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C-E-P-S *Journal*

Center for Educational Policy Studies Journal

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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.



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, naravoslova in tehnike, poučevanje družboslova 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 kvantitativnih 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 predstavitev ter recenzije novih publikacij.

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Editorial

The second issue in volume thirteen of the CEPS Journal is devoted to thematically diverse papers and is not a focus issue. It includes contributions by fifteen authors from six different countries: Bangladesh, Germany, Indonesia, Jordan, Portugal and Slovenia. The papers discuss a range of areas in education, including the context of anti-racism and anti-discrimination at five major universities in Canada, the level of self-reported peer victimisation at Slovenian universities, the issue of literacy policy in Southeast Asia, how Project-Based Learning is integrated into pre-service teacher education programmes in Portugal, and how geometry should be taught in primary school mathematics classes. The issue also features three papers dealing with problems in education caused by the Covid-19 pandemic, which were accepted for publication some time ago and, as recently accepted papers, were available online while waiting for an issue number. Although Covid-19 does not seem to be an important issue in education anymore, the papers have been included in this varia issue and represent a significant contribution to our understanding of the management of various crises in education, including those in the future. The issue concludes with a book review.

The paper by Muhammed Muazzam Hussain entitled *The Policy Efforts to Address Racism and Discrimination in Higher Education Institutions: The Case of Canada* reviews existing policies related to anti-racism and anti-discrimination at five major universities in Canada and assesses the equity initiatives undertaken by university authorities to promote greater access and inclusion of different ethnic minority groups. The findings reveal that, although the universities have some sort of anti-racism and anti-discrimination policies to combat racism and discrimination in their educational setting, they face challenges or limitations in adopting holistic and inclusive measures for the different ethnic and diverse minority groups studying there. The study argues for promoting discussion and responses to specific policies, programmes and practices, including behaviours and attitudes for combating racism and discrimination in institutional and professional contexts. The findings may be helpful for academics, policymakers and administrators to develop their understanding of institutional racism, identify challenges and adopt policy measures to address the issue.

The next paper, *Science Teachers' Practices During the Pandemic in Portugal* by Mónica Baptista, Estela Costa and Iva Martins, examines how science teachers adapted their practices to the context of the Covid-19 pandemic and what they learned during the period of confinement. The authors conclude that

adjustments were made in the design and management of classes. Synchronous classes were held using digital platforms and other communication infrastructure, experimental distance activities were implemented and online courses based on a television programme were taught. In addition, in order to enable distance learning during the period of confinement, teachers developed pedagogical skills using technological skills.

The third paper, *Project-Based Learning in Initial Teacher Education: The Practice of Three Higher Education Institutions in Portugal* by Tiago Tempera and Luís Tinoca, examines how Project-Based Learning is introduced into pre-service teachers' education programmes. The participants were three higher education institutions located in different regions of Portugal, all of which offer initial teacher education programmes for primary school teachers that include Project-Based Learning at some point. The data were collected through document analysis of the programmes' curricula, as well as through semi-structured interviews with the programme coordinators in each institution. The results show that the institutions value Project-Based Learning and try to include it in their programmes, whether in theoretical, didactical or practical terms. However, they encounter some difficulties in promoting more significant experiences that would enable students to feel confident enough to use this strategy in their Supervised Teaching Practice internships.

The next paper is from the field of mathematics education. *Geometry Teaching in Transition: An Investigation on the Importance of School Geometry in Primary Education* by Ana Kuzle investigates how geometry lessons have been re-evaluated due to a paradigm change and have consequently been attributed new meaning within the mathematics curriculum worldwide. The paper focuses on this paradigm shift in the sense of an evaluation of the extent to which both the didactical potential and the practical value of geometry instruction in primary education are currently recognised and utilised by primary grade teachers. A total of 120 primary grade teachers participated in the study. The author concludes that there has been positive recognition of the didactical potential of school geometry by teachers over the previous two decades, but, for various reasons, there has nonetheless been a lack of actual implementation in school practice. As well as being discussed with regard to the latter, the results are also interpreted in terms of their theoretical and practical implications.

The purpose of the fifth paper of this varia issue, *Retrospective and Concurrent Victimisation as Predictors of Social Self-Concept and Loneliness in First-Year University Students* by Katja Košir and Urška Žugelj, is to investigate students' current level of self-reported peer victimisation and perceived peer support, as well as their retrospectively reported victimisation, as predictors of

their social self-concept and loneliness in their first year of university. A total of 200 first-year university students (26% male) participated in the study. The results indicate that retrospectively reported victimisation experiences during their years of schooling explain additional variance in social self-concept and loneliness beyond the students' concurrent peer experiences. According to the authors, these findings indicate that experiencing victimisation during school years could have consequences for students' wellbeing that are not limited to the period of primary and secondary schooling, but can persist after their transition to university.

The sixth paper, *Literacy Policy in Southeast Asia: A Comparative Study between Singapore, Malaysia, and Indonesia* by Evi Fatimatur Rusydiyah, Zaini Tamin AR and Moh Rifqi Rahman, examines the literacy policies in Singapore, Malaysia and Indonesia and discusses the strategic policies to improve literacy in each country. The qualitative comparative research method was employed to acquire a comprehensive understanding of the literacy policies in these three countries. According to the findings, Singapore, Malaysia and Indonesia each have distinct literacy policy trends. The context of each country's education system and language affects the government's literacy policies: Singapore emphasises industrialisation, Malaysia refers to its multi-ethnic life and Indonesia reflects the 2013 curriculum.

In the seventh paper, entitled *Teachers' Attitudes towards the Rights of Students with Special Education Needs During the Covid-19 Pandemic*, the author Mohammad Sakarneh deals with educational problems related to the Covid-19 pandemic and aims to assess teachers' attitudes toward the rights of students with special needs during the pandemic. The study focuses on the attitudes of special education teachers regarding their self-efficacy and beliefs about using e-learning with their students during the Covid-19 lockdowns. It was undertaken using a quantitative research approach in which teachers working with children with special needs in Amman were interviewed virtually. The findings indicate that the teachers have positive attitudes and perceptions regarding the rights of children with disabilities, although they report having low self-esteem. The teachers emphasise the need to find ways of integrating e-learning for special needs children during the lockdowns and report that teachers in Jordan have relatively negative perceptions of using e-learning platforms for teaching children with disabilities. The author concludes that there is a need for policies to train and support teachers in these settings in order to equip them with the skills required to work with students with special needs using e-learning tools.

The last paper is by Slovenian authors Melita Puklek Levpušček and Mojca Poredoš. *Difficulties in the Close Social Relationships of Slovenian Students*

during the Covid-19 Pandemic also deals with the difficulties experienced by Slovenian upper-secondary school and university students aged 18 to 25 in their close social relationships during the Covid-19 pandemic. The authors examine the extent of social difficulties in six domains (relationships with friends, establishing a new relationship with an intimate partner, sexuality, relationship with a current intimate partner, parental control and living with parents, and family conflict) in the pre-pandemic period and in the first two waves of the pandemic. They were also interested in whether demographic variables were related to the students' perceived social difficulties. The results show that the severity of the reported difficulties increased in all six domains during the government-imposed quarantine periods, with relationships with friends and the opportunity to establish new intimate relationships being the most affected.

This edition concludes with a book review prepared by Žan Korošec, who evaluates a textbook on statistical methods entitled *Še ena knjiga o statistiki: Univariatne in bivariatne statistične metode v edukaciji* [Another Book on Statistics: Univariate and Bivariate Statistical Methods in Education] published by Založba Univerze na Primorskem in 2021 (ISBN 978-961-293-101-8).

IZTOK DEVETAK

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The Policy Efforts to Address Racism and Discrimination in Higher Education Institutions: The Case of Canada

MUHAMMED MUAZZAM HUSSAIN¹

∞ This paper reviews existing policies related to anti-racism and anti-discrimination at five major universities in Canada and assesses the equity initiatives undertaken by university authorities to promote greater access and inclusion of different ethnic minority groups. The study is based on secondary data sources. Therefore, policy papers, documents, study reports available in those universities, government policy and legislation, journals, and similar were consulted to construct the piece. Findings reveal that although the universities have some sort of anti-racism and anti-discrimination policies to combat racism and discrimination in their educational setting, they face challenges or limitations in adopting holistic and inclusive measures for the different ethnic and diverse minority groups studying there. The study argued for promoting discussions and responses to specific policies, programmes, and practices, including behaviours and attitudes in the institutional and professional contexts, for combating racism and discrimination. The findings may be helpful for academics, policymakers, and administrators to develop their understanding of institutional racism, identify challenges, and adopt policy measures to address it.

Keywords: anti-racism, anti-discrimination, higher education institutions, policy, Canada

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Politike prizadevanja za obravnavanje rasizma in diskriminacije v visokošolskih zavodih: primer Kanade

MUHAMMED MUAZZAM HUSSAIN

~~ Članek obravnavna obstoječe politike, povezane s preprečevanjem rasizma in diskriminacije petih večjih kanadskih univerz, in ovrednoti po bude po pravičnosti, ki so se jim zavezala vodstva univerz z namenom spodbujanja večjega dostopa in vključenosti različnih etničnih manjšin. Raziskava temelji na sekundarnih podatkovnih virih. Za pripravo članka smo pregledali strateške in druge dokumente, študijska poročila, vladno politiko in zakonodajo, revije ter druge podobne spise. Izsledki kažejo, da se, čeprav imajo univerze vzpostavljeno nekakšno protirasično in protidiskriminacijsko politiko, namenjeno boju proti rasizmu in diskriminaciji v njihovem izobraževalnem okolju, vseeno srečujejo z izzivi ali omejitvami pri prevzemanju holističnih in inkluzivnih ukrepov za različne etnične in manjšinske skupine, ki tam študirajo. Študija se je zavzemala za spodbujanje razprav in odzivov na specifične politike, programe in prakse, vključujoča vedenja in odnose v institucionalnem in strokovnem kontekstu, ki obstajajo v boju proti rasizmu in diskriminaciji. Ugotovitve so lahko v pomoč akademikom, oblikovalcem politik in skrbnikom, da razvijejo svoje razumevanje institucionalnega rasizma, da prepoznačajo izzive in sprejmejo ukrepe, ki bi to naslovili.

Ključne besede: protirasizem, protidiskriminacija, visokošolski zavodi, politika, Kanada

Introduction

Racism and discrimination are pervasive in the academic arena of Canada and the United States, which bears a legacy of its colonial past. It causes profound harm to people of Aboriginal groups, migrants and people of colour in their obtaining education, as well as their health and work lives (Brathwaite et al., 2022; Zuberi & Ptashnick, 2017). Challenging racism and discrimination in higher education institutions (HEIs) has been regarded as highly troublesome, complex, and a matter of debate (Law, 1996; Gillborn, 1995). The idea of institutional racism is socially constructed as embedded in the socio-political structure of a particular country systematically and prevails in subtle forms, and is pervasive in police service, education, health care, art, literature, media, including television broadcasting (Giddense, 2001; Kerry, 2019; Olivier & Denis, 2019; Tate & Bagguley, 2017). It is challenging to deal with various forms of racism and discrimination, including identifying institutional racism and its adverse effects (Bailey, 2016; D'Andrea & Daniels; 2007). The UN Convention (ICERD, 1969) portrays combatting racism and discrimination as a significant human rights instrument to address all kinds of racial discrimination and disadvantage (Thornberry, 2016). The Government of Canada has asserted its firm commitment to removing the incidence and burden of racial discrimination on vulnerable groups' lives, education, and cultures (Reading, 2014, DoCH, 2005). However, while the Anti- Racism strategy 2019–2020 was designed to build up a foundation for change by removing barriers and including Aboriginal groups, many universities have yet to incorporate competent practices and apply the critical race theory in higher education institutions (HEIs) to eradicate racial inequalities and disadvantage (Kolivoski et al., 2014, Osteen et al., 2013). Aboriginal language, culture, and tradition remained undermined in Canada's education policy and practices (Haque & Patrick, 2015, Joshee & Johnson, 2011, St Denis, 2007). It is often required to carry out extensive research in educational institutions to explore the racial and discrimination issues to ensure positive learning outcomes for all (Tilley, 2019). This paper aims to review existing policies related to anti-racism and anti-discrimination of HEIs in Canada, to assess the equity initiatives undertaken by the university authority, and to point out some challenges to promoting greater access and inclusion of different ethnic minorities groups in those HEIs.

The country contexts: Colonial expropriation, racism and discrimination

Canada is a member of the G8 with a population of 36.3 million (Canada country profile, 2019) with 28 per cent British descendants, 23 per cent French,

Italian descendants 3 per cent, aboriginal population 2 per cent and other different ethnic groups. The religious denominations include Catholic (45 per cent), Protestant (36 per cent), and other major religions, Islam, Buddhism, Hinduism, and others. It is a rich, diverse, multicultural country with two dominant official languages: English (59.3 per cent), French (23.2 per cent), and 53 native languages. Although it is home to 200 ethnic groups, only 16 per cent identified themselves as a visible ethnic minority. The 2016 census data show that Aboriginal people have lower chances of completing post-secondary education and attaining entry into higher education level study than other Canadian citizens. Canada bears the legacy of its colonial past; it was founded by early settlers who expropriated the Aboriginal communities and established a dominant White privileged class. To understand the origins of racism inflicted upon Aboriginals, it is crucial to analyse the colonisation of Aboriginal land critically. The West European Colonial ruler exerted widespread control over the life and property of Aboriginal people. By that process, the latter were forced to leave their lands, their resources were extracted, their societal networks broken down, and their culture lost as they assimilated into mainstream Canadian society (Fonseca, 2020). Discrimination of Aboriginal Native groups, including minority people of colour, is manifested in many aspects, including education, employment, health care, housing, and other services (Galabuzi, 2010).

A recent study (Wilkins-Laflamme, 2018) points out that discrimination due to religious belief exists in Canada. For example, after the terrorist attacks on September 11, 2001, the incidence of attacks against Muslim minority groups increased, and a significant number of White majority groups possessed negative attitudes and beliefs and committed violent acts toward them. It is often known as 'Islamophobia'.

Studies also reveal other forms of discrimination against minority ethnic groups, people of colour, and women (Godley, 2018; Leber, 2017; Anderson, 2017). Hate crime against the Muslim community increased by 61 per cent from 2014 to 2015. It is also found that sexual assault against women in the workplace increased. Another study also pointed out that some differences in perception of discrimination among native-born Canadian and immigrants remain existent (Vang & Chang, 2019).

In Canada, each province and territory operates its own higher education system and is supposed to maintain education standards, including mitigating the challenges of racism and discrimination and equity issues. Multiculturalism has been taken as the guiding principle since the 1970s. The significant policies that govern the HEIs of Canada include The Multiculturalism Act, 1988, The Accord on the Internationalisation of Education (ACDE, 2014) and

Canada's International Education Strategy: Harnessing our knowledge advantage to drive innovation and prosperity (CIES, GoC, 2014).

Despite the policies, experiences of racial discrimination remain widespread in Canada. A recent study shows that a large group of ethnic minorities, ranging from 46.3 to 64.2 per cent, have been victims of racial- and gender-based discrimination in multiple contexts of education, employment, health care, housing, police and other services. From 50.2 to 93.8 per cent of people experienced victimisation by racial micro-aggressions at least one time in their life (Cénat et al., 2021). In the HEIs, another facet of racial discrimination remains: the share and contribution of Racialised and Aboriginal faculty are limited both in quantity and influential capacity to policy formulation and management (Henry, 2017). Another challenging point includes Aboriginal peoples' experiences of systemic discrimination that are deeply rooted in the previous unjust history of colonial aggression, exclusion, and prejudice (Sheppard, 2017). Despite increasing calls for systemic change in the Canadian higher education sector, Aboriginal leaders continue to be under-represented, under-funded, and overworked (Povey et al., 2021).

Conceptual and theoretical framework

Racism is the subordination of any person or group because of some physically distinctive characteristics, which is counted as more significant throughout the socio-economic and political aspects of the human life course (Marsiglia & Kulis, 2015). Discrimination indicates unequal treatment of individuals based on their group membership rather than their inherent individual qualities. It usually involves actions by a dominant group that are harmful to the subordinate group members and can vary from minor to severe. Institutional discrimination can be derived from organisational structures to the personal system and follow simple to complex hierarchies (Marsiglia & Kulis, 2015). There are diverse theoretical approaches to analysing racism and discrimination issues, including the Marxist theory, Melting Pot theory, Structural Role Theory, Critical Race Theory, and others. Critical Race Theory (CRT) offers proper insights into the multidimensional aspects of racism and discrimination that prevail in society (DiAquoi, 2018; Rollock & Gillborn, 2011). Five significant elements of CRT in Education are used in educational research, policy, and practice. According to CRT, for a better understanding of racial discrimination, we need to analyse it from a trans-disciplinary and intersectional point of view. It covers multidimensional aspects of physical condition, age, sex, religious belief, gender-specific role, ethnicity, citizenship, and other closely connected

factors. It strongly opposes the ‘colour blindness’ attitude that disregards the positive human capacity of people of colour. In addition, CRT promotes the people of colour’s experiential knowledge and focuses on attaining positive social change and distributive justice through multi-disciplinary actions to address the full portrait of race and racism.

Another critical approach to analysing institutional racism and discrimination is the cultural, psychological perspective (CPP). According to this perspective, historical ideas and cultural patterns are identified as significant factors that perpetuate current racial discrimination in society. It points out that racism is embedded in people’s construction of the real world and maintained through selective action representing racialised contexts. It focuses on bringing positive attitudinal changes to remove racial behaviour and dominance (Salter et al., 2018).

Bonnett (2000) provides a categorical explanation of anti-racist practices and points out six types described: 1. Everyday anti-racism that promotes anti-racial activity as part of the regular cultural norm of the society; 2. Multicultural anti-racism: as the means of promoting cultural diversity to address racism; 3. Psychological anti-racism addresses racism through cognitive learning and behaviour modification; 4. Radical anti-racism as the way to alter the current power structure and socio-economic development of less empowered people; 5. Anti-Nazi and anti-fascist anti-racism; 6. The institutional policy development and the promotion of representative organisations. However, this typology aids in understanding different forms of anti-racism and anti-discrimination policies; it does not offer sufficient efforts to clarify the challenges from dominant policy perspectives that often guide a particular country’s strategic programmes and services.

Besides these categorisations, many policy approaches and strategies are used to tackle racism and discrimination. The significant policy types include the liberal policy approach, neoliberal policy, and critical race theory, among others. The liberal policy framework involves conceptualising racial harmony as a public good, a philosophy of community participation, depoliticising racism and migration issues, and the concept of multiracial society (Law, 1996; Law et al., 2004). Under this policy, some universal means-tested programmes and services are designed in the education sector for minority ethnic groups to reduce ethnic inequality, balance among different ethnic groups, and the promotion of cultural diversity. Despite its positive outlook on racial harmony, critics argue that liberal anti-racism (e.g., pluralism, multiculturalism, and moral/symbolic anti-racism) is less likely to capture the dynamic nature of racism. Liberal anti-racism lacks the means to analyse the interactive nature of

racism in terms of ethnicity, socio-economic position, sexuality, and similar factors, which have affected the lives of the minority population for a long time (Gillborn, 1995). By contrast, recent neoliberal approaches in education suggest promoting the privatisation of education (Fabricant & Fine, 2012); it uses a specific pedagogy of management that commodifies education and develops a work culture and ethics that nourish it through the mechanisms of schooling and assigned values for ensuring global competition (Marx, 2012). However, it is often argued that the neoliberal approaches urge local actors to be responsible for anti-racism initiatives; critiques point out that these initiatives may overlook local versions of racism (Casey & McManimon, 2013). For instance, local responses to racism may not promote coalition-building but instead increase competition among local agencies. These actions have sometimes proven less effective in addressing racial discrimination (Nelson & Dunn, 2017). Therefore, neoliberalism in Canada has often been equated with multiculturalism and business doctrine. It has been criticised that previous attempts for equality, diversity, and solidarity recently shifted to ensuring economic benefits for some privileged White groups (Joshee, 2008).

In this paper, CRT is used to identify policy challenges to address the persistent racial discrimination of HEIs in Canada. This theoretical approach helps to analyse the limitation of current policies and practices of HEIs, suggest more practical measures, and conduct critical research in education for better policy outcomes (Gillborn, 2006).

Methods

In this study, anti-racism and anti-discrimination policies were used to refer to those policies and practices undertaken by the university to prevent racism and discrimination of the indigenous, ethnic minority groups, and people of colour in student recruitment, accommodation, and academic activities. Five major universities (i.e., the University of Manitoba, the University of Toronto, the University of British Columbia, the University of Victoria, and the Dalhousie University) were chosen purposively for conducting the review study. The study used secondary sources of data. Therefore, the policy papers, documents, and study reports available in those universities, government policy documents, academic journal papers, and similar were reviewed to achieve the study objectives. The semi-systematic review strategy was employed to identify significant themes and knowledge gaps within the literature. By accessing different library catalogues, and subject-specific databases, relevant studies were searched by keywords: 'anti-racism' as a single word or 'anti-racism

and anti-discrimination policy' or 'anti-racism and anti-discrimination policy + higher education institutions + Canada'. Initially, all abstracts were listed and read to justify the appropriateness of research materials according to the objectives. Therefore, literature contents were assessed and rated by inclusion criteria, and those papers that did not meet the eligibility criteria were excluded. A total number of (n = 57) journal articles, reports, policy documents, and similar were finally accepted for review.

Results

Policy efforts and challenges to address racism and discrimination in HEIs, Canada

Canada has become a leading figure among OECD countries for spending on HEIs, and total full-time enrolment in universities reaches approximately one million students (Kirby, 2007). It is often argued that people having education from higher institutions and liberal ideology possess less racial prejudice and discriminatory attitude (Duckitt, 2001; Pedersen et al., 2000; Pedersen & Walker, 1997). In this paper, the anti-racism and anti-discrimination policies of five major universities in Canada have been assessed, and the equity initiatives undertaken by those university authorities to promote greater access and inclusion of different ethnic minority groups and point out positive aspects and challenges and similar have been identified. These are presented below:

Table 1
Anti-racism and anti-discrimination policies and challenges

University	Policies for combating racism and discrimination	Challenges
The Dalhousie University	The Affirmative Action Policies in 1970; The Diversity and Equity Committee (DEC)	Qualification for faculty recruitment; Community relationships;
The University of Manitoba	The Affirmative Action Initiative, currently named Educational Equity Initiative (EEI); The Educational Equity Committee (EEC)	Implementation of current policies; Transforming policies into services;
The University of Toronto	The Anti-racism, Multi-culturalism and Native Issues (AMNI) in 1992; Minor's (1996) six-stage anti-racist model of organisational development; Perisco's (1990) eight steps to create a diverse institutional climate	The establishment of community linkage; Lack of allocation of adequate resources;

University	Policies for combating racism and discrimination	Challenges
The University of British Columbia	School of Social Work's Equity Task Force (ETF); The Equity Survey Report (2013); The Equity Dialogue, (2013)	Accommodation related to disability is inconsistent and inadequate; Lack of equity committee and equity coordinator; White- centrism and lack of representation of students;
The University of Victoria	The Discrimination and Harassment Policy (DHP); The Environmental Assessment (EA); Employment Accommodation (EA); The Policy on Human Rights, Equity and Fairness (HREF); The Resource Centre for students with Disability (RCSD)	Participation in leadership and governance process by students with disability (SWD); Coordination; Community linkages.

Note. Adapted by Hussain, 2021.

At the Dalhousie University from the early 1970s, equity-seeking groups had identified racial minority and marginalised groups and attempted to address the equity issues through affirmative action policies. The activities primarily focused on student admission and support and included the Lesbian, Gay, Bisexual, Transgendered, Two-Spirited, Queer or Intersex (LGBTTQI) groups. The Diversity and Equity Committee (DEC) works throughout the student admission and support, faculty recruitment, pedagogy, curriculum, and organisational climate. The working strategies include commitment and dialogue, diversity in faculty/staff and students, training and community linkages, etc. In addition, a Gay, Lesbian, Bisexual, Transgender Caucus (GLBTC) is working to prevent racism and discrimination on campus. However, the Employment Equity Office and the university's Personnel Office arrange diversity training for staff and faculty to make them competent to carry out anti-discrimination policies, community relationships, and qualifications for faculty recruitment remain significant challenges to fulfilling the objectives (Riaño-Alcalá & Ono, 2012).

Despite the diversity and equity initiatives, critiques point out that many HEIs cannot achieve the goal as many coloured or indigenous faculty members face challenges in the workplace. It is often argued that policies and diversity initiatives undertaken served merely to deflect criticism of the system, but little change over the broader institutional aspects (Henry et al., 2017).

At the University of Manitoba, the educational equity initiative (EEI) is being employed to target the Aboriginals, immigrants, refugee, visible minority, and disability students to increase the number of applicants and graduates from those communities. They also adopted a community consultation process (CCP) to generate better ideas and recommendations to address the educational equity issues. The broader equity initiatives include the employment equity office and policies that run different projects, such as the safe space project

(SSP) for LGBTTQI. The educational equity committee (EEC) implements EEI, composed of faculty members and community members belonging to minority groups. An indigenous caucus (IC) is made by indigenous members who work jointly with EEI (e.g., conduct a workshop to promote equity and anti-discrimination). The EEI is guided by the conceptual framework called 'liberal action principles', including structural and anti-oppressive components. The EEI set out the leadership, governance, and strategic commitment to modify the condition of the disadvantage in education (Riaño-Alcalá & Ono, 2012). Therefore, accessibility and quality education in student outreach, admission, and support have been selected most priority for action by the EEC and EEI. They have created some programmes, such as the Inner-city Program (ICP), Thompson Program (TP), and Distance Education (DE). For example, the daycare centre of the ICP is an attempt to remove the barrier of childcare for single mothers. In addition, the BSW programme ensures an access design to support students who face systemic barriers common to inner-city life experiences, such as racism and discrimination. The ICP also provides a support network to increase student success. While all these are significant attempts, implementing current policies into action and transforming these into services remain substantial challenges. It is often argued that a grasp of Native students' perception of racial discrimination is related to clarifying their lived experience, resilience, and consequences of racism. Critiques also point out that modern, subtle racism is often less addressed as Aboriginal students constantly face multiple challenges such as lower educational attainment, low motivation with the academic learning system, lack of emotional attachment, and similar (Bailey, 2016).

At the University of Toronto, the anti-racism, multiculturalism, and native issues (AMNI) initiative was undertaken in 1992 to develop a comprehensive strategic policy that included the following components: minority student enrolment and retention, faculty recruitment, and the promotion of studying community and outreach programmes (Riaño-Alcalá & Ono, 2012). The AMNI committee, comprised of minority students, faculty, and community stakeholders, works to set out objectives and determine an action plan to obtain them. The operational framework of diversity initiatives is guided by the organisational model of Minor's (1996) six-stage anti-racist model of organisational development and Perisco's (1990) eight steps to create a diverse institutional climate (Riaño-Alcalá & Ono, 2012). The faculty's extensive outreach strategies include recruitment through bridging programmes and mentoring high school students for student recruitment and retention. The faculty development strategy includes faculty members participating in a workshop on anti-racism and working with diversity. The curriculum and teaching are based on a diversity

integration framework. In the theoretical and field practicum courses, diversity, anti-racism, and anti-discrimination issues are well treated, along with cultural competencies. However, establishing community linkage and allocating adequate resources constitute a significant challenge. Many HEIs often ignore structural racism; critiques point out that it fosters racial discrimination through interactive ways in society's multidimensional socio-economic, political, cultural, and judicial aspects. It is complicated to challenge the practices as it constantly reinforces exclusionary attitudes, discriminatory beliefs, social stigma, and inequality in the distribution of income, assets, and wealth in the broader social context (Bailey et al., 2017).

The University of British Columbia, School of Social Work's Equity Task Force (ETF) is currently working for diversity and inclusion by promoting anti-racism and anti-discrimination activities and conducting research to inform policy and practices. For example, the Equity Survey Report (2013) reveals that the pervasive dominance of White entitlement (i.e., White- centrism and lack of representation of students and faculty of people of colour) poses a significant challenge and requires more education and training for faculty to counter racial segregation and prejudice. In addition, there are some discrepancies found between theory and practices in the sphere of curriculum, pedagogy, and academic environment (Tamtik & Guenter, 2019).

Recent evidence also suggests that accommodation related to disability is inconsistent and inadequate (Equity Dialogue, 2013). Therefore, employing the equity committee and equity coordinator to handle the issues effectively is recommended. Critiques argue that widespread White class male representation in HEIs often undermines the efforts to challenge subtle and structural racism and ensure proactive measures for the inclusion of Aboriginals and people of colour. More drastic actions are necessary to redesign the current knowledge base and provide better job placement for people of colour, marginalised female staff, teachers, and students (Henry, 2015).

At the University of Victoria, the Discrimination and Harassment Policy (DHP) has been undertaken to recognise human rights and academic freedom as fundamental values for developing a work and learning culture. An unbiased approach containing confidential consultation (CC) process, advice, and guidance are provided by the director to ensure easy access for all community members. In addition, the Environmental Assessment (EA), a third-party review of the situation, has been made mandatory to promote anti-discrimination and anti-racism issues. The university is also striving to implement the policy of Employment Accommodation (EA) based on the employment equity principle and the British Columbia Human Rights Code. The collective agreement or

framework approach is followed, requiring an individual's involvement in the discussion process. In addition, another essential policy entitled Human Rights, Equity and Fairness (HREF) is implemented through the University Equity and Human Rights Office to create a positive working environment and mitigate the conflicts (Employment Equity, 2011). The policy framework also includes a significant component (i.e., the Academic Accommodation and Access for Students with Disabilities) directed by an advisory committee that provides an annual report to the Senate of the University. In addition, the Resource Centre for students with Disability (RCSD) was established to inform and assist students, staff, and faculty with appropriate academic accommodation and understanding of the disability issues. Despite having positive actions and principles, students with disabilities hardly participate in the leadership and governance process; coordination and community linkages remain a significant challenge. Critiques also point out that the present structure of HEIs bears and maintains a legacy of colonial power, class consciousness, and Western White supremacy (Abdulle & Obeyesekere, 2017). That process continuously undermines the world of non-White people in every aspect of ethnicity, economic condition, cultural belief, sexual orientation, and similar to uphold White supremacy (Dei & McDermott, 2014). It is often argued that inclusive equity policies of HEIs fail to address structural racism and various discriminatory factors and suggest continued critical anti-racist practice (MacLachlan, 2017).

