by their teachers.

There is no screening for detecting difficulties in fluent reading in Hungary. Reading skills are examined by norm-referenced tests only if the teachers or parents notice a problem in the process of learning to read, although numerous studies in this field show that problem perception without formalised testing is contingent, influenced by external and internal factors (Snowling et al., 2011, Südkamp et al., 2012; Virinkoski et al., 2018).

There are three stages of the diagnostic procedure in Hungary. First, when a reading problem is assumed by teachers or parents, educational

therapists or speech-language therapists (if available at the school) examine the child's performance within the institution. They also aid in deciding whether the child needs a more detailed diagnostic assessment or if it is sufficient for them to advise the teacher and the parent without further measures if the problem is not severe. In practice, due to the low capacity of these professionals, almost every child with poor reading skills is sent to the second level of the diagnostic process, because only pupils with official diagnoses have the opportunity to benefit from positive discrimination (exemption from grading, extra time in exams, oral exams instead of written exams, etc.) and to participate in intervention programmes.

From this stage (second level) onward, the diagnostic process and the consequences of the assessments are strictly regulated by the Act on Public Education and in the Edict on Pedagogical Professional Services, and the participants of the educational system are obliged to establish the intervention declared in the pedagogical report of the professional services.

At the second level, the child is directed to the local pedagogical counselling service of the county, where psychologists, special education teachers and speech-language therapists examine not only the academic skills of the child but also some basic skills that are essential in the successful acquisition of the problematic field (reading, writing or arithmetic). The outcome at this level can be:

- in case of mild problems: the child cannot be diagnosed with a specific educational difficulty or disorder, so only advice is given to teachers and the family,
- the child is diagnosed with 'assimilation, learning or behavioural difficulty' (also referred to as a 'struggling learner' in the international terminology), which requires the school to establish and plan an intervention by a special education teacher and the differentiation in the classroom, as well as to provide opportunities for positive discrimination (by law, the last such opportunity was available only until 2018),
- the child is sent to a counselling committee for further examination, which is the third level of the diagnostic process.

Psychologists and special education teachers in counselling committees are equipped to provide a diagnosis of 'special educational needs', which, on the one hand, means that the child has to receive therapy from a special education teacher, and on the other hand, the school receives more financial support to ensure that the inclusion needs of the child are met. Special committees are set up for sensory impairments, motor, language, mental or learning disabilities. If

some criteria are met, the possibility of obtaining a diagnosis of learning disability (Dékány & Mohai, 2012) is excluded; such criteria include inadequate teaching methods, problems in teacher-pupil rapport, insufficient instruction, changing schools or teachers, low learning motivation, insufficient linguistic experience, bilingual environment, temporal factors (lack of practice, little time to stabilise new knowledge), and socioeconomic disadvantages. Until 2018, in those cases in which most of these criteria were met, while the child had severe learning problems, the committee diagnosed 'assimilation, learning or behavioural difficulty' to ensure the intervention and the special attention for the child. After 2018, only the diagnosis of 'disability', which means the 'special educational needs', ensures the possibility for positive discrimination.

In the Hungarian diagnostic practice, the Meixner Reading Sheets are traditionally used for reading assessment at every level of the process. Ildikó Meixner (1928–2000) was a Hungarian psychologist and special education teacher who established the basis of prevention and re-education of dyslexia in Hungary in the early 1980s. She invented reading sheets to measure accuracy, fluency, and comprehension at every grade level of the primary school. The instruments can detect the problems of the reading technique with formalised values, indicating the need for further examination, as inadequate reading performance is a possible symptom of various developmental diversities. In the taxonomy of McKenna and Dougherty (2015), the tests of Ildiko Meixner are individual, formalised, norm-oriented tests used for screening and in diagnostics, since they are widely used in schools by educational therapists for planning the intervention, in pedagogical counselling services for the first diagnosis, and also in counselling committees (Torda, 2015). The original norm values for these tests were set in 1985 (Meixner, 2000); therefore, new criteria have been long overdue. A representative, large-sample research study was designed to update these values for each reading sheet.

In addition to measuring reading performance, a questionnaire was constructed to obtain information about the circumstances of written language learning. One of the questions was the participation of a child in an intervention program and the reason behind it. The aim was to determine if the children with severe reading fluency problems were enrolled in the intervention system.

Our hypotheses were:

1. The Meixner Reading Sheet is suitable for screening reading techniques; it can identify pupils with significantly lower performance in reading speed and accuracy.
2. At least 30% of children with poor reading fluency do not participate in intervention programmes in the educational system.

3. Due to the limited capacity of professionals, the participation relates to the depth of the problem. Only children with severe reading problems have the opportunity to receive interventions.
4. There will be differences in the participation in intervention programmes due to the socio-economical background, especially based on the settlement type. Parents with a higher educational level are more likely to notice if their child struggles with reading. Additionally, in the capital city and county seats, a wider range of interventions is accessible; therefore, struggling readers have better access to educational provision.

Method

Participants

Our representative sample included 1,200 5th grade pupils from 59 classes. The classes were selected randomly from the national database of schools. The sample was stratified for the capital and the country. Participation was voluntary for the selected schools and the parents of the children. The willingness for participation was significant from the side of the institutions (90%). In case of a refusal to participate, another school was randomly selected as a substitute. The reading performance of the children whose parents did not give their consent for their child to participate was not measured. The data of children with hearing-, visual-, motoric-impairment or intellectual disability were excluded. Furthermore, responding to the questionnaire was voluntary.

Finally, 957 pupils were assessed from 58 randomly selected classes: 53% to 47% was the ratio of boys and girls, and the age range was between 10;5 and 14;4 years (M = 11;9 years, SD = 0;6 years). The questionnaires had data about the type of settlement where each school was located and where each child lived. As for the highest educational level of the parents, these data were not registered in schools due to personal data protection. Teachers asked about this information, and the parents had the right to refuse to answer the question. Therefore, nearly a third of the data were missing: in the case of the highest educational level of the mother, 30% (n = 286), in the case of the highest educational level of the father, 32% (n = 308). The pattern of the missing data showed relevant differences between settlement types: parents were more likely to refuse to give any information about their educational level in the capital and the county seats (*Table 1.*).

Table 1
Missing Data of the Highest Educational Level of the Parents in Different Types of Settlements

Pattern of Missing Data	Number of Cases	Settlement Type of the School				
		Village	Municipality	Town	County Seat	Capital
No missing data	641	101	243	220	33	44
Missing Data about Father's Educational Level	308	29	35	82	32	130
Missing Data about Mother's Educational Level	286	27	26	78	27	128

Considering the above-described circumstances, the highest educational level of the mother was used in further analysis. As for the evaluation of the results, the discrepancy between settlement types will be taken into account.

Materials and Procedure

The reading test of Ildikó Meixner (2000) is a read-aloud test, which is a traditionally used instrument in the Hungarian diagnostic process for identifying pupils with problems in the technique of reading. In the case of low performance, further investigation is needed to specify the cause of slow or non-accurate reading. It contains five subtests at four levels: letters, syllables, words, and text. 5th grade children need to read (1) 50 vowels; (2) 50 consonants; (3a) 50 two-letter syllables; (3b) 50 three-letter syllables; (4) 50 words; (5) a 100-word long text. The reading material includes questions for superficial assessment of comprehension. The word list starts with frequent three-letter words with a simple syllable structure (CVC) and becomes more complex towards the end of the subtest. The last word is an 11-letter foreign term. The measured variables are the reading time in seconds, the number of misspelt items in each subtest, and the number of wrongly answered questions are taken into account. Three text variations were used to provide new texts for testing at different phases of the diagnostic process. The examiners were special education teachers with practice in diagnostics from the pedagogical counselling services allocated near the schools. However, a detailed guide was developed to ensure objectivity in testing and scoring.

Background data, including date of birth, gender, settlement type of the child, the highest educational level of parents, participation in an intervention programme and the reason for it, were collected via a questionnaire from the

headteachers of the classes. The questionnaire format was a table in which every row represented one child's data. The teachers gave the code of the category, in the case of settlement types these were: village, municipality, town, county seat and capital, in the case of the highest educational level of the parent the categories were: less than 8 grades (which is primary school in Hungary), 8 grades, vocational school, graduation, college, university. As for the participation in intervention programmes, the first cell was a single dichotomic question ('yes' or 'no'), referring to whether the child received special provision; the second question in this part investigated the reason behind it in three categories: 1) special educational needs with ICD code, 2) 'assimilation, learning or behavioural difficulty', 3) other.

Results

The criteria of poor reading skills were set based on the performance of 957 children in reading speed, accuracy (number of items spelt incorrectly) and comprehension of a text (number of questions answered incorrectly) in three text variants. All texts were scientific texts of 100 words, the first and the second from natural science and the third from social science. (*Table 2.*). In the current study, the test variant with text A is used for further examination.

Table 2

New Norm Values at 5th Grade Measured with 3 Alterations of the Text

		Minimum	Maximum	Mean	Standard deviation	New limiting value
Text A (N=957)	Speed (sec)	193	1619	349.91	103.52	460
	Number of items spelt incorrectly	0	99	18.63	14.38	34
	Number of comprehension mistakes (6 questions)	0	6	3.38	1,50	5
Text B (N=480)	Speed (sec)	183	746	325.35	72.39	410
	Number of items spelt incorrectly	0	148	16.93	15.13	33
	Number of comprehension mistakes (6 questions)	0	6	3.44	1.53	5
Text C (N=477)	Speed (sec)	194	1448	335.83	111.23	450
	Number of items spelt incorrectly	0	91	16.45	12.74	30
	Number of comprehension mistakes (9 questions)	0	9	4.21	2.04	6

Note. Adapted from Sipos, 2017.

In the case of the test with text A, the estimated Cronbach's Alpha was 0.82 in reading speed and 0.84 in accuracy, which showed high subtest reliability.

The sample was divided into four groups using the mean and one standard deviation in each measured variable. The new limiting value for the total time of reading counted with Text A: 1) fast readers (total time less than 243 s, M = 231.36, SD = 22.17, n = 59); 2) faster-than-average readers (244-350 s, M = 300.16, SD = 28.45, n = 516); 3) slower-than-average readers (351-458 s, M = 389.79, SD = 29.34, n = 287); and 4) children who have severe problems with the speed of reading (more than 459 s, M = 578.23, SD = 154.626, n = 93). Upon examining the subtests' results, it became obvious that the most advanced readers read the text three times faster than the children above the diagnostic criterion (*Table 3*).

Table 3

Reading Speed in Subtests in Different Categories

Reading speed (s)	Total	Vowels	Consonants	Two-letter syllables	Three-letter syllables	Words	Text A./2
Fast readers	less than 243 s	29.24	28.32	32.07	36.05	46.22	29.73
Faster-than-average r.	244-350 s	34.56	34.25	40.24	47.74	65.22	39.30
Slower-than-average r.	351-458 s	39.07	40.48	49.65	61.39	90.51	54.35
Slow readers	more than 459 s	45.34	46.17	64.52	89.89	144.27	94.02

A one-way ANOVA was conducted to compare the fluency of the four groups in each subtest. There was a significant difference between the groups at the p < .01 level at each subtest vowels: F (3, 948) = 89.97, p < .01; consonants: F (3, 948) = 141.05, p < .01; two-letter syllables: F (3, 948) = 409.15, p < .01; three-letter syllables: F (3, 948) = 613.08, p < .01; words: F (3, 948) = 618.77, p < .01; text: F (3, 948) = 424.95, p < .01). Post hoc comparisons using the Games-Howell test indicated that the mean performance of the groups was significantly different in every subtest. These results suggest that slow readers subjectively and statistically read slower than their peers.

The same categorisation was conducted based on the total number of misspelt items: 1) accurate readers (less than 5 mistakes, M = 2.88, SD = 1.18, n = 76); 2) almost-accurate readers (5-19 mistakes, M = 11.25, SD = 4.01, n = 518); 3) less-than-average accurate-readers than average (20-33 mistakes, M = 24.40, SD = 4.36, n = 234); 4) children, who have severe problems with accuracy (more

than 33 mistakes, $M = 18.63$, $SD = 13.55$, n = 167). Comparison of the four groups shows the same pattern in the subtests (*Table 4.*).

Table 4

The Number of Items Spelt Incorrectly at Different Categories

Accuracy (number of mistakes)	Total Number of Mistakes	Vowels	Consonants	Two-letter syllables	Three-letter syllables	Words	Text A./2.
Accurate readers	5th grade	.22	.05	.39	.46	.83	.46
Almost accurate readers	5th grade	.95	.57	1.37	2.15	3.28	1.47
Less than average accurate readers	5th grade	1.97	1.26	3.20	5.06	6.86	3.03
Non-accurate readers	5th grade	3.34	2.25	6.57	10.18	13.61	5.80

A one-way ANOVA was conducted to compare the accuracy of the four groups in each subtest. There was a significant difference between the groups at the $p < .01$ level at each subtest (vowels: $F(3, 951) = 130.34$, $p<.01$; consonants: $F(3, 951) = 117.93$, $p < .01$; two-letter syllables: $F(3, 951) = 401.12$, $p < .01$; three-letter syllables: $F(3, 951) = 514.25$, $p < .01$; words: $F(3, 951) = 455.22$, $p < .01$; text: $F(3, 951) = 529.19$, $p < .01$). Post hoc comparisons using the Games-Howell test indicated that the mean performance of the groups was significantly different in every subtest. The results show a significant and highly noticeable fall-back in the number of mistakes in the case of children with poor reading skills.

In our representative sample, 17% ($n = 161$) of the children took part in intervention programmes. The reason of intervention was special educational needs (n = 59, 6%), assimilation, learning or behavioural difficulty (n = 83, 9%) or other reasons (n = 19, 2%). Focusing on the children with poor reading skills, the data of the questionnaires showed that in case of low performance in reading speed (n = 92), only 45% of them received help (n = 41); in cases of a high mistake rate (n = 127), this rate is 40% (n = 51). An independent sample t-test was conducted to compare children's reading performance with fluency (speed or accuracy) difficulties participating in intervention programmes and children who are not. There was no significant difference in the reading speed, which is total time measured in seconds, between participants ($M = 596.99$, $SD = 186.83$) and non-participants ($M = 563.48$, $SD = 124.08$); $t(89) = -1.01$, $p = .31$. Different results appeared in the case of accuracy; significant difference was found in the total number of reading mistakes between children who participated in intervention programmes ($M = 50.82$, $SD = 13.76$) and non-participants ($M = 45.49$, $SD = 13.08$); $t(124) = -2.20$, $p = .03$. On the basis of the data, the severity

of slow reading speed does not influence access to intervention programmes, while spelling mistakes are more noticeable.

A Chi-square test of independence was performed to find connections between access to programmes and observed socio-economic factors. There was no significant connection between the types of the settlement (slow readers: $\chi^2(5) = 3.39$, $p = .64$; non-accurate readers: $\chi^2(4) = 2.54$, $p = .64$), the highest educational level of the mother (slow readers: $\chi^2(5) = 1.72$, $p = .89$; non-accurate readers: $\chi^2(5) = 1.59$, $p = .90$) or the highest educational level of the father (slow readers: $\chi^2(6) = 3.91$, $p = .69$; non-accurate readers: $\chi^2(5) = 2.43$, $p = .79$). This means that pupils have access (or no access) to intervention programmes irrespective of the observed socio-economic factors.

Discussion

The PISA results implicate educational reforms, different approaches, and changing attitudes in the participating countries (Babić & Baucal, 2011; Sahlberg, 2011). The introduction of an intervention system based on the screening of reading speed and accuracy has proven to be beneficial in many states (Shepard et al., 2017; da Costa et al., 2013). The large sample reading fluency assessment showed that pupils with significantly lower performance can be identified using the Meixner Reading Sheet, which is traditionally applied during the diagnostic process in schools and educational counselling committees. It is an individual test, and the testing time is short; the main fields of intervention can be planned based on the results.

The general finding of this study is that half of the 5th-grade pupils who have severe problems with reading speed or accuracy do not participate in programmes designed to improve their reading technique in Hungary, despite the significant differences in each aspect (speed and accuracy of reading) between the children with poor reading skills and their peers. These results supported our second hypothesis, which was formed based on the former results of international reading literacy assessments.

The participation in intervention programmes depends on the level of severity when a child has problems with accurate reading, hence the random appearance of slow readers in these programmes. Therefore, our third hypothesis is partly proved, demonstrating the need for informing and training teachers about the importance of fluent reading.

This finding corresponds with the unreliability of teachers' subjective ratings on their pupils reading achievement presented in the introduction (Snowling et al., 2011; Südkamp et al., 2012; Virinkoski et al., 2018), suggesting

a more formalised evaluation to identify pupils at-risk, therefore, as this is the first step in receiving targeted educational intervention.

However, the last hypothesis has not been confirmed, since limited access to intervention does not depend on the socioeconomic background factors researched in this study, so the problems are more general. Similarly, neither the type of settlement nor the parents' highest educational level significantly affects access to the provisions for children who struggle with the speed or accuracy of reading. This finding indicates the need for changes in detecting struggling readers, with the clause that this research also supported the results of international and national assessments (OECD, 2016, 2019; Ostorics et al., 2016), as there are significant differences in performance based on socioeconomic background (settlement type and the highest educational level of the parents). The significantly higher percentage of pupils with low performance in reading fluency in villages, municipalities, especially with parents with lower educational levels, indicates a higher requirement for test-based interventions.

In conclusion, the model used by the Hungarian educational system, as described above, implements a thoroughly organised and documented diagnostic system regarding reading difficulties but only in those instances in which the struggling reader is identified by teachers or parents. However, early detection of reading problems is lacking in half of the cases. According to research, this necessitates a key role of formalised screening due to the subjective, less reliable perceptions of reading performance (Jahnukainen & Itkonen, 2016; O'Connor et al., 2013).

Conclusion

The Declaration and Action Plan adopted by UNESCO on 22 May 2015 in Incheon (UNESCO, 2015) was signed by representatives of 160 countries with the declared goal of eradicating functional illiteracy, providing inclusive and equitable education, thus creating a basis for lifelong learning for sustainable development by 2030. The declaration represents a significant step forward in synthesising the previous social and education policy approaches in defining goals, areas for development, and indicators at both the global and national levels. It highlights the importance of continuous monitoring and the introduction of measurements that do not measure in a 'literate/illiterate' dichotomy but are able to provide a picture of individuals' reading and numeracy performance along a continuum, specifying skill levels in different contexts. The international and national assessments of reading literacy create a basis for national educational policies to analyse and evaluate their efficiency in providing equal

access to the learning of reading. In other words, the results can help educational policies to promote changes, provided a deficiency occurs in any of the fields.

Regarding reading, this study encourages major changes to ensure better provision for reading difficulties: 1) regular screening of reading fluency, 2) a wide range of intervention programmes based on the results of screening, 3) positive discrimination in case of dysfluency in reading, and 4) Introducing SEN pedagogy to teacher training, providing opportunities for personal development and training in this field.

The first step in helping children with poor reading skills is to introduce a screening system in primary school to identify those pupils who need intervention in the early stages of their education (Johnson et al., n.d.; Vaughn et al., 2008). Broad national programmes for improving literacy in the society are required, such as No Child Left Behind (NCLB) in 2001, and Every Student Succeeds Act (ESSA) in 2015 in the United States (Shepard et al., 2017), or the National Reading Plan in Portugal (da Costa et al., 2013), all of which included systematic monitoring of the success of reading acquisition. This system should be formalised and evidence-based, preventing educational participants from making subjective decisions about their pupils' skills, which increases the risk of ignoring problems in relevant aspects of reading.

The disappearance of the diagnosis of 'assimilation, learning or behavioural difficulty', and the introduction of a bipolar (typical or atypical) categorisation of development is very dangerous, the result of which special education teachers and educational therapists can only attend to half of the children with poor reading skills, who mostly are pupils with an official diagnosis. The limited capacity is a persisting problem, so there is a fear that pupils without 'special educational needs' will have even less access to intervention programmes. From another perspective, many children with severe problems in reading will not have opportunities for positive discrimination, so they will suffer a disadvantage in every subject, in every exam, due to their difficulties with written language.

This improvement of poor academic knowledge could have a positive legacy: if starting an intervention programme was not connected to official diagnosis, with the interaction of general pedagogy and special education, practice and science, evidence-based intervention programmes could be developed and tested. With the dissemination of knowledge and experience, the Response to Intervention Model would be adaptable, leading to more confidence in diagnostics and therapy planning for children with special educational needs (Jahnukainen & Itkonen, 2016; O'Connor et al., 2013).

Finally, this research has also highlighted the importance of training professionals involved, spreading knowledge about identifying, managing, and

treating learning difficulties. Although learning up-to-date approaches and methods is the responsibility of teachers, providing opportunities to learn is an obligation of the educational system.

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Appendix A: Games-Howell Post Hoc Analysis on Reading Speed in Subtests in Different Categories

Table 5

Results of Games-Howell Post Hoc Test on Reading Speed in Subtests in Different Categories

Subtest	(I) Category based on reading speed (s)	(J) Category based on reading speed (s)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Vowels	<= 243	244–350	-5.325*	.587	.000	-6.86	-3.79
		351–458	-9.836*	.674	.000	-11.59	-8.08
		459+	-16.100*	1.592	.000	-20.25	-11.95
	244–350	351–458	-4.512*	.480	.000	-5.75	-3.27
		459+	-10.775*	1.519	.000	-14.75	-6.80
	351–458	459+	-6.263*	1.555	.001	-10.32	-2.20
Consonants	<= 243	244–350	-5.926*	.587	.000	-7.46	-4.39
		351–458	-12.155*	.689	.000	-13.94	-10.37
		459+	-17.852*	1.019	.000	-20.50	-15.20
	244–350	351–458	-6.229*	.529	.000	-7.59	-4.87
		459+	-11.926*	.919	.000	-14.32	-9.53
	351–458	459+	-5.697*	.987	.000	-8.26	-3.13
Two-letter syllables	<= 243	244–350	-8.171*	.594	.000	-9.73	-6.61
		351–458	-17.630*	.670	.000	-19.38	-15.89
		459+	-32.454*	1.598	.000	-36.62	-28.29
	244–350	351-458	-9.460*	.466	.000	-10.66	-8.26
		459+	-24.283*	1.524	.000	-28.27	-20.30
	351–458	459+	-14.823*	1.555	.000	-18.88	-10.76
Three-letter syllables	<= 243	244–350	-11.693*	.590	.000	-13.24	-10.15
		351–458	-25.335*	.705	.000	-27.16	-23.51
		459+	-53.840*	2.430	.000	-60.19	-47.49
	244–350	351–458	-13.642*	.559	.000	-15.08	-12.20
		459+	-42.147*	2.392	.000	-48.40	-35.89
	351–458	459+	-28.505*	2.422	.000	-34.84	-22.17
Wordso	<= 243	244–350	-19.004*	.919	.000	-21.41	-16.60
		351–458	-44.281*	1.165	.000	-47.30	-41.26
		459+	-98.051*	4.834	.000	-110.69	-85.41
	244–350	351–458	-25.277*	.951	.000	-27.73	-22.82
		459+	-79.047*	4.787	.000	-91.57	-66.52
	351–458	459+	-53.770*	4.840	.000	-66.42	-41.12

Subtest	(I) Category based on reading speed (s)	(J) Category based on reading speed (s)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Text A	<= 243	244–350	-19.133*	1.213	.000	-22.30	-15.96
		351–458	-49.195*	1.551	.000	-53.21	-45.18
		459+	-128.575*	8.448	.000	-150.67	-106.48
	244–350	351–458	-30.062*	1.275	.000	-33.35	-26.77
		459+	-109.442*	8.402	.000	-131.43	-87.46
	351–458	459+	-79.380*	8.457	.000	-101.50	-57.26

Note. *. The mean difference is significant at the .05 level.

Appendix B: Games-Howell Post Hoc Analysis on the Number of Items Spelt Incorrectly in Different Categories

Table 6

Results of Games-Howell Post Hoc Test on the Number of Items Spelt Incorrectly at Different Categories

Subtest	(I) Category based on the accuracy of reading (mistakes)	(J) Category based on the accuracy of reading (mistakes)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Vowels	<= 4	5 –19	-.726*	.068	.000	-.90	-.55
		20–33	-1.742*	.114	.000	-2.04	-1.45
		34+	-3.115*	.219	.000	-3.68	-2.55
	5–19	20–33	-1.016*	.111	.000	-1.30	-.73
		34+	-2.389*	.217	.000	-2.95	-1.82
	20–33	34+	-1.373*	.236	.000	-1.98	-.76
Consonants	<= 4	5–19	-.515*	.045	.000	-.63	-.40
		20–33	-1.204*	.080	.000	-1.41	-1.00
		34+	-2.199*	.145	.000	-2.58	-1.82
	5–19	20–33	-.689*	.084	.000	-.91	-.47
		34+	-1.684*	.148	.000	-2.07	-1.30
	20–33	34+	-.996*	.162	.000	-1.42	-.58
Two-letter syllables	<= 4	5–19	-.972*	.098	.000	-1.23	-.72
		20–33	-2.802*	.133	.000	-3.15	-2.46
		34+	-6.180*	.278	.000	-6.90	-5.46
	5–19	20–33	-1.830*	.118	.000	-2.13	-1.53
		34+	-5.208*	.271	.000	-5.91	-4.50
	20–33	34+	-3..378*	.286	.000	-4.12	-2.64
Three-letter syllables	<= 4	5–19	-1.692*	.095	.000	-1.94	-1.45
		20–33	-4.599*	.151	.000	-4.99	-4.21
		34+	-9.721*	.396	.000	-10.75	-8.69
	5–19	20–33	-2.907*	.154	.000	-3.30	-2.51
		34+	-8.029*	.397	.000	-9.06	-7.00
	20–33	34+	-5.121*	.414	.000	-6.20	-4.05
Wordso	<= 4	5–19	-2.451*	.126	.000	-2.78	-2.12
		20–33	-6.034*	.185	.000	-6.51	-5.56
		34+	-12.777*	.622	.000	-14.40	-11.16
	5–19	20–33	-3.583*	.174	.000	-4.03	-3.13
		34+	-10.326*	.619	.000	-11.94	-8.72
	20 –33	34+	-6.743*	.634	.000	-8.39	-5.10

Subtest	(I) Category based on the accuracy of reading (mistakes)	(J) Category based on the accuracy of reading (mistakes)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Text A	<= 4	5–19	-2.008*	.135	.000	-2.36	-1.66
		20–33	-5.135*	.182	.000	-5.60	-4.66
		34+	-10.693*	.418	.000	-11.78	-9.61
	5–19	20–33	-3.127*	.166	.000	-3.56	-2.70
		34+	-8.686*	.411	.000	-9.76	-7.62
	20–33	34+	-5.559*	.429	.000	-6.67	-4.44

Note. *. The mean difference is significant at the .05 level.

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The Collaborative Wall: A Technological Means to Improving the Teaching-Learning Process about Physics

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Nowadays, teachers seek to improve learning conditions and build new educational spaces through technological advances. This mixed research aims to analyse students' perceptions about the use of the collaborative wall in the teaching-learning process for physics, considering data science. The collaborative wall is a web application that allows the participation of the students in the classroom through the dissemination of text and images. The participants are 77 students of the National Preparatory School No. 7 'Ezequiel A. Chávez' who took the course of Physics IV during the 2019 school year. At home, these students searched for and consulted information about the physics of hearing in order to create their infographics collaboratively using the Piktochart software. During the face-to-face sessions, the teacher of the course of Physics IV requested the creation of teams (maximum six members) to carry out the collaborative activities and used the projector to show the collaborative wall. Subsequently, each team uploaded their infographics on the collaborative wall through mobile devices such as tablets and smartphones to initiate the discussion of the Physics of Hearing topics. The results of machine learning (linear regression) indicate that the dissemination of infographics on the collaborative wall positively influences participation in the classroom, students' motivation, and the learning process about the physics of hearing. Data science identifies three predictive models about using the collaborative wall in physics through the decision tree technique. Finally, the collaborative wall facilitates the active role of the students during the face-to-face sessions, communication in the classroom and realisation of the collaborative activities.

Keywords: physics education, collaborative wall, collaborative activities, student opinion, data science

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Zid sodelovanja: tehnološko sredstvo za izboljšanje procesov poučevanja in učenja o fiziki

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Dandanes si učitelji prizadevajo, da bi prek tehnološkega napredka izboljšali učne pogoje in ustvarili nove izobraževalne prostore. Namen te mešane raziskave je ob upoštevanju podatkovne znanosti preučiti dojemanja učencev glede zidu sodelovanja v procesih poučevanja in učenja o fiziki. Zid sodelovanja je spletna aplikacija, ki omogoča udeležbo učencev v učilnici prek razširjanja besedil in slik. Udeležence predstavlja 77 srednješolcev Državne pripravljalne šole št. 7 'Ezequiel A. Chávez', ki so v letu 2019 obiskovali predmet fizika IV. Doma so ti dijaki poiskali in pregledali podatke o fiziki sluha, da bi skupaj ustvarili infografiko, z uporabo programske opreme Piktochart. Izvajalec fizike IV je med osebnimi srečanji pozval, da se oblikujejo skupine (z največ šestimi člani), ki so opravile naloge, in se poslužil projektorja za prikaz zidu sodelovanja. Nato je vsaka skupina naložila svojo infografiko na zid sodelovanja prek prenosne naprave, na primer tablic in pametnih telefonov, to pa za to, da se je lahko začela razprava na temo fizike sluha. Rezultati strojnega učenja (linearna regresija) kažejo, da je nalaganje infografik na zid sodelovanja pozitivno učinkovalo na delo v učilnici, motivacijo učencev in na učni proces o fiziki sluha. Podatkovna znanost prepoznava tri napovedovalne modele o uporabi zidu sodelovanja pri fiziki prek tehnike drevesa odločitev. Ne nazadnje pa zid sodelovanja pripomore k aktivni vlogi učenca med osebnimi srečanji, sporazumevanju v učilnici in k izvedbi skupnih dejavnosti.

Ključne besede: pouk fizike, zid sodelovanja, skupne dejavnosti, mnenje učenca, podatkovna znanost

Introduction

Today, educational institutions use technology to improve the teaching-learning process and organise new school activities (Azodi & Lotfi, 2020; Crouch & Hirshfeld, 2020; Ivić, 2019; Morphew et al., 2020). The use of Information and Communication Technology (ICT) in the educational field allows the personalisation of learning, the development of skills, and the active role of the students (Balalaieva, 2019; McMahon & Walker, 2019; Roldán-Segura et al., 2018; Zaneldin et al., 2019). For example, incorporating mobile devices in school activities facilitates the interaction and participation of the students before, during, and after the face-to-face sessions (Howlett & Waemusa, 2018; Yarahmadzehi & Goodarzi, 2020; Watkins et al., 2019).

The role of teachers in the educational field is changing due to the emergence of new digital tools, educational platforms and technological applications (Aznar-Díaz et al., 2019; Bilgic & Tuzun, 2020; Bosco et al., 2019; Bravo et al., 2019; Mäkipää et al., 2021). ICT facilitates the organisation of creative school activities inside and outside the classroom (De-Oscar & Santos-Gomes, 2019; Korhonen et al., 2021; Pulgar et al., 2020; Salas-Rueda, 2020).

In the field of physics, teachers have updated the school activities through the computer (Roldán-Segura et al., 2018), mobile devices (Di-Laccio et al., 2017), films(Quirantes-Sierra et al., 2011), digital games (Lion & Perosi, 2019), digital tools (Bravo et al., 2019) and videos (Vera et al., 2015). At Charles University in the Czech Republic, the use of the Interactive Physics Laboratory facilitated the active role of the students, collaborative work and assimilation of knowledge about electrostatics, motion under gravity, the magnetic field of solenoids, optics, oscillations and rigid body mechanics, rotating frames of reference, and thermodynamics (Snětinová et al., 2018). In the same way, the physics course students repaired a thermometer to facilitate the learning process about the principles of Galileo (Kireš, 2018). Repnik and Ambrožič (2018) organised and carried out collaborative activities about the centre of mass to encourage the active participation of the students during the face-to-face sessions.

Interactive virtual walls such as Padlet allow students to acquire a primary role during the teaching-learning process through exchanging ideas (De-Witt et al., 2015; Lyonsab et al., 2021; Rashid et al., 2019). In the English language course, the use of Padlet facilitated the participation of the students during the face-to-face sessions and improved academic performance (Zou & Xie, 2019). Similarly, the incorporation of Padlet in a foreign language course increased the students' motivation during the learning process, developed writing skills, and improved communication in the classroom (Rashid et al., 2019).

Interactive virtual walls are transforming the functions of the students during face-to-face sessions (DeWitt et al., 2015; Lyonsab et al., 2021; Zou & Xie, 2019). For example, Padlet allows efficient communication between the participants of the educational process through mobile devices (Sangeetha, 2016; Zou & Xie, 2019). The benefits of using interactive virtual walls in the educational field are the autonomy of the students during the learning process and the interaction of the participants in the classroom (Lyonsab et al., 2021; Rashid et al., 2019; Sangeetha, 2016).

Currently, the teachers of physics courses are using technological advances to build new educational spaces, facilitate the learning process, and promote the active role of students. For example, the collaborative wall is a web application that allows the participation of the students in the classroom through the dissemination of text and images. In this study, the students of the National Preparatory School No. 7 'Ezequiel A. Chávez' presented infographics about the physics of hearing on the collaborative wall in order to carry out the discussion of the topics related to the waves, sound phenomena, hearing, energy transfer and Doppler Effect during the face-to-face sessions.