Discussion

This paper aimed to review the anti-racism and anti-discrimination policies of five major universities in Canada, assess the equity initiatives undertaken by those university authorities, and point out some challenges to access and inclusion of different ethnic minority groups. However, this study focuses only on the Canadian context; the findings may be helpful in analysing the current anti-racism and anti-discrimination challenges in similar socio-cultural contexts such as North America and Europe. The results may help academics and policymakers to understand and obtain insights from Canadian efforts to address racism and discrimination in their own HEIs. This analysis would help students of minority ethnic groups around the globe become conscious of institutional racism and discrimination. Therefore, disadvantaged people of ethnic minorities, migrants, and people of colour would make concerted efforts to address the challenges of racism and bigotry in HEIs.

The findings revealed that most universities undertake positive initiatives to address racism and discrimination by adopting multiculturalism and

affirmative action policies. They took initiatives to ensure diversity and equity by some organised efforts to increase the accessibility of different minority groups in getting admission and support. The strategic approach includes developing a curriculum, pedagogy, and academic atmosphere for gaining positive learning outcomes for Aboriginal and minority ethnic groups. Some universities also adopted multiple strategies, including bridging community through dialogue and consultation to ensure accessibility and quality education of Aboriginal and minority students in student outreach, admission, and support. Although some positive steps are undertaken, critics point out that those efforts are inadequate to effectively address racism and discrimination in the educational environment and society. Those activities are undertaken only to deflect criticism. They fail to radically change the existing academic structure that benefits the White students, faculty, and academic staff at large (Henry et al., 2017). It can be pointed out that after taking the policy, significant questions remain on implementation of the policy and transforming it into services and benefits so that students from Aboriginal groups and people of colour could get break down the barriers of racism and discrimination.

In some universities, Equity Task Force (ETF) has been working for diversity and inclusion by promoting anti-racism and anti-discrimination activities and conducting research to inform policy and practices. The studies are conducted to understand racism and discrimination, identify the dominance of White-centrism and causes of the low level of representation of people of colour in education and training, and promote human rights and academic freedom in HEIs. Some universities have been striving to implement the policy of employment equity, academic accommodation, and access for students with disabilities. The findings resonate with a similar study that suggests that institutional racism and discrimination often undermine the efforts to implement proactive measures for challenging subtle and structural racism. More drastic actions are required to redesign the knowledge base, create a positive curriculum and a better work environment for minority people of colour, female faculty, and students (Henry, 2015). It is necessary to promote research for a clear understanding of modern, subtle racism, which causes ethnic minority students to experience discriminatory behaviour, dissatisfaction, and alienation in the academic arena (Bailey, 2016). Because subtle racism is often less addressed by many HEIs, which foster racial discrimination through interactive ways in society's socio-economic and political context (Bailey et al., 2017). Critiques also point out that the present structure of HEIs bears and maintains the legacy of colonial power, sharing western ideology, and serving the greater interest of the majority White population. That process continuously undermines the

world of non-White people in every aspect of their moral values, norms, and traditions, and Aboriginal knowledge in terms of socio-economic and political context (Dei & McDermott, 2014). It is often argued that inclusive equity policies of HEIs fail to address structural racism and various discriminatory factors and suggest continued critical anti-racist practice (MacLachlan, 2017).

Despite the constitution of Canada and HEIs' declared multiculturalism as the significant guiding policy to promote higher education and cultural diversity and a better future for all (Banting, 2005, James, 1995), critics point out that increasing corporatisation and globalisation create significant challenges in addressing racism and discrimination. A reconceptualisation of racism and discrimination issues is required, leading to redesigning policy and practices for better learning outcomes (Dua et al., 2005; Haque & Patrick, 2015; Ghosh, 2004; Joshee, 2009; Shin & Sterzuk, 2019).

Many recent studies (Sawa & Ward, 2015b; Yung, 2015; Rotstein, 2014, cited in Sheehy & Gilbert, 2015) point out that many HEIs in Canada do not have specific policies to address sexual assault or violence against female students. Although some HEIs already have codes of behaviour and rules and procedures to tackle sexual offences, these policies often remain unclear and, in some cases, contradictory. It is suggested to focus on inquiry into the disciplinary processes invoked by women who have direct experience with sexual assault on campus (Sheehy & Gilbert, 2015). Critiques often argue that this multicultural policy fails to address the needs of skilled and unskilled immigrants of colour (Omidvar & Richmond, 2005). Therefore, it is suggested that focusing on multiculturalism is not enough to tackle discrimination and racism in the everyday life of migrants of colour to address the structural inequality issues (Hick, 2010). It is worth pointing out that the host country's discriminatory policies adversely affect their social integration into mainstream society. Although multiculturalism accepts and recognises cultural pluralism, it can hardly sensitise and change cultural differences between the dominant White groups and the oppressed ethnic Natives and immigrants of colour (Mullaly, 2007). It can be pointed out that the dominant White groups maintain their position in shaping their understanding of ethnic others with the power of whiteness. Some questions might arise as the anti-racism practice began in the racist environment by focusing on consciousness-raising, which could be further developed by integrating cultural competency and ethnic sensitivity approaches.

Nevertheless, it is necessary to contemplate the issues, including the lack of provision of substantive accessible and equitable services for the Aboriginals and migrants of colour due to limited structural change in organisation and their involvement in the decision-making process (Yee, 2005). For example,

linguistic capabilities are considered one of the essential measures to address inequality and discrimination in HEIs. Critics also point out that existing programmes on language learning are less effective as most programmes are full-time. Migrants find difficulties attending courses, competing with unequal power relations, structural oppression, inequality, and inefficiency in others' languages often maintain status quo and discriminatory position for the Aboriginal communities and migrants of colour (Domineli, 2008). Therefore, it is required to focus on appropriately recognising Aboriginal groups' languages, ethnicity, and culture to compensate for the previous unjust history against them. It is necessary to undertake concerted efforts to use their languages at higher education public institutions.

Conclusion and policy implications

It is well documented that institutional racism in HEIs of Canada is widespread and devastating for Aboriginal groups, migrants, and people of colour. Although it is understood as a social reality, it is not easy to identify and address effectively. The adverse effect of racism on racial groups are not the same. Aboriginal groups and people of colour face multiple challenges in HEIs, including developing curriculum, pedagogy, and an inclusive academic atmosphere for gaining positive learning outcomes for indigenous and minority ethnic groups. The present multiculturalism policy and efforts undertaken by the government are not adequate to address those challenges. Policy and practices addressing racism, discrimination, and promoting social justice require grounded on the cultures of participating communities as social work practitioners often argue for the centrality of culture as a means of resisting racial subjugation resulting from consumerism and globalisation. It is recommended to apply culturally grounded social group work techniques and culturally competent practices in the HEIs of Canada (Fong, 2004; Marsiglia & Kulis, 2015; Werbner, 2005). Critical anti-discriminatory pedagogy (CADP) can be applied to challenging racial discrimination and injustices by promoting students' capability in HEIs. The CADP focuses on an intersectional analysis of discrimination, promoting transformative learning through critical consciousness. It is necessary to challenge the liberal individualist paradigm that maintains the White-centred culture and racialising processes in Canada's many HEIs (Blanchet et al., 2018). Therefore, it is suggested to initiate open dialogue, historical awareness, education, and consciousness for confronting these issues (Hall & Fields, 2013).

Although it is often argued that social workers and other professionals working to prevent racism in HEIs have limited capacities to solve the significant

problems, it is recommended to prompt response to specific policies, programmes, and practices in the institutional and professional context of HEIs. Educational service providers, administrators, and other progressive actors working in this arena should break the silence or ignore institutional racism. They need to become anti-racist entities as a catalyst for change. In delivering services, they should consider analysing appropriate programmes, training, supervision, monitoring, and evaluation system in HEIs (Hussain & Raihan, 2016). It requires a strong commitment and effective engagement of educators, students, and administrative personnel to incorporate anti-racism and anti-discrimination in designing curriculum, teaching, and learning. Since many HEIs are facing increasing challenges on the diversity issue, diverse faculty and student composition on campus often require diverse faculty and student composition, including the development of a clear vision, recruitment policy, and programmes (Dumas-Hines et al. 2001). Social workers need to bring change to the communities and ensure equity by implementing anti-discriminatory and anti-oppressive social policies (Hussain, 2020; NASW, 2007; Beattie & Johnson, 2012). It is, therefore, suggested to recognise and develop appropriate measures to promote the language, culture, and knowledge of Aboriginal communities, migrants and people of colour. There should be some efforts to take some opportunity to practice their language at HEIs to gain better learning outcomes and uphold their knowledge and culture.

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Science Teachers' Practices During the Pandemic in Portugal

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∞ This paper aims to examine how science teachers adapted their practices to the context of the Covid-19 pandemic and what they learned during the period of confinement.

The participants are fifteen science teachers who currently collaborate on a STEM research project. To collect the data, we used two techniques (individual interviews and teachers' individual written reflections), which have been analysed using an inductive content analysis approach. The results reveal that adjustments have been made in the design and management of classes. Synchronous classes using digital platforms and other communication infrastructure have been held; experimental distance activities have been implemented, and online courses based on a television programme have been taught. In addition, during the period of confinement, to enable distance learning, teachers developed pedagogical skills using technological skills. Finally, this study highlights the importance of teachers' role in crisis management, such as during the Covid-19 pandemic.

Keywords: pandemic context, science teachers, online teaching and learning, pedagogical skills, technological skills

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Prakse učiteljev naravoslovja med pandemijo na Portugalskem

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~~~~~ Članek poskuša preučiti, kako so učitelji naravoslovja prilagodili svojo prakso v luči pandemije covid-19 in česa so se naučili v obdobju zaprtja. Vzorec sestoji iz 15 učiteljev naravoslovja, ki trenutno sodelujejo pri raziskovalnem projektu STEM. Za zbiranje podatkov smo uporabili dve tehniki, in sicer individualne intervjuje in pisne refleksije učiteljev, ki smo jih analizirali z induktivnim pristopom analize vsebine. Rezultati kažejo, da so bile prilagoditve uperjene v oblikovanje in upravljanje z oddelki. Pouk je bil izveden sinhrono prek digitalnih platform in druge komunikacijske infrastrukture; realizirane so bile eksperimentalne dejavnosti na daljavo in spletni pouk, ki je temeljil na televizijskem programu. Poleg tega so med zaprtjem vzgojno-izobraževalnih ustanov učitelji razvijali svoje pedagoške kompetence, nanašajoče se na tehnološke veščine, zato da je bilo omogočeno učenje na daljavo. Končno, raziskava poudarja pomen vloge učiteljev v kriznem upravljanju, kot je na primer covid-19.

**Ključne besede:** kontekst pandemije, učitelji naravoslovja, spletno poučevanje in učenje, pedagoške kompetence, tehnološke veščine

## Introduction

Science teaching has been the focus of several studies and debates regarding its aims and objectives. Dulsch (2008), in a literature review on this topic, highlighted that the purpose of science education could be organised around conceptual, epistemic, and social learning goals, which are brought together in the term 'scientific literacy', which can be conceptualised from two distinct viewpoints: (i) considering conceptual knowledge as crucial, based on scientific ideas fundamental to academic pathways and scientific careers; or (ii) seeing scientific literacy as related to its usefulness to society, aligning it with the development of life skills, and recognising its universality as a way of providing citizens with the ability to understand the changes and developments taking place in modern societies (Holbrook & Rannikmae, 2009).

Therefore, the definition of scientific literacy is not simple, and its more contemporary conceptualisation moves away from scientific content, tending to focus on understanding the context and nature of science (Bybee et al., 2009). Various definitions of scientific literacy can be found in the literature and have been reviewed (e.g., DeBoer, 2000; Roberts, 2007), such as the one referring to scientific literacy as 'the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity' (NRC, 1996, p. 22).

Thus, considering its importance, science teaching should be designed and delivered to ensure the development of the fundamental aspects of scientific literacy, which, according to the PISA report (OECD, 2006), consists of the competence to (i) identify scientific questions; (ii) explain phenomena scientifically; and (iii) use scientific evidence. In this sense, it is crucial to use diversified pedagogical approaches, such as practical and enquiry activities, grounded in everyday problems and authentic contexts. Thus, placing the student at the centre of the teaching-learning process promotes students' engagement and motivation to learn science. Several studies in the literature describe the benefits of these approaches on students' achievement, interest, and attitudes towards science topics (e.g., Anderson et al., 2021; Bruder & Prescott, 2013; Holstermann et al., 2010; Marshall et al., 2017; Sadi & Cakiroglu, 2011; Vlassi & Karaliota, 2013).

Moreover, in the previous two decades, the internet has also contributed to rethinking and adapting science teaching, since more and more institutions offer training based on online courses (Allen & Seaman, 2017; Bennett & Lockyer, 2004; Gemin & Pape, 2017). However, this adaptation is only possible and effective if teachers are trained to modify their instructional practices, requiring different skills than face-to-face teaching (Barbour, 2012). In this sense, it is necessary

to ensure that teachers have access to programmes to develop the necessary skills for effective online teaching (Gachago et al., 2017; Walters et al., 2017).

Thus, taking into consideration that the Covid-19 pandemic forced the imposition of emergency remote teaching (Hodges et al., 2020), in a short period, teachers were faced with sudden and urgent response needs, associated with inevitable constraints and difficulties arising from the unpredictable nature of the pandemic situation, with no time to plan a response model to the emerging teaching-learning reality. This posed further challenges for science teachers, as the practical component and the associated processes that are necessary to understand the nature of science are difficult to implement online (Babinčáková & Bernard, 2020). In the meantime, several studies have been made on the reporting strategies that have been used by science teachers, and the difficulties they faced in the implementation of online science classes (e.g., Azhari & Fajri, 2021; Chadwick & McLoughlin, 2020; Khlaif et al., 2020). However, these studies do not describe what teachers have learned and how this knowledge can help them in unexpected new crises or simply in new waves of Covid-19. This research aims to contribute to this aspect and specifically to examine how science teachers adapted their practices to the pandemic context and what they learned during the period of confinement.

## **Theoretical framework**

Thus far, from this pandemic scenario, in a literature review, Baran, Correia, and Thompson (2011) synthesised and critically analysed the role and skills required for online teaching. In this work, based on publications developed since 1990, the authors selected 11 articles and examined them in the light of the transformative learning theory, which states that teachers must have the skills required to assume several roles: managerial, instructional designer, pedagogical, technical, facilitator, and social. Thus, the role of teachers in online education must be dynamic and multidimensional. Furthermore, professional development programmes must prevent teachers from 'leaning on their traditional teaching practices as reference points' as 'the affordances and limitations of online environments will pose new challenges for them as they try to operate within their existing sets of beliefs and practices' (Baran et al., 2011, p. 435).

In a review developed by Kebritchi et al. (2017), based on 104 published articles, three main categories were identified regarding the problems affecting online teaching: issues related to online learners, teachers, and content development. Issues related to teachers were structured into four categories: role change, transition from face-to-face to online, time management, and teaching styles.

Thus, the authors determined that for teachers it is a challenge to move from teacher-centred to student-centred education to ensure proper communication and use of technology. Moreover, for many teachers, it is difficult to deal with the lack of eye contact with their students, which is a communication barrier. In addition, teachers tend to bring their traditional teaching styles to online classes, and usually do not use the available tools, nor do they take into consideration the most appropriate way to help students achieve their learning goals.

Regarding online science teaching, almost all the studies described in the literature concern higher education, where the number of online courses is growing (e.g., Fischer et al., 2019; Hill et al., 2015; Ramlo, 2016; Swinnerton et al., 2016; Venkateswaran, 2016), and which, according to some authors (Clary & Wandersee, 2010; Johnson, 2002), provide environments that promote learning equitably. As for pre-university education, where attendance is compulsory, there are few studies that focus on the distance learning modality as a frequent practice. This lack of studies makes one wonder what is happening with the laboratory component, whose importance lies in the need to get students to learn not only manual techniques but also to make the link between theory and practice, to solve problems, interpret data, reach conclusions, and similar. Furthermore, engaging students in real laboratory activities also allows them to develop motor skills, learn to assemble apparatus and experiment with the use of measuring instruments (Burkett & Smith, 2016; Olympiou & Zacharia, 2012; Son et al., 2016). In face-to-face teaching, it is common to use various resources available online, such as virtual laboratories and simulations, and remote laboratories, to illustrate and promote a deeper understanding of theoretical concepts, and as a complement to laboratory activities. Although they do not promote the development of some of the skills acquired in the manipulation of real materials and equipment, these resources have the advantage of providing alternative representations of aspects not visible from a macroscopic point of view, as well as providing the possibility of performing experiments under ideal conditions (Zacharia & Anderson, 2003; Zacharia & Jong, 2014). Furthermore, they also enable the use of multiple representations (verbal, numerical, pictorial, and graphical), which facilitates a deeper understanding of the phenomena (Ainsworth, 2006).

Although not specifically about distance learning, there are several studies that describe the use of these resources by elementary and high school students. For example, Sullivan et al. (2017) carried out a quasi-experimental study, with 100 eighth-grade students, which involved the use of a virtual laboratory to carry out experiments related to pulleys. The results led to the conclusion that virtual laboratories can be an alternative to real laboratories, whenever

access to them is limited, because virtual laboratories facilitate the learning of some physical concepts, such as work and mechanical advantage.

In this sense, it is worth to highlight a study that consisted of the use of virtual laboratories on pulleys by 6<sup>th</sup>-grade students ( $N = 115$ ) divided into two groups (an experimental group and a control group). The control group students, who performed the laboratory activity in a physical laboratory, had greater participation in discussions related to assembling the devices, performing measurements, and calculating outputs. The students who carried out the activity virtually were focused more on predictions, establishing patterns of relationships between variables, and interpreting the phenomenon. According to the authors, both modalities are complementary in terms of the development of skills and knowledge in the students involved (Puntambekar et al., 2020).

In the chemistry area, Ambusaidi et al. (2017) describe a study carried out with 69 students (grades 5–10), who used virtual laboratories for chemical experiments. By applying an achievement test and two questionnaires on attitudes towards science and virtual labs, students had a positive attitude towards virtual laboratories, and using them had no effect on academic achievement. Remote labs differ from virtual/simulation labs because they are real-time interactive learning environments that allow students to control, perform and observe real distance experiences (de Jong et al., 2014; Tho & Yeung, 2014).

In a study carried out with 32 students (grades 7–9) with eight remote experiences on sound, electrical circuits, plant growth factors, plant respiration, and solar energy, researchers concluded that it was appropriate (i) to extend/enhance the existing e-learning practices (with virtual/simulation experiments only) and (ii) that doing so largely induce students' favourable views and perceptions in their learning (Tho & Yeung, 2018).

Similarly, in the physics area, a study by Evangelista et al. (2017) on the use of remote laboratories for studying electrical circuits by 37 secondary school students, showed that these were a powerful tool for students' learning and in promoting their interest and motivation.

With the Covid-19 pandemic, online teaching, and, particularly, science online teaching, became of utmost importance to the education scientific community. Therefore, at the end of the first semester of 2020, several educational researchers reflected on the impacts of these sudden and drastic changes in school communities, and numerous scientific journals have edited special issues on the theme. There are lessons to be learned from this new reality and experiences. Once shared, they can support a better understanding of how teachers and students have adapted themselves, the difficulties they have experienced, the strategies that have been used, and the ones considered the most effective.

Initially, the main difficulties faced by teachers and students were related to the selection and use of technologies that allowed the implementation of distance learning or, at least, that allowed the communication with the students. In a study carried out in Indonesia, with 353 mathematics and science teachers of primary and secondary education (Azhari & Fajri, 2021), through surveys and interviews, it was concluded that teachers did not feel prepared for distance learning. However, they felt motivated and committed to their mission. Another aspect that stood out from this study was the lack of guidance and technical support felt by teachers and students. The limited access to the internet caused several constraints and inequalities in the learning process. Most teachers chose to use applications with which they were already familiar, such WhatsApp (72%), although other applications (ZOOM Meetings, Google Classroom, Webex, etc.) were also used. One explanation for the prevailing use of WhatsApp was the financial difficulties of the students' parents, which made it impossible for them to have stable access to the internet and purchase computers. Moreover, Azhari and Fajri (2021) determined that teachers' confidence in the implementation of distance learning has increased, during this period, and pedagogically it had a positive effect, although requiring a great sense of initiative and creativity. As some teachers mentioned in the interviews, they overcame their difficulties individually and shared experiences with their peers. In addition to being forced to deal with platforms and overcome constraints, such as students who live in places without access to the internet, teachers also made use of state television and radio channels.

Another study, by Chadwick and McLoughlin (2020), conducted with 269 Irish science teachers (primary and secondary levels), explored, through surveys, the impact of the Covid-19 crisis on teaching and learning and assessment in science, the use of learning technologies to support distance learning in science, and the facilitation of practical activities in science. The results revealed a negative impact of Covid-19 on student teaching, learning, and assessment, with teachers recognising difficulties in supporting student learning, meeting specific student needs, and providing feedback. A particularly critical point that denotes teachers' problems about online teaching, was practical activities, whose implementation decreased dramatically, with more than a third of secondary school teachers not doing any. When implementing practical activities, primary teachers generally chose more hands-on activities. In contrast, second-level teachers used mostly technology-based solutions, such as video demonstrations and interactive simulations.

## Method

In this study, we followed a qualitative research methodology, based on an interpretive approach (Cohen et al., 2007). Interpretative research is a powerful tool for examining teachers' meaning construction and thinking. This is particularly important within this study, as it aims to examine how science teachers adapted their practices to the context of the Covid-19 pandemic and what they learned during the confinement period.

### The Portuguese context

The Portuguese education system is organised into three sequential levels: early childhood education and care, primary education, and secondary education. As in other OECD countries, pre-school education is offered to children between 3 and 5 years of age. Compulsory education usually starts at age 6, when children enrol in elementary schools. Compulsory basic education is organised into three cycles of studies, with varying lengths. At the end of the third cycle, students (typically aged 15) transit to (upper) secondary education. Secondary education is compulsory and organised in both general and vocational education pathways. Students choose one of four curricular areas in secondary education: science and technologies, social and economic sciences, languages and humanities or visual arts. Formal schooling, in Portugal, is compulsory for students until 18 years old or until the completion of upper secondary if students complete their studies before the age of 18 (Liebowitz, et al., 2018). Physics as a subject starts in grade 7 along with chemistry; the same teacher teaches both subjects.

### Participants

The participants in this study are fifteen science teachers who collaborate on a research project that aims to understand the effects of implementing STEM activities on the learning and motivation of students and their interest in pursuing scientific careers. The project started in 2019 and it will end in 2022; it is funded by the Foundation for Science and Technology.

All teachers had graduated in teaching science or in science and/or a postgraduate in the same area. Their ages ranged between 37 and 62 years old, and their professional experience between 8 and 36 years. Teachers belonged to several schools within the Lisbon district. They were all science teachers and teaching students aged 12 to 18 (from 7<sup>th</sup> to 12<sup>th</sup> grade) (Table 1).

**Table 1**  
*Teachers' attributes*

| Teacher | Age | Gender | Teaching experience | Formal education                                    | Science subjects (grades) taught during the project activities |
|---------|-----|--------|---------------------|-----------------------------------------------------|----------------------------------------------------------------|
| 1       | 41  | F      | 8                   | Master's degree in teaching physics and chemistry   | Physics and chemistry 8 <sup>th</sup> grade                    |
| 2       | 46  | F      | 21                  | Bachelor's degree in teaching physics and chemistry | Physics and chemistry 7 <sup>th</sup> grade                    |
| 3       | 60  | F      | 32                  | Bachelor's degree in chemistry engineering          | Physics and chemistry 8 <sup>th</sup> grade                    |
| 4       | 37  | F      | 10                  | Bachelor's degree in teaching physics and chemistry | Physics and chemistry 9 <sup>th</sup> grade                    |
| 5       | 59  | M      | 36                  | PhD science education                               | Physics and chemistry 12 <sup>th</sup> grade                   |
| 6       | 55  | F      | 29                  | Bachelor's degree in chemistry                      | Physics and chemistry 11 <sup>th</sup> grade                   |
| 7       | 55  | F      | 32                  | Master's in chemistry                               | Physics and chemistry 12 <sup>th</sup> grade                   |
| 8       | 42  | F      | 19                  | Bachelor's degree in teaching physics and chemistry | Physics and chemistry 9 <sup>th</sup> grade                    |
| 9       | 54  | F      | 25                  | Bachelor's degree in chemistry engineering          | Physics and chemistry 10 <sup>th</sup> grade                   |
| 10      | 55  | M      | 30                  | Bachelor's degree in chemistry engineering          | Physics and chemistry 9 <sup>th</sup> grade                    |
| 11      | 61  | F      | 19                  | Master's in science education                       | Physics and chemistry 10 <sup>th</sup> grade                   |
| 12      | 62  | F      | 30                  | Bachelor's degree in chemistry engineering          | Physics and chemistry 11 <sup>th</sup> grade                   |
| 13      | 39  | F      | 15                  | Bachelor's degree in teaching physics and chemistry | Physics and chemistry 7 <sup>th</sup> grade                    |
| 14      | 54  | F      | 22                  | Bachelor's degree in chemistry engineering          | Physics and chemistry 8 <sup>th</sup> grade                    |
| 15      | 49  | F      | 26                  | Bachelor's degree in teaching physics and chemistry | Physics and chemistry 7 <sup>th</sup> grade                    |

The fifteen teachers were involved in the project's activities when the confinement period started, and they simultaneously volunteered to be part of the present study. The anonymity of the participants and the confidentiality of personal data were guaranteed. They signed an informed consent agreement to participate in the study and were informed about the goals and the nature of the research and about their right to leave the research at any time.

## Data collection and analysis

The data collection instruments were semi-structured interviews and teachers' individual written reflections. Each interview lasted 30 minutes and was conducted online, using the ZOOM platform and video recording. The interview script consisted of two dimensions (class design and management, and teachers' learning) and included the following five open questions: *How did you adapt to distance learning? How did you develop the work with your students during the confinement period of the pandemic? How did you conduct experimental activities? How did you use #EstudoEmCasa with your students? What did you learn with distance teaching?* These questions were conceived by the researchers with the purpose of collecting data for this study. In July 2020, teachers also did individual written reflections that enabled triangulating the data obtained from the interviews (Patton, 1990). Therefore, they were asked to reflect on the work with students during the pandemic (i.e., distance work, the infrastructure they used, experimental activities, the media) and the learning they did with distance learning. These individual written reflections were emailed in July 2020.

To analyse the data, the first author of the present paper started reading the interview transcripts. After that, the text was segmented, and each segment was assigned a code and a category. After an initial categorisation, the reports were reread, and the first author inductively created subcategories (Strauss & Corbin, 1998) (Table 2). Then, the third author analysed the transcripts of the interviews and based on the descriptive categories and subcategories, created interpretive codes. The two researchers compared their codes and discussed a consensus coding scheme, which was 0.88 (Cohen et al., 2007). Considering the agreed codes, the researchers independently analysed the transcripts of the interviews and the recorded data. This procedure generated the categories and subcategories shown in Table 2. In addition to the transcripts of the interviews, the written reflections were also examined by the two researchers, who autonomously analysed the content of the reflections, considering the categories and subcategories already defined in the interviews, thus comparing their analyses. Disagreements and doubts were discussed to reach a consensus. The inter-rate reliability measured with Cohen's kappa coefficient was close to 0.85 (Cohen et al., 2007), after a second researcher coded 10% of the teachers' written reflections.

**Table 2***Categories and sub-categories of analysis*

| Categories                  | Sub-categories                     |
|-----------------------------|------------------------------------|
| Class design and management | Synchronous classes                |
|                             | Experimental activities conduction |
|                             | Television lessons                 |
| Teachers' learning          | Pedagogical skills                 |
|                             | Technological skills               |

## Results

### Class design and management

Science teachers have adapted their lessons plans and class management to the context of the confinement. During the interviews and in written reflections, teachers have mentioned they have developed synchronous classes, using digital platforms and other communication infrastructure, conducting experimental activities, and developing courses making use of a television programme. Thirteen teachers reported having developed synchronous classes, eight reported that they performed experimental activities in a context of confinement, and eleven teachers highlighted the use of the television programme (Table 3).

**Table 3***Identification of class design and class management mentioned in the interviews and written reflections*

| Teacher | Class design and management |                         |                      |
|---------|-----------------------------|-------------------------|----------------------|
|         | Synchronous classes         | Experimental activities | Television programme |
| 1       |                             | X                       | X                    |
| 2       | X                           |                         | X                    |
| 3       | X                           | X                       | X                    |
| 4       | X                           | X                       | X                    |
| 5       | X                           |                         |                      |
| 6       |                             | X                       | X                    |
| 7       | X                           | X                       | X                    |
| 8       | X                           |                         |                      |
| 9       | X                           |                         | X                    |
| 10      | X                           |                         |                      |

| Teacher | Class design and management |                         |                      |
|---------|-----------------------------|-------------------------|----------------------|
|         | Synchronous classes         | Experimental activities | Television programme |
| 11      | X                           |                         |                      |
| 12      | X                           | X                       | X                    |
| 13      | X                           |                         | X                    |
| 14      | X                           | X                       | X                    |
| 15      | X                           | X                       | X                    |

By analysing Table 3, it is possible to verify that the teaching experience and the age of the teachers do not seem to influence the way they designed and managed the class.

In the next subsection, examples of interviews with teachers and written reflections are presented for each subcategory, enabling us to know how, in the perspective of teachers, they have adapted their lesson plans and class management to the confinement context. The selected examples are representative of the types of responses obtained.