Therefore, this mixed research aims to analyse students' perceptions about using the collaborative wall in the teaching-learning process on physics with the use of data science. The research questions are:

1. What is the impact of the use of the collaborative wall in the teaching-learning process in physics?
2. What are the predictive models about the collaborative wall, participation in the classroom, motivation of the students and learning process about the Physics of Hearing?
3. What are the students' perceptions about disseminating infographics on the collaborative wall?

Literature review

Use of technology in the educational process about Physics

The use of technological tools, educational software, and web applications is transforming the teaching-learning process in physics (Crouch & Hirshfeld, 2020; Di-Laccio et al., 2017; Roldán-Segura et al., 2018). For example, the students of physics courses use ICT to facilitate the assimilation of knowledge, development of skills, and participation inside and outside the classroom (Bravo et al., 2019; Crouch & Hirshfeld, 2020; Morphew et al., 2020).

In secondary schools, teachers use technological advances to build new

learning spaces in physics (Gambari & Yusuf, 2016; Roldán-Segura et al., 2018). The students used mobile devices to facilitate the assimilation of knowledge and develop computer skills (Roldán-Segura et al., 2018). The results regarding the use of this technology reveal an increase in academic performance, the development of skills, and the active role of the students during the learning process (Roldán-Segura et al., 2018).

At the University of Granada, the students improved their academic performance in the physics course by consulting audiovisual content (Quirantes-Sierra et al., 2011). In particular, the use of films facilitated the learning about physics, developed the skills and increased the students' motivation during the face-to-face sessions (Quirantes-Sierra et al., 2011).

Educational institutions use technological advances such as mobile devices to update the physics courses (Di-Laccio et al., 2017; Roldán-Segura et al., 2018; Tracey et al., 2018). For example, the use of smartphones facilitated the assimilation of knowledge about the Doppler effect and improved the participation of the students in the classroom (Di-Laccio et al., 2017).

Technological tools enable the construction of new educational spaces in physics classes (Bravo et al., 2019). For example, the CmapTools application facilitated the understanding of the phenomenon of electromagnetic induction through the development of conceptual diagrams (Bravo et al., 2019).

Likewise, the design and production of videos enable updating the educational field activities (Cakiroglu & Yilmaz, 2017; Iskru & Schulz, 2020; Vera et al., 2015). In the physics course, the use of the videos facilitated the learning process about the phenomenon of free fall, increased motivation, and improved the participation of the students (Vera et al., 2015).

Finally, technological advances such as videos, digital tools and web applications are changing the organisation and implementation of school activities in the field of physics (Morphew et al., 2020; Roldán-Segura et al., 2018; Vera et al., 2015). The use of ICT in physics courses facilitates the active role of the students inside and outside the classroom (Bravo et al., 2019; Di-Laccio et al., 2017; Romero et al., 2020).

Use of the virtual wall and infographics in the educational field

Today, technology is transforming the realisation of school activities inside and outside the classroom (Arenas-Arredondo et al., 2021; De-Witt & Koh, 2020). In particular, virtual walls such as Padlet, Jamboard, and the collaborative wall enable the exchange of ideas before, during, and after the face-to-face sessions (De-Witt & Koh, 2020; Fadhilawati et al., 2020; Kharis et al., 2020).

In India, the use of Padlet and Edmodo improved the assimilation of knowledge, facilitated the realisation of collaborative activities, and developed the writing skills of the students in an English Language course (Sangeetha, 2016). Similarly, the students of a German language course used this virtual wall to improve their academic performance and develop their writing skills (Kharis et al., 2020).

The benefits of using virtual walls are increasing the motivation and active role of the students during the teaching-learning process (Fadhilawati et al., 2020; Kharis et al., 2020). For example, the students of an English language course used Padlet to develop their writing skills and actively participate in the classroom (Fadhilawati et al., 2020). Furthermore, the students of a business finance course applied, shared, and acquired new knowledge through an interactive virtual wall (De-Witt & Koh, 2020).

Virtual walls have improved the teaching-learning conditions in English language courses (Fadhilawati et al., 2020; Sangeetha, 2016), a German language course (Kharis et al., 2020) and a business finance course (De-Witt & Koh, 2020) by aiding in exchanging ideas and conducting the discussions. Also, this technological tool facilitated the organisation of collaborative activities and the construction of new learning spaces (De-Witt & Koh, 2020; Kharis et al., 2020)

At the same time, educational institutions use infographics to facilitate the assimilation of knowledge through the combination of text and images (Arenas-Arredondo et al., 2021; González, 2018; Muñoz-García, 2014). According to Arenas-Arredondo et al. (2021), incorporating infographics in the school activities improved the understanding of the topics, including specific sciences, social communication, education, informatics, engineering, health and tourism.

The benefits of infographics in the educational field are the creation of new school content, increasing motivation during the teaching-learning process, and disseminating information through images and text (Arenas-Arredondo et al., 2021; Dolz, 2020; Muñoz-García, 2014). In the field of electronics, the use of infographics improved the teaching-learning process about Boolean Algebra, developed the skills and increased the students' motivation during the realisation of the school activities (Salas-Rueda, 2015).

At the postgraduate level, teachers used infographics to increase the motivation and satisfaction of the students, to provide information, and to facilitate the assimilation of knowledge (Dolz, 2020). In the same way, the students of a biology course improved their understanding of animal and plant cells by consulting infographics (González, 2018).

Method

The Institute of Applied Sciences and Technology at the National Autonomous University of Mexico built a collaborative wall to promote the active role of the students during face-to-face sessions. The particular aims of this research are: (1) analyse the impact of the collaborative wall on participation during the face-to-face sessions, the motivation of the students, and the learning process about the physics of hearing (2) analyse the perceptions of the students about the use of the collaborative wall in the educational field and (3) identify the predictive models on the collaborative wall in the unit entitled 'Sound: The ear as a hearing instrument'.

The collaborative wall is a web application that allows the participation of the students in the classroom through the dissemination of text and images (See Figure 1). During the face-to-face sessions, the students use mobile devices such as tablets and smartphones to enter the collaborative wall.

Figure 1

Example about the use of Collaborative Wall

Participants

The participants are 77 students (30 male and 47 female) of the National Preparatory School No. 7 'Ezequiel A. Chávez' who took the course of Physics IV during the 2019 school year; the average age of the participants is 17.18 years.

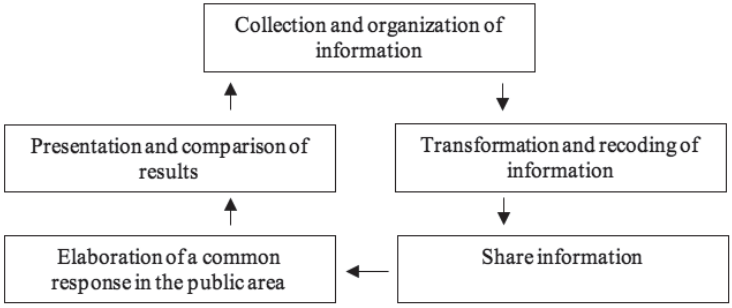
Procedure

The National Autonomous University of Mexico offered the 'Diploma Classroom' of the Future' in the 2019 school year to improve the teaching-learning conditions through the use of the pedagogical model proposed by Gamboa (2015) and technology (See Figure 2). During Module 3 of this diploma, the

teachers used the collaborative wall to facilitate the participation of the students in the classroom.

Figure 2

Techno-pedagogical model proposed



Note. Adapted from Gamboa-Rodríguez (2015).

At home, the students searched for and consulted the information about the physics of hearing to create their infographics using the Piktochart software collaboratively. During the face-to-face sessions, the teacher of the course of Physics IV requested the creation of teams (maximum six members) to show the collaborative wall on the projector and carry out the collaborative activities, such as the presentation and exchange of ideas about the waves, sound phenomena, hearing, energy transfer and Doppler Effect.

Subsequently, each team uploaded their infographics on the collaborative wall through mobile devices such as tablets and smartphones to initiate the discussion about the physics of hearing topics. Table 1 shows the analysis of the educational context.

Table 1
Educational context

No.	Aspect	Element	Description
1	Analysis	Course	Physics IV
		Problem	The students have difficulty assimilating and understanding the topics about the Physics of Hearing
2	Design	Learning objectives	Describe and discuss the topic about the waves
			Describe, discuss and explain the topic about the sound phenomena
			Describe, discuss, explain and interpret the topic about the hearing and energy transfer
			Describe, discuss, explain, interpret and examine the topic about the Doppler effect
		Incorporation of technology in school activities	Mobile devices such as tablet and smartphone
			Use of the Piktochart software to create the infographic
			Collaborative wall
3	Development	Before the class	At home, the students searched for and consulted the information about the Physics of Hearing in order to create their infographics using the Piktochart software collaboratively
		During the class	During the face-to-face sessions, the teacher of the Physics IV course requested the creation of teams (maximum 6 members) to carry out the collaborative activities and used the projector to show the collaborative wall. Subsequently, each team uploaded their infographics on the collaborative wall through mobile devices such as tablets and smartphones in order to initiate the discussion about the Physics of Hearing topics
4	Implementation	Unit	Sound: The ear as a hearing instrument

Technological advances allow the construction of new educational spaces where the students actively participate during the learning process (Alshammari, 2020; Bursa & Cengelci-Kose, 2020; Elvis-Mbiydzenyuy, 2020). Therefore, the hypothesis about the collaborative wall and participation of the students is:

- Hypothesis 1 (H1): The dissemination of infographics on the collaborative wall positively influences the participation of the students in the classroom.

  Educational institutions and teachers use ICT to increase students' motivation during the learning process (Agormedah et al., 2020; Banafshi et al., 2020). Therefore, the hypothesis about the collaborative wall and motivation of the students in the classroom is:

- Hypothesis 2 (H2): The dissemination of infographics on the collaborative wall positively influences the students' motivation.
  Incorporating technological advances into school activities improves the teaching-learning conditions (Akay & Koral-Gumusoglu, 2020; Carr, 2020; Sabiri, 2020). Therefore, the hypothesis about the collaborative wall and learning process during the realisation of activities in the classroom is:
- Hypothesis 3 (H3): The dissemination of infographics on the collaborative wall positively influences the learning process about the Physics of Hearing

In contrast, the predictive models about the use of the collaborative wall in the course of Physics IV are:

- Predictive Model 1 (PM1) about the dissemination of infographics on the collaborative wall and participation of the students in the classroom
- Predictive Model 2 (PM2) about the dissemination of infographics on the collaborative wall and motivation of the students
- Predictive Model 3 (PM3) about disseminating infographics on the collaborative wall and learning process about the Physics of Hearing.

Data collection

At the end of the 'Sound: The ear as a hearing instrument' unit, the students of the course of Physics IV answered the questionnaire about the use of the collaborative wall (See Table 2).

Table 2
Questionnaire about the use of the collaborative wall

No.	Variable	Dimension	Question	Answer	n	%
1	Profile of the students	Sex	1. Indicate your sex	Male	30	38.96
				Female	47	61.04
		Age	2. Indicate your age	16 years	8	10.39
				17 years	48	62.34
				18 years	20	25.97
				19 years	1	1.30
2	Collaborative wall	Dissemination of infographics	3. The collaborative wall facilitates the dissemination of infographics	Very much (1)	51	66.23
				Much (2)	16	20.78
				Little (3)	7	9.09
				Very little (4)	3	3.90
		Participation of the students in the classroom	4. The use of the collaborative wall improves the participation of the students in the classroom	Very much (1)	49	63.64
				Much (2)	15	19.48
				Little (3)	9	11.69
				Very little (4)	4	5.19
		Motivation of the students	5. The use of the collaborative wall improves the motivation of the students	Very much (1)	43	55.84
				Much (2)	23	29.87
				Little (3)	9	11.69
				Very little (4)	2	2.60
		Learning process	6. The use of the collaborative wall improves the learning process about the Physics of Hearing	Very much (1)	55	71.43
				Much (2)	17	22.08
				Little (3)	3	3.90
				Very little (4)	2	2.60
3	Student perception	Use of collaborative wall	7. What is your opinion about the use of the collaborative wall during the learning process?	Open	-	-

The values of Load Factor (> .500), Cronbach's Alpha (> .600) and Composite Reliability (> .700) are necessary to validate the questionnaire. Table 3 shows that the values of the Load Factor (> .540), Cronbach's Alpha (> .690) and Composite Reliability (> .820) enable validating the questionnaire about the collaborative wall.

Table 3
Validation of the questionnaire about the collaborative wall

Variable	Dimension	Load Factor	Cronbach's Alpha	Average Variance Extracted	Composite Reliability
Collaborative wall	Dissemination of infographics	.795	.695	.543	.822
	Participation of the students in the classroom	.747			
	Motivation of the students	.541			
	Learning process	.831			

Data analysis

Data analysis was performed using the Rapidminer tool and WordCloud application. The Rapidminer tool allows the calculation of linear regressions (machine learning) to evaluate the research hypotheses about the use of the collaborative wall in the course of Physics IV and build the predictive models.

The training section (50%, 60%, 70% and 80% of the sample) allows calculating the linear regressions, and the evaluation section (50%, 40%, 30% and 20% of the sample) allows identifying the accuracy of these linear regressions employing the squared error, which enables knowing the precision of the linear function in order to predict the behaviour of the events (Shalev-Shwartz & Ben, 2014).

According to Anderson et al. (2012), the t-test enables identifying the relationship between the variables of the simple linear regression. In particular, if the value of p is less than 0.05, then the variables have a significant relationship (Anderson et al., 2012).

The information about the student's profile (sex and age) and collaborative wall (dissemination of infographics, participation in the classroom, motivation of the students and learning process) enables the construction of the predictive models by means of the decision tree technique. In contrast, the WordCloud application allows evaluating the students' perception about the use of the collaborative wall through the frequency of words.

Results

The collaborative wall facilitates very much (n = 51, 66.23%), much (n = 16, 20.78%), little (n = 7, 9.09%) and very little (n = 3, 3.90%) the dissemination of infographics (See Table 2). The machine learning results indicate that the

dissemination of infographics on the collaborative wall positively influences the participation in the classroom, motivation of the students and learning process about the Physics of Hearing (See Table 4).

Table 4
Results of machine learning

Hypothesis	Training	Linear regression	Conclusion	t-value	p-value	Error squared
H1: Dissemination of infographics on the collaborative wall→ participation in the classroom	50%	y = .528x + .764	Accepted: .528	3.134	.000	.692
	60%	y = .589x + .689	Accepted: .589	4.065	.000	.744
	70%	y = .541x + .741	Accepted: .541	3.996	.000	.720
	80%	y = .493x + .799	Accepted: .493	4.180	.000	.802
H2: Dissemination of infographics on the collaborative wall→ motivation of the students	50%	y = .545x + .712	Accepted: .545	4.411	.000	.604
	60%	y = .535x + .685	Accepted: .535	4.813	.000	.600
	70%	y = .533x + .661	Accepted: .533	5.368	.000	.669
	80%	y = .485x + .732	Accepted: .485	5.487	.000	.733
H3: Dissemination of infographics on the collaborative wall→ learning process	50%	y = .713x + .458	Accepted: .713	6.687	.000	.694
	60%	y = .634x + .512	Accepted: .634	6.437	.000	.638
	70%	y = .611x + .504	Accepted: .611	6.798	.000	.670
	80%	y = .485x + .699	Accepted: .485	5.522	.000	.497

Participation in the classroom

The use of the collaborative wall improves very much (n = 49, 63.64%), much (n = 15, 19.48%), little (n = 9, 11.69%) and very little (n = 4, 5.19%) the participation of the students in the classroom (See Table 2). The results of machine learning with 50% (.528, t-value = 3.134, p-value =.000), 60% (.589, t-value = 4.065, p-value =.000), 70% (.541, t-value = 3.996, p-value = .000) and 80% (.493, t-value = 4.180, p-value = .000) of training indicate that H1 is accepted (See Table 4). Therefore, the dissemination of infographics on the collaborative wall positively influences the participation of the students in the classroom.

Table 5 shows 10 conditions of the PM1 about the use of the collaborative wall with an accuracy of 72.73%. For example, if the student thinks that the collaborative wall very much facilitates the dissemination of infographics and has an age ≤ 18.5 years, then the use of the collaborative wall very much improves the participation of the students in the classroom. Also, if the student thinks that the collaborative wall much facilitates the dissemination of infographics, is male and has an age ≤ 17.5 years, the use of the collaborative wall much improves the participation of the students in the classroom.

Table 5
Conditions of the PM1

No.	Collaborative wall → dissemination of infographics	Sex	Age	Collaborative wall → participation in the classroom
1	Very much	-	> 18.5 years	Very little
2	Very much	-	≤ 18.5 years	Very much
3	Much	Male	> 17.5 years	Very much
4	Much	Male	≤ 17.5 years	Much
5	Much	Female	> 17.5 years	Much
6	Much	Female	≤ 17.5 years	Very much
7	Little	Male	≤ 17.5 years	Very much
8	Little	Female	≤ 17.5 years	Little
9	Little	-	> 17.5 years	Very little
10	Very little	-	-	Much

Motivation of the students

The use of the collaborative wall improves very much (n = 43, 55.84%), much (n = 23, 29.87%), little (n = 9, 11.69%) and very little (n = 2, 2.60%) the motivation of the students (See Table 2). The results of machine learning with 50% (.545, t-value = 4.411, p-value = .000), 60% (.535, t-value = 4.813, p-value = .000), 70% (.533, t-value = 5.368, p-value = .000) and 80% (.485, t-value = 5.487, p-value = .000) of training indicate that H2 is accepted (See Table 4). Therefore, the dissemination of infographics on the collaborative wall positively influences the students' motivation.