### Synchronous classes

Thirteen teachers, from the most experienced to the least experienced, used digital platforms, such as ZOOM or Microsoft Teams, to carry out synchronous sessions with their students. ZOOM was considered very important to monitor the students' activities and overcome the difficulties experienced during the confinement. In this regard, for example, one of the interviewees mentioned:

*My school took a while to react and define a plan for this situation. When I started working with students in a context of total confinement and without access to synchronous interaction, I began to realise that it was impossible. It was difficult to assist the pupils, they had many doubts and doing it by email was not enough to clarify them. The pressure on our school started to increase to ensure the quality of students' learning, and the school management has taken action. If there is an issue, a difficulty, we can resolve it at that moment [...], most of my students, even the most disadvantaged, had been in class and enjoyed those moments. It was important to them. (Interview)*

Teachers said that synchronous classes have been crucial. Still, it was problematic to manage students from more disadvantaged, socio-economic contexts or belonging to minorities because of the lack of resources (computer

and internet), as a teacher stated:

*Microsoft Teams was very important for kids to have real-time classes, and my school had already developed a digital technology plan. Not everyone had access to computers and the internet. In my class, with more economic difficulties, there were still four or five. The school lent them computers to guarantee access to classes, and our municipality was also spectacular and arranged some computers for the kids. [...]. These things are difficult to achieve without interaction with the student ... and the use of the platform was good for giving feedback instantly, and seeing the difficulties, accompanying the student. (Interview)*

Moreover, interviewees reported that they used distance learning platforms and other technological infrastructure that allowed them to communicate in sync with students and, above all, ensure that all students had access to the materials provided.

The digital infrastructure they have used to communicate were email, WhatsApp, Moodle, mobile phones, and videos. According to one of the interviewees:

*Students had difficulties in accessing the platform, especially in the first weeks, some of them simply did not even have the internet at home or a computer [...], but everyone has a mobile phone and mobile data, so I used to send materials via WhatsApp, and answered the students' questions. It was the strategy I used and that they used with me to make sure that everyone had contact with me and access to the materials. (Interview)*

One teacher highlighted other digital infrastructure that made it possible to ensure that everyone was able to access the proposed activities:

*When I developed the class, I had to consider that there are kids who don't have access to the computer and think about strategies to manage this [...] I used the mobile phone a lot to create synchronous moments with these students. Everyone had a mobile phone, and I called to accompany them on the subject, ask questions [...] the kids went to school to check the materials and then left them at school for the teachers to correct. Still, it is different if we can interact with them by phone, they feel more accompanied. (Interview)*

### ***Conducting experimental activities***

Experimental activities are critical in science teaching. In this sense, various resources have been used so that students could perform experiments

at a distance, using mobile phone applications to measure variables (e.g., sound level) and assembling and carrying out experimental activities, using bottles, balls, marbles, boxes, wood, etc. Videos were also used to make simulations, animations, and remote laboratory activities.

In this regard, one teacher declared that her students had developed an experimental activity on sound, at home, using a mobile phone application to measure the sound level in one room of their homes or the surrounding area:

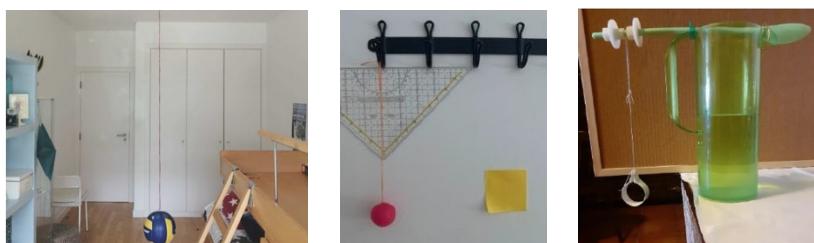
*I asked students to make sound level measurements in the area where they live, placing the sonometer installed on the phone at the window at different times of the day. Each student identified areas of their home where the noise produced is highest and took measurements at other times. They took measurements for three days a week and recorded them for later treatment. They organised the data in a table, performed the calculations of the averages of the collected values and constructed the noise map of the area where they live or of the area of the chosen house, using the same scale of the maps analysed initially. (Written reflection)*

Moreover, most teachers have stated how they encouraged their students to use daily life materials to carry out experimental activities. As an example, we describe the case of a teacher who developed the gravity pendulum activity. As she mentioned in the interview:

*The students made pendulums at home with their materials and the most creative ways they could imagine. They used balls and wires attached to the ceiling of their rooms, squares and hangers with a string and a ball, kitchen materials [...] they made videos with the experience and the parents helped, so the families got involved [Figure 1]. [...] The students made a very positive evaluation of the activity and motivated them a lot. (Interview)*

**Figure 1**

*Gravity pendulums built by students at home*



In her written reflection, the teacher pointed out that with the pendulums already built, students were able to control variables and make measurements:

*The students built a pendulum, carried out experimental determinations and communicated the results obtained through a scientific article, scientific poster and even a video about the work. They had to build tables and graphs, do treatment of the results obtained. (Written reflection)*

Teachers also used videos and other external representations (e.g., simulations, animations, remote laboratory) for students to explore experimental activities. As one of the teachers revealed:

*In Sciences, there is an experimental component, and this part has been heavy during confinement. We didn't have a laboratory, and we had to think about how to get the experiences to the students' homes. I used PHET simulations and several animations available on the internet. I showed videos to make observations. (Interview)*

During the interview, there was a teacher who reiterated that she used a remote laboratory to develop experimental activities with students:

*The remote lab played an important role during the confinement. Students were able to launch the experiment in real time, control variables and collect data. It is not the same as carrying out the activity in the classroom, but it was an important resource in this pandemic context. (Interview)*

### ***Television class***

One of the Portuguese government's measures was creating a television broadcast (#EstudoEmCasa) for students to be able to access the contents of the subjects. The interviews showed us three types of uses of television classes: (i) teachers who did not suggest to their students to watch #EstudoEmCasa; (ii) teachers who had recommended it to complement the contents; (iii) teachers who, in synchronous classes, explored the subjects covered in the programme, but also used other activities and strategies. For example, one of the teachers who recommended #EstudoEmCasa to complement the subjects of the discipline mentioned:

*It was an option taken by my school cluster. We give our synchronous classes, send the materials to the students; those who have no chance of accessing synchronous classes, because they do not have a computer or internet, they come to schools and pick up the materials, and then use #EstudoEmCasa as a supplement. In my discipline, the television programme concentrates two years of schooling at the same time. So, I only use it as a complementary activity. If I developed my work with them based on the*

*programme, it would accentuate the inequalities, because students with support at home can follow the programme and then study; those who don't have it, need the materials that the teacher gives them and that guides them in their study. (Interview)*

Moreover, several teachers chose to explore, in synchronous classes, subjects discussed in the #EstudoEmCasa, having also resorted to other activities:

*I think, in this context, #EstudoEmCasa was important because, in some way, it had given access to all students to classes. The most disadvantaged students, from socio-economic backgrounds, with more problems, have accessed the contents and classes on television. [...] parents may not have a computer (as in either case), but all students have a television. So, it was an important initiative so that the gap is not so big [...] in my classes, I explored the subjects of #EstudoEmCasa, but I also did other things. I used different materials, I put them to experiment with materials they had at home. (Interview)*

### Teachers' learning

In the interviews and written reflections, teachers recognised that they have learned at the level of pedagogical skills and multimedia skills during the confinement period, due to their experiences in remote teaching. More specifically, seven teachers mentioned having developed pedagogical skills and twelve mentioned learning related to technological skills (Table 4).

**Table 4**

*Identification of teachers' learning mentioned in the interviews and written reflections*

| Teacher | Teachers' learning |                      |
|---------|--------------------|----------------------|
|         | Pedagogical skills | Technological skills |
| 1       |                    | X                    |
| 2       | X                  | X                    |
| 3       |                    | X                    |
| 4       | X                  |                      |
| 5       |                    | X                    |
| 6       |                    | X                    |
| 7       |                    | X                    |
| 8       | X                  |                      |
| 9       | X                  | X                    |

| Teacher | Teachers' learning |                      |
|---------|--------------------|----------------------|
|         | Pedagogical skills | Technological skills |
| 11      |                    | X                    |
| 12      | X                  | X                    |
| 13      | X                  |                      |
| 14      |                    | X                    |
| 15      | X                  | X                    |

In the next subsection, examples of interviews with teachers and written reflections are shown for each subcategory. The selected examples are representative of the types of responses obtained in relation to what teachers learned during the pandemic.

#### *Pedagogical skills*

From the teachers' perspectives, they have developed their skills to design tasks adapted to distance learning during the pandemic period, which has involved students in their own learning. For example, one of the teachers said:

*The adjustment of STEM activities to this context was one thing that I learned. I had no experience in online teaching, and I had to build and adapt activities that would suit this new situation of total confinement, in which students are at home, having online teaching. [...] I think I have learned to use the platforms and develop activities that focus the students' attention and motivate them. (Interview)*

Another teacher also mentioned what she learned in the development of STEM activities during the confinement.

*The transition from face to face to online was not easy and it was necessary to rethink the way of teaching. What changes should be made to STEM activities to be developed in this context? Will it work? Yes, I had difficulties that I gradually got over, and I feel I've learned something. For example, at that time, I found myself thinking about the best way to teach the sound. I had to think of new strategies and chose to use the cell phone. (Interview)*

Moreover, in her written reflection, one teacher highlighted she had also learned to develop activities appropriated to distance learning (e.g., virtual exhibitions), and to vary students' ways of working (e.g., using group work).

*[I learned that] in a distance learning context, students can present their work to the class and get to know the work developed by each other [using*

*the online platform]. [I also learned that] the final products can be organised to form a virtual exhibition to be presented on the group's website. (Reflection)*

In the interview, one of the teachers also corroborated the learning referred in the two previous examples:

*We had to adapt the best we knew to the new situation, and the challenges were countless. We had to move quickly from face to face to online, and it was different [...] I had to learn which activities did work in this context and for my students. (Interview)*

### ***Technological skills***

Teachers recognised that learning has been developed mainly in two domains: the skills to use digital platforms and the skills to select and use digital resources. Regarding the use of digital platforms, one of them stated:

*At the beginning of the pandemic, I didn't know how to use the digital platform and I frequently have used the cell phone, which was very well accepted by the students. I had to gain this skill to be able to use it and make the most of the platform, because I recognise that it is an important tool to help students [...] I think I have been able to develop this ability and that now I am able to work and make more effective use of the platform. (Interview)*

Another teacher mentioned that:

*The correct word is ignorance about platforms, I had never used them before, and we had to quickly get used to using them and the students too. And this is something that I had to learn and explore. The school cluster made a platform option, we have used Teams and in the first days I have explored it and then I have managed to use it in a more profitable way, and it was certainly a learning experience. (Interview)*

Teachers also recognised that they have learned to select and use digital resources appropriate to the tasks they have proposed to their students:

*I already used simulations and videos in my classes, but not that way. Teaching exclusively at a distance is another way of looking at teaching and learning, which involved developing my own skills to use resources in other way. I give as an example a PHET simulation that I used to explore orally, in the classroom, but now I had to think about how they could use this at home, and which questions I could ask them to explore. (Interview)*

## Discussion

This study aimed to examine how science teachers have adapted their practices to the pandemic context and what they have learnt during the confinement. The results showed several adaptations related to class design and management: the development of (i) synchronous classes using digital platforms and other communication infrastructure; (ii) experimental distance activities; (iii) classes based on a television programme.

Concerning the first adaptation, *synchronous classes using digital platforms and other communication infrastructure* teachers considered the use of digital platforms essential to monitor students learning. However, they faced several challenges associated with students with socio-economic difficulties, who are more vulnerable or belonging to minorities, which is related to the lack of computers and the internet. To overcome these difficulties, teachers used other technological infrastructure that allowed them to communicate in sync with their students. These results are in line with research developed in other countries, during the confinement period showing inequalities in access to education for students from underprivileged contexts (Chadwick & McLoughlin, 2020; Fore, 2020; Fox, 2016). Also, in the study of Khlaif et al. (2020), developed with science teachers, the constraints were overcome, resorting to other communication infrastructure, more familiar to students (email, WhatsApp, Moodle, mobile phone, and videos).

Regarding the development of *experimental activities*, the results show that the closure of schools impacted the way teachers carried them out. In the science subject, teachers encouraged students to do practical activities in their homes by using everyday materials, mobile phone applications, videos, among others, which facilitated the teaching of experimental science at a distance. From the teachers' perspective, carrying out activities with materials that the students had at home (e.g., in their kitchens) allowed them to increase their engagement and the involvement of families. Likewise, in other studies that intended to examine the impact of Covid-19 on teaching science, during online classes, it was demonstrated that teachers also developed hands-on activities with students, such as kitchen science and fieldwork, video demonstrations, and interactive solutions (Chadwick & McLoughlin, 2020).

Regarding the television programme *#EstudoEmCasa*, most of the interviewees considered it a means for all students to have access to classes, because it reaches all families, especially those from the most disadvantaged socio-economic classes. Similarly, a study conducted by Azhari and Fajri (2021) shows that the use of public television to access science classes was crucial to support

the learning of students with financial difficulties (they could not obtain stable access to the internet or buy computers) In addition, it is noteworthy that the present study shows that teachers adopted *#EstudoemCasa* differently: some teachers did not suggest that students watch the programme; other teachers recommended it as a complement to the classes; some teachers explored the programme's subjects through synchronous classes, among other strategies. None of the adopted solutions seem to be better than the others. They are just different ways of reaching students, as in the case in which students, not having internet at home, went to schools to get the materials, using *#EstudoemCasa* as a complement.

During the pandemic, the interviewees revealed what they have learnt related to pedagogical and technological skills. At the beginning of the confinement, the technological skills influenced the pedagogical practices, and teachers recognised that they made efforts to become accustomed to a new way of teaching, integrating, and exploring digital resources. The use of digital platforms was at first a challenge for teachers. Moreover, most teachers recognised that they did not know how to work with platforms and that they had learned to use them for their students' learning's sake. Other studies have also shown positive results in this domain, highlighting the importance of teachers in responding to the pandemic to support their students (Delcker & Ifenthaler, 2020) and the gradual development of self-confidence in the implementation of ICT during the Covid-19 pandemic (Azhari & Fajri, 2021).

## Conclusions

The sudden closure of schools in Portugal in March 2020 made teachers respond rapidly to ensure their students' learning. In this sense, most teachers resorted to distance learning platforms, developed experimental activities with their students through everyday materials and other digital resources and resorted to home study. However, to make this possible, teachers recognised that they had to develop their own learning. Given these results, some recommendations emerged: the need for schools to develop distance learning plans to guide teachers and the educational community in times of crisis; the need to involve teachers in professional development programmes that allow them to develop knowledge about online teaching; the need to support science teachers to develop their pedagogical skills on experimental distance learning; the need to ensure that all students have access to resources that enable them to learn at a distance. Finally, this study showed teachers' importance and role in managing this unpredictable crisis in their schools.

Thus, this study has enabled listing pedagogical implications for post-Covid education: the importance of teachers using digital resources with their students, either face-to-face or remotely, allowing them to develop digital skills; the importance of teachers carrying out open experimental activities with their students to develop their autonomy, essential in crisis situations, such as Covid-19, with students planning the experiments, selecting materials, carrying out the experiments and drawing conclusions. In the future, in a post-pandemic context, what kind of measures can be taken to enhance the science curriculum and support teachers in unforeseen situations like the one we are experiencing. Public authorities and policymakers also would find in this study the motivation to go further in the training of teachers in STEM areas, creating training contexts and promoting programmes to prepare teachers for the unpredictability of modern times. This crisis has made clear the need to think about science teaching taking place not only in a physical space, but also in a virtual space, and all that this implies in new strategies and activities that allow for the promotion of inclusion and the development of student learning in virtual educational environments. The study contributed to thinking about new ways of teaching that could be put into practice by teachers in the current context and maintained in a post-Covid period.

This study had some limitations, which should be considered when interpreting its results. First, only fifteen teachers participated, so the results cannot be generalised. The second is that all data were self-reported by the teachers, that is, the researchers did not observe teachers' practices during the pandemic and, therefore, the results stem from the teachers' perspectives. In future research, it is important to collect data directly from teachers' classes.

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## Biographical note

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# Project-Based Learning in Initial Teacher Education: The Practice of Three Higher Education Institutions in Portugal

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TIAGO TEMPERA<sup>\*1</sup> AND LUÍS TINOCA<sup>2</sup>

∞ Future teachers first come into contact with diversified teaching strategies, such as Project-Based Learning, in initial teacher education programmes. Such strategies contrast with the type of methods that they experienced throughout their own schooling, which are essentially teacher centred. The present research aims to understand how Project-Based Learning is being integrated into the curriculum of primary school teachers' initial teacher education programmes. The participants were three higher education institutions located in different regions of Portugal, all of which offer initial teacher education programmes for primary school teachers that include Project-Based Learning at some point. The data were collected through document analysis of the programmes' curricula, as well as through semi-structured interviews with the programme coordinators in each institution. The results show that the institutions value Project-Based Learning and make an effort to include it in their programmes, whether in theoretical, didactical or practical terms. However, they encounter some difficulties in promoting more significant experiences that would enable the students to feel confident to use this strategy in their Supervised Teaching Practice internships.

**Keywords:** active learning, initial teacher education, project-based learning, teaching strategies

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## Projektno učenje v začetnem izobraževanju učiteljev: praksa treh visokošolskih zavodov na Portugalskem

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TIAGO TEMPERA IN LUÍS TINOCA

∞ Bodoči učitelji prvič pridejo v stik z raznolikimi strategijami poučevanja, kot je na primer projektno učenje, v programih začetnega izobraževanja učiteljev. Takšne strategije so v nasprotju z vrsto metod, ki so jih izkusili med svojim šolanjem, ki so bile pretežno osredinjene na učitelja. Ta raziskava skuša razumeti, kako je projektno učenje vključeno v učni načrt programa začetnega izobraževanja osnovnošolskih učiteljev. Udeležence predstavljajo trije visokošolski zavodi iz različnih portugalskih regij, pri čemer vsi ponujajo programe začetnega izobraževanja osnovnošolskih učiteljev, ki na neki točki vključujejo projektno učenje. Podatki so bili zbrani z analizo dokumentov učnih načrtov, prav tako s polstrukturiranimi intervjuji s koordinatorji programov na vsaki izmed omenjenih ustanov. Rezultati kažejo, da zavodi cenijo projektno učenje in se ga trudijo vključiti v svoje programe, pa naj bo to v teoretičnem, didaktičnem ali v praktičnem smislu. Srečujejo pa se z nekatimi težavami pri spodbujanju pomenljivih izkušenj, ki bi pri študentih stimulirale samozavestno rabo te strategije pri njihovem nadzorovanem pedagoškem usposabljanju.

**Ključne besede:** aktivno učenje, začetno izobraževanje učiteljev, projektno učenje, učne strategije

## Introduction

Throughout their lives, teachers face a continuous process of personal and professional growth that is not restricted to learning knowledge and skills (Menezes & Ponte, 2006). As part of their strong criticism of traditionalist school practices, Ball and Cohen (1999) claim that teacher education programmes should prepare future teachers for challenging and reflective work with a practice-based curriculum. They also argue that teachers should learn from their teaching practices, particularly concerning how to evaluate the different situations they face and how to use their didactical knowledge to improve their educational practices. Regarding research, Kostiainen et al. (2018) state that there have been few studies focusing on new educational approaches in teacher education, or how these approaches are experienced by future teachers.

According to Biesta (2011), there are several factors to consider in the education of teachers, especially the enhancement of educational wisdom rather than the common development of knowledge and skills. Reinforcing this idea, Darling-Hammond and Baratz-Snowden (2007) state that the teacher education curriculum should not be limited to the acquisition of knowledge, but should also allow students to seek and apply new strategies in situations where models are not enough. Braga (2001) considers that Initial Teacher Education (ITE) in Portugal is typically poor due to the emphasis given to the content to be taught, and claims that higher education professors should promote activities that contribute to students' engagement in their own learning process, so that they can develop curriculum management skills.

Several authors (Almeida, 2015; Ball & Cohen, 1999; Leite & Ramos, 2010; Rangel & Gonçalves, 2011) criticise traditionalist and transmissive teaching approaches, which are essentially teacher centred, and defend teaching methods based on socio-constructivist and interdisciplinary principles that encourage students to be more actively engaged in the learning process. One of the major concerns mentioned by Tasci (2015) is that during the students' own schooling, there is a great difficulty in internalising knowledge and being able to establish relationships between theoretical knowledge and real life. Based on his empirical research, Hattie (2008) states that learning occurs when there is the explicit goal of learning, when it is challenging and when everyone is involved in the process.

Emphasising the importance of the interdisciplinary nature of knowledge, Leite and Arez (2011) support a project approach in the initiation to professional practice of future teachers, as it favours an orientation towards an active teaching professionalism, preparation for decision-making in diversified

and non-typical situations, integration of knowledge from different areas, and the learning styles that are characteristic of new generations. Reinforcing this idea, Rangel and Gonçalves (2011) defend Project-Based Learning (PjBL) as a central focus in ITE curricula, highlighting its effectiveness in contrast to direct, transmissive and expository teaching.

In Portugal, initial primary school teacher education has two components: a degree in Basic Education lasting three years, constituted as the common core for prospective teachers who want to work with children from 0 to 12 years of age, followed by a master's degree for Primary School Teachers (or its variants: Preschool and 1st cycle of education – 0 to 9 years of age; 1st and 2nd cycles of education – 6 to 12 years of age), lasting two years, with a strong focus on didactics components and Supervised Teaching Practice. Supervised Teaching Practice internships are carried out at different times during the undergraduate and master's degrees. During these internships, future teachers are integrated into classrooms of more experienced teachers (called cooperating teachers), working together in planning activities, but always with the support of the higher education institutions' professors. This process follows the model recommended by Decree-Law No. 43/2007, under the joint responsibility of the Ministry of Education and the Ministry of Science, Technology and Higher Education, which includes guidelines first for students' scientific education and later for didactics education.

Since the implementation of the Bologna Process in 2007, which brought about significant changes in the structure and conceptualisation of ITE, there has been a conceptual change in the way of looking at the teaching and learning process (Almeida, 2015), resulting in traditionalist or transmissive methods being considered non-preferred approaches for teaching (Leite & Ramos, 2010).

## **Project-Based Learning**

Silva (2005) contextualises Project-Based Learning (PjBL) historically, pointing out that the proposal to organise the teaching process around central nuclei of content, thus making learning more meaningful and effective, has a long tradition in education, dating back to the beginning of the twentieth century and being connected, in the United States, to names like Dewey and Kilpatrick. This perspective was also adopted in Europe, which followed an education for life perspective and detached itself from a compartmentalised teaching model disconnected from pupils' interests.

We can consider PjBL as a teaching strategy that presupposes the involvement of all participants, with the purpose of solving real-life and authentic

problems that are in the common interest of those who are participating in the project (Leite et al., 1989). Vasconcelos (2011) adds that project work contributes to giving meaning to learning by engaging participants in problem solving, decision making and the search for answers. This process allows the development of essential lifelong learning competences, such as the collection and processing of data, the social learning of group work, decision making, and the spirit of initiative and creativity.

In this sense, Leite and Arez (2011) defend the inclusion of project work practices in ITE, providing student teachers with intervention skills in an integrated manner by developing projects in formal and non-formal educational contexts. In this way, student teachers are prepared to strategically intervene in educational contexts, and are able to involve children in the design, implementation and evaluation of collective projects. Putting student teachers in practical contact with this strategy allows them to become responsible for their own educational path through experiences and knowledge beyond those acquired academically, thus promoting a greater isomorphism between training and teaching, as defended by Estrela (2001).

Although PjBL may not be entirely new in education, Silva (2011) reinforces the idea that it remains innovative, mainly due to its continued limited use in schools and the need to further implement project work in preschool and basic education. In didactical terms, Vasconcelos et al. (2012) propose four sequential phases for pupils to follow when working on projects: (i) *the problem definition phase*, in which the problem is formulated and the questions to be investigated are defined; (ii) *the planning and development phase*, in which the possible path of the project's development is foreseen, taking into account the defined objectives; (iii) *the execution phase*, in which the research process and activities that enrich and lead to the defined problem's answers are developed; and (iv) *the dissemination and evaluation phase*, in which the results are presented, as well as an evaluation of the entire process and a consequent survey of new issues that could lead to a new project. Silva (2005) considers that all phases of a project contribute to the continuous construction of knowledge, involving conception and decision making (starting from the initial idea or problem), as well as the planning, implementation, and the evaluation of the process. Rangel and Gonçalves (2011) add that the application of this strategy in educational contexts favours motivated, participatory, shared, cooperative and integrated education. In addition to these socio-affective aspects, Hayes (2010) defends curricular integration as a characteristic of project work in which the use of different curricular areas allows the incorporation and interconnection of a large number of sources, concepts and paths. Furthermore, Darling-Hammond

(2006) assumes that a successful teacher education programme includes coherence and integration between all areas of the programme, as opposed to a collection of courses with no apparent connection.

The success of learning through projects does, however, depend on its continuity; it is not as effective if it is merely used for isolated activities, as its approach must be systematic over time (Fernandes et al., 2014). Tamim and Grant (2013) recognise the difficulties of PjBL implementation in the classroom, stating some implications that teachers need to take into account so that the strategy does not end up being disadvantageous for the pupils. The authors claim that teachers need to believe in its effectiveness and be open to constructivist learning approaches. In addition, they must develop learner-centred teaching skills so that they can manage activities resulting from project work in a successful way.

### **Initial Teacher Education**

Estrela (2002) defines ITE as the structured, framed and formal beginning of a personal preparation and development process aimed at professional performance in a school, servicing a historically situated society. It is a complex process that must take into account the different problems that can be solved using the knowledge of different curricular areas. Pantić (2012) claims that teacher preparation should be a collaborative effort and have a continuing development, since fragmented education of teachers does not seem to be the most effective way to enable professionals to work collectively later in schools.

In her research, Braga (2001) criticises ITE for valuing aspects that are not relevant to the quality of personal, professional and social training of individuals by providing purely technical input that fails to contribute to the maturity process at these levels. She therefore argues that teacher education should prepare teachers to reflect on all aspects of the teaching-learning process as active members in the construction of the curriculum, rather than just its execution.

For this purpose, the Organisation for Economic Co-operation and Development (OECD, 2017) also defines learning principles for a quality educational environment that can be taken in account by ITE programmes. These principles place the pupil at the centre of learning, valuing their knowledge and promoting a horizontal connection between areas of knowledge. With these guidelines, the OECD aims to provide a framework and practical tools for those who work in education, enabling them to innovate their learning environment. The seven proposed principles (OECD, 2017) emphasise that learning

environments should “make learning an engagement central; ensure that learning is understood as social; be highly attuned to learners’ emotions; reflect individual differences; be demanding for all while avoiding overload; use broad assessments and feedback; and promote horizontal connectedness” (p. 17).

Kavanagh et al. (2020) defend a teacher education programme based on practice, promoting decision making and critical sense in identifying problems and judging situations. In this regard, Brew and Saunders (2020) also advocate research activities in teacher education, challenging professors themselves to rethink the pedagogies they commonly use. Higher education professors must, therefore, provide meaningful experiences to student teachers in order to realise what should really be learned (Daves & Roberts, 2010). Regarding the knowledge areas integrated in ITE programmes, Darling-Hammond (2006) assumes that a successful teacher education programme demonstrates coherence and integration between all areas of the programme, as opposed to being a collection of courses with no apparent connection.

Favourable conditions to develop meaningful experiences in ITE can be created throughout a programme that structures social processes allowing students to experience the topics covered in practical terms and to develop experiences in the light of theory (Kostiainen et al., 2018). For these authors, a teacher education pedagogy that combines meaningful practical experiences and reflection is essential in order for future teachers to understand the connection between theory and practice. In this regard, Nicu (2015) reinforces the idea that there is a need to develop strong education policies in teacher education and to provide higher education professors with continuous education in order to create an awareness of new teaching-learning methods.

Active learning experiences that have a direct correlation with the professional skills of teachers are considered essential in ITE programmes (Niemi, 2011). According to Pietila and Virkkula (2011), the use of PjBL in teacher education programmes can be beneficial because it improves teaching and learning quality, contributing to a high level of cognitive development and involving students in problem solving and the search for innovative solutions, while also teaching them planning, research and communication processes. Lasauskiene and Rauduvaite (2015) recommend that institutional solutions should be introduced to develop the implementation of PjBL as a teaching strategy in order to improve the skills of higher education professors in terms of peer collaboration and changing attitudes towards different learning methods.

## Method

With the present research we aim to understand how PjBL is being integrated into the curriculum of primary school teachers' ITE. The research questions that guide the project and that we address in this paper are: "How is PjBL incorporated in ITE programmes?"; "What is the importance given to PjBL in the ITE curriculum?"; "How long has PjBL been part of primary school teacher education programmes?"; and "Has the strategy to integrate PjBL in ITE changed over time? If so, how and why?".

The research is situated in a phenomenological-interpretative paradigm (Cohen et al., 2000): it seeks to understand the subjectivity of human experience, it maintains the integrity of the investigated phenomenon, and it makes an effort to interpret the phenomenon from the point of view of the participants. Thus, the inferences made emerge from the particular observed situations. The objective of the investigation is to understand the observed phenomena at the specific time and place of observation and to compare what is observed with observations made at different times and places. Every effort is made to understand and interpret the observed phenomenon taking into account its participants.

### *Research Design*

Given these characteristics, we chose a multiple case study design, as it focuses on specific situations that are supposed to be unique and special in certain aspects (Stake, 1995; Yin, 2014). The purpose of using this type of qualitative study is not to obtain knowledge of general properties of a population, but to understand the specificity of a given situation with the intention of producing knowledge about a particular object (Amado, 2014). When studying the processes and dynamics of ITE programmes, the ultimate aim is to provide a better understanding of specific cases, which will contribute to the formulation of working hypotheses about the situation in question.

### *Participants*

The participants in the research were three higher education institutions located in different regions of Portugal, all of which offer ITE programmes for primary school teachers. The institutions were chosen through a documental analysis of their programmes' curricula available online (which included PjBL at some point of the programme) and through previous work that the professors of these institutions had published. The selected institutions have different ITE programmes, but all conceive of project work as an integral strategy in

their courses. At each institution, we interviewed the professors coordinating the Basic Education programme and the Primary School master's programme (six in total, two from each institution).

### *Instruments*

Two data sources were used in the research in order to guarantee methodological triangulation by using two methods for the same object of study (Cohen et al., 2000). The data were collected through documental analysis of the programmes' curricula and through semi-structured interviews, so as to better understand the nature of the PjBL approach throughout the ITE programmes. Document analysis provided data on the context in which the participants operate and on the relevance of PjBL in the ITE curriculum. Furthermore, the information contained in these documents suggested questions for further clarification during the subsequent interviews (Bowen, 2009). The interviews were based on a previously defined protocol, ensuring that all participants answered the same questions (Bogdan & Biklen, 2013), while maintaining a degree of freedom in its exploration.

### *Analysis*

Data analysis consisted of two phases. In the first phase, the ITE programmes' curricula and course syllabi were analysed in order to select the participant institutions. Our criterion was the inclusion of PjBL at some point of the programme, either in the courses' content or method. In the second phase, subsequent to the interviews, the collected data were subjected to content analysis (Amado, 2014) and categorised according to the objectives of the study.

## **Results**

The three higher education institutions participating in the research (named InstA, InstB and InstC) are located in different regions of Portugal and all consider PjBL at some point in their ITE programmes.

The documental analysis of the programmes' curricula revealed that there are no courses with a title referring to PjBL explicitly. Although this strategy is included in the description of the courses of some syllabi, it is not clearly referred to in the titles. With a more detailed analysis focusing on the content of the courses of the syllabi, it was found that PjBL is mentioned both from a **theoretical** perspective (InstA and InstB), as well as from a **didactical** and **practical** perspective (InstA, InstB and InstC). The theoretical perspective includes the evolution of concepts and practices in Education and Pedagogy, the

main pedagogical movements of the modern era, and contemporary pedagogical theorists of Project Pedagogy. The didactical perspective includes the pedagogical knowledge for implementing project work in the classroom centred on PjBL phases (problem definition, planning and development, execution, dissemination and evaluation). The practical perspective includes project work experiences promoted by professors of the ITE programme within a course's work method. Adding to the documental analysis, the interviewed programme coordinators explain that PjBL is approached throughout the education of teachers, albeit implicitly in most cases and not necessarily expressed in the analysed documents.

At InstA, PjBL is addressed for the first time in practical terms in an interdisciplinary course in the first year of the programme. In this course, students have to carry out project work with the contribution of various areas of knowledge (Portuguese, Mathematics and Social Sciences). Later, it is addressed in more depth, in theoretical and didactical terms, in the programme's third year, with didactical application in an Initiation to Professional Practice course. There is an intention to "create the basis for students to build a project with children when they are on the internship" (Coordinator1 InstA). Thus, in the final year of the degree in Basic Education, students are asked to develop project work with preschool or primary school pupils (depending on the students' choice), being supported by a set of professors from several areas of knowledge. The main objective is for the project to be developed from an interdisciplinary perspective. These projects can originate from the pupils' curiosity about various themes or from the teacher's proposal (such as the solar system, animals, countries, etc.); alternatively, they can emerge from a directly observable problem (improvement of the playground, improvement of the library, optimisation of spaces in the classroom, etc.). In the master's degree Supervised Teaching Practice courses, the use of PjBL is not mandatory and depends on the conditions students find in their internship schools, the openness of the cooperating teacher to apply this strategy, and their interest and intention to use it. The intention in these internships is that future teachers develop their educational practices according to their pedagogical interests, with the methods that motivate them most, so it is not required to use project work. In addition to these moments, there are courses throughout the programme in specific areas of knowledge that propose the realisation of projects to be developed by student teachers as the course's work method, although not necessarily with the collaboration of different areas. The programme coordinator admits that, in higher education, it is always more complicated for professors from different curricular areas to work together due to several factors, such as a lack of

time and the specificity and curriculum of their own courses. Despite these difficulties, there is an intention that “professors put student teachers to work on projects so that they could do the same with children on their internships” (Coordinator1 InstA). Consequently, there is a need for student teachers to develop projects themselves in order to have this experience in the first person.

At InstB, PjBL is addressed for the first time during the second year of the programme, in a theoretical course in which various teaching strategies are studied. As a continuation of this theoretical approach, project work appears throughout the programme in some courses as a work method, which means that students develop projects related to a proposed topic within the scope of the particular course’s area of knowledge. Although these projects typically cross several areas of knowledge, they primarily aim to deepen knowledge in a specific area. Some professors also request that students read articles about project work in order to consolidate this strategy, and the topic is approached again later in the master’s degree so that student teachers can apply it in their Initiation to Professional Practice. Thus, future teachers are not obliged to develop this strategy with pupils in internships unless they consider it relevant and believe that they are able to execute it in the school where their practice is taking place. The programme coordinators interviewed also reveal a concern regarding project work in schools, stating that it is often impractical due to the requirement of many schools to devote a high number of hours to Portuguese, Mathematics and Environmental Studies, which is done in a segmented, un-integrated way. Thus, there is little time to develop projects, depending on the openness of the cooperating teacher to do so. The coordinators nonetheless say that some cooperating teachers do demonstrate an interest in developing projects. Moving away from the “manual-training-exam logic that is very present in some schools (...) we have [cooperating] teachers who support, encourage and give space” (Coordinator2 InstB) to future teachers to develop other methods, different from the ones they usually adopt.

In the case of InstC, PjBL assumes a logic of continuity throughout the programme, as a work method for several courses. Project work first appears in the programme’s first year, in the Natural Sciences course, and subsequently in several courses that seek to work in an interdisciplinary way by using this strategy. This model allows two courses from different areas of knowledge to develop the same work from different perspectives, using their respective specificity to enrich the learning experience for future teachers. This type of work method is carried out throughout the programme, with particular focus on courses in the areas of Portuguese, Mathematics and Natural Sciences. In these courses, students develop project work in two modalities: (i) short-term projects related to proposals

of the professor, who provides theoretical support material and the method to be used, on which students have to base their work in order to develop the activity, analyse the results and present a final product; (ii) medium or long-term projects, starting with the observation of a social and cultural reality, in which students “have to identify the problem-issue, define a theoretical framework, determine the method to use, build a data collection instrument, collect data in the field, analyse and interpret the data, establish conclusions and defend [their discoveries] at the end of the semester” (Coordinator1 InstC). In this institution, there is a designated physical area dedicated to projects, in which students can work freely and discuss their work with colleagues and professors. In Supervised Teaching Practice internships, future teachers are not obliged to use this strategy, although they often do so due to their personal experiences gained throughout the programme. The intention is that future teachers take these personal experiences to the internships, but this is often difficult due to the schools’ conditions and demands. According to the coordinators:

Student teachers have a lot of pressure to teach the official curriculum, and that sometimes does not give them the necessary time to implement project work, since time is known to be one of the biggest obstacles to the development of this type of work, and the [cooperating] teachers in the schools are often unable to give them the time to implement these types of activities” (Coordinator1 InstC).

The approach to PjBL in the three institutions has been a mutual concern for some years, with some of the institutions having a history of more extensive development over time. At InstA, project work was typically undertaken in preschool teacher programmes, while PjBL was approached mostly in a theoretical way in the primary school teacher programmes, as a strategy that could be used with pupils. It was only after the implementation of the Bologna Process in 2007 that the request for student teachers to try this strategy in the Supervised Teaching Practice internships began. The track record at InstB is similar, with PjBL being approached more theoretically in the pre-Bologna period and more didactically after the implementation of the Bologna Process. At InstC, PjBL has emerged in more recent years. Although it was not even approached theoretically for a long time, engagement with the didactical and practical approaches of this strategy began in a more consistent and integrated way in some courses of the programme’s curricula in 2016.

Regarding how students cope with the appropriation of PjBL, all three institutions highlight the difficulty students demonstrate in understanding its essence due to the lack of experiences of this nature throughout their own

schooling. InstA notes that students' first contacts with project work in the programme are sometimes unsuccessful, but they gradually begin to give it more importance:

In the first year of the programme, the results of the evaluation/satisfaction questionnaires answered by students show that there are many who do not appreciate this course [which requests them to develop a project of their own] and they are very resistant to this type of work method. However, in the third year, when we talk about PjBL in a different light, addressing its application with children, they adhere to it very well. This may have to do with several factors. One is that three years have passed since the first experience and the students have engaged with a series of issues in educational and pedagogical terms that makes them perceive [education] in another way. The other reason may be the fact that they no longer have to do the project themselves, they supervise the children to do the project, which may make it easier to see how the process works from an outside perspective. (Coordinator1 InstA)

The interviewed coordinators at InstB note that although students find this strategy easy to understand and learn, they face some difficulties in putting it into practice when integrating it in the Supervised Teaching Practice internships: "They do not have [difficulty] in appropriating [the strategy]. It is more in the difficulty of implementing it later, and that also has to do with the lack of experience in terms of project work" (Coordinator1 InstB). InstC considers that the students' previous experience in their own schooling, which is marked by an expository or teacher-centred teaching pedagogy without active approaches to learning, is an initial obstacle to the appropriation of this strategy. However, due to the inclusion of project work as the work method of some courses since the programme's first year, it becomes a natural work path for students. "When an activity of this type appears [later in the programme], the gears of this work strategy, either of individual or group work, are already more oiled" (Coordinator1 InstC). As for the application of the strategy with children, the interviewees refer to aspects that are in agreement with all of the other institutions:

There is greater skill in their understanding of all of the stages of a project and its transposition to its planning. However, it is noted that they still have to face several obstacles to its implementation in the field, that is, they understand the theoretical part of the project because they also experienced it in their own practice in the activities they do with us, but then its implementation [at schools] is another type of difficulty" (Coordinator1 InstC).

Asked about the importance and significance of PjBL in the programmes in comparison to other teaching strategies, all of the interviewees consider that this approach is important, but they do not give it prominence, instead regarding it with the same importance as other teaching strategies. Regardless of the type of PjBL approach carried out in the institutions, all of the coordinators mentioned that PjBL is an often-explored topic by future teachers in their final master's degree report every year.

The following table (Table 1) systematises the information obtained during the interviews, according to the most relevant mentioned characteristics.

**Table 1**

*Synthesis of the PjBL approach in the three higher education institutions*

| PjBL                                                           | InstA                                                                                                                                                                         | InstB                                                                                                    | InstC                                                                                                                       |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Predominant perspective</b>                                 | Theoretical, didactical and practical.                                                                                                                                        | Theoretical and didactical.                                                                              | Practical, as the work method of some courses.                                                                              |
| <b>Students' first encounter with PjBL in the programme</b>    | 1st year, as a course's work method.                                                                                                                                          | 2nd year, as a theoretical approach.                                                                     | 1st year, as a course's work method.                                                                                        |
| <b>Importance given throughout the programme</b>               | Theoretically balanced in relation to other teaching strategies. Reinforced didactically in the 3rd year, when students apply it in Supervised Teaching Practice internships. | Theoretically balanced in relation to other teaching strategies.                                         | Theoretically balanced in relation to other teaching strategies. Reinforced practically as the work method in some courses. |
| <b>Approach history</b>                                        | Theoretical in pre-Bologna programmes. Theoretical, practical and didactical in post-Bologna programmes.                                                                      | Theoretical in pre-Bologna programmes. Theoretical, practical and didactical in post-Bologna programmes. | Theoretical in pre-Bologna programmes. More consistently incorporated into the programme's curricula since 2016.            |
| <b>Application in Supervised Teaching Practice internships</b> | Mandatory in the 3rd year of the Basic Education degree internship. Not mandatory in master's internships.                                                                    | Not mandatory in Basic Education degree and master's internships.                                        | Not mandatory in Basic Education degree and master's internships.                                                           |

The three institutions approach PjBL from theoretical, didactical and practical perspectives, although some focus more on one perspective than the others. The first time this strategy appears in the programmes is in their first year and it continues throughout the subsequent years. All of the institutions give a balanced theoretical importance to PjBL compared to other teaching strategies. Furthermore, it is didactically reinforced at InstA and more

experimentally reinforced at InstC throughout the programmes. PjBL has been a part of ITE programmes in these institutions over time in theoretical terms, but has gained some relevance in a practical and didactical way, especially after the implementation of the Bologna Process. Regarding the application of PjBL in student internships, it is not mandatory in the master's degree Supervised Teaching Practice, being left to the discretion of future teachers, depending on their interest in this strategy or the conditions found in schools enabling its application.

## **Discussion and Conclusions**

It is possible to verify that all of the institutions surveyed value and care about the PjBL approach in ITE, whether in theoretical, practical or didactical terms. It is, of course, not the only strategy taught during the programmes, nor is it considered the most important strategy in relation to other teaching approaches, but it is nonetheless an integral part in the programmes' courses and, in some situations, in Supervised Teaching Practice internships.

All of the institutions show a concern with the learning environments valued by the OECD (2017), namely Learning Principle 1 "the learning environment recognises the learners as its core participants, encourages their active engagement and develops in them an understanding of their own activity as learners" (p. 22), and Learning Principle 2 "the learning environment is founded on the social nature of learning and actively encourages well-organised co-operative learning" (p. 23). Although regarded as an important aspect by all of the institutions, there is an increased effort by InstC to promote Learning Principle 7 (OECD, 2017) more actively: "the learning environment strongly promotes 'horizontal connectedness' across areas of knowledge and courses as well as the community and the wider world" (p. 26).

The implementation of the Bologna Process gave added impetus to PjBL, reinforcing the importance of student-centred teaching models. In the pre-Bologna period, PjBL was approached in an essentially theoretical way, but since the implementation of the Bologna Process it has been approached from a more didactical perspective in two of the institutions surveyed and from a more practical perspective in the third. In this way, ITE programmes have sought to move from a traditionalist knowledge transmission system to a competency-based system accordingly to the Decree-Law No. 74/2006 from the Ministry of Science, Technology and Higher Education of Portugal.

There is, however, still widespread difficulty in applying PjBL in ITE programmes. The professors of the institutions surveyed exhibited some

difficulty in implementing interdisciplinary projects with students if the projects are not foreseen in the course's syllabus. This is due to the extension of curricula and the lack of time for working cooperatively with colleagues from other knowledge areas. Given that education departments in higher education institutions are mainly divided by knowledge areas and typically work independently, integration between these areas becomes difficult, and is only possible through involvement and collaboration between the professors who value an integrative curriculum. This division results in some difficulties for an interdisciplinary approach in teacher education, even though it is desirable for future teachers to adapt this approach in their professional practice. The collaboration between professors of different areas should be a primary focus in ITE in order to overcome the curricular fragmentation of the programmes (Pantić, 2012). We agree with Nicu (2015) that there is a need to invest more in teaching approaches that promote student activity such as PjBL, to ensure the conditions for professors to do so, and to further complement their training whenever necessary. According to Fernandes et al. (2014), the approach to project work must be systematic and must not appear as an isolated case in teacher education programmes.

Regarding how the student teachers cope with in the appropriation of PjBL, all three institutions agree that there is an initial difficulty and resistance due to the lack of active learning experiences in the students' own schooling. During the programme, however, the students reveal an ease in appropriating and understanding PjBL, although there can be some difficulty in implementing it in contexts of Supervised Teaching Practice. The inclusion of more active learning experiences and research studies in ITE could develop future teachers' high level professional competences, as stated by Niemi (2011), leading to a more confident approach to these strategies with pupils.

Although the student teachers encounter certain difficulties, the motivation they gain through their experiences during ITE encourage them to develop PjBL with pupils in their Supervised Teaching Practice internships, and even to develop research work on this strategy, as shown by the Supervised Teaching Practice reports that they produce as their final work to obtain the master's degree required to become primary school teachers. These reports reveal the impact that PjBL has on some student teachers, leading them to apply it in the context of professional internships and to investigate its results and implications for the learning processes of primary school pupils.

In general, the results of the present research give some insight into understanding the nature of the PjBL approach in the curricula of ITE in higher education institutions, the importance institutions attribute to this type of work

throughout their programmes, and the implications of this approach for future teachers, as well as some difficulties experienced during the process.

There is a recognised need to continue to invest in the inclusion of teaching methods that promote students' active involvement in the learning process in ITE programmes, given that the students' own schooling is marked mainly by transmissive and expository teaching approaches; many of them will have their first experience with teaching strategies such as PjBL during their ITE. Bearing in mind that it is desirable for future primary school teachers to shift from the familiar transmissive teaching model to a student-centred teaching approach (Almeida, 2015; Ball & Cohen, 1999; Leite & Ramos, 2010; Rangel & Gonçalves, 2011), their experiences as ITE students is extremely important. In agreement with Pietila and Virkkula (2011), as well as Lasauskiene and Rauduvaitė (2015), we believe that PjBL should be included in ITE programmes, not only from a theoretical perspective, but also didactically and practically. By being exposed to a range of experiences, future teachers will come into contact with different teaching methods and be encouraged to apply them during their Supervised Teaching Practice internships and subsequently in their professional practice as teachers.

There is, however, still some way to go in optimising the approach of teaching methods that encourage students to be more actively engaged in the learning process in ITE programmes, as students still demonstrate some difficulties in integrating these methods in their own teaching practices. Higher education institutions should provide more diversified teaching experiences to students, so that they can experience their effectiveness and feel confident to apply them with their pupils. On the other hand, Supervised Teaching Practice internships should enable students to experiment with different teaching methods, rather than limiting them to what is usually developed by schools. In this way, we could observe a better appropriation of these methods by students and their consequent application in professional practice.

Despite the fact that the collected data are extremely valuable for the characterisation of the PjBL approach in higher education institutions' ITE programmes, a characterisation that could be extended to other programmes with similar teaching models, a multiple case study does not allow us a national overview of the subject. Although such an overview was not our objective, this could be regarded as a limitation of the present research. Future investigations could involve extending the research field to institutions in other areas of the country and establishing a comparative analysis at an international level.

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## Literacy Policy in Southeast Asia: A Comparative Study between Singapore, Malaysia, and Indonesia

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EVI FATIMATUR RUSYDIYAH<sup>\*1</sup>, ZAINI TAMIN AR<sup>2</sup> AND MOH. RIFQI RAHMAN<sup>2</sup>

∞ This study starts with two questions: why is the literacy of 15-year-old Indonesian students low, and how does this compare with other countries? This study aimed to examine the literacy policies in Singapore, Malaysia, and Indonesia and discuss the strategic policies to improve literacy in each country. The qualitative comparative research method was employed to acquire a comprehensive understanding of the literacy policies in these three countries. According to the findings, Singapore, Malaysia, and Indonesia each have distinct literacy policy trends. The context of each country's education system and language affects the government's literacy policies: Singapore emphasises industrialisation; Malaysia refers to its multi-ethnic life; Indonesia reflects the 2013 curriculum. Meanwhile, the National Library Board (NLB; Singapore), the Malaysian National Literacy Agency (Malaysia), the Language and Book Development Agency, as well as the Archive and Library Agency (Indonesia) contribute to the implementation and commitment of these literacy policies. As part of their programme implementation, each institution has a literacy activity.

**Keywords:** comparative studies, educational policy, literacy, Southeast Asia

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## Politike opismenjevanja v jugovzhodni Aziji: primerjalna raziskava med Singapurjem, Malezijo in Indonezijo

EVI FATIMATUR RUSYDIYAH, ZAINI TAMIN AR IN MOH. RIFQI RAHMAN

≈ Ta študija se začenja z dvema vprašanjema: zakaj je pismenost 15-letnih indonezijskih učencev nizka in kako se to lahko primerja z drugimi državami. Raziskava se usmerja v preučevanje politik opismenjevanja v Singapurju, Maleziji in v Indoneziji, pri čemer obravnava strateške ukrepe izboljšanja pismenosti v vsaki izmed omenjenih držav. Pri tem je bila uporabljena kvalitativna primerjalna raziskovalna metoda, zato da smo lahko pridobili celostno razumevanje politik opismenjevanja v teh treh državah. Glede na izsledke imajo Singapur, Malezija in Indonezija različne smernice glede politik opismenjevanja. Kontekst izobraževalnega sistema posamezne države in jezik vplivata na vladne politike opismenjevanja; Singapur poudarja industrializacijo, Malezija se sklicuje na večetnično življenje, Indonezija pa odseva svoj kurikulum iz leta 2013. Medtem Svet narodne knjižnice (angl. National Library Board; Singapur), Malezijska državna agencija za pismenost (angl. Malaysian National Literacy Agency), Agencija za razvoj jezika in knjige (angl. Language and Book Development Agency) pa tudi Agencija za arhiviranje in knjižnice (angl. Archive and Library Agency; Indonezija) prispevajo k izvedbi in predanosti tem politikam opismenjevanja. Kot del njihovega izvedbenega programa ima vsaka ustanova svojo opismenjevalno dejavnost.

**Ključne besede:** primerjalna raziskava, edukacijske politike, pismenost, jugovzhodna Azija

## Introduction

Literacy is a crucial demand in the so-called fourth industrial revolution because it is essential in ensuring the independence of lifelong learning in the information and digital era. To support this, qualities such as basic literacy, problem-solving, and character are required, which are connected with reading skills and the ability to critically and analytically evaluate and reflect on information (UNESCO, 2003). Literacy is described as the ability to utilise information related to social life and to understand, use, and comprehend reading to acquire and develop personal knowledge and the potential to play a role in a particular community. Literacy is the ability to use reading resources to increase one's understanding to be valuable in the community (Kirsch et al., 2002).

Literacy comprises four stages: performative, functional, informative, and epistemic. Symbols can be read, written, and conversed with at the performative level. Language satisfies daily demands at the functional stage, such as reading directions. During the informative stage, language can be utilised to obtain knowledge. Finally, people must update their knowledge (National Commission of Education, 2001). Educational policies and evaluations can help build these four stages, which can be seen in, for example, achieving competencies under national academic standards that summarise the achievement of literacy competency.

The fundamental goal of literacy is to provide students with literacy skills to contribute to society. This goal is not limited to paper, formal contexts, or standard language that only reflects the dominant language and culture; the scope of literacy must be widened to include social change and technological growth, which will alter language skills and the quest for knowledge. Literacy can help in research, teaching, and learning activities if they are already set in place (Sang, 2017) the conventional view of literacy and literacy education may no longer satisfy students' needs in working and social lives, especially beyond classroom settings. Therefore, expanded territories of literacy have been proposed to better support teachers' and students' literacy education and practices. This paper conceptualized two expanded perspectives of literacy that are important and useful to understand literacy and literacy education in the modern society, which provide theories and frameworks for scholars, educators, and practitioners in the field of education. 1. Introduction An important mission of teaching and learning literacy is to equip students with literacy skills so that they can fully participate in social and cultural activities in the modern world. The conventional view of literacy, however, is limited to the mastery of "page-bound, official, and standard forms of the national language" (The New London Group, 1996).

Literacy programmes can boost students' enthusiasm and reading skills, but the educational institution must support them. Reader communities, for example, are built and developed by maximising the teaching materials in class and library usage. This system is essential because systematic literacy activities encourage students to appreciate reading (Bafadal, 2009). Reading fondness is a part of character education in Indonesia (President of Republic Indonesia, 2017). The movement may be able to assist Indonesia in resolving literacy issues. According to the Programme for International Student Assessment (PISA) survey (Harususilo, 2019a), the reading interest in Indonesia is still low, followed by a considerable illiteracy level. These two factors impact Indonesia's Human Development Index ranking (HDI). According to OECD data from 2009 to 2015, Indonesia consistently scores in the bottom ten in terms of literacy quality. The reading literacy of 15-year-old students in Indonesia is 371 points, compared to an OECD average of 487 points. In terms of mathematics literacy, the average 15-year-old student in Indonesia scores 379 points, compared to an OECD average of 489 points. Finally, in terms of scientific literacy, the typical 15-year-old student in Indonesia has 396 points, compared to 489 points on average in OECD countries (Schleicher, 2019).

According to the United Nations Development Programme data, Indonesia's HDI in 2013 ranked 108<sup>th</sup> out of 187 countries. If Indonesia wishes to enhance its HDI, it must undertake literacy initiatives to increase reading enthusiasm and minimise illiteracy (Ministry of Education and Culture, 2017). Furthermore, the 2018 PISA survey results revealed similar findings: Indonesia is in 72<sup>nd</sup> place out of 78 nations, showing that Indonesian children's capacity to absorb and utilise reading content at the age of 10 remained in the bottom 10 among OECD countries (OECD, 2019).

The encouragement of policy implementation in a country is one of the variables impacting educational advancement. As a result, the government should regard survey or study results from independent or international institutions as a driving force for change, as the key to successful learning and obtaining other points of view (Debray-Pelot & McGuinn, 2009; Harususilo, 2019b). To meet the objectives, these policies must be accurately, equitably, and substantively assessed (Meens & Howe, 2015).

Technical issues, such as classroom layout arrangements, classrooms' social organisation, and curriculum, must be addressed in educational policy for the development of literacy. The National Literacy Strategy explains the implementation review of the pedagogical structure related to the adopted reading time, arrangements, and alterations that enable student movement and curriculum standardisation (Moss, 2004). Thus, educational policies must increase students' literacy abilities and establish an appropriate curriculum to promote

literacy skills and make literacy a basic standard of education (Shanahan, 2014). Educators and researchers should support students in developing reading skills, criticise the educational policy, and identify aspects and features that are not yet appropriate (Bianco, 2001). Literacy educational policies should provide and implement practical ideas to develop literacy skills (Castleton & McDonald, 2002). Literacy does not develop and work independently; it must be packaged to be appropriately presented in the educational curriculum.

Southeast Asian countries have taken the issue of literacy very seriously. Singapore, for example, has taken the lead in developing literacy policy, while Malaysia and Indonesia were among the countries that followed (UNESCO, n.d.). Implementing these policies demonstrates that the quality of literacy determines the quality of education in a country. Singapore has the highest education quality in the Association of Southeast Asia Nations (ASEAN), while Malaysia is the third, and Indonesia is the fifth (Welle, 2017). This research raises questions about how the implementation of the policy, orientation, language, and forms of literacy policy implementation in Southeast Asia compared with a comprehensive education system.

As a result, this research aims to discover literacy-related policies in Southeast Asian countries, including Singapore, Malaysia, and Indonesia, by utilising a comparative analytical approach to provide a more comprehensive picture. This study intends to add to the literature and extend awareness, mainly to Southeast Asian countries' governmental policies, to the execution of literacy programmes, which is critical in advancing education. This research is also expected to be a specific reference for Southeast Asian countries and other countries in the development of literacy policies based on cultural identity, socio-economic development, formal/non-formal primary education, community learning, gender equality, governance, and civil society.

## **Research methods**

This study employed qualitative comparative research, specifically focusing on analysing empirical data to generalise the analysis, taking into account the possibility of replication in subsequent studies and constructing logical propositions based on the qualitative study of the phenomenon in question (Woodside & Zhang, 2012). This strategy can efficiently and effectively address the issues outlined in the preceding paragraph, and it produces outcomes that complement and enrich the state of the art of such research.

The material in this study was the literacy policies in three Southeast Asian countries: Singapore, Malaysia, and Indonesia. The HDI results from

nations with a high HDI score in Southeast Asia (Singapore) and Malaysia's medium HDI value. Literacy policy variables are divided into four categories: implementation policy, orientation, language, and policy form.

The data from government policies in the form of laws, data from state official websites, and the interviews with policymakers were used as the study instrument. All qualitative data analysis approaches required coding data into themes and then categories. All notes from the course document analysis, interview transcripts, and field diary observations were coded. The coding procedure was carried out by reading each document and assigning a code to each sentence, paragraph, or section (Table 1).

**Table 1**  
*Coding of Literacy Policy*

| Variable            | Coding                 |
|---------------------|------------------------|
| Implementing policy | Literacy programme     |
|                     | Facilitate             |
|                     | Evaluation programme   |
| Orientation         | Information validation |
|                     | Curricula education    |
| Language            | Mother language        |
|                     | Foreign language       |
| Policy form         | Formal policy form     |
|                     | Non-formal policy form |

## Results and discussion

### Literacy policy in Southeast Asia

The literacy policies discussed in this article include the context of the educational system and literacy providers. The following are the literacy policies in three Southeast Asia countries: Singapore, Malaysia, and Indonesia.

#### *Literacy policy in Singapore*

Singapore's National Library Board (NLB) has developed a reading programme in schools for students aged 7 to 12 years to familiarise them with reading at the start of their schooling. Tan Huism, the Chair of Singapore NLB, noted that the initiative strives to meet the demands of the millennial generation, according to Huism, is one that thinks quickly and is adaptive to change. As a result, it is vital to assist them at the start of their education (Mariana, 2019).

To optimise the effectiveness of this programme, NLB educates Early Childhood Education teachers on literacy so that they can provide relevant teaching materials to their students. In addition, the Source, Understand, Research, and Evaluate programme, which is open to people of all ages, attempts to teach people how to validate information, particularly internet-based information. For this programme to work effectively, the NLB collaborates with the Singapore Ministry of Education. This initiative also adopts some steps, such as producing school curricula, implementing school librarians, and creating materials on a diverse and exciting website. The NLB has partnered with volunteers, training institutions, and military education to reach deep into society.

The following are concrete programmes that have become the main instruments for literacy development in Singapore.

1. Born to Read, Read to Bond. This programme has been developed by NLB to encourage lifelong reading (Thulaja, 2018) and is implemented by the Singapore Ministry of Community Development and sports partnerships. This programme is expected to develop a reading generation at a young age and spread this to all family members and the community. Furthermore, the programme's concept is to use reading as a bonding bridge for personal relationships between children and parents. This programme's unique implementation emphasises the provision of reading packages (books and educational aids), complete with counselling to new mothers. This programme enlisted the participation of nine prestigious hospitals. Books, magazines, and brochures are all examples of reading materials. Furthermore, the initiative provides new mothers with library membership cards while also holding public presentations on how to teach children to read.
2. The Asian Children's Festival (ACF), held annually by NLB since 2000, has received much positive feedback from the public. This agenda's focus was on children aged 4 to 12. This event was created specifically for special-needs youngsters (National Library Board Singapore, 2020). ACF seeks to shape Asia Pacific children's identities, raise understanding of customs and culture, provide creative activities for children, and encourage children to write more actively. Furthermore, ACF serves as a forum for publishers, particularly book publishers, to exchange ideas and develop works that continue to nurture children's enthusiasm for reading.
3. KidsREAD. In 2004, NLB established KidsREAD, a national event to build a collaborative reading programme for children aged 4 to 8 years and foster reading habits, particularly in children from low-income

homes. This programme seeks to instil ethnic values in children. Kid'sREAD has enhanced the reading potential of nearly 2,000 middle-class children aged 4–8 and has established more than 45 reading communities (National Library Board Singapore, 2020). Many volunteers participate in this programme as facilitators, helping improve the children's reading skills, telling stories, and creating various learning activities.