Table 6 shows nine conditions of the PM2 about the use of the collaborative wall with an accuracy of 68.83%. For example, if the student thinks that the collaborative wall very much facilitates the dissemination of infographics and has an age ≤ 17.5 years, then the use of the collaborative wall very much improves the students' motivation. Also, if the student thinks that the collaborative wall much facilitates the dissemination of infographics and is female, then the use of the collaborative wall much improves the students' motivation.

Table 6
Conditions of the PM2

No.	Collaborative wall → dissemination of infographics	Sex	Age	Collaborative wall → motivation of the students
1	Very much	-	≤ 17.5 years	Very much
2	Very much	Male	> 17.5 years	Much
3	Very much	Female	> 17.5 years	Very much
4	Much	Male	-	Very much
5	Much	Female	-	Much
6	Little	-	≤ 16.5 years	Much
7	Little	Male	> 16.5 years	Very much
8	Little	Female	> 16.5 years	Little
9	Very little	-	-	Very much

Learning process

The use of the collaborative wall improves very much (n = 55, 71.43%), much (n = 17, 22.08%), little (n = 3, 3.90%) and very little (n = 2, 2.60%) the learning process about the Physics of Hearing (See Table 2). The results of machine learning with 50% (.713, t-value = 6.687, p-value = .000), 60% (.634, t-value = 6.437, p-value = .000), 70% (.611, t-value = 6.798, p-value = .000) and 80% (.485, t-value = 5.522, p-value = .000) of training indicate that H3 is accepted (See Table 4). Therefore, the dissemination of infographics on the collaborative wall positively influences the learning process about the physics of hearing.

Table 7 shows seven conditions of the PM3 about the use of the collaborative wall with an accuracy of 77.92%. For example, if the student thinks that the collaborative wall very much facilitates the dissemination of infographics, is female and has an age ≤ 16.5 years, then the use of the collaborative wall very much improves the learning process about the physics of hearing. Also, if the student thinks that the collaborative wall much facilitates the dissemination of infographics, then the use of the collaborative wall very much improves the learning process about the physics of hearing.

Table 7
Conditions of the PM3

No.	Collaborative wall → dissemination of infographics	Sex	Age	Collaborative wall → learning process
1	Very much	-	> 16.5 years	Very much
2	Very much	Male	≤ 16.5 years	Much
3	Very much	Female	≤ 16.5 years	Very much
4	Much	-	-	Very much
5	Little	-	> 17.5 years	Very little
6	Little	-	≤ 17.5 years	Much
7	Very little	-	-	Very much

Perception of the students

Technological advances enable organising new activities during the face-to-face sessions. In the Physics IV course, the students actively participated in the classroom through the collaborative wall.

- 'We showed our work in an easier way. I understood faster and better' (Student 4, male, 16 years old).
- 'It allowed making a comparison between the different works of the group' (Student 22, male, 16 years old).

Web applications enable the active role of the students during the teaching-learning process. According to the students of the Physics IV course, the collaborative wall is easy to use.

- 'It is easy to use and is very attractive. Also, this application allowed the interaction of several friends at the same time' (Student 26, male, 17 years old).
- 'It's easy and fast' (Student 32, male, 18 years old).

Technology facilitates the creation of new virtual spaces that improve the learning process. In particular, the collaborative wall improved the teaching-learning conditions and facilitated the assimilation of knowledge through the dissemination of infographics.

- 'It was a very useful tool for learning' (Student 37, female, 18 years old).
- 'We better understood the course topics with the application' (Student 42, female, 17 years old).

Teachers use technology to achieve the active role of the students during face-to-face sessions. For example, the collaborative wall facilitated the realisation of creative activities in the classroom.

- 'It was interesting and allowed working creatively and productively' (Student 11, woman, 17 years old).
- 'We show the homework. It is less boring and more practical' (Student 54, female, 17 years old).

Finally, incorporating the collaborative wall into the teaching-learning process on physics increased the students' motivation and enabled sharing the information in the classroom.

- 'The class is less boring' (Student 7, female, 17 years old).
- 'The application allows sharing information' (Student 29, female, 17 years old).

The WordCloud application analyses the answers to the question: 'What is your opinion about the use of the collaborative wall during the learning process?' by identifying the words that students mention most frequently. Figure 3 shows the word cloud about the use of the collaborative wall. The most common words are 'better', 'organisation', 'use', 'topics', 'time', 'way', 'ideas', 'team', 'faster', 'new', 'class', and 'understand'. Therefore, the perception of students about the incorporation of this technological tool in the educational field is strongly related to the words: 'time', 'better', 'use' and 'organisation'.

Figure 3
Word cloud about the use of the collaborative wall

Discussion

Today, teachers are creating and implementing new school activities through technology (Cutri & Mena, 2020; Lee, 2020; Yasar, 2020). In the Physics IV course, educators incorporated the collaborative wall in the 'Sound: The ear as a hearing instrument' unit to improve the teaching-learning conditions.

According to Arenas-Arredondo et al. (2021), the use of infographics in school activities improved the teaching-learning process. In particular, the students of the National Preparatory School No. 7 'Ezequiel A. Chávez' used the Piktochart software to create their infographics about the waves, sound phenomena, hearing, energy transfer, and the Doppler Effect.

Likewise, virtual walls allow the construction of new educational spaces (De-Witt & Koh, 2020; Fadhilawati et al., 2020; Kharis et al., 2020). For example, 66.23% of the students (n = 51) think that the collaborative wall very much facilitates the dissemination of infographics. Also, an analysis showed that the collaborative wall much facilitates (n = 16, 20.78%) the dissemination of infographics. Therefore, the majority of the students (87.01%) have a favourable opinion about this aspect.

Participation in the classroom

Several authors (e.g., Adam, 2020; Okkan & Aydin, 2020; Tilak & Glassman, 2020) mention that the incorporation of digital tools allows the active role of the students at any time. In particular, virtual walls enable active participation in the classroom through the exchange of ideas and discussion of topics (De-Witt & Koh, 2020; Fadhilawati et al., 2020; Kharis et al., 2020). In the Physics course, the students used the collaborative wall to exchange ideas and discuss waves, sound phenomena, hearing, energy transfer, and the Doppler Effect.

Similar to De-Witt and Koh (2020), the incorporation of the interactive virtual wall called Padlet in the Business Finance course facilitated the active role of the students during the face-to-face sessions. Most of the students (n = 49, 63.64%) think that the use of the collaborative wall very much improves the participation of the students in the classroom. Also, the use of the collaborative wall much improves (n = 15, 19.48%) the participation of the students in the classroom. Therefore, the majority of the students (83.12%) have favourable perceptions about the use of this virtual wall.

This research shares the ideas of various authors (e.g., De-Witt & Koh, 2020; Fadhilawati et al., 2020) about the use of virtual walls to promote the active role of the students during the teaching-learning process. The results of

machine learning results about H1 are greater than .490; therefore, the dissemination of infographics on the collaborative wall positively influences the participation of the students in the classroom.

Data science enables the identification of ten conditions of the PM1 with an accuracy of 72.73%. In this predictive model, the age and sex of the students determine how the dissemination of infographics on the collaborative wall influences the participation of the students. The decision tree technique identifies four conditions in which the use of the collaborative wall very much improves the participation of the students in the classroom. For example, if the student thinks that the collaborative wall very much facilitates the dissemination of infographics and has an age of ≤ 18.5 years, then the use of the collaborative wall very much improves the participation of the students in the classroom. In contrast, the sex of the students determines six conditions of the PM1. For example, if the student thinks that the collaborative wall much facilitates the dissemination of infographics, is male, and has an age ≤ 17.5 years, then the collaborative wall much improves the participation of the students in the classroom.

Motivation of the students

This research shares the ideas of various authors (e.g., Bozna & Yuzer, 2020; Lee, 2020; Tilak & Glassman, 2020) about the use of technology to increase students' motivation. According to Zou and Xie (2019), the virtual wall facilitated the construction of educational spaces where the students increased their motivation during the teaching-learning process.

In a German language course, the students increased their motivation through the use of Padlet in the classroom (Kharis et al., 2020). In the same way, 55.84% of the students (n = 43) think that the use of the collaborative wall very much improves their motivation in the 'Sound: The ear as a hearing instrument' unit. Likewise, quantitative data reveals that the use of the collaborative wall much improves (n = 23, 29.87%) the motivation of these students. Therefore, the majority of students (85.71%) have a favourable perception regarding the use of this virtual wall.

As mentioned by Fadhilawati et al. (2020), the incorporation of virtual walls in the educational field favours the creation of new spaces for learning and teaching. The results of machine learning about H2 are greater than 0.480; therefore, the dissemination of infographics on the collaborative wall positively influences the students' motivation.

Data science enables the identification of nine conditions of the PM2 with an accuracy of 68.83%.In this predictive model, the age and sex of the

students determine how the dissemination of infographics on the collaborative wall influences their motivation. The decision tree technique identifies five conditions where the use of the collaborative wall very much improves the students' motivation. For example, if the student thinks that the collaborative wall very much facilitates the dissemination of infographics and has an age ≤ 17.5 years, then the use of the collaborative wall very much improves the students' motivation. In contrast, the sex of the students determines six conditions of the PM2. For example, if the student thinks that the collaborative wall much facilitates the dissemination of infographics and is female, then the use of the collaborative wall much improves the motivation of the students.

Learning process

Teachers use web applications and technological tools to facilitate the learning process (Adam, 2020; Cutri & Mena, 2020; Erarslan & Arslan, 2020). As Fadhilawati et al. (2020) indicated, virtual walls improved the assimilation of knowledge and developed the skills of the students. In particular, the incorporation of the collaborative wall in the National Preparatory School No. 7 'Ezequiel A. Chávez' improved the teaching-learning conditions about the waves, sound phenomena, hearing, energy transfer and Doppler Effect.

The use of virtual walls improved the teaching-learning conditions in the English language course (Fadhilawati et al., 2020; Sangeetha, 2016), German language course (Kharis et al., 2020) and business finance course (De-Witt & Koh, 2020) by exchanging the ideas and conducting the discussions. In particular, 71.43% of the students ($n = 55$) think that the use of the collaborative wall very much improves the learning process about the physics of hearing. Likewise, the use of the collaborative wall much improves ($n = 17$, 22.08%) the learning process about the physics of hearing. Therefore, the majority of the students (93.51%) have a favourable perception of the use of this virtual wall.

Various authors (e.g., De-Witt & Koh, 2020; Fadhilawati et al., 2020; Kharis et al., 2020) explain that technological advances such as the virtual wall favour learning inside and outside the classroom. The results of machine learning about H3 are higher than .480; therefore, the dissemination of infographics on the collaborative wall positively influences the learning process about the physics of hearing.

Data science enables the identification of seven conditions of the PM3 with an accuracy of 77.92%. In this predictive model, the age and sex of the students determine how the dissemination of infographics on the collaborative wall influences the learning process. The decision tree technique identifies four

conditions in which the use of the collaborative wall very much improves the learning process about the physics of hearing. For example, if the student thinks that the collaborative wall much facilitates the dissemination of infographics, then the use of the collaborative wall very much improves the learning process about the physics of hearing. In contrast, the sex of the students determines two conditions of the PM3. For example, if the student thinks that the collaborative wall facilitates the dissemination of infographics very much, is female and has an age ≤ 16.5 years, then the use of the collaborative wall very much improves the learning process about the physics of hearing.

Perception of the students

In the Physics IV course, the students actively participated in the classroom through the collaborative wall. This web application improved the teaching-learning conditions, facilitated the assimilation of knowledge through the dissemination of infographics and allowed the realisation of creative activities during the face-to-face sessions.

Furthermore, the incorporation of the collaborative wall in the teaching-learning process about physics increased the students' motivation and allowed sharing the information in the classroom.

Conclusion

Educational institutions use technological advances to transform the role of the students during the learning process and improve the teaching conditions. For example, the collaborative wall is a web application that allows the participation of the students in the classroom through the dissemination of text and images. The results of machine learning indicate that the dissemination of infographics on the collaborative wall positively influences the participation in the classroom, motivation of the students and learning process about the physics of hearing. Data science enables the identification of three predictive models about the use of the collaborative wall in the physics classroom.

The limitations of this research are the size of the sample, the use of the collaborative wall during the learning process solely about the physics of hearing and the perceptions of the students. Therefore, future research may analyse the use of the collaborative wall in other topics related to Physics. In addition, an inferential statistical analysis should be used to identify the differences related to the incorporation of this technological tool in the teaching-learning process.

This research recommends the use of the collaborative wall because this web application facilitates the active role of the students during the face-to-face sessions, communication in the classroom and realisation of creative school activities. In the Physics IV course, the incorporation of the collaborative wall in the school activities improved the teaching-learning conditions about the waves, sound phenomena, hearing, energy transfer and Doppler Effect.

Physics is an experimental subject; therefore, educators can use simulators, social networks, web applications, third-dimensional tools to improve the teaching-learning conditions. Finally, teachers can build new educational spaces through technological advances. In particular, the collaborative wall allowed the students of the National Preparatory School No. 7 'Ezequiel A. Chávez' to have the main role during the learning process about the Physics of Hearing.

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Insights into Engineering Education Teaching Practice in Slovenian Primary Schools during the Covid-19 Pandemic: Distance Learning Model

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When the Covid-19 pandemic started in March 2020, the educational process had to be redesigned to meet current needs. At the Faculty of Education of the University of Ljubljana, pre-service engineering and technology teachers (3rd and 4th years of undergraduate two-subject teachers' study programme) are obliged to complete a teaching practice in educational institutions and submit a teaching practice diary. Due to the closure of primary schools, the teaching practice was transformed to distance/online practice. This empirical study examines a recently developed intuitive model for distance learning, which took place during the teaching practice. Teaching practice diaries served as an instrument for gathering data. The sample size encompasses 56 lesson plan activities for the compulsory primary school Design and Technology subject for students aged 12–15 years at 15 primary schools in different parts of Slovenia carried out during online teaching practice by 11 pre-service technology teachers in the 2019/2020 and 2020/2021 academic years. The research methodology is focused on lesson-type determination and model elements analysis in lesson plan making and implementation activity. Distance learning model elements are evaluated with regard to online/offline learning tools from e-learning platforms to engineering education field-specific tools (e.g., technical drawings and electric circuits). Online teaching practice was as new for pre-service technology teachers and teacher-mentors as online learning was new for students. The advantages and disadvantages are highlighted. Furthermore, the distance learning model from the first Covid-19 wave teaching practice was adapted to challenge the second Covid-19 wave. The pandemic has enabled the rise of blended learning, which has been gaining focus in secondary and higher education levels in recent years; however, it encountered obstacles when entering the primary school domain. How to

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encompass blended learning into the evolved distance learning model will be shown.

Keywords: blended learning, distance learning model, engineering education, online learning tools, teaching practice, technology teacher

Vpogled v pedagoško prakso tehniškega izobraževanja v slovenskih osnovnih šolah med pandemijo covida-19: model učenja na daljavo

Bernarda Urankar in Janez Jamšek

Ko se je marca 2020 začela pandemija covida-19, je bilo treba izobraževalni proces preoblikovati, da bi ustrezal trenutnim potrebam. Na Pedagoški fakulteti Univerze v Ljubljani imajo bodoči učitelji tehnike v 3. in 4. letniku dodiplomskega dvopredmetnega študijskega programa obvezno opravljanje pedagoške prakse v izobraževalnih ustanovah. Zaradi zaprtja osnovnih šol se je učna praksa preoblikovala v prakso na daljavo/spletno prakso. Ta empirična študija preučuje pred kratkim razvit intuitivni model učenja na daljavo, ki se je izvajal med pedagoško prakso. Dnevniki pedagoške prakse so služili kot instrument za zbiranje podatkov. Velikost vzorca obsega 56 učnih priprav z dejavnostmi/aktivnostmi za osnovnošolski predmet tehnika in tehnologija za učence, stare od 12 do 15 let, na 15 osnovnih šolah v različnih krajih po Sloveniji, ki jih je med prakso na daljavo v študijskem letu 2019/20 in 2020/21 izvajalo 11 učiteljev tehnike. Raziskovalna metodologija je osredinjena na določanje tipa učne ure in analizo elementov učnega modela v učni pripravi z dejavnostmi/aktivnostmi izvedbe načrta. Elementi modela učenja na daljavo se ocenjujejo glede na uporabljena spletna učna orodja na platformah za e-učenje in spletna orodja za tehniško izobraževanje (npr. tehniške risbe in električna vezja). Pedagoška praksa, izvedena z modelom učenja na daljavo, je bila nova za študente – bodoče učitelje – in učitelje mentorje pa tudi za učence. Poudarjene so prednosti in slabosti spletnih učnih orodij. Poleg tega model učenja na daljavo iz učne prakse prvega vala covida-19 je bil prilagojen za izvajanje pedagoške prakse v terminu drugega vala covida-19. Pandemija je omogočila porast uporabe kombiniranega učenja, ki je osredinjeno na srednješolsko in visokošolsko izobraževanje, vendar je pri vstopu v osnovnošolsko domeno naletelo na ovire. Prikazano bo, kako kombinirano učenje vključiti v predlagani model učenja na daljavo.