4. 1,000 Reading Fathers. This programme has been organised by NLB in collaboration with the Center for Fathers since 2007. This programme seeks to increase fathers' involvement in their children's learning to read and write (National Library Board Singapore, 2020). This goal is vital since a father's attention to his children will promote their interest in reading. To participate in this programme, the fathers are provided with various guidebooks. Fathers and children are assisted in implementing library notebook swaps, which serve as a daily report book.
5. The Quest – First-Ever Collectible Card Game was launched by NLB in June 2009. Children who struggle to read or open books will gather short story cards and exchange them once they have finished reading the tale behind them. This strategy is simple and has been shown to increase their reading interest. This campaign has inspired almost 70,000 children to read. The event, held at the national library, resulted in the rental of two million books and the exchange of 1.5 million game cards (National Library Board Singapore, 2020). According to the programme, 75% of children are interested in collecting and exchanging tale card games.
6. Read It! Singapore. Read it! Singapore has been the most popular literacy programme since its inception in 2005. This programme recommends books to youngsters and encourages them to read them (Lim, 2013). The programme organisers hold many major seminars and meetings between panellists and readers. Web pages were used in this programme to allow readers of all ages to share their reading experiences. Since 2010, this programme has held the 'Asian Young Writers Award' for youngsters and an award for young writers.

The six programmes above are the result of the Singapore government's policy to create communities with above-average reading interest. In Singapore, the educational condition is rapidly developing, which serves as actual proof of the success of the nation's literacy policy. Some of the programmes that become state policies can be reflected by other countries to formulate policies to improve the literacy ability of their people.

### *Literacy policy in Malaysia*

Literacy can be measured using either the level of human development (children, adolescents, and adults) or the level of education (preschool, elementary, secondary, and higher learning) (Edzan, 2008). Given Malaysia's multiethnicity, it is estimated that the average Malaysian student already has functional literacy in two or more languages. The official language is Malay, the second language is English, and the regional languages are Tamil and Chinese (Pandian, 1997).

The Malaysian National Literacy Agency oversees literacy in the country. The Minister of Education, the Ministry of Rural Development, the Ministry of Human Resources, the Ministry of Youth and Sports, and the Ministry of Entrepreneurship were among the involved central government agencies (Ministry of Education Malaysia, 2013). These organisations encourage academic and casual reading activities, ranging from basic to advanced. The ministries are interested in rural development by, for example, developing literacy classes for farmers. Farmers are taught materials related to agriculture and the tasks of their daily lives.

The National Literacy Policy, which began in 1961 through the Community Development Division of the Rural Development Ministry (MORD), was thought to have reduced adult illiteracy in Malaysia. This responsibility was extended to the states of Sabah and Sarawak in 1963 (Pandian, 1997). Although more than 93 per cent of Malaysians are currently literate, the Malaysian government still needs to develop and implement a lifetime education programme. The initiatives taken by the MORD in overcoming illiteracy are as follows:

1. Harmonious Family Education Programme,
2. Religious Education Programme, Skills Training Programme,
3. Community Resource Centre and Reading Programme,
4. Functional Literacy Programme,
5. Preschool programmes,
6. Community Work Programmes and Community Activity Centres (UNESCO Institute for Statistics, 2002).

Through these programmes, adult students can earn information and skills to become useful citizens.

To make the most of the programme, the Malaysian government has designed strategic methods to enhance literacy (UNESCO Institute for Statistics, 2002). These strategic steps are the following:

1. Programme enhancements for adults and adolescents aged 15 and up, dropout populations, and street children. The following are the

programme's objectives:

- a. Eradicating illiteracy among adults and young people aged 15 years old and older,
- b. Giving participants skills and knowledge that are useful for their social life,
- c. Helping participants to overcome social problems that hamper community development,
- d. Instilling the spirit of unity and love for the nation, people, and religion,
- e. Providing guidance and encouragement to enable participants to develop the concept of self-development.

2. The Ministry of Rural Development's literacy and non-formal education initiatives, emphasise group teaching and learning, and the classes are delivered at convenient locations and times for participants. A class or group has 15 or more participants. This activity's curriculum includes reading, writing, and arithmetic with the topics of family life, health, economics, civil service, and religion. All teaching, learning, and training activities are carried out in a location-specific manner.
3. The learning material. To prevent illiteracy from recurring, the Ministry of Rural Development supplies rural communities with reading and learning resources such as books, audiotapes, posters, and educational games through loans. It has attempted to disseminate literacy culture to all groups, including cities and communities in remote areas.
4. The promotion of information literacy. Individuals must achieve a certain level of information literacy to face the Information Age's difficulties. The Malaysian national policy relates to the Information Technology Agenda and the early appearance of promoting information literacy in Malaysian society. Various entities are attempting to establish an information-literate society to achieve the government's aim of fulfilling the nation's 2020 Vision, which states that all members of society will have access to complete information (Edzan, 2008).

At the very least, some of the strategic stages provided an overview of literacy in Malaysia, which have been used to foster a progressive reading and multiliteracy culture. These efforts may necessitate time for citizens to be multiliterate or participate in various literacy activities. This attempt will be most effective if the political and economic situation is stable with strong leadership and ethnic harmony.

### *Literacy policy in Indonesia*

Indonesia is facing severe challenges in improving literacy. The Early Grade Reading Assessment, which is a survey demonstrating students' poor reading abilities in Indonesia, reported that only half of the country could read in 2012. However, only half of the readers could comprehend the reading texts' content (USAID, 2014). In the same year, UNESCO reported that Indonesia's reading interest index was 0.001%, implying that for every 1,000 Indonesians, only one is interested in reading (Masengi et al., 2014). According to the 2011 Progress in International Reading Literacy Study data, Indonesian children's average reading and comprehension process is still relatively low, which validated this fact (Mullis et al., 2012).

Given that literacy culture is the key to educational achievement, the Indonesian government promotes literacy skills. The government then passed Law No. 3 of 2017 About the Book System, which states that the system intends to foster a literacy culture among the Indonesian people.

Regulation No. 23 of 2015 on Character Development was issued by the Ministry of Education and Culture. According to the regulations, teachers and students must read for 15 minutes before studying (Ministry of Education and Culture, 2015). To ensure that these laws and regulations are followed, the Ministry of Education, through the Language and Book Development Agency, the Archive and Library Agency, and other associated agencies, continues to enhance book acquisition in schools and communities.

As a result, all parties must execute large-scale literacy programmes in schools, Islamic residential schools, tertiary institutions, and the community. The national government has the authority to enact laws to foster a literate culture. The role of the local government is to implement the policy at all levels of education and society. As a result, the local government must foster a literacy culture. The School Literacy Movement, developed by the Ministry of Education and Culture to stimulate students' interest in reading and writing, is one of the literacy programmes in Indonesia.

The School Literacy Movement is a reading, writing, analysing, and investigating activity in which all school members, publishers, academics, the media, the community, and policymakers from the Ministry of Education and Culture must participate (Ministry of Education and Culture, 2015). This policy will undoubtedly need a stage to be implemented and maximised. Policies like this cannot be implemented smoothly and completely in a short period since transforming educational institutions takes time (Wandasari, 2017). All elements must support the School Literacy Movement, from the government to educational institutions, instructors, students, and the larger community.

Students' reading habits are one of the essential strategies to be implemented. Teachers and school residents carry out this activity, and it is tailored to match the various educational institutions (Ministry of Education and Culture, 2015).

When the reading habit is established, the School Literacy Movement can then process the development and learning activities in partnership between productive and receptive learning skills. The School Literacy Movement seeks to shape and develop student's character as lifelong learners by cultivating the process of school literacy while also attempting to establish a literacy culture in schools, increase the number of students who love to read, view school as a learning place, and maintain the continuity of the learning process (Sutrianto et al., 2016).

The School Literacy Movement consists of several stages:

1. The teacher sets a reading time of 15 minutes each day. The schools may choose the reading duration; it can start at the beginning, middle, or end of the teaching process.
2. The teacher provides reading books.
3. Students can bring their books from home.
4. Students read books based on their interests.
5. Reading books in this context is not followed by assignments/assessments.
6. Reading a book at this stage can be accompanied by discussion.
7. Students are reading in a relaxed and pleasant atmosphere. This reading habit can develop through classroom space, lighting, and posters about the importance of reading.
8. The teachers also read books for 15 minutes (Sutrianto et al., 2016).

These stages foster students' interests in reading to master, understand, and carry out the knowledge comprehensively and meaningfully. The reading material contains character values in the form of local, national, and global wisdom, which is adjusted to the student's development.

Through implementing the School Literacy Movement programme, an educational institution must continually encourage the gradual development of literary culture. Coordination and communication of all school inhabitants, parents of children, and other connected parties is one endeavour that can be put forward and become an ongoing concern.

## Discussion

According to the previous description, the three countries in Southeast Asia have different policies in terms of literacy. Their governments are very concerned about literacy development with their respective policy patterns. Table 2 shows the policies of each country.

**Table 2**

*The comparison of literacy policy in the three observed countries*

| Variable            | Singapore                                                                                                                   | Malaysia                                                                         | Indonesia                                                        |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------|
| Implementing Policy | National Library Board                                                                                                      | National Literacy Agency                                                         | Language and Book Development Agency, Archive and Library Agency |
| Orientation         | Industrialisation                                                                                                           | Multi-ethnic society                                                             | Character education in the 2013 curriculum                       |
| Language            | English                                                                                                                     | Malay, English, Tamil, and Chinese                                               | Indonesian                                                       |
| Policy Form         | Born to Read, Read to Bond; ACF; KidsREAD; 1000 Fathers Reading; Quest-First-Ever Collectible Card Game; Read It! Singapore | The reading tradition from the basic to advanced level, both formal and informal | National Literacy Movement, School Literacy Movement             |

Table 2 illustrates the variations and similarities in the literacy policies of the three countries. The policy and language orientation characteristics are what distinguish them. Singapore's literacy policy implementation was centred on advancing the country's industrialisation. Literacy is used in all areas intertwined with economic features (Boon & Gopinathan, 2008). The planned and constructed literacy programme aims to deal with industrialisation with proper English. Language literacy is a starting point in Malaysia for uniting its multi-ethnicity, which necessitates that pupils be literate in at least two or more languages because the official language in Malaysia is Malay, while the second language is English, and the regional languages are Tamil and Chinese. The literacy policy in Indonesia relates to the 2013 curriculum, which promotes student character formation and growth. This policy is based on Ministry of Education and Culture Regulation Number 23 of 2015 concerning Character Development through a 15-minute reading habit before studying (Ministry of Education and Culture, 2015) and Presidential Regulation Number 87 of 2017 concerning Character Education Strengthening (Presiden Republik Indonesia, 2017). As a result, Bahasa Indonesia is employed as Indonesia's unifying language (Suwandi, 2015).

Furthermore, the commonality of these literacy policies is seen in the implementation factors and policy forms. The literacy initiatives in Singapore, Malaysia, and Indonesia use a specialist in literacy institutions to carry out literacy policies. The NLB, Singapore's national library agency, serves as a pivot and driving force in implementing literacy programmes. The Singapore government has six major programmes to raise literacy levels (i.e., Born to Read, Read to Bond, to encourage reading through family ties; ACF, to encourage children's lifetime learning practices; KidsREAD aims to instil a love of reading in young people, particularly those from low-income homes; 1000 Fathers Reading promotes fathers as role models for their children to read regularly; Quest-First-Ever Collectible Card Game, to nurture children's enthusiasm in reading in novel ways; and Read It! Singapore, to promote a reading culture among Singaporeans in general). Singapore has become one of the best-educated countries in Asia, if not the world, thanks to NLB. This accomplishment cannot be divorced from the Singaporean community's great reading interest. The six programmes are part of the Singapore government's objective to create a community with a high reading interest. As a result, education is spreading throughout the country.

The literacy programme in Malaysia is managed by the Malaysian National Literacy Agency. the Ministry of Education, the Ministry of Rural Development, the Ministry of Human Resources, the Ministry of Youth and Sports, and the Ministry of Entrepreneurship are all involved (Ministry of Education Malaysia, 2013). The literacy programme promotes reading from primary to advanced levels, both official and informal, in conjunction with several Malaysian government departments. Malaysia used it to foster a progressive reading and multiliteracy culture. These initiatives may take time for citizens to become multiliterate or participate in multiple forms of literacy activities. They will be the most effective if the political and economic environment is stable with strong leadership and harmony among ethnic groups.

Literacy policy in Indonesia is created and executed by the Ministry of Education at the primary, secondary, and university levels. Based on these laws and regulations, the Ministry of Education is working with the Language and Book Development Agency and the Archive and Library Agency to improve the purchase of books in schools and communities. Literacy institutions, educational institutions, and the community assist the Indonesian government in implementing the School Literacy Movement (Ministry of Education and Culture, 2016), which attempts to foster a literacy culture at all school levels. The School Literacy Movement is a Ministry of Education-led initiative that includes all school personnel, parents, publishers, academics, media, community, and policymakers.

## Conclusion

According to the findings of this comparative study, Singapore, Malaysia, and Indonesia have literacy policies reflecting their policy patterns and variations. The background of each country's educational system influences the government literacy policies: Singapore promotes industrialisation, Malaysia relates the policies to its multi-ethnic society, and Indonesia refers to the 2013 curriculum. Meanwhile, the three countries' literacy policies are implemented and committed to specialised literacy institutions: the NLB (Singapore), the Malaysian National Literacy Agency (Malaysia), and the Language and Book Development Agency, as well as the Archive and Library Agency (Indonesia). More research will be conducted on the role of government and related organisations in supporting the literacy programme, which is one of the indicators of a country's success. This article only covers three Southeast Asian countries; additional research, including more countries, is required to gain more comprehensive conclusions and findings on literacy policy in ASEAN countries and beyond, such as Europe.

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# Geometry Teaching in Transition: An Investigation on the Importance of School Geometry in Primary Education

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≈ Mathematics instruction in primary school has been influenced by many policy changes and empirical findings in the previous two decades. Geometry lessons, in particular, were re-evaluated due to a paradigm change and, consequently, were attributed a new meaning within the mathematics curriculum worldwide. The present paper focuses on this paradigm shift in the sense of the evaluation to what extent both the didactical potential and the practical value of geometry instruction in elementary education are currently recognised and utilised by primary grade teachers. In total, 120 primary grade teachers participated in the study. The results showed that there had been positive recognition of the didactical potential of school geometry by the teachers over the previous two decades; however, it lacked actual implementation in school practice for different reasons. The results are discussed not only with regard to the latter of these but also with regard to their theoretical and practical implications.

**Keywords:** geometry, geometry instruction, primary education, in-service teachers

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## Poučevanje geometrije v tranziciji: poizvedba pomembnosti šolske geometrije v osnovni šoli

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ANA KUZLE

~~ Poučevanje matematike v osnovni šoli je bilo v zadnjih dveh desetletjih pod vplivom številnih preoblikovanj politik pa tudi empiričnih ugotovitev. Pouk geometrije je bil ponovno ovrednoten skladno s paradigmatsko spremembo, čemur je sledilo pripisovanje novega pomena geometriji znotraj učnih načrtov za matematiko po svetu. Prispevek se osredinja na ta paradigmatski premik v smislu evalvacije, do katere mere sta didaktični potencial in praktična vrednost poučevanja geometrije v osnovni šoli trenutno priznana in izkoriščena pri učiteljih. Skupno je v raziskavi sodelovalo 120 učiteljev razrednega pouka. Rezultati kažejo, da lahko zaznavamo pozitivno prepoznavo didaktičnega potenciala šolske geometrije pri učiteljih v zadnjih dveh desetletjih, vendar pa do dejanske izvedbe v šolsko prakso zaradi različnih razlogov ni prišlo. Rezultati niso pojasnjeni samo z upoštevajočim primanjkljajem, ampak sklicujoči se na teoretične in praktične posledice.

**Ključne besede:** geometrija, poučevanje geometrije, osnovnošolsko izobraževanje, učitelji

## Introduction

When Winter published an article titled 'What's the purpose of geometry in primary education?' in 1976, the debate about the relevance of geometry for students in the early grades was already in full swing. Even though there is a clear consensus that geometry instruction is indispensable even at the elementary school level (Franke & Reinholt, 2016; Sinclair & Bruce, 2015; Sitter, 2019), the fundamental debate has not been completely settled (Eichler, 2005). Arguably, there is little reason to do so, as the status of elementary school geometry instruction is still considered unsatisfactory in many cases, especially compared to that of arithmetic (Backe-Neuwald, 2000; Sinclair & Bruce, 2015). Furthermore, 'study after study shows that students perform quite poorly on a wide range of geometry tasks' (Sinclair & Bruce, 2015, p. 319) independent of the country, which calls for emergent attention to primary school geometry (e.g., Glasnović Gracin & Kuzle, 2018).

Backe-Neuwald's (2000) holistic study 'Meaningful geometry in primary school' provided the first impressions of various aspects of geometry teaching in German elementary schools two decades ago. However, the picture emerging from the study was full of contradictions. Despite manifold advantages that lift it in a positive way from the rest of mathematics, geometry teaching appeared as the stepchild of mathematics in the eyes of the respondents (Backe-Neuwald, 2000). The main reason for this was the uncertainty of the teachers, both regarding the selection of central geometry contents and the criteria that determined their significance.

In the previous two decades, geometry lessons were re-evaluated due to a paradigm change and were assigned new meaning within school mathematics in primary and secondary education (Franke & Reinholt, 2016; Kultusministerkonferenz [KMK], 2005; Mammana & Villani, 1998). Only a few studies (e.g., Sitter, 2019; Wiese, 2016) have been based on recent data following the paradigm shift. This paper focuses on recent developments and discussions, with a particular interest in teachers and their attitudes toward teaching geometry, with the aim of providing additional empirical evidence based on current data on the state of elementary school geometry. Concretely, the focus of the investigation was the extent to which both the didactical potential and the practical value of geometry instruction in elementary education are recognised and utilised by primary grade teachers nowadays. Understanding the status quo of current geometry teaching is the basis for different policy decisions, such as the further development of mathematics curricula and teacher training, and, therefore, highly relevant for the improvement of geometry teaching in primary education.

## Theoretical Background

In this section, I first present the reasons for teaching geometry from early grades onward, which is followed by empirical research on the topic. The section ends with the two research questions that guided the study.

### Reasons for Teaching Geometry in Primary Education

The goals and aspects of the modern didactics of geometry have changed and evolved (see Franke & Reinhold, 2016; Radatz & Rickmeyer, 1991; Winter, 1976; Wittmann, 1999). This didactic potential of geometry can be combined with other mathematical topics and has great potential to complement them and make them comprehensible through other approaches (Franke & Reinhold, 2016). In the following, the topics and contents relevant to modern geometry didactics are outlined. The detailed descriptions of the goals and contents of good geometry teaching are intended to illustrate their relevance for mathematics teaching as a whole and highlight the versatile didactical potential of geometry for primary education.

The proponents of an early introduction of geometric content in school assert various reasons. First, geometry promotes knowledge and skills that have relevance and overlap with a wide range of school content, not only in mathematics. For mathematics, a discipline in which, more than in many other subjects, the contents build on each other (van den Heuvel-Panhuizen, 2008), this connection seems to be obvious, and in that manner provides not only a foundation for further geometry instruction (Franke & Reinhold, 2016) but also for other mathematical topics (Hattermann et al., 2015). Furthermore, Bauersfeld (1992) argued that geometry is the basis of arithmetic, both in terms of content and teaching-learning processes in general; he called this the 'genetic connection' (p. 7) between geometry and arithmetic whose argumentation was based on a constructivist view, namely by putting thought processes over the correctness of the final results or imparting competencies instead of poorly contextualised subject knowledge. Consequently, geometry can contribute to absorbing the strong heterogeneity of learning preconditions and socialisations present in elementary school and to creating sustainable learning foundations from it (Krauthausen, 2018; Wollring, 2007). These specific features of geometry lessons (e.g., possibilities for activity-based teaching, discovery learning, action-oriented instruction) relate more strongly to the students (Radatz & Rickmeyer, 1991) and, in that manner, may influence students' motivation and help them develop a positive attitude towards mathematics (Krauthausen,

2018). In addition to content areas of mathematics, geometry instruction also facilitates access to process-related competencies, such as problem solving and argumentation (KMK, 2005; NCTM, 2000). Researchers (Kuzle & Bruder, 2016; Wittmann, 1999) emphasised that geometry instruction can contribute to the development of problem-solving abilities due to the richness of geometric content, which opens possibilities for the heuristic approach in the sense of a discovering, trying out, and composing and decomposing procedures.

Geometry is viewed in a special way as a tool for acquiring skills, not only, as mentioned above, in the area of school competencies, but much more generally, such as the acquisition of intellectual, cognitive and practical life competencies (Franke & Reinhold, 2016; Graumann, 1994; van den Heuvel-Panhuizen, 2008; Wittmann, 1999). For example, language is permeated by mathematics concepts in the sense of knowledge of the mathematical necessity of a particular mathematical relationship (Simon, 2017). In everyday speech, we use geometric concepts, such as positional relations (Franke & Reinhold, 2016; van den Heuvel-Panhuizen, 2008). Three-dimensional space in particular is difficult for young students to access in planar representations (Eichler, 2005). Geometry can bridge this gap by helping students to gently navigate this process of abstraction with constant recourse to their familiar environment, and in that manner may support the development of the orientation ability and the ability to operate with objects mentally (Franke & Reinhold, 2016; van den Heuvel-Panhuizen, 2008). The process is complete when children learn to comprehend their environment and to see it in a different light through geometry instruction (Eichler, 2005; Franke & Reinhold, 2016). Winter speaks of the 'spatial reality of the child being carefully disciplined' (Winter, 1976, p. 14) when natural experiences are reflected on, analysed, and structured in the classroom. Nowadays, this list certainly needs to be supplemented by digital technologies, which can further support the teaching and learning of geometry (Jones, 2000; Sinclair & Bruce, 2015).

### **Empirical Studies on the Role of Geometry Teaching**

The much-cited work of Backe-Neuwald (2000) still represents a milestone in the contemporary empirical examination of primary school geometry and its role in the school structure. It reflected the importance of geometry in the teaching practice at the end of the 1990s from the perspective of 108 in-service and 22 trainee teachers using a comprehensive questionnaire. The results of Backe-Neuwald's work have since been followed up twice in the form of a replication (Sitter, 2019) or extension study (Wiese, 2016).

The teachers' image of geometry lessons was rather ambivalent (Backe-Neuwald, 2000). When the teachers were asked about associations with elementary school geometry lessons, some described it as 'a welcome change' or 'an exciting thing', while others considered it 'secondary' or 'not important' (Backe-Neuwald, 2000, pp. 16–18). Furthermore, many teachers suggested that the short teaching time should be filled with more important mathematical content, especially arithmetic. Nevertheless, Backe-Neuwald (2000) reported that geometry instruction was described in a positive manner compared to arithmetic instruction, with the teachers emphasising teaching principles more typical for geometry instruction, such as action-orientation, discovery-based learning, problem-oriented teaching, orientation to the children's real lives, and working with hands-on materials and manipulatives. Regarding the latter, Backe-Neuwald (2000), however, reported that many teachers shied away from the preparatory intensity of geometry lessons as was also reported in a later study by Sitter (2019). Furthermore, the teachers stated that geometry lessons were increasingly characterised by partner and group work, allowed free work and open lessons, and could be taught across subjects. The majority of the teachers surveyed felt that geometry instruction had a motivating effect on the students.

When it came to the advantages of teaching geometry, the three benefits that were by far most often chosen by the teachers were 'offers children many opportunities to make independent discoveries', 'promotes and supports spatial visualisation ability', and 'makes an important contribution to the development of reality', which are aligned with the literature in geometry didactics (e.g., Franke & Reinhold, 2016; Sinclair & Bruce, 2015; Winter, 1976). Furthermore, the statement 'lays the foundation for later systematic geometry teaching in secondary school' was also recognised by the teachers. This may indicate a corresponding long-term perspective of the teachers or be the reason for the neglect in elementary school, since teachers may classify geometry instruction as a topic of secondary school (Backe-Neuwald, 2000). Despite the teachers generally showing positive attitudes toward geometry instruction, they also provided several reasons for neglecting it (Backe-Neuwald, 2000). Geometry was predominantly taught in Grades 1–2 and less so in Grades 3–4. Backe-Neuwald (2000) assumed different reasons for this result. Firstly, it may be that the teachers felt pressured to cover all arithmetic topics which prevented them from teaching geometry in Grades 3–4. Secondly, it may be that the teachers did not feel competent in teaching the subject (Backe-Neuwald, 2000). The latter was also supported by Hofbauer (2018) who reported that geometry had a low priority for many secondary in-service teachers in their educational studies and,

therefore, felt inadequately trained in this regard. Wiese's (2016) comparative study with 16 primary grade in-service teachers confirmed the earlier results of Backe-Neuwald (2000). On average, geometry instruction took up about 8% of all mathematics lessons in the school year, however, the values fluctuated between 2% and 19% among the individual teachers (Wiese, 2016). Wiese (2016) put this in relation to the roughly calculated weight of the geometry in the curriculum, which she specified as 20% to 30% (Wiese, 2016). Accordingly, she concluded that geometry lessons were still not given the weight that the curriculum assigned them.

Overall, Backe-Neuwald (2000) found that many of the respondents dealt extensively with geometry instruction on a theoretical level, and some showed a very reflective and self-critical attitude toward their own geometry instruction. However, the teachers' answers reflected the disparity between the importance they attached to the subject and the significance that the subject had in their teaching practice. In total, 80% of the teachers surveyed agreed with the thesis that geometry instruction was neglected in elementary school, despite the stated advantages. Thus, there was a clear gap between the aspirations and the reality of geometry instruction in elementary education. Consequently, Backe-Neuwald (2000) concluded that the mathematics curriculum should be reconsidered, namely geometric and arithmetic content should be more closely interlinked and prepared in the sense of modern mathematics didactics. Since Backe-Neuwald's findings, however, the mathematics curriculum, and with it also geometry instruction, have been subject to significant external changes (Mammana & Villani, 1998). The impulses are due to, on the one hand, the results of the large-scale studies (i.e., PISA, TIMSS), and the revaluation of geometry in the context of the revised (inter-)national standards, on the other; this makes a reassessment of existing empirical findings necessary.

## Research Questions

Based on the above theoretical considerations and empirical results, the following research questions were investigated:

1. What didactical potential do in-service teachers assign to elementary school geometry?
  - To what extent does the didactical potential of different geometry teaching goals and aspects discussed in the modern geometry didactics correspond to current teaching practices?
  - Considering the didactical potential of geometry teaching, which goals and aspects are relevant to in-service teachers?

2. What practical value do in-service teachers assign to elementary school geometry?

## Method

### Participants

For this study, a mixed-methods research design was chosen using a convenience sample. Here, elementary schools were selected through existing contacts with the researcher's university. Of the 159 schools contacted, only 45 participated in the study; of the 176 questionnaires distributed, 120 of them were returned anonymously. The sample of 120 in-service primary teachers (Grades 1–6) consisted of 22 male (18.3%) and 97 female teachers (80.8%). One person did not provide gender information. A total of 90 teachers taught mathematics as subject specialists (75%) and 29 of them as non-subject specialists (24.2%). The data of one person was not provided. In terms of professional experience, the following picture emerged: 16 teachers (13.3%) have been teaching mathematics for less than or up to two years, 18 (15%) for up to 5 years, 19 (15.8%) for up to 10 years, 16 (13.3%) for up to 20 years, and 51 (42.5%) for more than 20 years.

### Data Collection Instrument

The main source of data was a questionnaire on the state of the art of school geometry in primary grades that was based on an adaptation of the instrument from the work of Backe-Neuwald (2000). Additionally, new items or statements for a specific item were developed on the basis of literature published in the previous 20 years that (amongst other factors) reflected the paradigm shift, curriculum developments, and factors influencing geometry instruction (Franke & Reinhold, 2016; Krauthausen, 2018; Senatsverwaltung für Bildung, Jugend und Wissenschaft Berlin, Ministerium für Bildung, Jugend und Sport des Landes Brandenburg [RLP], 2015). To cover a wide field of research and different research questions, the items about geometry teaching were very broad. The questionnaire consisted of six sections: (1) personal information (e.g., gender, teaching experience, professional background), (2) characteristics of teaching geometry (i.e., associations regarding teaching geometry, number of lessons dealing with geometric topics per grade level, instruction form, teaching principles, topics covered, use of digital tools, teaching sources), (3) material (i.e., importance of material in geometry teaching, goals of using material for teaching purposes, concrete material being used regarding teaching a specific

geometry topic), (4) goals and aspects of teaching geometry (i.e., importance of teaching of geometry for its application in everyday life, characterisation of students in geometry classes in comparison with other mathematics areas (e.g., motivation, interest, concentration), advantages of teaching geometry), (5) neglect of teaching geometry (i.e., teachers' opinion on whether geometry is neglected in school mathematics, evaluation of the reasons leading to the neglect of geometry instruction), and (6) personal attitude toward teaching geometry (i.e., emotions associated with teaching geometry).

Each section consisted of items with both open and closed questions. Thus, the questionnaire was self-contained and formed a coherent instrument in its structure and design, which should have always been filled out completely, even if (as in the present work) a selection of the given answers was made afterwards along with the own main points of investigation. The former enabled comparability between the groups studied, whereas the latter allowed the participants the opportunity to write down their own opinions without imposing the researcher's view. In this paper, I focus on sections (2) and (4) of the questionnaire, namely 'characteristics of teaching geometry', and 'goals and aspects of teaching geometry', respectively. With respect to the former, three items were analysed and with respect to the latter one item was analysed.

## Data Analysis

The questionnaire was for the most part distributed on the site after agreement with the school management; in isolated cases, it was also sent by email and returned to the author within one week. The questionnaires were analysed after all the data had been collected.

To determine what didactical potential in-service teachers assign to elementary school geometry two items were analysed: an open-ended item from section (2) 'characteristics of teaching geometry' and a standardised item from section (4) 'goals and aspects of teaching geometry'. The open-ended item was as follows: 'Geometry teaching in elementary school is for me...' which allowed an insight into teachers' goals and aspects of their geometry teaching. The analysis of the item was based on qualitative content analysis according to Mayring (2000). Here, the theory-based deductive category system was used, which resulted from the literature review presented earlier in the paper and was applied to the teachers' answers. In the qualitative analysis step, the deductively derived categories were methodically assigned to text passages. The core element here is the precise definition of the given categories (Mayring, 2000). In this study, the categories emerged from the literature research and the current

state of the modern geometry didactics, providing the foundation for a coding manual for the evaluation of the qualitative item. Accordingly, the material was coded based on the following eight categories:

- Motivation: geometry instruction has a motivating effect on students through alternative instructional concepts and a sense of achievement by experiencing success (Krauthausen, 2018).
- Sustainable learning environments: in geometry instruction, cooperative, differentiable, and action-oriented learning environments have a high didactical potential (Wollring, 2007).
- Problem solving: geometry lessons offer many opportunities to support the development of problem-solving abilities (Kuzle & Bruder, 2016).
- Opening up reality: geometry aids in understanding reality, and trains learners in everyday practical competencies (Graumann, 2009; van den Heuvel-Panhuizen, 2008).
- Spatial visualisation ability: geometry instruction supports the development of the ability to orientate oneself in three-dimensional space, and to operate mentally (Franke & Reinhold, 2016; Sinclair & Bruce, 2015; van den Heuvel-Panhuizen, 2008).
- Acquisition of arithmetic concepts: geometry supports and complements the acquisition of arithmetic concepts (Bauersfeld, 1992; Franke & Reinhold, 2016; van den Heuvel-Panhuizen, 2008).
- Geometric concept formation: the knowledge of geometric concepts provides a foundation for further geometry instruction and supports the development of knowledge to systematise geometric concepts (Franke & Reinhold, 2016).
- Basic knowledge: geometry (content) is part of general knowledge and provides a foundation for understanding other mathematical and historical topics (Hattermann et al., 2015).

Concretely, the text material was examined to determine to what extent the categories can be applied and whether there are problems of demarcation between the categories. In the case of the present work, the category system could be tested as suitable for all texts. However, there were statements that could not be categorised in the presented category system as they contained no content pertaining to the didactical potential of geometry teaching. With respect to the former, after the first pass with the help of the interpretation rules, which are based on Mayring's work (2000) regarding the applied techniques of 'paraphrasing' and 'generalisation', eight categories were formed. All collected statements of the teachers were shortened in paraphrasing to the essential content of the

statement and then by generalisation, the main statement was extracted. These main statements were assigned to each category. The resulting category system now contained those aspects that could be filtered out and summarised from the available text material in a theory-based manner on the basis of the defined characteristics for 'goals and aspects of geometry instruction'. With respect to the statements that did not fit the developed category system, an additional category system needed to be developed as they contained no content mathematics-related statements but more affect-related statements revealing values (i.e., personal truths of individuals) and beliefs (i.e., cognitive statements to which the holder attributes truth or applicability) (Hannula, 2012) of the participating teachers regarding teaching geometry. The nature of these was (independent of the level) classified into three categories: positive (e.g., positive values such as 'important', 'indispensable' or positive beliefs such as 'Geometry is an essential part of mathematics teaching'), negative (e.g., negative values such as 'secondary' or negative beliefs such as 'difficult', 'stressful') and neutral (Laine et al., 2015). By using two different coding systems (i.e., one reflecting the didactical potential of teaching geometry and the other reflecting the mathematics-related affect), it was possible to assign each statement to one of the developed categories.

In contrast to the open-ended question, the standardised item included 22 statements on the advantages of teaching geometry that have been taken from the work of Backe-Neuwald (2000) but also supplemented with statements from the more recent literature outlined earlier in the present paper with an option of writing an additional statement. Through these statements, all eight categories of the didactical potential of geometry were covered (i.e., motivation, sustainable learning environments, problem solving, opening up reality, spatial visualisation ability, acquisition of arithmetic concepts, geometric concept formation, and basic knowledge). The participants were asked to mark aspects of school geometry that were most relevant to them, and to hierarchise five answers accordingly (e.g., 1-most relevant). The item was evaluated according to the frequencies of all answer options and assigned rankings. Regarding the latter, a simple score was generated, which valued the most important reason with five points, the second most important with four points, and so on. The score, as opposed to merely looking at the absolute frequencies, allowed for a better assessment of the importance of the reasons, even though both metrics showed an almost equal ordering of the reasons. Both items complemented each other; by evaluating the open-ended item, teachers were given the opportunity to express themselves freely without being steered in one direction by predetermined answer choices. Through the additional evaluation of the standardised item, the spectrum of answers was expanded. It was therefore

of particular interest whether the answers to the open-ended question corresponded to those of the standardised item, and to what extent new aspects emerged through the standardised item.

To determine the practical value of teaching geometry from the teachers' perspective, two items were analysed. Two items from section (2) 'characteristics of teaching geometry' focused on a quantitative aspect of teaching geometry, namely the number of lessons dealing with geometric topics per grade level, and on the form in which geometry instruction was anchored in mathematics instruction (i.e., parts of lessons, individual lessons, integrated into the weekly or daily schedule, integrated into interdisciplinary projects or series of lessons). In addition, when evaluating this item, the ranking undertaken by the teachers (e.g., 1-most often) was considered, which allowed individual items a higher weighting than others. Thus, it was assumed that teachers who checked the item 'series of lessons' and 'integration into the weekly or daily schedule' gave more space to geometry instruction than teachers who checked 'parts of lessons' or 'individual lessons'. The item 'integrated into interdisciplinary projects' indicated that geometry lessons were not considered as a part of regular mathematics lessons but were only treated in so-called project weeks. All standardised items were analysed using descriptive statistics.

## Results

In this section, the results pertaining to the two research questions are presented. Concretely, I present the results regarding the didactical potential of teaching geometry recognised by the in-service teachers and the practical value they assign to teaching geometry.

### Didactical Potential of Elementary School Geometry: Goals and Aspects

Here I present the results regarding teachers' associations with teaching geometry, and the benefits of teaching geometry that cover (2) 'aspects pertaining to characteristics of teaching geometry', and (4) 'goals and aspects of teaching geometry', respectively from the questionnaire. The results reflect a clear tendency regarding the teachers' responses to the open-ended item (see Table 1). Statements<sup>2</sup> regarding several categories are presented below along the

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<sup>2</sup> A subjective selection of content statements by the author is unavoidable; this has been handled in a comparable manner in the previous research (Backe-Neuwald, 2000), and does not necessarily diminish the validity of the conclusions.

variables of teaching experience, and professional background. The motivation category made up the largest part of the content-related statements with a total of 34 teachers (29.1%) stating that geometry lessons were highly motivating for the students. Their answers included statements such as:

- *'a way to get children interested in mathematics who otherwise do not like the subject.' (up to 2 yrs., specialist)*
- *'nice, because the students are motivated to do it.' (up to 2 yrs., non-specialist)*
- *'motivates the students, also those who don't like arithmetic so much.' (up to 20 yrs., specialist)*

In the second place of content-related statements, 12 teachers (10.3%) indicated sustainable learning environments, with a particular emphasis being assigned to the action-oriented aspect. Their answers included statements such as:

- *'very interesting, because it is so versatile and exciting, and a lot can be practically discovered, tinkered with and developed with the children.' (up to 2 yrs., specialist)*
- *'above all action-oriented work.' (over 20 yrs., specialist)*
- *'laying, folding, drawing, constructing, comparing, etc. practical, visualised, active learning.' (over 20 yrs., specialist)*

Even though in the third place of content-related statements, only 8.5% of the teachers' answers ( $n = 10$ ) associated geometry teaching with the development of spatial visualisation ability. Their responses included statements such as:

- *'a lot of mental geometry, i.e., work on spatial visualisation ability ...' (up to 10 yrs., specialist)*
- *'a branch of mathematics, important for the development of spatial visualisation ...' (over 20 yrs., specialist)*

All other content categories were coded to a limited extent, namely opening up reality, problem solving, acquisition of arithmetic concepts, geometric concept formation, and basic knowledge. Seven teachers did not fill out the item (5.8%).

Lastly, worth reporting are affect-related statements, which made up almost one-third of all statements. A total of 23.3% of the teachers ( $n = 28$ ) had positive affect-related values and beliefs about teaching geometry. Occasionally, positive statements were associated with too little weight being given to

geometry. The positive responses included statements such as:

- *'one of the most exciting and interesting subject areas, but nevertheless often underrepresented.'* (up to 10 yrs., specialist, belief)
- *'extremely important and a significant part of mathematics.'* (over 20 yrs., specialist, value)

Furthermore, eight affect-related statements (6.7%) reflected strong negative affect-related values and beliefs about teaching geometry. Negative responses included statements such as:

- *'secondary'* (up to 2 yrs., non-specialist, value)
- *'difficult because motor skills (holding pencil, drawing lines) are underdeveloped.'* (up to 2 yrs., non-specialist, belief)
- *'always a challenge.'* (up to 20 yrs., specialist, belief)
- *'stressful because I would have to have 20 hands to help everyone.'* (over 20 yrs., specialist, belief)

**Table 1**

*Distribution of In-service Teachers' Free Associations Regarding Geometry Teaching*

| Type of category          | Category                                   | Absolute and relative frequencies |
|---------------------------|--------------------------------------------|-----------------------------------|
| Content-related statement | Motivation                                 | 34 (28.3%)                        |
|                           | Sustainable learning environments          | 12 (10%)                          |
|                           | Problem solving                            | 4 (3.3%)                          |
|                           | Opening up reality                         | 7 (5.8%)                          |
|                           | Spatial visualisation ability              | 10 (8.3%)                         |
|                           | Acquisition of arithmetic concepts         | 4 (3.3%)                          |
| Affect-related statement  | Geometric concept formation                | 2 (1.7%)                          |
|                           | Basic knowledge                            | 2 (1.7%)                          |
|                           | Positive affect-related values and beliefs | 28 (23.3%)                        |
|                           | Neutral affect-related values and beliefs  | 2 (1.7%)                          |
| No statement              | Negative affect-related values and beliefs | 8 (6.7%)                          |
|                           | No statement                               | 7 (5.8%)                          |

The results from the standardised item pertaining to the benefits of teaching geometry in primary school are shown in Table 2. Of 120 surveys, 119 teachers filled out this item. Additionally, not all participants ranked their answers ( $n = 24$ ), so these data were not considered for the Top 5 Score. The teachers' answers predominantly confirmed the findings of the aforementioned

open-ended item. Motivational aspects were included in several statements, such as 'is fun for students' (item 4.3.1), 'can promote a positive attitude towards the subject of mathematics' (item 4.3.17), and similarly was the most frequently coded content-related aspect. Likewise, the benefit of teaching geometry to support the acquisition of arithmetic concepts (item 4.3.19) was recognised by 11 teachers only. Here, in contrast, the relevance of spatial visualisation (item 4.3.13) predominated with 79.2% of teachers ( $n = 95$ ) attributing this geometric goal the greatest relevance in primary school geometry. A total of 32 teachers attributed this statement one of the five possible rankings, with 18 of them giving it rank 1. Also, opening up reality (item 4.3.10), and problem solving (item 4.3.18) were attributed greater importance than was reflected on the open-ended item, with 39 and 41 instances, respectively.

**Table 2***Benefits of Teaching Geometry in School Mathematics*

| Item   | Statement Geometry in primary school ...                                                                         | Absolute frequencies<br>(max.119) | Top 5 Score |
|--------|------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------|
| 4.3.13 | promotes and supports spatial visualisation ability.                                                             | 95                                | 258         |
| 4.3.14 | gives children who are otherwise weak in mathematics a sense of achievement.                                     | 73                                | 126         |
| 4.3.6  | offers children many opportunities to make independent discoveries.                                              | 69                                | 127         |
| 4.3.1  | is fun for students.                                                                                             | 68                                | 122         |
| 4.3.21 | trains motor skills (e.g., sheathing, folding, stretching, drawing).                                             | 67                                | 94          |
| 4.3.16 | is an indispensable part of mathematics education.                                                               | 59                                | 84          |
| 4.3.2  | promotes children's creativity.                                                                                  | 53                                | 59          |
| 4.3.3  | promotes elementary mental abilities like ordering and classifying.                                              | 51                                | 71          |
| 4.3.12 | sharpens perception.                                                                                             | 48                                | 77          |
| 4.3.22 | enables them to grasp content using concrete material.                                                           | 47                                | 50          |
| 4.3.18 | makes an important contribution to the development of reality.                                                   | 41                                | 58          |
| 4.3.17 | can promote a positive attitude towards the subject of mathematics.                                              | 39                                | 50          |
| 4.3.10 | enables a contribution to the formation of general mathematical competencies (e.g., reasoning, problem solving). | 39                                | 49          |
| 4.3.7  | offers opportunities for open forms of teaching.                                                                 | 38                                | 24          |

| Item   | Statement Geometry in primary school ...                    | Absolute frequencies<br>(max.119) | Top 5 Score |
|--------|-------------------------------------------------------------|-----------------------------------|-------------|
| 4.3.9  | promotes and challenges language competence.                | 35                                | 31          |
| 4.3.20 | lays the foundation for later systematic geometry teaching. | 33                                | 27          |
| 4.3.8  | offers opportunities for interdisciplinary work.            | 33                                | 26          |
| 4.3.4  | enables individual differentiation.                         | 25                                | 25          |
| 4.3.15 | promotes describing and uncovering structures.              | 24                                | 15          |
| 4.3.11 | promotes aesthetic sensibility.                             | 22                                | 10          |
| 4.3.5  | promotes social skills.                                     | 20                                | 10          |
| 4.3.19 | supports the acquisition of arithmetic concepts.            | 11                                | 7           |
| 4.3.23 | Other: _____                                                | 0                                 | 0           |

### Practical Value of Elementary School Geometry

Here I present the results pertaining to the practical value of elementary school geometry, specifically the form of instruction and teaching hours in geometry. Regarding the implementation form in which geometry lessons are taught, the results showed that they were mainly taught in the form of a series of lessons (65%), and individual lessons (64.2%) (see Figure 1). About one-third of participants indicated that parts of lessons, projects or daily/weekly schedules were filled with geometric content. In total, six participants did not fill out this item. Furthermore, only half of the teachers ranked the marked answers by frequency ( $n = 54$ ) so that only a tendency could be depicted. Accordingly, 42.6% of teachers ( $n = 23$ ) most often conducted a series of lessons, followed by 33.3% of teachers ( $n = 18$ ) who conducted individual lessons. Here, the Top 5 Score was higher for individual lessons with a score of 186 than for a series of lessons with a score of 149 since more teachers gave ranks 1 and 2 to the former.

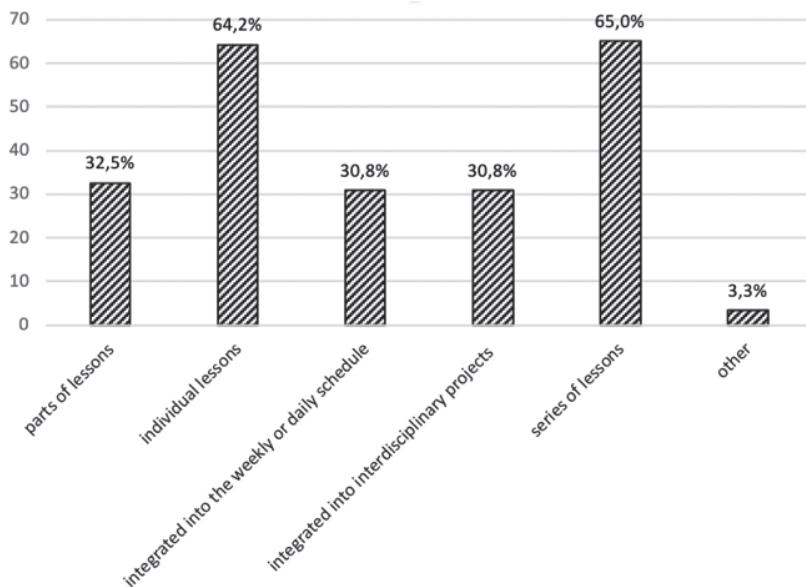
**Figure 1***Different Implementation Forms of Geometry Lessons*

Table 3 illustrates results regarding the teaching hours per grade level within geometry instruction. It must be taken into account that there were missing data since the participating teachers did not necessarily teach mathematics in all grades. Furthermore, each federal state prescribes a contingent of hours in each subject within own elementary school policy regulations. Generally, these vary between 160 and 200 hours for mathematics. There are no concrete specifications as to how many hours and which areas should be covered. In the school's internal curriculum, this is mostly determined from school to school. Thus, the information on how many mathematics lessons and specifically geometry lessons were taught in total varies in every school. As an example, one participating school provided information on the number of geometry lessons per grade level: Grades 1–2 50 hours, Grade 3 50 hours, and Grades 4–6 70 hours. Lastly, some answers were given in percentages, and for that reason, could not be used and were unfortunately not included in the evaluation. Since these pieces of information were not available, only a tendency could be depicted; the number of geometry lessons in mathematics increases with the increasing grade level. However, similarities can be seen with respect to its extreme minimum value independent of the grade level.

**Table 3**  
*Distribution of Teaching Hours per Grade Level*

|                    | Grade |       |        |        |        |        |
|--------------------|-------|-------|--------|--------|--------|--------|
|                    | 1     | 2     | 3      | 4      | 5      | 6      |
| Average            | 15.77 | 18.83 | 20.74  | 25.76  | 28.29  | 34.23  |
| Median             | 15    | 20    | 20     | 20     | 30     | 35     |
| Standard deviation | 9.416 | 9.903 | 11.710 | 16.239 | 15.332 | 18.390 |
| Minimum            | 1     | 1     | 0      | 1      | 1      | 1      |
| Maximum            | 35    | 40    | 60     | 55     | 60     | 80     |

## Discussion

This study investigated the importance of school geometry in primary education by providing an insight into the extent to which both the didactical potential and the practical value of geometry instruction in elementary schools nowadays are recognised and utilised by primary grade teachers. Even though the importance of geometry instruction within elementary school mathematics increased significantly, as reported in the Backe-Neuwald's (2000) study as well as in newer replication and extension studies (Sitter, 2019; Wiese, 2016), the question about the current importance of geometry teaching cannot be answered unambiguously.

The results revealed that teachers employ teaching practices conducive to geometry learning but also revealed their insecurity regarding other important aspects as reported in the literature (Bauersfeld, 1992; Franke & Reinholt, 2016; Radatz & Rickmeyer, 1991; van den Heuvel-Panhuizen, 2008; Winter, 1997; Wollring, 2007). The evaluation of the open-ended item 'Geometry teaching in elementary school is for me ...' showed an explicit subject didactic conception, especially for the topics of spatial visualisation, development of reality as well as problem solving. A total of 8.5% of the respondents associated spatial visualisation ability as a central aspect of teaching geometry in primary school. In the evaluation of the standardised items, item 4.3.13 'promotes and supports spatial visualisation ability' was ranked most significant with 95 respondents marking this statement. This result can be seen to be consistent with the study of Backe-Neuwald (2000) which was the third most common item chosen by teachers. Franke and Reinholt (2016), and Sinclair and Bruce (2015) also assign to this content one of the most important didactical potentials of geometry teaching in primary education; spatial visualisation is often listed as one of the main goals of primary grade geometry (Franke & Reinholt, 2016). On the one

hand, spatial visualisation is found in many geometric topics, and, on the other, the topic of 'Space and Shape' is extensively anchored in the framework curriculum (RLP, 2015).

Other findings from this research suggest that geometry instruction is poorly linked to the rest of mathematics instruction. Although Graumann (2009), and Kuzle and Bruder (2016) make it clear that geometry instruction is particularly suited for training problem-solving abilities, few teachers reported this aspect. In the open-ended item, only 3.4% of the teachers commented on problem solving; in the standardised item, statement 4.3.10 on general mathematical competencies such as problem solving and reasoning, is ranked 13 out of 23 ( $n = 39$ ). Similarly, this aspect had the least relevance in the study of Backe-Neuwald (2000). This is rather problematic, since problem-solving abilities are highly relevant for the whole mathematics education and can be learned and extended especially through geometry problems (Kuzle & Bruder, 2016). However, on a positive note, discovery learning, which is related to problem-solving skills in the broadest sense, was rated as a highly relevant aspect of geometry instruction. The fact that geometry 'offers children many opportunities to make independent discoveries' (item 4.3.6) was ranked 3 out of 23 ( $n = 69$ ). This is aligned with Backe-Neuwald's (2000) study where this aspect was recognised as the most important aspect of teaching geometry by about 60% of respondents.

In Backe-Neuwald's (2000) study, discovery learning and opening up reality were ranked first and second as the most important aspects of geometry instruction, respectively. These can be seen as part of a successful geometry learning environment. The teachers surveyed referred to geometry learning environments in 10.3% of their responses ( $n = 12$ ). According to Franke and Reinholt (2016), and Wollring (2007), geometry instruction is particularly suitable for creating sustainable learning environments. Concretely, teachers recognised differentiating instruction, and action orientation as important aspects of geometry instruction. These answers indicated that they dealt with individual aspects of successful learning environments. However, action orientation and differentiation were mentioned rarely on the open-ended item; 'enables individual differentiation' (item 4.3.4) and 'enables them to grasp content using concrete material' (item 4.3.22) appeared in 47 and 25 instances, respectively. Since the evaluation of the standardised item 4.3.6 showed that the statement 'offers children many opportunities to make independent discoveries' was highly ranked by the teachers, it can therefore be assumed that geometric learning environments are designed by teachers in the sense of discovery learning. However, it remains questionable to what extent these make a connection to the lived

experiences of the students since (other than in the study of Backe-Neuwald (2000)) only about one-third of participants ( $n = 41$ ) attributed importance to 'makes an important contribution to the development of reality' (item 4.3.18). Since it is through the connection to reality that children understand the relevance and the meaning of the content being learnt (Winter, 1976) it is worrying that this aspect has declined in relevance in the previous two decades.

The study results indicated that the teachers had a concrete idea of what geometry teaching was about and which aspects were considered to be particularly important (see Table 1). Nevertheless, the subject-specific responses only partially reflected the geometry discourse in the community since the answers on the open-ended item reflected the motivational aspect more (29.1%) rather than geometrical topics. Such association with geometry teaching can be further differentiated. One main argument for motivation was that children who are weak in arithmetic lessons can achieve a sense of achievement in geometry lessons and are therefore motivated. Also, in the evaluation of the standardised item, the statement 'enables children who are otherwise weak in mathematics to experience success' (item 4.3.14) was the second most frequently marked ( $n = 73$ ; 61.3%). Thus, the teachers agreed with the statement of Krauthausen (2018, p. 105) that children can achieve a positive self-concept regarding mathematics through geometry instruction, creating an opportunity to compensate for weaknesses in arithmetic instruction. Even though this aspect was ranked fourth in the study of Backe-Neuwald (2000), it was more dominant since only about 30% of teachers ( $n = 32$ ) agreed with this statement. Furthermore, teachers indicated that both they and the children enjoy geometry lessons. For instance, Graumann (1994) assumed that geometry instruction offered great potential for learning in an action-oriented, playful, and fun way. This view was also reflected in the teachers' statements as well as in the standardised item, with the statement, 'is fun for students' (item 4.3.1) being marked fourth most often.

Furthermore, the survey supported the results of Backe-Neuwald (2000) that geometry is still barely connected to other areas of mathematics, such as arithmetic and algebra, which was revealed by both the open-ended item and the standardised item. The statement 'supports the acquisition of arithmetic concepts' (item 4.3.19) was hardly seen as relevant by the teachers ( $n = 11$ ) or mentioned by the teachers on the open-ended item ( $n = 4$ ). Furthermore, the statement 'promotes describing and uncovering structures' (item 4.3.15) was also recognised by 24 teachers only. These responses indicate that teachers treat geometry as an autonomous part of mathematics and make few references to arithmetic or algebra. These results clearly show that the two areas are still strongly separated. Additionally, the statement 'lays the foundation

for later systematic geometry teaching' was selected least frequently by teachers ( $n = 33$ ). This result indicates that geometry is still not being taught in the sense of a spiral curriculum, as Wittmann had called for it in 1999 but in a canonical way and not integrated into the network of different contextualised areas of competence. Wittmann (1999) spoke of the fact that 'geometry has no tradition in elementary school' (p. 208). Geometry can and must be the basis of arithmetic, both in terms of content and in the formation of mathematical teaching-learning processes (Bauersfeld, 1992; van den Heuvel-Panhuizen, 2008; Wittmann, 1999). Geometry is also useful in the subject area 'Patterns and structures' to understand and deepen arithmetic concepts, and to initiate algebraic structures (van den Heuvel-Panhuizen, 2008). If the often-lamented weak institutional, and also practical anchoring of geometry lessons in the curriculum is to be overcome, better integration with other mathematical sub-areas and competencies must be ensured. This is unfortunately not reflected in the current framework curriculum (RLP, 2015). A similar picture was reported by Glasnović Gracin and Kuzle (2018) regarding the designated curriculum in Croatia and students' performance. In order to link different mathematical areas, references between arithmetic, algebra and geometry should also be made within the framework curriculum. Also, in teacher training, greater emphasis on the subject and didactic interdependencies between geometry, arithmetic, and algebra instruction should be given (Franke & Reinhold, 2016).

The question of the practical value that in-service teachers assign to geometry instruction in elementary schools provided a much clearer picture. Geometry teaching offers a great potential to train and extend a wide variety of mathematical skills and abilities. The fact that 65% of the respondents conduct entire lesson series on geometric content and less than one-third teach geometry lessons in projects (30.8%) or as part of a lesson (32.5%) shows that geometry lessons have become highly valued. Thus, it seems that the teachers give geometric topics a high priority both in terms of content and time and that they have taken up a fixed place in mathematics lessons and are not outsourced in the form of a project but are an integral part of mathematics instruction. This is somewhat contradictory to results pertaining to the amount of time spent per grade level teaching geometry (see Table 3), but this item offers only a reliable result to a limited extent. However, there is a tendency that the number of teaching hours increases continuously from Grade 1 to Grade 6. Backe-Neuwald (2000) came to a similar conclusion, suggesting that more instructional time was needed for arithmetic basics in the lower grades and that geometry instruction was neglected for this reason. This result could be explained by the paradigm shift that started at the end of the 1990s. National

and international movements within mathematics have led to a new emphasis on the subject, which has had a great influence on school life in general, but also on the teaching of geometry in elementary schools (Mammana & Villani, 1998) as well as on new educational standards (KMK, 2005). It remains problematic that Germany's educational system is famously decentralised, which means that Germany effectively has 16 different school systems, one for each federal state. Thus, the number of prescribed hours for each subject, and hence also mathematics differs. Also, each federal state's curriculum does not prescribe the number of hours for each mathematical topic which makes it difficult to understand the trend describing the teachers' choices.

## Conclusions

The geometry didactic community attributes a high didactic potential to geometry instruction and a didactic and content-related dovetailing with the rest of mathematics instruction is demanded (Bauerfeld, 1993; Franke & Reinhold, 2016; Radatz & Rickmeyer, 1991; Winter, 1971; Wittmann, 1999). In recent decades, many goals and aspects of good geometry teaching have been elaborated, which were only partially implemented by the teachers surveyed. The study showed that the participating teachers had generally a positive attitude toward the teaching of geometry and a professional knowledge of basic topics of geometry didactics. However, it also became clear that the potential of geometry teaching was not being fully exploited by the teachers at the present time. Many of the geometry-relevant topics, goals and aspects were mentioned to a limited extent or were attributed minimal relevance. The positive attitudes and the willingness to deal with the topic field are optimal prerequisites for granting geometry didactics more attention. Many teachers stated that both they and their students are particularly motivated to deal with geometric content in the classroom. Essentially, some of the goals and aspects of good geometry teaching have already found their way into mathematics lessons. However, the results pertaining to the number of hours spent on geometry topics showed that the subject is still not treated equally compared to other areas of school mathematics.

This study was a mixed-methods study using convenience sampling. Thus, the participating teachers only represented the country to a limited extent. One should not forget that Germany's educational system is decentralised. Hence, the results of the study are limited to the curricula of the federal states of Berlin and Brandenburg. As such, the results may be limited to specific cultural and contextual characteristics. Also, due to voluntary participation, one may assume that the teachers were more motivated and that the results reflect the

practices of motivated teachers. However, this is questionable since the data did not reveal a unanimous picture nor conclusive results in all cases. For the generalisability of the results in a wider setting, it is essential to recruit a larger sample from a variety of settings (e.g., federal states or countries) using alternative sampling strategies (e.g., maximum variation sampling, probability sampling), so that a researcher could create a less-biased and more thorough description of the current state of geometry teaching on both national and international levels, which can then be generalisable to a population.

The results have also provided evidence of possible theoretical as well as methodological biases. With respect to the former, an extensive literature review concerning modern geometry didactics was undertaken. However, surely not all aspects of its didactical potential have been covered but rather the main ones. With respect to the latter, some items were not entirely or fully answered by all participants (e.g., item 2.2), and some answers were not free of contradictions; for example, a majority of the respondents considered geometry teaching to be neglected and its topics to be unimportant in large parts, but nevertheless taught geometry with a positive attitude. Eliminating these problems with such an extensive and aspect-rich questionnaire is not likely to be trivial and would include the use of complementary instruments that are not based on self-assessment, such as student achievement tests, classroom documentation, or protocols as suggested by Wiese (2016). In that manner, one would obtain a more objective 'truth' by taking two perspectives in focus: the perspective of a teacher himself, and the perspective of the researcher. Furthermore, since this study showed that teachers were fundamentally positive about geometry instruction, and partially recognised its didactic potential, it would be interesting to further explore how teachers could be supported in conducting a high-quality geometry instruction that has an adequate place in mathematics education. Also, with the results of the questionnaire, it was difficult to make a statement about the number of hours geometry was taught in the individual grades. In this context, it would be interesting to investigate which concrete goals and contents are implemented and to what extent geometry is actually taught. By using the above-mentioned methods, it would be possible to make precise statements about the scope, goals, and content of geometry instruction, and to identify and analyse gaps.

By relating the study results to educational practice, some implications can be drawn as well as possible research of practical nature. Historically, educational policy, educational standards, and framework curricula have a strong influence on the status, goals, and content of school geometry (Franke & Reinhold, 2016). The strong influence of educational policy regulations on everyday

teaching practice suggests that particularly relevant goals and content need to be more strongly anchored in framework curricula and standards. In the case of Germany with its decentralised system, it is questionable to what extent it is possible to set this as a goal as well as to prescribe hours for geometry topics. The existing curriculum models (e.g., Remillard & Heck, 2014) present the starting point for providing students' well-established opportunities to learn geometry. The designated curriculum (i.e., instructional plans specified by an authorised, governing body) here plays a vital role since it influences all components of the operational curriculum (i.e., teacher-intended curriculum, enacted curriculum, attained curriculum). Likewise, this may also affect countries with highly centralised educational systems when policymakers attribute geometry little attention within the designated curriculum. Also, at this point, it would be interesting to further research the extent to which teachers design their geometry instruction according to current framework curricula. It also remains to be critically questioned how well the paradigm shift in teacher education can be distinguished from the paradigm shift in schools over the previous two decades. To what extent has the paradigm shift been introduced in higher education institutions? Here, the questionnaire would need to be expanded by items focusing on the respective teacher training program which would involve a very extensive and time-consuming study.