Ključne besede: kombinirano učenje, model učenja na daljavo, tehniško izobraževanje, spletna učna orodja, učna praksa, učitelj tehnike

Introduction and context

To avoid misconceptions about engineering education terms, we start by explaining them. The technology teacher study programme at the University of Ljubljana, after bachelor's or master's degrees, enables teachers to teach technical subjects at the primary school level (students aged 12–15 years) that are more commonly termed 'technology subjects'. Pre-service teachers in this field are 'pre-service technology teachers'. They can also teach technological subjects at the secondary level (students aged 15–19 years) that are more commonly termed 'engineering subjects'. Technology teacher programmes are not common around the world; in many countries, the general primary school teacher study programme does not even cover any technique/technology/engineering related subjects for students aged 6–14 years. For clarity in this study, we use the domain-related term 'engineering education' and address students of the technology teacher study programme as 'pre-service technology teachers' (PSTT).

Teaching/learning methods

The predominant teaching method in engineering education is the traditional teaching method: frontal, face-to-face lectures followed by practical work, regardless of the education level (from primary school to university). The term 'traditional teaching method', also known as 'face-to-face learning', is characterised by classroom implementation with time and space constraints, using traditional methods (lecturer-centred) and traditional resources, such as textbooks, discussions, chalkboards and others (Jansen, 2004).

Technological development induced a demand to exceed these time/space constraints. The beginning of distance learning is considered to be correspondence education at the beginning of the 20th century (Kahiigi, 2008; Moore, 2013). With the accelerated development of radio, television technology, and the internet, teaching materials have moved online. The new way of learning was termed 'e-learning' (eL) and reached its peak in 1997–1999. Distance learning and eL overlap in some cases, but they are not the same (Bonk & Graham, 2005; Kahiigi, 2008; Moore, 2013). eL is any learning that involves technology as a learning aid. It can be done both in the classroom and with teacher and learners separated, which is not the case in distance learning (Kemeny & Kurtz, 1967).

Along with the rapid development of new technologies, eL has been developing in parallel from the first phenomenon of personal computer integration and thus computer-aided teaching (CAI) to current mass open online

courses and their versions, such as MOOC, c-MOOC, x-MOOC and LOOC (Deimann & Friesen, 2013). As learning technology evolves, there is still no common agreement on definitions and terminologies (Lowenthal & Wilson, 2010). Interchanged terms are often without meaningful definitions. eL has many different names related to the technology used (e.g., online, virtual, network, distributed and web learning). However, Rodrigues et al. (2019) affirm that both these concepts share the common feature that 'they are a form of instruction that occurs between a learner and an instructor and are held at different times and/or places, using several forms of material' (p. 88). Lately, eL is alternatively called 'online learning', which is an umbrella term for any learning that takes place across a distance and not in a face-to-face platform (Anderson, 2016; Mpungose, 2020).

Furthermore, Choudhury and Pattnaik (2020) affirm that the definition of eL evolves with the evolution of the internet. It started with Web 1.0, which was a read-only site, internet-based learning from which a wide range of material could be accessed, and information sought and downloaded. This was the early development of what became known as browsers. Today, Web 4.0 is rising using artificial intelligence, which can directly interact in real-time with human beings (Choudhury & Pattnaik, 2020, p. 2). Online learning is defined as a learning experience in synchronous or asynchronous environments using different devices (e.g., mobile phones, laptops, etc.) with internet access. In these environments, students can be anywhere (locally independent) and learn and collaborate with instructors and other students (Singh & Thurman, 2019). Despite the initial success of the eL method, it subsequently emerged that the structured learning environment and targeted e-learning materials did not motivate participants sufficiently to persevere to complete their courses. More and more studies (Nikoubakht & Kiamanesh, 2019) argue that face-to-face is irreplaceable even if the current discourse and technological revolution demand the use of eL. An upgrade of eL is blended learning (Bonk & Graham, 2005), which combines online and face-to-face learning and enables students to use many ways of accessing course content based on their needs (strengths/limitations) (Anderson, 2016).

Blended learning is most rapidly implemented at the higher education level, where it is easiest to introduce (Rihtaršič & Jamšek, 2019). The lower we go along the educational ladder, the more sophisticated its implementation must be to ensure success. The trend of student learning motivation is declining mainly due to the well-established, traditional delivery of knowledge on stock that is widely available on the web, and students can access it almost anytime. All contemporary learning models are, therefore, based on learning on

demand. The slow introduction of distance/flexible/online/blended learning on primary/ secondary school level (Dvorščak & Jamšek, 2017; Kosec et al., 2020; Lokar & Jamšek, 2017) was changed with pandemic declaration due to the Covid-19 (SAR-CoV-2) virus outbreak in China by the World Health Organisation on 11 March 2020. In response to the pandemic in many countries worldwide, schools were closed. This occurred suddenly, giving school communities limited time to prepare new learning models.

Schools were also locked down in Slovenia; teachers across the entire educational system (and everyone else) were forced to switch overnight from traditional teaching, face-to-face, to distance or online learning. While PSTT receive relevant competent knowledge at the postgraduate study level and are therefore trained for introducing and teaching students at primary/secondary school level using online/blended learning, PSTT at the undergraduate level still do not have this knowledge. During undergraduate teacher education programme studies, they have compulsory pedagogical practice in the 3rd and 4th years.

With the pandemic declaration, education providers in different countries received different instructional guidance. One of the first and the most in-depth forms of guidance was made by UNESCO INRULED and the Smart Learning Institute of Beijing Normal University (SLIBNU) on 15 March 2020. They published a handbook on the promotion of flexible learning during educational disruptions, which provides guidelines and guides for teachers in the new situation (Huang et al., 2020). In China, the Chinese Ministry of Education launched an initiative named 'Disrupted Classes, Undisrupted Learning'. Its purpose was to provide flexible online learning from theory to vivid examples and touching stories based on millions of teachers and students. In Slovenia, at the start of the pandemic, government institutions did not provide any model guidance for teachers about the transformation of the learning process. The Ministry of Education, Science and Sport set up a single online entry point (www.sio.si) to support teachers in conducting distance education. This point provides access to various online classrooms, e-learning materials, video conferencing, and similar tools for distance learning purposes. ARNES, the Academic and Research Network of Slovenia, also set up a new video conferencing service, Arnes VID.

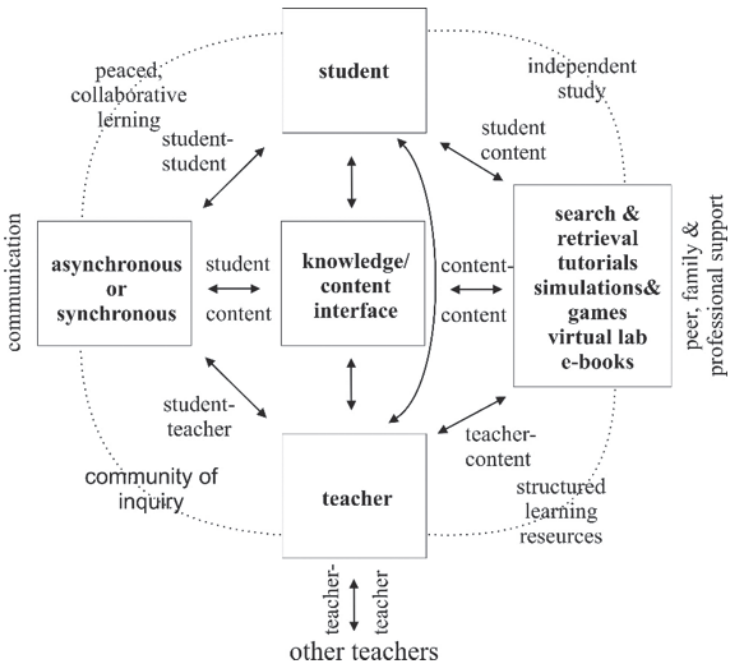
Online learning models

Online learning models originate from distance learning's first-generation model, also known as the 'correspondence model' (Peters, 1994). Print-based correspondence was conducted between the teaching staff (teachers) and participants; this is known as the classical didactic triangle. eL models for e-learning purposes further evolved. They differ according to theories of eL

(objectivism, behaviourism, cognitivism, constructivism, connectivism) and according to the target group, so-called for business eL, strategic-learning, pedagogical models, web learning models, and so on (Dabbagh, 2005; Tsai, 2009). Examples of models are the strategic eL Model (Madar & Willis, 2014), Gagne's nine events of instruction model (Gagne et al., 1998), ADDIE model (Kurt, 2017), the community of inquiry model (Picciano, 2017), among others. An overview of the eL proposed model can be found in the work of Suryawanshi and Suryawanshi (2015). Online learning models evolved with rising education technology e-learning models. Anderson's Online Learning Model (Anderson, 2011) was an attempt to build a common integrated theory of online education that could subsume all other models with the exception of the face-to-face interaction in formal classrooms, Figure 1. It demonstrates the instructional flow within the two sides and represents the beginnings of the model from the distance education perspective. Anderson intended to deepen our understanding of this complex educational context.

Figure 1

Anderson's online learning model

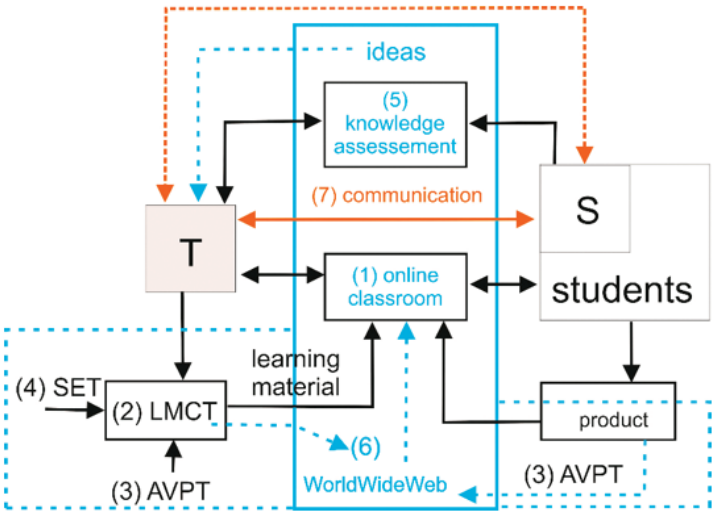


Note. Adapted from Anderson, 2011.

Anderson's model was upgraded by Bosch (2016) to the Blending with Purpose model, which is an integrated model encompassing the face-to-face component of blended learning. Recently a multimodal model that attempts to integrate the work of several other major theorists and model builders was proposed for online education in general (Picciano, 2017). It is based on pedagogical purpose and expands the blending with purpose model approach. It adds several new components (e.g., community, interaction, and self-paced, independent instruction) while focusing on online learning. In a recent study, a group of researchers developed a conceptual model to encapsulate the core processes of education provision (Orr et al., 2018). The concept originates from the theory-based design developed by Dabbagh (2005) to combine strategies, learning techniques, and pedagogy. The group focused on higher education, whereas the findings can be transferred to lower levels of education.

Figure 2

Intuitive model for online learning.



Note: T = teacher; S = student; LMCT = learning material creating tools; AVPT = audio and video processing tools and SET = specific engineering tools. Adapted from Urankar & Jamšek (2020).

Due to teachers' lack of knowledge regarding online learning models and tools, we proposed an intuitive model for online learning (Urankar & Jamšek, 2020). It is based on Anderson's Online Learning Model (Anderson,

2011) elements but designed from the teacher-user perspective of online or offline tools. The OOFAT model's open tools set dimension concept (e.g., availability, free, freeware and shareware) was considered a starting point (Orr et al., 2018). The updated proposed model is shown in Figure 2. Teachers (T) transform the theoretical lecture content into e-learning materials for students (S), which they acquire on the World Wide Web (WWW) (6) or create partially/entirely by themselves using available online tools (online or on a personal computer) (2–4). The e-learning material is delivered and explained through online classrooms (1). The knowledge acquired from the submitted e-learning materials is assessed using knowledge assessment tools (5) (questionnaires, quizzes, assignments, etc.). If a student's misunderstanding is detected, the teacher carries out audio and/or video communication (7) via online tools or ICT devices. The practical part of the teaching lesson can be translated into the presentation and evaluation of already implemented product examples or given instructions such as technical drawings and technological sheets for making products at home. Pictures or videos (V) of students' products can be uploaded to the online classroom or posted on the WWW.

The online/offline tools set is based on the knowledge of a typical in-service teacher and PSTT. For example, an in-service teacher is mastering Microsoft Office tools and the most widespread online tools with which he has already become acquainted (e.g., YouTube). For the PSTT, tools used during their study are considered. The tools are given in meaningful sets (1–8) according to the model shown in Figure 2: (1) online classrooms tools, (2) e-learning materials creating tools, (3) audio (Af) and video (Vf) processing tools (incorporating capturing and recording functions) tools, (4) specific engineering tools (SET), (5) tools for knowledge assessment, (6) learning content online publishing tools, (7) online video meetings tools and (8) other tools.

(1) **Online classroom tools** are derived from the e-learning management systems into what we know today as 'learning platforms', which provide the possibility of creating and organising/delivering assignments and other e-learning materials, providing feedback information and simple teacher-student communication and more. Arnes is the most widespread online classroom in Slovenia. International, free of charge, learning platforms with a longer appearance include Edmodo, Beenpod, Goclass and newer popular alternatives such as Schoology, Canvas, Google Classroom (new.edmodo.com; beenpod.com; goclass.com; schoology.com; learn.canvas.net; classroom.google.com).

(2) **Learning materials creation tools (LMCT)**. The most basic tools come from Microsoft Office (MS) tools, specifically Word and PowerPoint

(PP). Word can easily generate .pdf documents. PP is much more suitable for the preparation of e-learning materials. In addition to text, pictures and graphs, it allows the insertion of Vf and Af recordings and the creation of animations, as well as user-interactive options. With time-bound animations of playing pictures, Vf, or Af explanations, the delivery of e-learning materials is similar to a step-by-step explanation in the classroom. This way, we can achieve a higher student motivation for the content. Students can view individual slides at their own pace and take time to think, write notes, and similar. Video clips available on YouTube have an advantage compared to PP in greater accessibility, using a range of different devices (computers, phones, tablets, etc.) that have internet access. Students do not need a PP viewer; they can stop the Vf, playback or play it in slower or faster motion, but this is not comparable to PP slides viewing at your own pace.

(3) **Audio and video processing tools (AVPT)**. Watching Vf and listening to the given explanation is more appropriate for students to observe what is happening than to read the subtitles. The following are some of the most widely used and freely available tools among students (OBS, Geforce experience, Bandicam, Speechnotes, Adobe Premiere, Audacity) (obsproject.com; nvidia.com; bandicam.com; speechnotes.co; adobe.com; audacityteam.org.). OBS, Geforce experience, and Bandicam enable high-performance recording from cameras and other outdoor units as well as on-screen events. It can write the spoken text from the video in written form. Original language transcript can be further copied into a web translator and translated. We read the text and transcribe the audio recording of the original video. It can be, for example, from YouTube. These tools allow basic video processing, whereas Adobe Premiere is an example of a more powerful tool. The edited videos are built into educational video material. Audacity is a target tool for recording and editing audio sounds from various external devices and other media. It is easy to use, allows eliminating unnecessary soundtracks and removes noise. It allows you to export files in various formats. Audio files, for instance, explanations of what is happening in the flow of a hydroelectric power plant, can be inserted in the PP presentation.

(4) **Specific engineering tools (SET) relate to the professional fields of mechanical and electrical engineering.** For the primary school level, we provide useful tools for the field of mechanical engineering that enable technical documentation (CiciCAD, Qcad, freeCAD, Google Sketchup and Solid Edge) and some tools related to the electrical circuits (Edison,

Crocodile Clips, Yenka and Phet) (cicicad.si; qcad.org; freecadweb.org; sketchup.com; solidedge.siemens.com; edisonlab.com; crocodile-clips1.com; yenka.com; phet.colorado.edu). QCAD has been translated into the Slovenian language, but it is available free of charge only for a trial duration, while the professional tool Solid Edge is free for educational purposes without truncated features. The Edison tool is free for the trial period. Its main feature is two work surfaces, one with models of real building blocks of electrical circuits and the other with electrical symbols that one can connect into a schematic diagram. Many gauges can be added. There is a truncated version in the Slovenian language, in which the circuit is not shown with symbols and has only a limited number of components/elements. Crocodile Clips is a tool targeted at primary school students. It enables the creation of simulations of electrical circuits operation (including some machine elements). The software is easy to use and enables graphical plotting of the observed parameters. Yenka is an upgraded version of Crocodile Clips simulations. It is a free software tool with no time limits. Electrical circuits can be assembled with real 3D models of electrical components or with symbols of individual electrical elements. The operation of the assembled circuit can be saved as a working simulation. The Phet tool provides online simulations targeted for science and offers a virtual lab. Example of online simulation: depending on the conditions of the electrical parameters in the closed circuit, the light bulbs turn on with different brightness levels not only in the on/off state.