The study showed that the teachers were basically positive about the geometry instruction and also partially recognised its didactic potential. That said, it would be interesting to further investigate how teachers can be supported in order to carry out optimal geometry teaching, which takes an adequate place in mathematics education. Adequate and solid teacher training focusing on both content and pedagogical content knowledge is essential as well as supplementary training in order to dissolve uncertainties when teaching geometry (Jones & Mooney, 2003). Thus, solid teacher training needs to better prepare future mathematics teachers to play the roles and to reflect the teaching practices conducive to geometry learning that have been emphasised in the literature. Thus, we need to understand how teachers may be better prepared to play the roles that have been emphasised in the literature as well as ongoing developments (Sinclair & Bruce, 2015). More generally, regular empirical studies on the status of elementary school geometry on different levels (e.g., school, university) should be conducted to obtain up-to-date developments. Only in this way can general statements be substantiated, and reality be depicted.

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### Biographical note

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## Retrospective and Concurrent Victimisation as Predictors of Social Self-Concept and Loneliness in First-Year University Students

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KATJA KOŠIR<sup>\*1</sup> AND URŠKA ŽUGELJ<sup>2</sup>

∞ Peer victimisation during school years has been found to significantly shape the way students perceive themselves and how they enter into relationships with peers, thus impacting students' current and long-term wellbeing. However, victimisation has seldom been examined in university students. The present study aimed to investigate students' current level of self-reported peer victimisation and perceived peer support and their retrospectively reported victimisation as predictors of their social self-concept and loneliness in their first year of university. First-year university students (N = 200; 26% male) participated in the study. The results indicated that retrospectively reported victimisation experiences during their years of schooling explained additional variance in social self-concept and loneliness beyond their concurrent peer experiences. These findings indicate that experiencing victimisation during school years could have consequences for students' wellbeing that are not limited to the period of primary and secondary schooling, but can persist after their transition to university. Practical implications for the promotion of mental health in the higher education context are discussed.

**Keywords:** victimisation, retrospective measures, loneliness, self-concept, university students

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## Retrospektivna in trenutna vrstniška viktimizacija kot napovednika socialne samopodobe in osamljenosti pri študentih prvega letnika

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KATJA KOŠIR IN URŠKA ŽUGELJ

~~~~ Izkušnja vrstniške viktimizacije v obdobju šolanja pomembno sooblikuje, kako se mladostniki zaznavajo in na kak način vstopajo v vrstniške odnose, ter tako določa njihovo trenutno in dolgoročno blagostanje. Vendarle pa je le malo raziskav izkušnje vrstniške viktimizacije preučevalo pri študentih. V tej raziskavi smo preučevali trenutno stopnjo samoporočane viktimizacije, oporo vrstnikov in retrospektivno poročano viktimizacijo kot napovednike socialne samopodobe in osamljenosti pri študentih prvega letnika. V raziskavi je sodelovalo 200 (26 % moških) študentov prvega letnika. Rezultati so pokazali, da izkušnje retrospektivno poročane viktimizacije v letih šolanja pojasnjujejo dodaten delež variance v socialni samopodobi in osamljenosti, ki je ni mogoče pojasniti z njihovimi izkušnjami trenutne viktimizacije. Te ugotovitve nakujujejo na potencialni učinek izkušnje viktimizacije v obdobju osnovne in srednje šole za dobrobit študentov, ki presega obdobje primarnega in sekundarnega izobraževanja, ampak lahko vztraja tudi v obdobju prehoda v visokošolsko izobraževanje. Predstavljeni so tudi praktične implikacije ugotovitev za promocijo duševnega zdravja v kontekstu visokošolskega izobraževanja.

Ključne besede: viktimizacija, retrospektivne mere, osamljenost, samopodoba, študentje

Introduction

Peer relationships are strong sources of joy, support and satisfaction, as well as distress, in all periods of schooling. In adolescence, the importance and impact of experiences within the peer context on students' wellbeing increases. Experiencing bullying, defined as aggressive, goal-directed behaviour that harms another individual within the context of a power imbalance (Volk et al., 2017), is among the most hurtful sources of distress within the peer context (Juvonen & Graham, 2014). Frequent victimisation has concurrent and long-term effects on students' physical, psychological, relational and general wellbeing (Copeland et al., 2013; Gini & Pozzoli, 2009; Reijntjes et al., 2010; Salmivalli, 2018).

The manifestations of bullying, as well as the underlying motives for bullying, change during school years; in adolescence, direct forms of bullying (physical and verbal) decrease while indirect, relational bullying increases (Yeager et al., 2015). Thus, in adolescence, bullying is mainly manifested as relational bullying (e.g., spreading rumours, excluding someone from activities) (Yeager et al., 2015). In addition, the social dynamics of bullying change in adolescence: changes in students' social motivation (high aspiration for popularity, power and status among peers) can lead to the aggressive-popularity norm, which means that popularity in the classroom can be achieved through aggressive and/or bullying behaviour (Laninga-Wijnen et al., 2020). Thus, the responses of peers as bystanders of bullying can maintain and even enhance the bullying dynamics. Students who do not conform to the norms of the peer group (least fitting classmates; Juvonen & Schacter, 2017) can thus become chronic victims of bullying. Due to the growing influence of bullying perpetrators on other peers, students who experience bullying become increasingly isolated. Thus, they suffer not only from bullying, but also from its consequences, which are usually manifested as increasing social isolation. This often leads to changes in self-perception: attributing the experience of violence to characteristics that are internal, uncontrollable and stable (characterological self-blaming attributions; Graham & Juvonen, 1998), which hinders them from establishing further peer interactions and enhances victimisation (Schacter et al., 2014). Hence, it is not surprising that peer support has been found to be one of the strongest protective factors of victimisation (Cook et al., 2010). This has also been confirmed in a sample of Slovenian adolescents (Košir et al., 2020).

The experience of victimisation thus shapes how students perceive themselves and how they enter into peer relationships. Students who were victims of bullying have been consistently found to be at higher risk for internalising problems in young and middle adulthood (Copeland et al., 2013; Ttofi et al.,

2011). Internalising symptoms refer to various emotional difficulties, ranging from low self-concept, social withdrawal and loneliness to symptoms of depression and anxiety. Until recently, these symptoms were perceived as "less problematic" compared to externalising symptoms, and thus received less attention in developmental research (Guzman-Holst & Bowes, 2021). In children and adolescents, internalising symptoms are manifested as feeling lonely and withdrawn, avoiding social situations and feeling unwanted or inadequate (i.e., low self-esteem). Although the relationship between being victimised and internalising symptoms is complex and very likely reciprocal, some prospective studies have been able to control this relationship for pre-existing health conditions, family situation and other exposures to violence (e.g., family violence) when exploring the effects of being victimised on subsequent health, educational and social outcomes (Wolke et al., 2015). These studies indicate that victims of frequent bullying report having more trouble making or keeping friends, and are less likely to live with a partner and have social support (Takizawa et al., 2014; Wolke et al., 2013). Recently, an increasing body of neuropsychological research has examined biological mediators between experiencing peer violence and mental health problems, explaining the psychological consequences of experiencing social exclusion through structural and functional changes in brain function. These studies (e.g., Quinlan et al., 2020) showed that experiencing chronic peer victimisation affects the development of brain structure, and that these structural brain changes predict mental health problems in late adolescence or early adulthood.

Feeling related to others and establishing positive relations is a fundamental human need (Baumeister & Leary, 1995; Deci & Ryan, 2000); the experience of victimisation grossly hinders the satisfaction of this need. Being victimised is related to lower social self-concept, as reflected in deflated perceptions of the quality of peer relations, social competence and acceptance among peers (Cook et al., 2010; Hawker & Boulton, 2000). In addition, victimisation is related to increased loneliness (Graham et al., 2006), defined as a negative emotional state associated with a perception that an individual's social needs are not met in terms of quantity or quality (Campbell, 2013). The relationship between victimisation and self-concept, as well as loneliness, is reciprocal, since students with low self-concept and lonely students are more likely to be seen as vulnerable, and thus as easy targets for bullying (see, e.g., Scholte et al., 2007). Although these relationships are well-established in adolescence, it is still quite unclear how prior victimisation is related to the ways students build their peer relations and how they perceive the quality of their social relations as they enter university.

According to the stress-buffering model (Cohen & Wills, 1985), social support is a significant protective factor that can both promote positive social outcomes as well as work as a buffer in children and adolescents with negative social experiences and protects them from developing internalising symptoms. Previous studies (e.g., Copeland et al., 2004; Rueger et al., 2008) have indicated that peer support is one of the strongest sources of their wellbeing in school and their social adjustment. It is thus hypothesised that peer support will be a strong predictor of both of the measures of students' psychosocial outcomes used in the present study (students' social self-concept and feelings of loneliness). Furthermore, the study focuses on whether students' retrospectively reported peer victimisation explains additional variation in both psychosocial outcomes beyond their current peer experiences, assessed as concurrent victimisation and peer support.

Bullying in university students

Bullying has been mostly studied in samples of early to middle adolescents, thus mostly on the lower- and upper-secondary educational level. It has seldom been studied in university students, who are typically in the developmental period of late adolescence. However, as pointed out by Cassidy et al. (2021), the risk of being bullied does not end when youths graduate from secondary school. Bullying can continue into the university level and beyond, taking different forms over the life course. According to some scholars (e.g., Francisco et al., 2015), one of the possible obstacles to the recognition of bullying and adequate responses is related to terminological issues; the term bullying carries a connotation of childish behaviour, and it can be difficult to associate it with adults and environments such as universities. An additional factor that could blur the extent of bullying at the university level is the reluctance of university students to report bullying due to their beliefs that they should be able to handle such situations on their own (Crosslin & Golman, 2014).

Research on bullying in university students is therefore scarce, but it has been gaining research attention and recognition over the last decade (Cassidy et al., 2021). Recent studies indicate that being victimised at university is related to victimisation in previous years of schooling (Pörhölä, 2016); on a large sample of university students, Beran et al. (2012) found that students who had been harassed in secondary school had 2.66 times greater probability of experiencing victimisation at university. Moreover, students' prior bullying experiences are related to their mental health at university; on a sample of university students, Manrique et al. (2019) found that a history of bullying in the years of secondary

school was associated with depressive, anxiety and posttraumatic stress disorder symptoms in students' first year of studies and again in their third year.

The small number of studies investigating bullying in the higher education context has provided evidence that bullying at university is a relevant social problem; however, the prevalence estimates vary by country, the form of bullying and the methodology. To our knowledge, there are no studies that have investigated bullying among university students in the Slovenian context. Foreign studies reported the prevalence of victimisation among university students ranging from 20 to 30% (e.g., Faucher et al., 2014; Marraccini et al., 2018) or around 8% in studies with more rigid parameters for defining bullying (e.g., Schenk & Fremouw, 2012). Bullying among university students takes many forms, which can mainly be categorised as relational bullying (e.g., spreading rumours on the grounds of race, disability, gender, religion and sexual orientation; ridiculing or demeaning a person; social exclusion; Cowie & Myers, 2016). Regarding forms of victimisation, female students were found to experience bullying mostly from friends and acquaintances in the form of social exclusion, belittling and gossiping, while male students reported being more likely targeted by peers with challenges to their masculinity (Brock et al., 2014; Faucher et al., 2014).

Some studies have investigated students' experiences of victimisation during different periods of schooling using retrospective measures. Based on retrospective responses, Chen and Huang (2015) found that adolescents reported higher levels of traditional and cyberbullying and victimisation for their period of schooling prior to higher education. **Anderson and Sturm (2007)** nonetheless argue that studying and understanding bullying in university students is very important; retrospective studies of bullying and victimisation that have investigated students' experiences of bullying during their primary and secondary schooling have found that there is a positive association between being a bully or a victim in all three periods of schooling (Chapell et al., 2006; Chen & Huang, 2015). Despite the findings of retrospective research that students report the lowest occurrence of traditional and online peer violence during their higher education schooling, the study of peer violence among students is crucial (Anderson & Sturm, 2007).

The current study aimed to investigate students' retrospectively reported prior victimisation during school years, as well as their recent peer experiences at university – current victimisation and perceived peer support – as predictors of their social self-concept and feelings of loneliness in a sample of first-year university students. The aim of the study was twofold: (1) to examine the relationship between university students' current level of peer victimisation and

their psychosocial outcomes, and (2) to examine whether university students' retrospectively reported victimisation during their school years predicts their psychosocial outcomes beyond their current psychosocial experiences (self-reported victimisation and perceived peer support).

Method

Participants and procedure

The sample consisted of 200 first-year university students (26% males) from the three biggest public Slovenian universities (35% from the University of Ljubljana, 35% from the University of Maribor and 30% from the University of Primorska). Their mean age was 19.84 years ($SD = 1.35$).

Instruments

Current and retrospectively reported victimisation. Self-reported victimisation was assessed with the Adolescent Peer Relations Instrument: Bullying (APRI-B) (Marsh et al., 2011; Slovenian adaptation by Košir et al., 2020) confirmatory factor analysis demonstrated a well-defined multidimensional factor structure of reliable, highly differentiated self-concept factors. Correlations between 11 SDQII factors and 7 mental health problems (Youth Self-Report; YSR, which measures victimisation in the verbal, physical and social subdomains. The victimisation part of the questionnaire consists of 18 items in which the participants reported how often they had experienced these behaviours ((e.g., "I was teased by students saying things to me") on a six-point scale (1 = *never* to 6 = *every day*). The students were asked to report their victimisation experiences for two time periods: in the current academic year (concurrent victimisation) and in the years of their schooling.

Perceived peer support. The peer personal support scale from the Classroom Life Instrument (Johnson et al., 1983; Slovenian adaptation by Košir et al., 2007) was used to assess perceived peer support at university. The scale consists of five items (e.g., "My colleagues at university really care about me"). The answers were given using a 5-point Likert scale (1 = *never true* to 5 = *always true*).

Social self-concept. Students' social self-concept was assessed using the same-sex relationship subscale from the Self-Description Questionnaire II (SDQ II-S, Marsh et al., 2004; Slovenian adaptation by Brajdot, 2001). This questionnaire measures adolescents' perceptions of their popularity among peers of the same sex, their perceptions of how easily they make friends with

same-sex peers, and the perceived quality of their interactions with same-sex peers. It consists of ten items (e.g., "I make friends easily") assessed using a 4-point scale (1 = *never true for me* to 4 = *always true for me*).

Loneliness. The UCLA loneliness scale (Russell, Peplau, & Cutrona, 1980; Slovenian adaptation by Avsec & Bajec, n.d.) was used to measure the students' subjective feelings of loneliness and social isolation. The scale consists of 20 items (e.g., "How often do you feel that you lack companionship?") rated on a 4-point Likert scale (1 = *never*, 4 = *often*).

Research design

The participants were recruited from the three biggest public Slovenian universities via e-mails sent to university teachers and student tutors, who were asked to distribute the link to the online questionnaire to their first-year undergraduate students. Only students who provided complete answers were included in the analyses.

The data were collected online in March 2020 (i.e., after six months at university). The study participants were informed about the purpose of the study and the voluntary nature of their participation. The study was approved by the ethics committee of the Faculty of Arts, University of Maribor.

Results

Descriptive statistics, correlations and Cronbach's alpha reliabilities are presented in Table 1. The participants reported relatively low levels of victimisation; higher levels of victimisation were reported retrospectively for the period of primary and secondary schooling. The students' victimisation in the current academic year was positively related to retrospectively reported victimisation and negatively related to perceived peer support; both correlations are low. The students who reported higher victimisation during their schooling reported a lower social self-concept and higher feelings of loneliness. The correlations between the students' current victimisation and their social self-concept and loneliness were not significant. The students who perceived lower peer support reported lower social self-concept and higher feelings of loneliness; the correlation was moderate. Social self-concept and loneliness are highly negatively correlated. The reliability coefficients were appropriate (good to excellent) for all measures.

Table 1
Means, standard deviations, reliabilities and correlations

| | <i>M</i> | <i>SD</i> | 1. | 2. | 3. | 4. | 5. |
|----------------------------------|----------|-----------|--------|--------|--------|--------|-------|
| 1. Victimization – concurrent | 1.07 | 1.18 | (.93) | | | | |
| 2. Victimization – retrospective | 1.74 | 0.63 | .21** | (.93) | | | |
| 3. Perceived peer support | 3.48 | 0.72 | -.20** | -.07 | (.87) | | |
| 4. Social self-concept | 3.42 | 0.83 | -.11 | -.31** | .50** | (.88) | |
| 5. Loneliness | 2.22 | 0.54 | .10 | .31** | -.47** | -.77** | (.91) |

Note. * $p < .05$, ** $p < .001$. Cronbach's α reliability coefficients are shown on the diagonal (in brackets).

Table 2
Hierarchical regression analysis for variables predicting social self-concept and loneliness

| | Social self-concept | | | | | | Loneliness | | | | | |
|---|---------------------|---------|----------|---------|----------|---------|------------|---------|----------|---------|----------|---------|
| | Model 1 | | Model 2 | | Model 3 | | Model 1 | | Model 2 | | Model 3 | |
| | B | β | B | β | B | β | B | β | B | β | B | β |
| Step 1: control variables | | | | | | | | | | | | |
| Gender | 0.25 | 0.14 | 0.06 | .03 | 0.10 | .05 | -0.27 | -.22** | -0.16 | -.13* | -0.18 | -.15* |
| ΔR^2 | | .02 | | | | | | .05** | | | | |
| Step 2: concurrent peer experiences | | | | | | | | | | | | |
| Victimization - concurrent | | -0.5 | -.01 | 0.21 | .05 | | | | 0.03 | .01 | -0.14 | -.05 |
| Peer support | | 0.58 | .50*** | 0.56 | .48*** | | | | -0.33 | -.44*** | -0.32 | -.43*** |
| ΔR^2 | | | .24*** | | | | | | .19*** | | | |
| Step 3: retrospectively reported peer experiences | | | | | | | | | | | | |
| Victimization - retrospective | | | | -0.37 | -.29** | | | | 0.25 | .30*** | | |
| ΔR^2 | .02 | | .26 | | .34 | | .05 | | .24 | | .32 | |
| Total R^2 | .02 | | .26 | | .34 | | .05 | | .24 | | .32 | |
| F for ΔR^2 | 3.75 | | 22.56*** | | 24.52*** | | 9.92** | | 20.19*** | | 23.19*** | |

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; Gender: 0 – males; 1 – females.

In order to examine the students' concurrent and retrospective victimisation and perceived peer support as predictors of social self-concept and loneliness, two series of hierarchical regression analyses were conducted. As shown in Table 2, gender as a control variable entered in the first step did not account for a significant portion of variance in predicting social self-concept, while it explained a small portion of variance in loneliness, with male students

reporting higher loneliness. Concurrent peer experiences entered in the second step accounted for a significant portion of variance in social self-concept (24%) and loneliness (19%), with perceived peer support being a positive predictor of social self-concept and a negative predictor of loneliness. However, concurrent peer victimisation showed no significant relation to either social self-concept or loneliness. In the third step, retrospectively reported victimisation during school years was entered. It accounted for a significant increase in explained variance in both social self-concept (8%) and loneliness (6%), negatively predicting the students' social self-concept and positively predicting loneliness. Thus, retrospectively reported victimisation during school years explained additional variation in both the students' social self-concept and loneliness that is not explained by their concurrent peer victimisation.

Discussion

In the present study, we investigated students' concurrent peer experiences at university (operationalised as peer victimisation and perceived peer support) and their retrospectively reported victimisation during school years in first-year university students. We found that the retrospectively reported victimisation during school years predicted students' self-concept and loneliness beyond their concurrent peer experiences. Students who reported higher victimisation during school years had a lower social self-concept and reported higher loneliness in their first year at university. Students' current level of victimisation was not a significant predictor of either social self-concept or loneliness.

Despite the cross-sectional research design of our study, these findings could indicate that the experience of victimisation during school years affects students' relationship pathways as they enter university. It is likely that these experiences shape the way they perceive themselves in social relations (i.e., their social cognitions; Juvonen & Schachter, 2017) and their social behaviour. Students who have experienced long-lasting victimisation may develop distorted beliefs about themselves and about their social environment that enhance the development of negative cognitive biases as characteristics of internalising symptoms; however, there is a lack of studies investigating the mediating role of cognitions in the relationship between negative peer experiences and psychosocial outcomes. Furthermore, students who were bullied during their schooling may, due to the social exclusion that usually accompanies victimisation in adolescence, also lack social skills to effectively build peer relations in new social contexts (see, e.g., Pörhölä, 2016). Future studies should

address the psychological mechanisms that would, in addition to neurological processes (see, e.g., Quinlan, 2020), explain the associations between students' victimisation experiences and their future psychosocial functioning. The finding that retrospectively reported victimisation during schooling predicts students' psychosocial outcomes at university is of particular importance, since the correlation between retrospectively reported and concurrent victimisation was low and since university students' concurrent victimisation did not predict their psychosocial outcomes. Thus, students' social self-concept and feelings of loneliness could not be explained by their concurrent victimisation experience. Since our participants were first-year students, it is possible that the social dynamics of their academic groups were not yet established. This limitation should be taken into account when interpreting the finding that the students' concurrent self-reported victimisation did not predict their psychosocial outcomes. It would therefore be relevant to investigate the relationship between peer victimisation at university and students' psychosocial outcomes on a more representative sample of university students.

In addition, our findings are consistent with previous studies that have reported the experiences of victimisation in different periods of schooling being correlated (Beran et al., 2012; Chapell et al., 2006; Chen and Huang, 2015), although, as mentioned above, the correlation between concurrent and retrospectively reported victimisation was low in our study.

We also found that university students who perceived higher support from their peers at university reported a higher social self-concept and fewer feelings of loneliness. This finding is consistent with previous studies that have investigated the role of peer support in students' psychosocial outcomes (e.g., Holt & Espelage; Košir et al., 2020; Newman et al., 2007; Salmivalli & Peets, 2011). Nevertheless, since the role of peer relations has seldom been investigated in university students, our finding significantly contributes to the scientific understanding of the importance of quality peer relations in higher education.

Several limitations should be taken into account when interpreting the results of our study. Due to the cross-sectional research design, causal interpretations of the relations between the students' (prior and current) victimisation and their self-concept and loneliness should be avoided. Additionally, the validity of the retrospective reports of victimisation during school years is likely to be limited, since it relies on autobiographical memory that is both reconstructive and constructive (Grant & Ceci, 2000); people tend to remember their construction or reconstruction of past events. Despite being subject to distortions, autobiographical memory is nevertheless considered to be quite accurate, especially when reporters have personally experienced the behaviours (Bovaird, 2010),

which is the case in our study. On a minor note, common method bias (Podsakoff et al., 2003) can be seen as a further study limitation, as all of the variables were assessed using self-report measures. Lastly, since the participants were recruited via e-mail, a random sampling procedure was not provided, which also resulted in the unrepresentativeness of the sample with respect to gender.

Conclusions

Despite these limitations, our findings indicate that experiencing victimisation during primary and secondary school years is related to students' wellbeing later in life. Although the research does not allow for causal conclusions, this finding could indicate that the consequences of experiencing victimisation are not limited to the period of schooling, but can persist after students transition to university. Experiencing peer victimisation during school years is a formative experience that contributes to students' social and emotional learning in a negative way. Thus, our findings advocate a need for designing and implementing interventions that promote inclusive classroom environments and enable all students to develop positive social behaviours (e.g., positive youth development programmes; see, e.g., Bonell et al., 2016). The formative potential of the educational context in higher education should be recognised; peer experiences that students gain in higher education can work as reparative experiences. Thus, implementing social and emotional learning programmes in higher education could be of special relevance in promoting students' social, emotional, cognitive and moral competence. In order to effectively design tailored interventions that address the needs of university students, future studies should further investigate students' retrospectively reported bullying experiences, as well as the specifics and characteristics of bullying in higher education, also using qualitative research methodologies that would enable a deeper understanding of victimisation experiences in this developmental period. In addition, future studies should further investigate the risk and protective factors for students' victimisation in the Slovenian context, since foreign studies indicated that there are subgroups of students with a higher risk of being victimised in the university context (e.g., sexual, racial, or ethnic minorities, students with disabilities; Cassidy et al., 2021; Wensley & Campbell, 2012).

The findings of our study and other studies that have investigated various aspects of bullying in university students clearly indicate the need for a stronger emphasis on students' psychological wellbeing at the university level. Thus, university students should not be left out of strategies and programmes for the promotion of mental health at the systemic level. Moreover, Slovenian

universities could rethink strategies that would enhance the supportive, safe and inclusive social environment for students, not only focusing on academic challenges, but also providing support for coping with issues such as victimisation, social exclusion and loneliness.

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Teachers' Attitudes towards the Rights of Students with Special Education Needs During the Covid-19 Pandemic

MOHAMMAD SAKARNEH¹

∞ This study aims to assess teachers' attitudes toward the rights of students with special needs during the Covid-19 pandemic. The study focuses on the attitudes of the special education teachers regarding their self-efficacy and beliefs about using e-learning with their students during the Covid-19 lockdowns. It was undertaken using a quantitative research approach by which teachers working with children with special needs in Amman were interviewed virtually. The findings indicate that the teachers have positive attitudes and perceptions regarding the rights of children with disabilities, although they report having low self-esteem. They report the need to find ways of integrating e-learning for special needs children during the lockdowns. The findings indicate that teachers in Jordan have relatively negative perceptions of using e-learning platforms for teaching children with disabilities. There is a need for policies to train and support teachers in these settings to equip them with the skills to work with students with special needs using e-learning tools.

Keywords: Covid-19, rights, students with special needs, teachers' attitudes

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Stališča učiteljev do pravic učencev s posebnimi potrebami med pandemijo covida-19

MOHAMMAD SAKARNEH

~~~~~ Namen raziskave je oceniti odnos učiteljev do pravic učencev s posebnimi potrebami med pandemijo covida-19. Študija se osredinjava na stališča pedagogov glede njihove samoučinkovitosti in pogledov o uporabi spletnega učenja z njihovimi učenci med zaprtji, povzročenimi zaradi pandemije covida-19. Pri študiji smo uporabili kvantitativni raziskovalni pristop, pri čemer smo na daljavo intervjuvali učitelje, ki delajo z otroki s posebnimi potrebami, v Amanu. Izsledki nakazujejo, da imajo učitelji pozitiven odnos in predstavo glede pravic otrok s posebnimi potrebami, čeprav poročajo o nizki samopodobi. Poudarjajo potrebo po iskanju načinov vključevanja spletnega učenja za otroke s posebnimi potrebami med zaprtji. Ugotovitve kažejo, da imajo jordanski učitelji razmeroma negativne predstave o uporabi platform spletnega učenja pri poučevanju otrok s posebnimi potrebami. Tako nastaja potreba po strategijah usposabljanja in podpore učiteljem v takšnih položajih, da bi se lahko opremili z veščinami, ki bi jim služile pri delu z učenci s posebnimi potrebami z uporabo orodij spletnega učenja.

**Ključne besede:** covid-19, pravice, učenci s posebnimi potrebami, stališča učiteljev

## Introduction

Special education has received a great deal of attention throughout the world recently with policymakers making efforts to ensure that all individuals are treated equitably. Teachers working with children who have special education needs are required to adapt their teaching practices to ensure that they accommodate all children (Sakarneh & Al-Swelmyeen, 2020). The need to accommodate the learning needs of all children is a core issue that requires a hands-on approach in handling children with special education needs (Sakarneh, 2020). Many countries around the world are pursuing inclusive education by which spaces are designed in a manner that enables learning for all students irrespective of their status including the presence of disabilities (Booth & Ainscow, 2016; Sakarneh, 2019). The attitudes of the special education teachers can play a major role in determining how effectively they can respond to the special needs of the students.

With the coming of the Covid-19 pandemic that started spreading in late 2019, there was a significant shift in how things are done, including social relations. One of the main changes that faced the global community was the closure of schools and in-person instruction at all levels of education. Schools and teachers had to come up with ways of continuing to engage their students online through remote classes. This was considered a beneficial strategy for ensuring that all students continued learning despite the pandemic and the physical distancing regulations given by many governments. In theory, this was meant to ensure that students continued to learn effectively without being exposed to the virus (Van Lancker, & Parolin, 2020). Studies on the issue have been conducted, such as that of Duraku and Nagavci (2020), which have indicated that the changes have had a negative effect on the education of children with special education needs. The adverse outcomes for children with special needs that have been identified in the research include the negative emotional states associated with their isolation, lack of socialisation and changes in routine. Children with special education needs may face many difficulties in learning effectively through the e-learning platforms that have been instituted due to the pandemic (Organization for Economic Cooperation and Development (OECD), 2020; Sakarneh, 2021).

Many theories have been proposed for the design and development of learning frameworks for online settings. Some of the educational theories that are directly applicable to this issue include Kolb's learning cycle and self-regulated learning theories (Adam et al., 2017). Research on the practice of e-learning for students with special education needs has indicated that intelligent

emotional agents can provide the necessary support for students in line with learning an attention disorder; in the study by Chatzara et al. (2016), the relevance of a virtual agent in providing emotional support was evaluated. The study involved adaptation or customisation of the e-learning framework by providing customised emotional support to the students depending on their behaviour and user profiles.

According to a review by Adam et al. (2017), the application of self-regulated learning is a significant element of the online learning strategies adopted in addressing the needs of students. Self-regulated learning involves the application of self-directive processes for transforming the mental capabilities of individuals into academic skills. In this case, the learner is in control of his motivational, metacognitive, and behavioural aspects of learning since there is no direct supervision. E-learning involves individuals having personal responsibility and control over the acquisition of knowledge and skills.

Studies on how children with special education needs learn on online platforms have been undertaken in different settings. Some of the key challenges identified as affecting children with learning disabilities include learning challenges such as difficulties remembering what has been learned. For example, they may have letter and number reversal, inconsistent school performance or inconsistent reading skills and poor reading performance. To address these issues, special needs education involves different interventions such as individualised learning using components that are specific to the specific disabilities of the student (Pirani et al., 2013). The aim of these interventions is to provide a rich learning environment where multimedia tools are used to improve academic performance. Additionally, remediation is provided as a strategy for practice and guided instruction to aid struggling learners.