(5) **Knowledge assessment tools**. There are many different tools available on the World Wide Web. The following are just the three most commonly used, free tools with different usability domains (Google Forms, Kahoot, Quizizz) (docs.google.com; kahoot.com; quizizz.com). Google Forms is the most widely used tool developed for multiple operating systems and for mobile phones and tablets. With the created surveys, quizzes, assignments, we can easily gain insight into the understanding and knowledge of students. We can generate many different question types. Forms can be designed by adding images, videos, logos, copying, moving, creating paragraphs, enabling logical skipping of questions. Responses to completed forms are collected in an ongoing, transparent and automatic basis in the form of response data and charts. The collected data can be further analysed. Kahoot is a tool for composing quizzes. It is most suitable for checking the understanding of knowledge during regular school lessons as it provides immediate feedback to the teacher. Quizzes in other applications are more suitable for consolidating

knowledge (e.g., 1ka or quizzes in Google Forms), where there are several options for creating different types of questions that students solve individually. The created quiz can be shared with students with code or through portals such as Google Classroom, Remind, Canvas, Schoology, MS Teams and Twitter.

(6) **Learning content online publishing tools**. We can use various web portals to collect and share the created materials. The best known is YouTube, although Arnes Video was recently created for educational purposes (YouTube.com, video.arnes.si). Furthermore, one can use the Padlet tool, which allows "sharing; for instance. a group of students can share the collected materials (for instance: product pictures, tests, video contributions, etc.).

(7) **Online video meetings tools**. In particular, two tools have been introduced for educational purposes, MS Teams and Zoom (teamsdemo.office.com, zoom.us), which are available free of charge for educational purposes in truncated versions. MS Teams has been developed for computers and mobile devices. Participants can conduct web meetings, video conferencing (up to 250), video and voice calls, chat, screen sharing, file sharing, instant messaging and set wallpapers. It offers the ability to add many different applications, messaging and receiving assignments, grading, recording meetings, whiteboard writing, adding various web applications, and similar. The tool breaks down online learning and can also be used as an online classroom. Another tool is Zoom. The free version has a time limit for video conferencing meetings and the number of meeting participants. The paid version allows more features for more enjoyable and efficient online learning.

(8) **Other tools**. There are three tools included in this group. The first, Pinterest (pinterest.com), is dedicated to finding ideas for making learning materials. Another, already mentioned, YouTube, is a tool that teachers like for making their teaching materials public. The tool We-transfer (wetransfer.com) is intended for transferring larger files. These are often longer video files of higher resolution.

A study (Lebeličnik et al., 2015) categorising online learning activities according to the principles of the Universal Design for Learning (UDL) model and examining the use of ICT by students of pedagogical disciplines compared to students of other disciplines revealed a difference between them. Student teachers were more likely than their peers to use activities to create an inclusive learning environment, while non-teaching students used more sophisticated

ICT learning activities. These research findings suggest a need to promote more ICT learning activities for students of pedagogical programmes, particularly those that involve interaction, collaborative learning and planning and organising one's own learning.

Aims and research questions

Our main purpose in the present study is to analyse the level of distance learning model implementation during pedagogical teaching practice for PSTT in a situation for which neither PSTT, teachers-mentors, nor the students in the school were prepared. Due to the possibility of another pandemic and the need to implement online learning throughout the engineering education vertical, the paper's purpose is to serve as an example of good pedagogical practice. We are mainly concerned with the basic intuitive online learning model and with the evaluation of teaching practice being executed during the first and the second Covid-19 waves. To cope with education lockdown periods and study purposes, we have incorporated teaching practice into a proposed modified online learning model that best suits our needs and takes advantage of the state of primary school educational technology.

RQ1: How has Covid-19 affected the first teaching practice in the 2019/2020 academic year during 6–10 April 2020?

RQ2: How has Covid-19 affected second teaching practice in the 2020/2021 academic year during 1–24 December 2020 and 11–25 January 2021?

RQ3: Is there a difference between the first and the second pedagogical practices?

RQ4: In what ways was practical work carried out during remote lessons in both pedagogical practices?

RQ5: How did students perceive the workload during the remote teaching periods?

Method

This chapter analyses two samples of PSTT and two research instruments: a distance learning diary and a semi-structured interview. The research process is presented and described.

Participants

The research sample consisted of six 3rd year students, five of whom were female and one male aged 21, and five 4th year students, two of whom were female and three male, aged 22-23, undergraduate students.

Part one encompasses online teaching practice carried out in the 2019/2020 academic year during 6–10 April 2020 for six PSTT from the 3rd year of the undergraduate study and during 14–20 April 2020 for five PSTT from the 4th year of undergraduate study at 11 different primary schools in different parts of Slovenia (Ljubljana, Prevalje, Braslovče, Bohinjska Bistrica, Novo Mesto, Ajdovščina). All PSTT had different in-service technology teacher-mentors, who has a proper professional title (mentor or higher)m and there are enough hours of the Design and Technology subject to execute the teaching practice requirements.

Part two encompasses online teaching practice carried out in the 2020/2021 academic year during 1–24 of December 2020 and 11–25 of January 2021 for five PSTT from the 3rd year of the undergraduate study, and eight PSTT from the 4th year of undergraduate study at 13 different primary schools in different parts of Slovenia (Ljubljana, Prevalje, Bohinjska Bistrica, Novo Mesto, Ajdovščina, Trzin).

PSTT from the Faculty of Education of the University of Ljubljana participated in the study, completing online teaching practice at primary school regarding Design & Technology-related compulsory/optional subjects. In traditional, face-to-face teaching practice for 3rd and 4th years PSTT, during the spring period, the required scope of teaching practice is at least five learning performances and one learning performance during the winter period. One learning performance includes making a lesson plan for one lesson unit, the mentor teacher's previous observation, and the implementation of the lesson plan. All teaching practice activities are given in an electronic document report as a teaching practice diary that will serve as an instrument for gathering data.

Sample size encompasses all together 56 lesson plan activities from submitted teaching practice diaries from PSTT for the compulsory primary school Design and Technology subject for students aged 12–15 years at 15 different primary schools in different parts of Slovenia carried out during online teaching practice by a total of 11 PSTT and 16 in-service technology teacher-mentor in the academic years 2019/2020 and 2020/2021.

Instruments

The research was conducted using two research instruments: a diary of students' pedagogical practice and a semi-structured interview with each student. PSTT pedagogical practice diaries were analysed during two periods when the pedagogical practice was conducted remotely: April 2020, December 2020, and January 2021. The entries in the practice diary are a collection of information about the student's online activities, the use of online tools, the

advantages and disadvantages of didactic distance learning with web applications/animations, videos, and all other online tools.

Our empirical study investigates our recently developed intuitive model for distance learning. It will enable determining the level of distance learning model implementation during obligatory pedagogical teaching practice for PSTT. The intuitive model is described, and relevant distant e-learning models are given.

The research methodology is as follows. Diary encompasses all activities that were executed during teaching practice in detail. These activities can be divided into three subgroups: teacher's observation, lesson plan making, and lesson plan implementation. Lesson plans will be divided according to cognitive taxonomy objectives into three types: conceptual understanding, fluency/procedural skills and application. According to the Design and Technology curriculum, lessons types are evenly represented. We assume that online learning can result in one predominant lesson type. Furthermore, distance learning model elements will be determined in lesson plan making and implementation activity. All activities will be further evaluated with regard to online/offline learning tools from e-learning platforms to engineering education field-specific tools explained in detail in the followed. For quantitative description, only basic statistics will be used (sum and percentage), whereas for qualitative description, the intuitive distance learning model applied to the teaching practice diary content will be used. Pedagogical practice activities are equated to implementing traditional teaching practise lesson plans.

A semi-structured interview was conducted with each student to obtain additional information or opinions about the implementation of pedagogical practices for teaching engineering and technology through distance education. Students answered nine open-ended questions: specifics of communication and collaboration with the teacher-mentor, ways of gathering information for learning content preparation, difficulties in finding and installing new online tools on their computers, specifics of learning new online tools for learning content preparation, specifics of each online tool, success of targeted learning content preparation with newly introduced online tools, teacher-mentor satisfaction with student learning preparation, student satisfaction with prepared learning content and distance education, and much more that students wanted to share. Students answered the questions without any time limit via the MS Teams portal.

Data analysis

In order to monitor the implementation of the pedagogical practice and distance learning, a new structure of the pedagogical practice diary was created just before the start of the pedagogical practice. The analysis of the final version

of the submitted diaries of pedagogical distance practice for students of the 3rd and 4th years of the Technology study programme took place after the submission of the diaries for review and evaluation.

The second part of the study consists of semi-structured interviews with all 3rd- and 4th-year students who completed the pedagogical practice via the familiar MS Teams online environment. Immediately following completion of the pedagogical practice, interviews were conducted with 3rd-year students on 21 April 2020. Interviews with 4th-year students followed on 22 April 2020.

The study was conducted using a descriptive method of educational research. A mixed-methods research approach was used for the analysis. The analysis of the pedagogical practice diaries was quantitative, and the semi-structured interviews' analysis was qualitative. A qualitative research approach is used to analyse the data obtained from data collection techniques: pedagogical practice diaries and semi-structured interviews. The analysis of pedagogical practice diaries in distance education is an independent data collection technique.

Results

The results are presented in the following order. First, the participants are given, followed by a description of the gathered data sample. Collected teaching practice diary data are divided and presented in two parts. The parts partition is timed. During the first period, in-service technology teacher-mentors did not obtain any guidance. Teaching practice was independently under in-service technology teacher-mentor mentoring, considering only school pandemic directives. During the second period, in-service technology teacher-mentors were given directions to guide teaching practice towards an intuitive online learning model.

Tables 1-3 show the main teaching practice diary data. All diary data are presented according to activities (first column), divided into Teacher's Observation, Lesson Plan, and Other. In traditional, face-to-face teaching practice, the student would first observe an in-service technology teacher-mentor lesson implementation before making his/her own lesson to continue the observed lesson. For this purpose, the Lesson Plan column is divided into subcolumns for making and implementing. Under the Lesson Making subcolumns are content material, attachment, and lesson type. The content material number shows how many different toolsets were used. This number is further broken down in Tables 2 and 4 according to distance learning model elements to toolsets (1–8) defined under the Introduction and context sections. The attachment column in Tables 1 and 3 tells us how many lessons topic supporting materials were

prepared, whereas lesson type indicates the objectives' taxonomy level. Under lesson implementing columns are webinar lesson and knowledge assessment. Online/offline tools from the toolsets (1–8) are given here. Under the last column in Tables 1 and 3, Other, only information regarding how the activity was performed between teacher/mentor/students according to the intuitive distance learning model is given (e.g., by using a personal computer, smart mobile phone, or other ICT device).

Results for the first teaching practice period are shown in Table 1. There was only 14% out of the expected 100% teacher's observation activities. Half of them were not related to any lesson plan activity, which would be otherwise expected. In most cases (88.4%), PSTT were involved in making lesson plans, whereas only in 4.7% did they also perform lesson plan implementation in online contact (webinar) with the students. In an additional 7%, they were in contact with the students, assessing their knowledge by using either quiz tools or pictures together with a product. In all cases, 25 assessments consisted of 25 questions. The most common lesson type was, as expected, conceptual understanding. In 37.2% of cases, it was combined with fluency/procedural skills lesson type. The application type, which would otherwise predominate during the teaching practice, was detected only in 14% of cases.

Table 1

Results for online teaching practice for pre-service technology teachers PSTT for the first teaching practice period where content material and attachment number present several possible components.

Activity	Teacher´s Observation	Lesson plan					Other Device
		Making		Implementing			
		Content material	Attechment	Lesson type	Webinar lesson	Knowledge assessment	
1		2	3	1, 3	Zoom	Sketch, picture, product	1
2		1	1	3			1
3			1	3			1
4		4		1			1
5	1	1	1	1, 2		Quiz (25)	1
6		1		1			1
7; 8		2	2	1, 2			1*
9; 10		2	2	1, 2			1
11		2	2	1, 2		Quiz (25)	1

Activity	Teacher´s Observation	Lesson plan					Other Device
		Making			Implementing		
		Content material	Attechment	Lesson type	Webinar lesson	Knowledge assessment	
12		1	4	1			1
13	1	1					1
14			3	3			1
15	1	1	3	3			1*
16	1						1
17; 18		3	1	1, 2			1
19; 20		4		1			1
21; 22; 23		5		1			1
24; 25		5	3	1, 2			1
26		5	2	1, 3		picture, product	1
27		2	3	1, 2			1*
28; 29	1						1
30; 31		4	1	1			1
32		2	3	1			1
33		5	4	1			1
34		5	2	1, 2			1
35		3	1	1			1
36; 37		4	2	1			1*; 1
38; 39		2	1	1			1
40		4	2	1, 2	Zoom		1*
41; 42		4	2	1, 2			1
43		3	2	1, 2			1
Sum	6	38	32	35(1); 16(2); 6(3)	2	4	43(6*)
%	14,0	88,4	25,6	81(1); 37(2); 14(3)	4,7	9,3	100(14)

Note. Lesson type 1 = conceptual understanding; 2 = fluency/procedural skills; 3 = application and * = smart phone.

Table 2

Teaching practice for pre-service technology teachers PSTT during the first teaching practice period.

Activity	Lesson plan making									
	Content Material						Attachement			
	Text	PPT	Pictures	Video	Websites		WS/I	Questi-onnaries	Product Sketch	Engineering specific
					W1	W2				
1			6		6		1		1	E1(2)
2					3					E1(1)
3										E1(1)
4	1	1	8		3	3				
5					6	3		Q1		
6	1				4	2				
7				V1, V9, V12	3	2	1			E7(1)
8	1	1		V3(1)			1	Q3		
10				V3(2)				Q1		E1(1)
9; 11	1				10; 11	0; 4		Q2(2)		
12				V5(1)				Q2		E5(3)
13					10					
14								Q2	1	E6(1)
15				V1(1)			1	Q3(2)		E6(1)
16	/									
17	1	1	3					Q2		
18	1			V3(1); V4(2)	1	1				E7(1)
19; 20	1	1	9; 10;		9; 8;					
21; 22; 23	1	1	5; 30; 35	V3(1;1;1); V4(1;1;1)	2; 12; 25	0; 0; 4				
24	1	1	12	V3(1); V4(2)	3			Q4		
25	1	1	15	V3(1)	12		1	Q5		
26	1	1	12	V3(1)			1		1	
27			6		5			Q2		E3(2)
28; 29	/									
30	1	1	3	V3(1)	5					
31	1	1	12	V4(2)						
32		1	33				1			E2(1); E8(1)
33	1	1	35	V3(1)	11		1	Q5		E7(1); E8(1)
34	1	1	17	V3(1)	12			Q5(2)		
35	1			V6(1); V7(1); V8(1)	10	5				
36	1		1	V2(1); V3(1)	10	3			1	

Activity	Lesson plan making									
	Content Material							Attachement		
	Text	PPT	Pictures	Video	Websites		WS/I	Questi-onnaries	Product Sketch	Engineering specific
					W1	W2				
37	1	1		V3(3); V9(3); V10(3); V11(3)	7	4		Q6(2)		
38; 39			1; 12		3; 8;					
40; 41; 42	1	1		V1(1;0;0); V2(0;1;1); V3(10;0;1); V9(1;1;0); 10(1;1;0); V11(0;1;0)	17; 5; 8;	7; 2; 2,		Q6; Q1; Q6		E4(1;1;0); E10(0;0;1)
43	1	1			5	3		Q6		E8(7)
Sum	26	21	20	22	30		8	19	4	16
%	60,5	48,8	46,5	51,2	69,8		16,6	44,2	9,3	37,2

Note. Table 1 break down results for making lesson plan section where: PPT = Powerpoint tool; WS = worksheet; I = instructions; Vi = video tool; Wi = web site; Qi = questionnaire tool; Ei = engineering-specific tool.

Table 2 shows a breakdown of Table 1 for making the lesson plan section. It presents the lesson plan structure. Lesson plans in 60.5% of cases consist of a text document covering lesson content that is supplemented by PP presentation in 48.8%, pictures in 46.5%, Vf in 51.2%, and websites in 69.8% of cases. Eleven different video tools were used: V1 – smartphone application; V2 – Dictaphone; V3- PPT; V4 – Loom; V5 – Bandicam; V6 – Speechnotes- transcript; V7 – Adobe Premiere Pro CC 2017; V8 – Adobe Audition; V9 – Audacity; V10 – Nvidia GeForce Experience and V11 – ShotCut. The number in parentheses indicates how many video clips were used for the lesson plan, ranging from 1 to 10. In most cases, one video clip is used. Website supplementation for lesson plans can be divided into two distinctive usages: as YouTube videos or other websites relevant to the content, but videos are not predominant. The numbers in website column W1 tell us how many different URLs (Uniform Resource Locator) were used, and in column W2 how many YouTube videos were shown. Typically, one webpage was selected and more YouTube videos, up to 25. Worksheets that supported lesson content delivery were prepared in 16.6% and questionnaires in 44.2 % of cases. Six different tools for making questionnaires for teaching lesson educational objectives achievement level were used: Q1 – Kahoot; Q2 – Google Forms; Q3 – Quizziz; Q4 – Word; Q5 – PPT; Q6 – 1ka; Q7 – Mentimeter; Q8 – H5P and Q9 – Scratch where the Google Forms were the most often used. Students were making products during the implementation of the teaching lesson in 9.3% of cases, and SET were used in 37.2%. These tools were: E1 – SolidWorks;

E2 – Solid Edge; E3 – Phet; E4 – Yenka; E5 – Crocodile Clips; E6 – Qcad; E7 – Edison; E8 – Gimp; E9 – Open Board and E10 – PP.

Results for the second teaching practice period are shown in Table 3. There were no teachers' observation activities. In all the cases, PSTT were involved in making lesson plans, and almost half of them (46.2%) also implemented the prepared lesson plan mainly using Zoom. The percentage for knowledge assessment is much higher in this case (53.9%). The most commonly used tool was Sketch. The predominant lesson type was conceptual understanding combined with fluency/procedural skills (38.5%). In 30.8% of cases, lesson types were combined with an application type. For teaching practice purposes, PSTT were using personal computers in all cases and only in 12.5% did they combine it with a smartphone, as shown in Table 1 and Table 3.

Table 3

Results for online teaching practice for pre-service technology teachers PSTT for the second teaching practice period where content material and attachment number present several possible components.

Activity	Teacher´s Observation	Lesson plan					Other Device
		Making			Implementing		
		Content material	Attechment	Lesson type	Webinar lesson	Knowledge assessment	
1		5	3	1, 3		Sketch	1
2		5	2	1, 2, 3		Sketch	1
3		5	1	1, 2	Zoom		1
4		5	1	1	Zoom		1
5		5	3	1, 2	Zoom		1
6		5	3	1	Zoom		1
7		5	3	1, 2		Word	1
8		4	3	1, 2			1*
9		5	3	1, 2			1
10		4	4	1, 3		Sketch	1
11		3	2	1	MS Teams	Quiz	1
12		2	2	1, 3	Zoom	Sketch	1
13		2	2	1		Quiz	1
Sum	0	13,0	13,0	13(1); 6(2); 4(3)	6	7	13(1); 1(1*)
%	0	100,0	100,0	100(1); 46(2); 30(3)	46,2	53,9	100(1); 7,7(1*)

Note. Lesson type 1 = conceptual understanding; 2 = fluency/procedural skills; 3 =application and * = smartphone.

Table 4 shows Table 3 break down for making lesson plan section. It presents the lesson plan structure. The lesson plan in 84.6% of cases consists of a text document covering lesson content supplemented by a PowerPoint presentation in 84.6%, pictures in 76.9% and video clips in 76.9% of cases, and websites in all the cases. Five different video tools were used: V3 – PPT; V12 – Screencast-O-Matic; V13 – Gimp; V14 – H5P, and V15 – Scratch. From 1 to 10 video clips were used for the lesson plan. In 60% of cases, three or more videos were selected. A website supplementation was present in all cases. In 84.6% of cases, two websites were selected with an additional 1 to 12 YouTube videos. Worksheets for lesson content delivery support were prepared in 84.6% of cases and in the same percentage for questionnaires. Six different tools for making questionnaires were used: Q2 – Google Forms; Q4 – Word; Q5 - PPT; Q7 – Mentimeter; Q8 – H5P and Q9 – Scratch. Word tool was the most often used. Students were making products only in one case. Specific engineering tools were used in 23,1 %. These tools were: E1 – SolidWorks; E6 – Qcad, and E9 – Open Board.

Table 4

Teaching practice for pre-service technology teachers PSTT during the second teaching practice period.

Activity	Lesson plan making									
	Content Material							Attachement		
	Text	PPT	Pictures	Video	Websites		WS/I	Questi-onnaries	Product	Engineering specific
					W1	W2				
1	1	1	30			2	1		1	E6 (8)
2	1	1	10	V3(10)	3		1	Q4		
3	1	1	17	V15(10)	3	5		Q7		
4	1	1	50	V3(5)	3	3	1			
5	1	1	5	V14(3)	12	3	1	Q2		
6	1	1	18	V3(1)	4	2	2	Q5(2)*		
7	1	1	3	V16(3)	1	2	1	Q8		
8	1	1		V16(3)	1	2	1	Q8		
9	1	1	10	V17(1)	10	2	1	Q9		
10		1	1	V3(1)	2	2	1	Q2		E1 (1)
11	1	1		V3(1)	12	3	1	Q5*		
12	1				1	1		Q4*		E9 (2)
13			10		9	1	1	Q4		
Sum	11	11	10		13		11		1	3
%	84,6	84,6	76,9		100,0		84,6		7,7	23,1

Note. Table 3 breaks down results for making lesson plan section: PPT = Powerpoint tool; WS = worksheet; I = instructions; V_i = video tool; W_i = web site; Qi = questionnaire tool; E_i = engineering specific tool.

Distance learning model elements used tools are extracted from Table 1, Table 3, and teaching practice diaries for both teaching practice periods and are given in sets 1–8 according to Figure 2: (1) – online classrooms tools, (2) – learning material creating tools, (3) – audio (A) and video (V) processing tools, (4) – specific engineering tools, (5) – tools for knowledge assessment, (6) – learning content online publishing tools, (7) – online video meetings tools and (8) – other tools.

(1) **Online classroom tools**. During the first teaching practice period in 9 of 11 primary schools where online teaching practice was conducted, 82% of students used the Arnes classroom, based on the Moodle web system, while in the remaining two schools, they used their own online classrooms. During the second teaching practice period in 11 of 13 primary schools where online teaching practice was conducted, 84.6% of students used the Arnes classroom. The remaining two schools used their own online classrooms.

(2) **Learning materials creation tools (LMCT)**. To implement distance learning PSTT prepared e-learning materials for students. According to Table 2 and Table 4, e-learning materials could be in the form of PP, pictures, Vf, websites hyperlinks, worksheets, questionnaires, engineering-specific material like drafts, schematic diagrams, drawings, technological sheets, electrical circuits, and similar. Furthermore, the method of making and the type of tools used depended on the topic. For text documents, only Word was used. For slide presentations, only PowerPoint was used. Although many free tools are available, this was expected since both come in the MS Office package for which the schools have bought licences. Even for creating Vf, PowerPoint (V3) is the most frequently used by PSTT at 43.5% (Table 4). It enables the creation of simple presentations by inserting various text parts, pasted images, video and audio recordings, and prepared animations into a didactically meaningfully whole. The presentations prepared in this way were mostly passed on to the students, who were able to review the new learning contents independently, at their own pace. In 25% of cases, the produced PP presentation was exported as a Vf and passed on to the students. Students could also stop/watch the video again if necessary. Fewer students (13.5%) produced e-learning material based on Word texts with supplements (video, worksheet or engineering specific like schematic diagrams, drawing, technological sheet, electrical circuit, etc.). Most often, it is in the case of the lesson content summaries and worksheets used for new learning content introduction/acquisition.

(3) **Audio and video processing tools (AVPT)**. Vf took second place as the most essential part of a lesson plan e-learning material. According to the obtained results, PSTT used a large variety (17, specifically) of freely available tools that they learned during their studies or were advised by their mentors. PowerPoint (V3) was the most frequent AVPT followed by GeForce Experience (V12) (8.7%); Dictaphone (V2), Loom (V4) and Audacity (V11), all at 6.5 %; smartphone applications (V1), Adobe Premiere Pro CC 2017 (V9), ShotCut (V13) and H5P (V16) all at 4.3% (Table 2 and Table 4). Geforce enables high-performance recording from cameras and other outdoor units, as well as on-screen events (lectures, seminars, video conferences). The largest proportion of students used Dictaphone to record sound due to its simplicity. One student recorded the sound with a smartphone and subsequently processed it with the Audacity tool. One student recorded speech by using Dictaphone and subsequently edited it with Adobe Audition; 18 % of students used ShareX and Nvidia GeForce Experience to record full or partial screen. Individual students prepared videos with Bandicam and Loom. One student recorded the original video in English with a transcript and translation (Google Translate) in Slovenian. Just under half of the students, 45%, further processed the captured footage, mostly in Adobe Premiere, and one student did so in Shotcut.

(4) **Specific engineering tools (SET)**. Tools used for learning topics from the technical documentation were the most frequently used of the SET. PSTT used different tools: Solid works in 20%, Qcad in 15%, and Solid Edge in 5% of cases. PSTT became acquainted with the last two tools during their studies, whereas they learned Solidworks (independently or on the recommendation by their teacher mentor). In the case of learning topics related to electrical circuits, 15% of students used Yenka and 10% Edison. Phet online simulation (a virtual laboratory) and the Crocodile Clips tool were both used in 5% of cases.

(5) **Knowledge assessment tools**. To analyse the acquired knowledge and understanding level from the given e-learning material, 51,8 % of PSTT created quizzes/questionnaires as a part of the lesson plan. The most often used are Google Forms (Q2) 27,6 % followed by word (Q4) 17,2 %, 1ka (Q6) 13,8 %, PPT (Q5) 13,8 %, Kahoot (Q1) 10,3 %, H5P (Q8) 6,9 %, Mentimeter (Q7) 3,4 % and Scratch (Q9) 3,4 %.

(6) **Learning content online publishing tools**. The largest number of PSTT (41.7%) posted the creation of e-learning material on the ZOOM web portal; 25% of them were allowed to publish on the web portal of

Slovenian educational video content, Arnes Video; 16.6% of them posted the creation of teaching materials on the MS Teams web portal. Half that amount (8.3%) of PSTT posted the creation of e-learning material on the YouTube portal and the in-service technology teacher-mentor's Google online classroom.

(7) **Online video meetings tools**. Only a few PSTT had the opportunity to meet students via video conferencing, of which 87.5% used Zoom and 12.5% MS Teams.

(8) **Other tools**. Among the remaining relevant to lesson plan making or implementing tools, a tool for transferring larger files, WeTransfer, was used. For examples and ideas of learning content, most PSTT (92.3%) searched on YouTube.

Table 5 presents the lesson plan structure with the online tools used by students of the pedagogical study programme and the students of other study programmes who participated in the 2015 survey. Students of the pedagogy study programme provide a lesson plan consisting of a text document covering the lesson content (82%) supplemented by a PowerPoint presentation (64%) and by video/sound recordings (12%) and websites (74%). Students of the pedagogy study programme also implemented the prepared lesson plan as webinar instruction in 28% of cases, but most of them used other tools 90% of the time. Students of the nonpedagogy study programme provide a lesson plan consisting of a text document covering the lesson content in 86.4% of cases, supplemented by a PowerPoint presentation (31.8%) and by video/sound recordings (1.1%) and websites (85.2%= of cases. Students of the nonpedagogy study programme also implemented the prepared lesson plan as webinar instruction in 13.6% of cases but with the large majority (96.6%) using other tools.

Table 5

The online tools used by students of the pedagogical study programme and students of other study programmes who participated in the 2015 survey.

Students of/ %	Lesson plan - making							Lesson plan	
	Content Material					Attachment		Implementing	
	Text	PPT	Pictures	Video Sound	Websites	WS/I	Questi-onnaries	Other tools	Webinar lesson
Pedagog. Study pro-gram	82	64		12	74			90	28
NON Pedagog. Study pro-gram	86,4	31,8		1,1	85,2			96,6	13,6

Note. Students results for making lesson plans, where: PPT = PowerPoint tool; WS = worksheet, I = instruction, where the number of content material represents the percentage of use of possible text, PPT, video/audio and website content. Students' results for implementing lesson plans using possible other tools and webinar lessons, for which the number represents the percentage of use of other tools and webinar lessons. Adapted from Lebeničnik et al., 2015.

The results of the research show that PSTT, pre-service technology teachers appeared to be heavily involved in e-learning activities and used most of the online tools mentioned in the 2015 survey (online classroom, online lectures, video viewing, use of other e-learning content and videos, combined text/image/video tools, quizzes, voice recognition, One Note, Zoom, etc.) and other specific online tools.

Discussion & Conclusions

At the start of the pandemic, no clear guidelines and directives from the Ministry of Education, Science and Sport were given in Slovenia for teachers regarding how to implement distance learning (at all levels). Distance learning was new for all participating primary school students and in-service technology teacher-mentors. While attempting to overcome the online learning issues, in-service technology teacher-mentors encouraged the implementation of online teaching practice. The research results of the first phase of pedagogical practice in 2019/2020 show that PSTT were not mentored by permanent teachers of technology in the educational process in the initial phase of pedagogical practice. In-service technology teacher-mentors were directed to integrate PSTT in establishing online learning to the greatest extent possible. The most predominant PSTT engagement was e-learning material preparation, as can

be seen from Table 1. All in-service technology teacher-mentors were following the proposed intuitive learning model for teaching the subject Design and Technology. As teaching practice took place in the initial part of the online learning implementation, there was considerable confusion and many changes in the implementation. For example, in the Design and Technology subject, students received homework. At first, they had to send homework by email; then, they submitted it to the school's online classroom, and later they had to send it to the Google classroom. This resulted in uncertainty about what they had to submit and whether they had submitted it successfully.

The results show that in the second phase of teaching practice, we provided detailed instructions to technology teachers-in-training on effectively incorporating PSTT into the instructional process. In this case, they performed as the intuitive learning model suggests, which resulted in boosting online learning, which became meaningful. PSTT and in-service technology teacher-mentors recognised its values and advantages. The level of distance learning model implementation was found to be reached in all the separate elements, but only in 15.4% of cases was the model fully implemented. Compared to the first teaching practice phase, we could observe a difference: 25% fewer technical drawings, 30% more web pages included in the lesson plan, 150% to 200% more time dedicated to all activities related to e-learning material preparation, 200 % to 300 % more prepared attachments to the lesson plan, such as worksheets and questionnaires, 150% more published e-learning materials, 500% more webinars performed and 600% more homework assessment. During online learning, the predominant lesson type was conceptual understanding, which is not the case during normal teaching practice conditions. Lesson plan objectives were set at lower taxonomy levels as lessons were based on using more deduction methods in which students only listen to and/or read lesson material.

The research results show that the disadvantages of online learning were present. PSTT found that it was more difficult to follow online learning for less able students and students with special needs, which was reflected in a lower level of motivation to learn. They lacked guidance and additional explanation; only a few of these students had family support. While independent literature study is self-evident to PSTT, it was something new for students. Capable students were less likely to have problems with online learning than other students who already needed more explanation under normal circumstances. Not all students had equal access to ICT. Some students were left to fend for themselves; some had the help of family. It turned out to be important that the e-learning materials for students were given in the Slovenian language. In the knowledge test, the questions/tasks with image support were better understood and resolved.

In the practical work specific to the subject of design and technology, the results show that despite the restriction of materials and tools accessible at home, some advantages were seen. Publishing and sharing images/videos of students' products raised their work motivation. Parents' help and cooperation and significantly improved student products were observed in cases in which well-equipped home workshops were available to students.

Slovenian teachers were significantly forced to produce teaching materials than, for example, English-speaking teachers in Ireland. The latter mostly benefited from an extensive database of already produced materials. They also had extensive work guidelines after only one month from the start of the pandemic (Burke & Dempsey, 2020).

According to the studies overview done by Orr et al. (2018), it was observed that a large majority (92%) of all distance and online education studies conclude that distance and online education is at least as effective, if not better, than traditional education. Around 3% of the studies show that the traditional face-to-face format is more effective, and the remaining studies cannot demonstrate improvement (Nguyen, 2015). These studies, however, show that the rigorous methodology of the earlier ones is lacking. In terms of high standard meta-analyses, Means et al. (2010) found a positive but small significant difference in favour of online learning. Lack (2013) concluded that there is not enough evidence one way or another. Means et al. (2013) reported that the advantage of online learning over face-to-face classes was significant in those studies contrasting blended learning with traditional face-to-face instruction but not in those studies contrasting purely online with face-to-face conditions.

The research results show that PSTT believes that online learning will never replace genuine face-to-face conversation with students; however, they have realised the true importance and applicability of the technology in all possible areas of our lives. In the context of teaching practice, we observed for the first time the emergence of collaboration between PSTT and in-service technology teacher-mentor as PSTT were more technologically and ICT literate. The consequence of such collaboration was the higher quality of the learning material produced, which played a key role in this situation.

PSTT covered distance/online learning and blended learning in the 1st year of the postgraduate teacher study programme at the Faculty of Education of the University of Ljubljana. They are fully trained for distance learning execution, whereas PSTT of the undergraduate teacher study programme are not. This is also why only basic, well-known tools that enable distance learning model elements were mostly used. During the first teaching practice period, in-service teachers obtained only some general directives regarding distance

learning from the Ministry of Education, Science and Sport related to the type of portal, webinar, and e-learning material they could use. However, suggested e-learning material for the technology domain was unavailable due to the Institute of Education site being under construction. The results of our study suggest that only a clear guide with instructions for in-service teachers to enforce new learning methods, such as online learning, could have been successful during the Covid-19 pandemic.

The results of our study show that by adopting the intuitive distance/online learning model, in-service technology teacher-mentors and PSTT became aware of the benefits of this learning method and the need to modernise traditional teaching. Covid-19 pandemic is beneficial for teaching modernisation toward blended learning. Only with modern learning strategies does modern educational technology gain meaning and immeasurable potential for motivating students. The findings can be applied to the engineering education domain regardless of education level for regular teaching/learning purposes to enable a more robust education process if the pandemic repeats in the future.

Limitations of the research: it would be useful to increase the sample of the research and include the performance of pedagogical practice of students from other Slovenian universities and present the results of foreign universities; it would be useful to conduct a structured interview to better generalise the results; since the epidemic is an exceptional state, not all invited teacher-mentors chose to conduct distance learning placements with students, the future teachers of technology.

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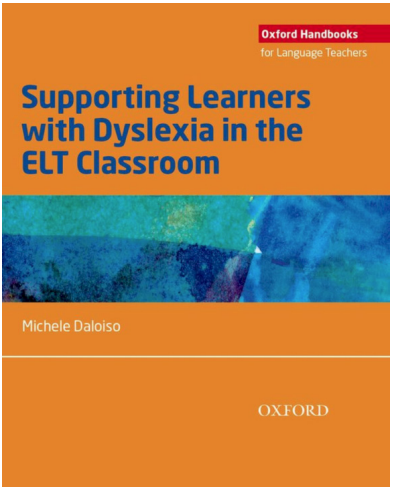
Michele Daloiso, *Supporting Learners with Dyslexia in the ELT Classroom*, Oxford University Press, 2017; 213 pp.: ISBN 978-0194403320

Reviewed by Alma Žero[1]



With estimated prevalence rates ranging from as low as 4–8% to as high as 17–21% (Elliott, 2020), dyslexia has become an indispensable aspect to consider in developing inclusive education policies and practices, encompassing all subject areas and in particular English language teaching (ELT). Lack of support for learners with dyslexia may result in reduced self-confidence, lower academic achievement, and a higher risk of unemployment (APA, 2013), which makes the book *Supporting Learners with Dyslexia in the ELT Classroom* by Michele Daloiso both timely and necessary. The book is intended for all ELT contexts, but the author uses the EFL classroom as an example, as will we. The book is divided into six chapters. The first three chapters outline theoretical perspectives and methodological guidelines, while the last three look at the practical implications, with selected activities for the teacher. As the author embraces the neurodiversity paradigm, it eventually guides the methodological rationale for the discussed suggestions and strategies in the book, helping teachers shift their attention from learner difficulties to learning barriers in the EFL classroom.

Furthermore, the author contextualises each chapter through the story of Marcos, a Spanish-speaking EFL learner with dyslexia, whose life we follow from birth to high school. His experiences are presented in episodes that serve as introductions to the contents of the chapters. The reader is thus invited to critically reflect on learning and teaching implications even before reading the chapter in question.

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Chapter 1, titled *Literacy and dyslexia: an overview*, underscores essential concepts and paradigms in understanding the nature, features and causes of dyslexia, including its impact on the EFL learning process. The author starts by challenging the reader's beliefs about dyslexia through a short survey, emphasising that recent and uneven acknowledgement and identification of dyslexia across countries gave rise to numerous persisting misconceptions and common stereotypes. Instead of providing a variety of definitions of dyslexia, the author focuses on personal stories and definitions provided by learners themselves, following a more natural writing approach with a language that is more understandable to the reader. In addressing the causes of dyslexia, Daloiso relies on the so-called 'causal modelling framework' (Frith, 1995; Morton & Frith, 1995) (p. 31) with three underlying levels: biological, cognitive, and behavioural. However, the reader is encouraged to reflect on the contextual aspects at each of the three levels as the environment (considered from society, school, and classroom perspectives) is perceived as crucial in influencing learners with dyslexia. This view aligns with the social and interactionist models in understanding dyslexia and the human rights-based approach to inclusive education (see Nijakowska, 2020; UNICEF, 2012).

Furthermore, the reader is introduced to the relevance of Brunswick's (2010) cross-linguistic research in exploring the varied incidence of dyslexia across countries. Namely, 'orthographic depth' (or the degree to which a written language deviates from one-to-one sound-letter correspondence) plays a significant role in the estimated prevalence of dyslexia in learners; in fact, English has the deepest orthography and the highest number of people with dyslexia compared to orthographically 'shallower' languages. This section corroborates the claim that the linguistic aspect of dyslexia becomes much more evident when learners engage in learning English as a foreign language.

In Chapter 2, *Dyslexia and English as a foreign language*, the reader is introduced to emotional, cognitive, and linguistic factors that impact the learning process of an EFL learner with dyslexia. We would like to highlight a few useful choices that the author makes in explaining the topic of this chapter. First, the focus on motivation from the stimulus appraisal theory perspective and not simply as 'rational willingness', offers a much more in-depth introduction to the emotional factors that are pivotal for EFL learners at the beginning level. Second, in discussing 'cognitive load', the author draws our attention to the ever-present tension between the top-down and bottom-up approaches to teaching receptive skills in the EFL classroom. 'Learners with dyslexia can experience difficulties with bottom-up processes [leading to cognitive overload] that, in turn, can eventually affect access to top-down processes if no support is

provided' (p. 51). Third, the foreign language curriculum should no longer overlook the significance of metacognitive skills that EFL learners with dyslexia can use to compensate for their linguistic difficulties. In addition, the author contextualises the chapter by providing extracts of interviews with learners with dyslexia about the difficulties they experience at the emotional, cognitive, and linguistic levels. However, it is much appreciated that Daloiso also focuses on the EFL teacher and how the teacher's methodological choices may cause more barriers for learners with dyslexia, even when well-meant. It is an important issue in foreign language education to be addressed more frequently and in greater detail. In addition, observation is highlighted as key in providing appropriate accommodation to learners with dyslexia, which is why the chapter offers several observation tools for teachers.

Chapter 3, titled *Methodological guidelines for accessible language teaching*, slightly departs from the previous two chapters by exploring more practical concepts, in particular, the Language Teaching Accessibility Theory (LTAT), a framework of reference for language teachers that informs the design of accessible learning environments. Addressing Michael Moore's (1989) research, the author evokes Vygotsky's constructivist approach to explain the role of the EFL teacher as a mediator facilitating the interaction between the student and the target language, where certain difficulties may arise for learners with dyslexia. A member of the DEAL research group (University of Venice, Italy) that developed the LTAT, the author takes us through the 'macro-level' of methodological choices and teaching approach in a language course and the 'micro-level' of specific interventions in single units of the language course—all with the purpose to make the EFL classroom more accessible. A highly useful section of this chapter relates to general principles for accessible teaching practice, reminding the reader of the importance of structured EFL lessons, adjustment to suit learner needs, efficient differentiation, and multimodality in terms of multisensory and multimedia instruction. Teachers are also invited to reflect on their personal experiences as learners and on their former teachers' choices in ELT, with the aim to challenge potentially unexplored beliefs about language learning that may set barriers for EFL learners with dyslexia. With numerous ELT methodologies, Daloiso investigates the strengths and weaknesses of three common approaches (structural, communicative, and formative-communicative) that, according to the author, influence the market of today's EFL textbooks. To illustrate, although the opportunity to process grammar explicitly is a particular advantage of the structural approach in teaching EFL learners with dyslexia, other neo-behaviourist connotations can be frustrating such as the presentation of language in a mono-sensory way, the underestimated

importance of phonological and orthographic awareness, and the over-emphasis on grammatical correctness. The last part of the chapter discusses the impact of the classroom climate on accessible environments and suggests practical ideas to promote awareness of learning diversity in the EFL classroom.

Chapters 4–6, titled *Working on sounds and letters*, *Developing communicative skills*, and *Accessible language testing and assessment*, respectively, move from theory to practical suggestions and activities in supporting learners with dyslexia in the EFL classroom. In Chapter 4, the author focuses on phonology and orthography. The reader is introduced to implicit and explicit phonological awakening and the importance of an integrated approach when working with EFL learners at a very young age. Some takeaways are a section dedicated to storytelling from the interactionist perspective, a view most often neglected in ELT and yet most useful not only to children with dyslexia but all learners, and the 'sounds syllabus', a unique strategy that supports the development of phonemic awareness in learners but also compensates for the lack of time and space to design a comprehensive phonological program in the ELT classroom. Chapter 5, in contrast, integrates receptive and productive skills and discusses practical ideas to support learners with dyslexia in communication-oriented work. Daloiso provides suggestions for developing technical and strategic learner skills in listening, reading, writing, and speaking, a usual component in teacher education programs that often raises several conflicting questions among EFL teachers. However, both inexperienced pre-service teachers and experienced practising teachers are given the opportunity to make specific connections and reflect on viable choices throughout the chapter. Finally, a most critical area in ELT seems to be assessment, which is also the focus of the final chapter in this book. The author draws attention to the interrelatedness of assessment procedures and policy/school regulations, which sometimes limit the teaching and set barriers to the learning process. Common ELT methodologies are evoked to explain different types of accommodations and modifications in classroom-based assessment and official examinations, which could be a slight limitation to understanding the changing roles of assessment in schools. However, we believe that the shift to formative strategies in this section, such as self-evaluation, exemplifies inclusive practices in the form of personalised EFL teaching that allows the development of self-regulated, confident learners.

In the end, we would like to commend the author who, with academic yet readable language, neatly explains the book's topic in a structured and relatable way. The summary maps placed at the end of each chapter are a terrific visual tool in guiding the reader through the chapter, thus providing an actual practical example to be used with trainees with dyslexia in initial and

continuing teacher education. The experiential model used throughout the book in engaging the reader to analyse the topic is both convenient and valuable as it humanises concepts that sometimes seem to be covered much too distantly, almost in isolation, from the real-life context. We are invited to think about the concept of diversity itself since the author emphasises EFL areas of difficulty for both learners with and without dyslexia. The only suggestion we would have for future editions would be for the author to add personal narratives from a researcher's point of view, considering that Michele Daloiso is a member of a renowned research group that explores language teaching and learning methodologies with extensive experience that could further challenge the reader. However, an exhaustive academic endeavour, the book is certainly a most useful resource to all engaged in the topic but especially to foreign language teacher educators as it provides a methodological framework of reference that can be used in both initial training and continuing professional development programs across contexts.

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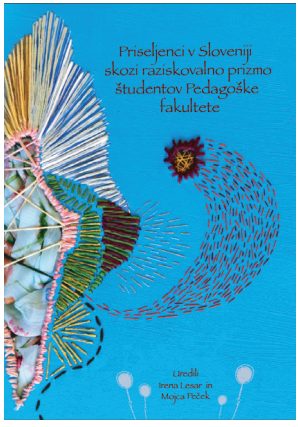
Irena Lesar and Mojca Peček (Eds.), *Immigrants in Slovenia through the research prism of students of the Faculty of Education* (in Slovene: *Priseljenci v Sloveniji skozi raziskovalno prizmo študentov Pedagoške fakultete*), University in Ljubljana, Faculty of Education, 2021, 276 pp.: ISBN 978-961-253-276-5

Reviewed by Špela Razpotnik[1]



In 2021, Immigrants in Slovenia through the research prism of students of the Faculty of Education was published by the Faculty of Education in Ljubljana, edited by Irena Lesar and Mojca Peček.

The idea for it derives from the fact that a whole range of high-quality graduate, master and doctoral theses) have been created at the Faculty of Education, which deal with the topic of migration, most often at its intersection with education.

The editors contacted the mentors of these theses with a call to highlight some of the quality final works on the field of migration, finished in recent years. In the second step, editors contacted the authors who prepared these articles for this publication.

The result is a collection of articles dealing with migration from very diverse perspectives and using very different methodological approaches, all of which have a common degree of depth and innovation in the choice of research perspective. The aforementioned diversity regarding approaches and content is discussed in the editorial entitled *Being an immigrant in Slovenia*, using large-sample research and first-person reflections. The authors attempt to represent the most holistic picture of what it means to be an immigrant in Slovenia, drawing on Bronfenbrenner's ecological model (1994). The editors assess the efforts made thus far in migration research in Slovenia, pointing out some of the deficit areas: migrants without status, research from the perspectives of migrants

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themselves, especially children, and participatory research.

Some of the works that follow may fill some of those gaps.

The collection of articles includes two made on the basis of the doctoral thesis, one by Sabina Krajnc Dular and the second by Karmen Mlinar.

Krajnc Dular reveals how the learning outcomes of immigrant students are related to the integration processes and how both are embedded in the system, consisting of the school, teacher, teaching material, student, parents. The part that the teacher covers is crucial. The result of this research also includes the didactic dimensions of quality teaching for immigrant students, which can serve as an example of effective approaches to follow.

In her article (last chapter in the book), Mlinar is also interested in primary school concerning the development of an intercultural and anti-bias school ethos. She presents a *Declaration about respecting differences* as a model, developed at one of the primary schools and based on the paradigm shift from tolerance towards mutual respect. It supports an intercultural and anti-bias ethos of education from the bottom up. Generally, she reveals how the inclusion of pupils with non-dominant ethnic backgrounds is expressed on the systemic and practical-everyday levels.

Patricia Urlep and Anthony Paul Smaga titled their article *Analysis of Discrimination against Immigrants in Slovenia.* It is based on the first-person perspective of immigrants to Slovenia and analyses their own experiences of discrimination on various levels (employment, health care system, legal system, etc.). In addition to different levels, they also identify different layers of discrimination, from subtle forms to more direct ones.

Following is an article by Doris Špurej, whose research problem is distinctly innovative and deals with the contribution of volunteering to the integration of refugees, specifically persons with the status of international protection. Conceptually, it brings the relationship to the forefront as a means of integration. She addresses volunteering to work with refugees from the perspective of Putnam's concept of social capital and social networking, Allport's contact hypothesis, and the hypothesis of inter-group cooperation. The findings confirm the recognition of the importance of volunteers in the process of refugee integration into society and in refugees themselves.

The article by Melita Zukić is distinctly action-oriented and follows the unmet needs of a specific community in Slovenia, the Muslim Community specifically, the aspect of the realisation of their religious needs, which she examines through the lens of Slovenian kindergartens. She presents the legal basis of confessional activity in Slovenia, as well as some cases from abroad. The parents' perspective is very fore-fronted, mostly regarding social, educational, and

nutrition aspects that are the main areas, which are not recognised in Slovenian kindergartens thus far from the perspective of the researched minority.

Anja Franko Dobnikar presents the learning outcomes of immigrant students through the prism of language. She starts from the unfortunate but well-known research fact that the language achievements of immigrant pupils differ significantly across countries, with immigrant pupils' achievements mostly being lower than the achievements of their counterparts. She follows the thesis that language is often a primary barrier to equal achievements, so she wants to draw attention to the teaching and learning of the language of the host country.

Three chapters (by Andrejka Štimpfel, by Barbara Sotenšek, and by Katja Vodopivec and Irena Lesar) are dedicated to the question of how to improve the learning outcomes and general school performance of migrant students in three different subjects (Slovenian language, mathematics, and English language).

The final chapter is by Maša Bricelj, which opens up the research question (no less important but, compared to learning outcomes, mostly overlooked) of the relation between teachers and migrant students and how it is related to their well-being in school.

As a whole, the book discusses many specific topics, which can be interesting by themselves (many focused on schools, but also some going broader) but fascinating it is to attempt to see different interplays and overlaps of other chapters: being discriminated and having a religious needs unmet in the host society, with one's general well-being being lower and learning outcomes worst – all of this is part of having a non-dominant ethnic background in Slovenia.

The book is fresh and innovative in its format (a set of articles based on the final works on a common topic) and seems entirely appropriate for an institution such as the Faculty of Education of the University of Ljubljana, so we can hope that more will follow that example.

It also provides recognition and further encouragement to students whose work is published in this selection.

It can also serve as a valuable resource for future students who are about to search for relevant research topics, as the chapters can demonstrate to them a whole range of approaches to a particular topic, bring a degree of interdisciplinarity and present new findings, didactic and other approaches for working with migrant pupils, and also opens up a reflection on gaps in the research of topics, which still need to be addressed.

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