For learning with special education needs, the use of online systems has been evaluated in studies, such as that of Sanchez-Gordon & Lujan-Mora (2017), indicating the accessibility of MOOCs for persons with cognitive impairments. An interesting element in the review was that most of the studies focus on sensory-impaired learners but ignore the needs of those with cognitive impairments. A participatory design process is necessary for the user-centred educational tools adopted for learners with special needs in online settings to enable them to interact with the element in the learning modules.

While access to education and lack of discrimination are cited as fundamental human rights for children with disabilities, ensuring their achievement in the time of the Covid-19 pandemic has not been easy. Some of the critical challenges include a lack of coordination and effective policies as well as resources. Inclusiveness for children with special education needs is negatively

affected by issues, such as inadequate teacher training, lack of support, negative attitudes, and challenges in curriculum and pedagogy (Sakarneh, 2020). When learners with special education needs must be taught through online platforms, the challenges are exacerbated by inconsistencies between the online materials and curriculum as well as the willingness of parents and teachers to provide the necessary support. A major issue has been that teachers do not have a clear idea of what the least restrictive learning environment for inclusive learning is on online platforms (Burdette et al., 2013). The centre for online learning also reports that online learning is not presented as a key part of the formal training for special needs teachers. This leaves the teachers ill-equipped to handle the needs of the students and may result in negative attitudes (Rice & Mellard, 2016).

The attitudes of teachers regarding students with special needs are important because they influence their views regarding the capacity of the students to learn. Positive teacher attitudes have been identified as a key issue in determining how welcoming teachers are to students with diverse needs. Studies such as that of the European Agency for Development in Special Needs Education (EADSNE, 2012) indicate that positive teacher attitudes influence inclusion towards learners with special education needs. The impact of the attitudes results in variations in their willingness to respond effectively and positively to the differences. The attitudes influence the views that teachers have about children with special education needs and how well they can utilise the available resources to improve their outcomes. The availability of resources is not sufficient to determine the outcomes since the teachers must utilise them in their work and this is mitigated by their attitudes. The teacher's attitudes can be considered one of the most important ways of ensuring that children with special education needs achieve educational goals (Saloviita, 2020).

### *Inclusive Education System in Jordan*

The Jordanian educational system has gone through several stages of educational development since the Education Reform Law (ERL) of 1952; the next reform in the law was in 1964 (Abbas, 2012; Al Jabery & Zumberg, 2008; Benson, 2020). Drawing on the Jordanian constitution and national values, the 1964 law was meant to create an inclusive school system (Abbas, 2012; Al Jabery & Zumberg, 2008; Benson, 2020). The most momentous change was the first National Conference on Education Reform (NCER) in 1987 (Ministry of Education (MoE), 1988). The conference was held under the patronage of the late King Hussein and led by Crown Prince Hassan (MoE, 1988). In 2002, the MoE launched the future vision for education in Jordan, presented at the 'Vision

Forum for the Future of Education in Jordan' held in Amman, September 15–16, 2002 (MoE, 2002).

Jordan, like other countries, has invested most of its efforts in education reform in all its fields, and that was through a series of national reform conferences that brought together educational leaders and stakeholders from all disciplines, which concluded with several recommendations in all aspects of education (Sakarneh, 2015). Part of this comprehensive educational reform movement was on the subject of special education. The MoE worked hard to provide students with special needs most of its attention by establishing a special administration that takes care of their affairs to include them fully in the school community. It has been done as a response and application of the text of the Jordanian constitution and the rights of individuals with special education needs (The Higher Council for the Affairs of Persons with Disabilities (HCD), 2017; Mahases, 2018). Many countries, including Jordan, have committed themselves to the texts of conventions and recommendations of international conferences regarding the full integration of individuals with special needs, including the UNESCO World Declaration on the concept of Education for All in 1990. Furthermore, the Salamanca Statement and the Framework for Action for Education for People with Special Needs in 1994 and the Dakar Conference in 2000, as well as the Convention on the Rights of Persons with Disabilities that was adopted in 2006 and the international educational literature in this field (Alkhateeb et al., 2016). Most recently, the Law on the Rights of Persons with Disabilities No. 20 in 2017 was approved, as it addressed multiple facets of full inclusion in daily living for persons with special education needs (Benson, 2020; HCD, 2017). However, some phrases and words in the law remain unclear and ambiguous and difficult to apply, such as 'lack of reasonable accommodations', leaving it to numerous bureaucracies to determine what is reasonable, which eventually leads to unclear assumptions about the rights of advocates and parents (Benson, 2020; HCD, 2017). The inclusion of students with special education needs remains under the authority of MoE and is supported by HCD and also other bodies of authorities providing services regarding the needs of students with these needs, such as the Ministry of Health (MoH) and the Ministry of Social Development (MoSD) (Benson, 2020; HCD, 2017). Regardless of the rhetoric of community and government support for inclusion, it is still partially hindered at the practical level and has not been seen fully clear in the Jordanian schools, where also there is restricted parental and other stakeholders' participation at all levels regarding inclusion (Abbas, 2012; Abu-Hamour & Al-Hmouz, 2014; Benson, 2020; Sakarneh, 2014). In this regard, the literature revealed some barriers to the inclusion system in Jordan: 'lack of consistent

funding, coordination between ministries, no clear standards or benchmarks for teachers or students' (Benson, 2020, p. 111) and other contextual, social, and educational barriers (Abu-Hamour & Al-Hmouz, 2014; Sakarneh, 2020). Nevertheless, the MoE took serious and practical measures regarding the integration of these students when the number of partially integrated students with different special education needs reached 1,008 students in 150 inclusive schools at the end of 2018 (Mahases, 2018). The 2015 General Population and Housing Census indicated that around 11% of the total population in Jordan aged 5 and above have disabilities and only 1.9% of them enrolled in primary education, which means that the vast majority of the children of school age with special education needs are totally excluded from the opportunities of education (Department of Statistics (DoS), 2015; MoE, 2020).

Recently, the MoE in collaboration with HCD and based on the text of Article (18/ h) of the Law on the Rights of Persons with Disabilities (20) of the Year 2017, launched a ten-year strategy for inclusive education (2020–2030); the goal is to ensure that the access for individuals with special education needs to educational services and programs are built on an equal basis with others through developing the capacity of the educational stakeholders, adapting accessible curricula, and ensuring that school buildings and facilities are accessible for all (MoE, 2020).

### *The lockdown Response*

The outbreak of the Corona virus pandemic forced countries around the world to close schools, affecting 103 million students across the Middle East and North Africa region (MENA). In mid-March, 2020, Jordan was one of the first countries in the region to respond to the crisis by imposing a curfew and closing all educational institutions across the kingdom. To sustain learning during the pandemic, the MoE resorted to distance learning tools, as officials were quick to take advantage of the materials available in the private sector to develop an educational platform called 'Darsak' 'Your Lesson', and other platforms such as 'Edraak', 'Jo Academy', and 'Abwab' as well as two television channels dedicated to providing online lectures (Azzi-Huck et al., 2020). These resources covered the core subjects of the curriculum, which are Arabic, English, Mathematics, and Science from the first year of primary school to the third year of secondary school. In addition, the Jordanian Sports TV channel was reconfigured to broadcast educational programs specifically designed for students preparing to take the 'Tawjih' high school exam. The MoE has also supported teachers by implementing new interventions to facilitate the transition to distance learning. A newly launched teacher training platform that offers training courses on

distance learning tools, blended learning, and educational technology (Azzi-Huck et al., 2020).

In Jordan, more than 16% of students lack access to the Internet, which is 16 percentage points lower than the OECD's average: a third of them do not have a computer that can be used for homework, which is 25 percentage points lower than the OECD average. This digital divide is often found in low-income families; Less than 30% of students of lower economic status have a computer for homework, and only about 50% have access to the Internet. This has not been easy to alleviate (Azzi-Huck et al., 2020). In Jordan, telecom infrastructure is inconsistent. Most students still do not have laptops, tablets, or smartphones available for learning. Additional, teachers who have not had time to familiarise themselves with the new teaching technology are now creating curricula and structuring distant classes. 'They are finding it difficult to engage and assess students remotely. The learning environment has shifted for parents, as well, many of whom were deputised overnight as homeschoolers in systems with which they may not be familiar' (Azzi-Huck et al., 2020, p. 1).

The British Council (BC) in Amman convened a webinar about an inclusive education plan during Covid-19 lockdowns. The participants shared the challenges faced by Special Educational Needs and Disabilities students in Jordan as a result of lockdown and solutions for that. It was reported that there were 21,000 students with different special education needs in 2020/2021 school year but there are different types of challenges, such integration; although there is collaboration between the MoE and the HCD and Non-Governmental Organizations (NGOs), 'in implementing the 10-Year Strategy for Inclusive Education (2020–2030), the challenges faced and the Ministry's interventions and support to overcome those challenges by activating distance education and filming the curriculum lessons that the MoE developed for students with [Special Educational Needs and Disabilities] including sign language and audio' (British Council [BC], 2020, p. 2). The response to these challenges were: intervention through 'E-learning programmes by producing 2300 filmed videos [...] for students with visual impairment [...] also provide counselling and support services to families with intellectual disability students [...] in addition, they created a YouTube channel that includes 200 movies dedicated to children with intellectual disabilities and autistic disorder' (BC, 2020, p. 3).

A short report prepared by UNICEF indicated that during the COVID-19 pandemic the MoE with cooperating with international organisations (e.g., UNICEF) made significant strides toward supporting students with special education needs within a short period. They established a communication network during the lockdown between teacher, schools, special education

teachers, students, and parents (BC, 2020). UNICEF 'has provided disability inclusive workbooks [that] have been designed considering each student's individual education plan [...] [and organising visits] conducted by two shadow teachers at a time, one that supports therapy and the other in support of learning. Nearly 700 children with disabilities are being served in Azraq and Za'atari refugee camps through this modality' (UNICEF, 2022, p. 3).

A study conducted by Abu-Rabba' et al. (2021) aimed to investigate the level of usage of online learning in kindergartens in Jordan during the Covid-19 pandemic from the point of view of the teachers. The results showed that the usage of 'online learning in kindergartens during the covid-19 pandemic from a teachers' point of view were moderate and it also showed statistical differences in the level of utilisation of online learning attributed to the type of school in favor of private schools'.

Based on the literature and the situation in most countries where the needs of children with special needs are not effectively addressed, it is apparent that teachers can be a critical part of the process (Sakarneh et al., 2019). The critical issue is that the teacher attitudes towards e-learning for children with special needs in Jordan needs to be understood for effective formulation of policies and possible solutions. The experience of the teachers in using e-learning platforms and those with practical working experience in providing inclusive education for children with disabilities in Jordan were considered in the sampling and selection of participants for the study. The views of special education teachers on the use of technology in addressing the needs of special students during the Covid-19 pandemic need to be investigated to identify how it can be enhanced. This study seeks to evaluate how teaching of children with special needs through e-learning platforms takes place in Jordan. It has also been identified that the attitudes of teachers can significantly influence the strategies they adopt in helping children with special needs to learn (Burdette et al., 2013).

The research questions to be addressed in this study are:

- What are the attitudes of special education teachers in Jordan towards the rights of students with special needs during the Covid-19 pandemic?
- What are the views of teachers about the effectiveness of e-learning for special needs children in Jordan during the Covid-19 pandemic?
- Are there any significant statistical differences in relation to teachers' attitudes due to gender and experience?

## Method

The study applies a quantitative methodology for the assessment of the teachers' attitudes towards the rights of students with special needs during the Covid-19 pandemic. A survey approach was applied by sampling special education teachers in Jordan and evaluating their views. Teacher attitude was the dependent variable while the independent variables were gender, qualifications, years of experience, and age of the teachers.

The participants selected for this research were special education teachers working in different schools and kindergartens for children with disabilities and special education needs. The aim of the study was to obtain a sample of teachers who are experienced in dealing with children who have special learning needs. The teachers were sought from different primary schools in the city of Amman. Using the government registry, all teachers working with children who have special learning needs and disabilities were identified and invited to participate in the study. It was necessary to find the teachers who were experienced in working with children who have learning disabilities. The type of disability was not considered in the assessment with the teachers being simply selected on the basis of their training and experience in teaching children who have learning disabilities.

The main instrument in this study was a survey questionnaire that was used for collecting the data from the respondents. The questionnaire consisted of two elements: demographic characteristics of the teachers and the teachers' attitudes scale. The two elements were critical to the achievement of the research objectives because they would help in understanding the key characteristics of the teachers and evaluating their perceptions and attitudes regarding the students they teach.

The teacher's attitudes scale was selected for the study because it has been developed and tested in other studies (Cullen et al., 2010). The teacher attitudes towards inclusion scale (TATIS) instrument is appropriate as a tool for assessing the attitudes of teachers towards different issues in their classes. It was selected for the study because it evaluates the self-efficacy of teachers as well as their roles and responsibilities in relation to inclusion of students with disabilities. To make it appropriate for assessing the issue of e-learning for these students, the instrument (a scale) was adapted to focus specifically on the beliefs and perceptions of teachers about the rights of students with special needs and e-learning process for them during the Covid-19 pandemic.

The teachers' attitudes scale is applicable in the assessment of the perceptions that teachers have towards the rights of students with special needs

and the use of e-learning. The validity of the measure was based on the effectiveness and applicability of the measures as they have been applied in prior studies for assessing the attitudes of teachers towards working with inclusive classrooms and disabled children (Cullen et al., 2010; Yada & Savolainen, 2017).

Some of the key ethical issues considered in the study included the assessment of the views of teachers towards children with disabilities. The views of teachers are personal opinions that must be treated with confidentiality. Teachers express their views regarding their teaching practices and working with the special needs children and expect that the information will be handled confidentially. The ideas expressed in the research are those of the teachers and should not be used against them professionally. Another ethical consideration in the research was the need to ensure that the findings would be used to improve the outcomes of the sector and the education of children with special needs.

Collection of the data was undertaken using the survey questionnaire. For ease of distribution and supply of the questionnaire to the relevant participants, it was prepared using Google Forms and distributed online using a link that was sent to the emails of the selected participants. This format allowed easy completion of the form to ensure that the participants could easily answer the set questions and provide the necessary feedback through the online channel. The questionnaire consisted of 10 questions in the demographic information section and another 14 items for measuring the teacher attitudes towards inclusion of students with disabilities in e-learning platforms. The collection of the data was done over a period of two weeks with each being expected to take about 25–45 minutes to complete.

Analysis of the collected data from the study involved cleaning of the data to ensure that it was complete and consistent. The analysis of the data was done using the Statistics Program for Social Sciences (SPSS) version 22 as the tool for the statistical analysis. This software was applied due to its power in undertaking statistical analysis and effectiveness in providing both descriptive and inferential statistics. The analysis of the data using SPSS was also appropriate for the objectives of the study using a quantitative approach. The data were collected over a period of two weeks; since they were collected using an online form, they were easy to transfer to a Microsoft Excel spreadsheet to check for completeness and missing data before the analysis would be undertaken. The online form was distributed to the sampled teachers via email, which also contained an informed consent form. The research participants were expected to complete the informed consent form after reading the information sheet for the study. After completing the informed consent form and submitting it, the survey became available to them via the invite link, which allowed them to access and complete it.

## Results

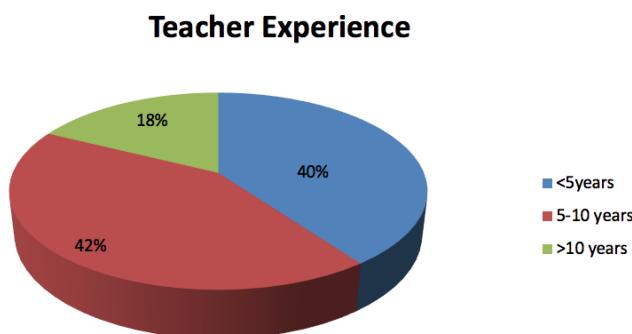
Descriptive statistics for the sample are shown in Table 1. In terms of gender, the sample of teachers consisted of 38.8% males while the other 61.2% were women. The researcher explains the difference between the ratio of males and females is that the males are reluctant to work in the sector of special education more than the females are.

**Table 1**  
*Demographic characteristics of the study sample*

| Gender | Number | Percent |
|--------|--------|---------|
| Male   | 33     | 38.8%   |
| Female | 52     | 61.2%   |
| Total  | 85     | 100.0%  |

In terms of experience, as shown in Figure 1, the sample of teachers mostly had been in service for less than 10 years; 40% had experience of less than 5 years while 42% reported having 5–10 years of experience and 18% had more than 10 years of experience.

**Figure 1**  
*Teachers' experience*



Teachers involved in the education of children with special education needs require special training to ensure they have the necessary skills. In this case, the findings indicate that about a third (32.9%) of the teachers did not have formal special education training. This means they may have learned how to deal with special needs children over the course of their practice. The education

levels of the teachers differed considerably, with some having certificates while others were qualified with postgraduate and undergraduate degrees. Most of the sampled teachers had certificates and diplomas in special education with only 7% having postgraduate degrees in education.

The scores for the attitudes of the teachers towards e-learning for children with disabilities were evaluated using different dimensions of the attitudes. The dimensions of self-efficacy, beliefs, and attitudes towards inclusive learning in online platforms were considered in the study. The findings indicate that teacher attitudes towards e-learning for children with special education needs are relatively neutral in terms of self-efficacy. The average scores and variances of the dimensions of the attitudes towards e-learning for students with special education needs are shown in Table 2.

**Table 2**

*Means and standard deviations of the attitudes scale's dimensions*

| Dimension                                                          | Mean | Std. Deviation |
|--------------------------------------------------------------------|------|----------------|
| Attitudes towards students with disabilities in inclusive settings | 34.5 | 1.83           |
| Beliefs about efficacy of inclusion                                | 16.5 | .92            |
| Beliefs about professional roles and responsibilities              | 22.3 | 3.17           |

As shown in Table 2, the scores indicate that the beliefs of teachers about the general rights of students with special needs to be educated scored highly. The average score on the professional roles and responsibility of the teachers was 22.3,  $SD = 3.17$ . The teachers reported that they strongly believed that the students with special education needs had a right to be provided with the right education and opportunities to learn despite the pandemic and the resulting lockdowns.

Regarding the self-efficacy of the teachers in delivering the required learning to the students through the e-learning platforms, as can be seen in Table 2, the results indicate a relatively low result of 16.5,  $SD = .92$ . This indicates that the teachers had relatively low attitudes about their capacity to handle special need children and to teach them effectively using e-learning tools. This means the teachers have negative perceptions about their skills or the capacity available to them through the resources they have from the e-learning platforms available to them (Rice & Mellard, 2016).

On the inclusive learning dimension, the average score for the teachers was 34.5,  $SD = 1.83$ . This indicates that the teachers had highly positive attitudes towards inclusive learning being possible and effective for learners through the e-learning platforms. Looking at the three dimensions together, it is clear that

the area in need of the most attention is how to improve the self-efficacy of the teachers by giving them the necessary training and resources to accomplish e-learning for children with special education needs.

Further analysis of the attitudes was undertaken in relation to teacher characteristics in terms of gender and experience level. For teacher gender, the differences in the performance of the teachers were evaluated using the independent samples t-test; the test also involved comparison of the mean TATIS scores for the respondents in relation to their gender, as shown in Table 3.

**Table 3**  
*TATIS scores for the respondents in relation to gender*

|             | Gender | N  | M     | SD    | t     | df  | Sig. |
|-------------|--------|----|-------|-------|-------|-----|------|
| TATIS Total | Male   | 33 | 44.94 | 15.11 |       |     |      |
| Raw Score   | Female | 52 | 43.2  | 14.93 | -1.75 | 970 | .081 |

As can be seen in Table 3, the total raw score for the teacher attitudes was evaluated using the independent samples test, which indicated that the male teachers had a slightly higher mean score of 44.94 compared to that of female teachers at 43.62. The independent samples test for the two groups indicates that the t-score was -1.75 with a p-value of .081. These statistics mean that the two samples were not significantly different; it can be argued that the male and female teachers do not vary significantly in terms of their attitudes towards inclusivity of children with special education needs. Both male and female teachers have over 85% in their ranking of how positively they perceive the education of children with special needs during the Covid-19 pandemic.

For the experience level of the teachers, the one-way ANOVA method was used for comparison of the means, as shown in Table 4. This was applied because the sample consisted of teachers with three levels of experience: below 5 years, 5–10 years, and over 10 years.

**Table 4**  
*Comparison of the means using One-Way ANOVA method: TATIS total raw score*

|                | Sum of Squares | Degrees of freedom | Mean Square | F     | Sig. |
|----------------|----------------|--------------------|-------------|-------|------|
| Between groups | 2473.22        | 2                  | 1236.65     |       |      |
| Within groups  | 64204.11       | 84                 | 764.34      | 22.57 | .000 |
| Total          | 66747.33       | 86                 |             |       |      |

As can be seen in Table 4, the results of the one-way analysis of variance indicate that there are significant differences within and between the three groups. The statistic of 22.564 with a p-value of .000 indicates that the groups differ significantly. A post-hoc test was undertaken to identify whether there are homogenous sets in the group, as shown in Table 5.

**Table 5**

*Post-hoc tests for homogenous subsets: TATIS total raw Score*

| Teacher experience | N  | Subset for alpha = 0.05 |       |
|--------------------|----|-------------------------|-------|
|                    |    | 1                       | 2     |
| <5 years           | 34 | 45.1                    |       |
| 5-10 years         | 35 |                         | 43.94 |
| >10 years          | 16 |                         | 44.22 |

It can be noted in Table 5 that the results indicate that the group of teachers with less than five years of experience had a relatively higher mean raw score than the other two groups did. The group with five to ten years of experience and the group with over ten years of experience are presented as homogenous subsets, meaning they have relatively similar attitudes. The researcher would like to explain that the inequality of the teachers' gender refers to the availability of teachers who were willing to participate and met the criteria of the study.

## Discussion

The results of the analysis indicate that most special needs teachers in Amman have the necessary training in special needs education to enable them to handle their students effectively. Some of the critical challenges that can be identified in the assessment of the attitudes that the teachers have in providing e-learning opportunities for special needs children in Jordan include the fact that some of them do not have formal training. Additionally, some of the teachers have low experience and academic qualifications that contribute heavily to their low self-efficacy. These findings are in line with those of Ahmmmed et al. (2014) who reported that teachers with higher qualifications have more positive attitudes towards inclusive learning. Regarding e-learning platforms and their use in teaching special needs children, the findings are in line with those of Bonal and Gonzalez (2020) who argued that the pandemic has contributed negatively to the learning gap.

The pandemic has made it difficult for teachers to provide the necessary learning in line with the needs of disabled students. In the case of Jordan, support for e-learning to special needs students is relatively low and many teachers feel that they do not have what they need to make their work possible. The attitudes of teachers especially in relation to their self-efficacy and the provision of inclusive learning indicate that there is a need for policy makers to address gaps in the provision of the necessary resources in adapting e-learning to the needs of disabled children. The attitudes of teachers are positive in terms of the belief that children with special education needs should not be discriminated against when considering the continuation of education at home through e-learning platforms.

Differences in the overall attitudes of the teachers towards children with special education needs were shown to be relatively similar irrespective of teacher gender. The male and female teachers had similarly positive attitudes towards children with special education needs. However, teacher experience is presented as a key factor influencing their attitudes toward children with special education needs. Those with very low experience (below five years) had significantly different attitudes that were substantially lower than their colleagues with more experience.

## Conclusions

The findings imply that there is a need for the identification of the weaknesses adversely affecting the provision of learning through electronic platforms for disabled students. These students have more needs for adaptation than others and they require more attention from the teachers than their counterparts do. As a result, these students need learning platforms that are more adaptive and capable of addressing their unique needs. This is difficult to achieve with e-learning because it also lacks the necessary capacities and skills on the part of teachers. The attitudes of the special education teachers regarding the applicability of e-learning for their students during the Covid-19 pandemic indicate that they consider them to be applicable in addressing the needs of the students and ensuring that their rights are not ignored due to the current situation of schools' closure (Bonal & González, 2020).

The effectiveness of these measures has been questioned with most teachers feeling that they do not have the necessary capacity or skills to address the needs of special education students at home through e-learning. These findings imply that the government needs to develop strategies to improve the training of special education teachers and integrate technology into their

practices. Policymakers should also focus on developing appropriate frameworks for providing the necessary resources to the teachers to help them work effectively with the special needs students during the pandemic.

The findings of this study are applicable in understanding how teachers perceive students with special needs in their classes. Specifically, the present research shows how teachers in Jordan responded to educating children with special needs during the Covid-19 pandemic. The findings of this study contribute to the training of special education teachers in Jordan and the identification of the specific areas for the ministry to consider. The study shows the skills gaps for teachers of special needs children in Jordan and the resources they need to improve their capacity.

However, the results of this study are limited to the circumstances and settings in which it was conducted and cannot be generalised unless the same circumstances and settings are employed, specifically the method, sample, study tool, and data collection and analysis.

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## Biographical note

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## Difficulties in the Close Social Relationships of Slovenian Students during the Covid-19 pandemic

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MELITA PUKLEK LEVPUŠČEK<sup>\*1</sup> AND MOJCA POREDOŠ<sup>2</sup>

∞ This study examined the difficulties experienced by Slovenian upper-secondary school and university students aged 18 to 25 in their close social relationships during the Covid-19 pandemic. We examined the extent of social difficulties in six domains (relationships with friends, establishing a new relationship with an intimate partner, sexuality, relationship with a current intimate partner, parental control and living with parents, and family conflict) in the pre-pandemic period and in the first two waves of the pandemic. We were also interested in whether demographic variables were related to the students' perceived social difficulties. The results showed that the severity of reported difficulties increased in all six domains during the government-imposed quarantine periods, with relationships with friends and the opportunity to establish new intimate relationships being the most affected. In addition, we found differences in the extent of perceived difficulties related to educational status, gender, intimate relationship, and change in living situations. The study offers insight into the socio-emotional life of students during a non-normative life event that educators should acknowledge.

**Keywords:** close social relationships, difficulties, family, friends, intimate partners, Covid-19 pandemic

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## Težave slovenskih dijakov in študentov v tesnih medosebnih odnosih med pandemijo covida-19

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MELITA PUKLEK LEVPUŠČEK IN MOJCA POREDOŠ

≈ V študiji sva preučevali težave v tesnih medosebnih odnosih, s katerimi so se spoprijemali slovenski dijaki in študentje, stari od 18 do 25 let, med pandemijo covida-19. Primerjali sva stopnjo težav v tesnih odnosih na področjih odnosov s prijatelji, vzpostavljanja nove partnerske zveze, spolnosti, trenutnega partnerskega odnosa, starševskega nadzora in prebivanja s starši ter družinskih konfliktov v času pred pandemijo in v prvih dveh valovih pandemije. Zanimala naju je tudi povezanost nekaterih demografskih spremenljivk z zaznanimi težavami v tesnih odnosih. Rezultati so pokazali, da se je stopnja zaznanih težav v času dveh valov pandemije povišala na vseh šestih področjih odnosov, najbolj na področju odnosov s prijatelji in vzpostavljanja nove partnerske zveze. Stopnja zaznanih težav je bila povezana tudi z izobraževalno stopnjo udeležencev, s spolom, prisotnostjo ali z odsotnostjo partnerskega razmerja in s spremembo prebivališča. Študija nudi strokovnim delavcem na področju vzgoje in izobraževanja vpogled v socialno-emocionalno življenje mladih v času nenormativnega življenjskega dogodka in omočna razmislek o intervencijah ob podobnih dogodkih v prihodnosti.

**Ključne besede:** tesni medosebni odnosi, težave, družina, prijatelji, intimni partnerji, pandemija covida-19

## Introduction

Establishing and maintaining close interpersonal relationships is important at all stages of development but is especially intense with regard to making commitments to others in a variety of social contexts from late adolescence through the twenties. Young people in their late teens and early twenties face three major developmental tasks associated with close interpersonal relationships: (a) the transformation of family roles and relationships and psychological individuation from parents, (b) the development of interdependent relationships with peers (mutual and lasting friendships with acceptance and respect for the independence of each in the relationship), and (c) the development of intimate partnerships (Conger, 1991; Zupančič, 2020). The Covid-19 pandemic declared in March 2020 (WHO, 2020) was not only a health risk but also affected various areas of life, such as education, work, family life, and socialising. As social contact was restricted to limit the spread of new coronavirus infections, adolescents and emerging adults were at a severe disadvantage in gaining important social experiences and were, therefore, more vulnerable to developing potential problems in psychosocial functioning. Maintaining social distance also significantly altered young people's daily routines and habits, severely affecting their search for social support and communication with people with whom they did not live (Brooks et al., 2020). This study adds value to previous research on the living conditions and mental health of young people during the pandemic Covid-19 by comparing their perceptions of difficulties in close social relationships during the pre-pandemic time and during the first two waves of the pandemic.

## Literature Review

### *Close Social Relationships in Late Teens and Early Twenties*

In his theory of the developmental period between adolescence and young adulthood, Arnett (2000; 2003) describes 'emerging adulthood' (from age 18 to mid-20s) as a time of continued exploration and development of a clear identity, self-focus, a sense of being in-between, an optimistic perception of one's life goals, and the experience of life possibilities in a variety of areas, especially work and study, partnership, and worldview. Relationships with parents and friends improve in quality during this period, while romantic partnerships take on an increasingly central role in individuals' lives, providing them with the most important social support, emotional satisfaction, and experience of interdependence and shared pursuits (Collins, 2003; Fuhrman & Buhrmester, 1992). Young people gradually individuate from their parents and are no longer under their

daily influence and supervision. The parent and adult child in emerging adulthood form a relationship between two adults (Tanner, 2006), which allows family members to develop more reciprocal interactions and greater respect for each other's personal autonomy than during adolescence (Aquilino, 2006). Emerging adults have more opportunities to satisfy their need for independent life than adolescents do. Those who move away from their parental home report fewer negative feelings towards their parents, feel more psychologically connected to them, value their parents' opinions, and report fewer conflicts with them than those who live with their parents (Arnett, 2014). However, the effect of moving away from the parental home varies between countries and cultures. Positive associations between leaving their parents' home and better psychological adaptation and more constructive relationships with parents were mainly found in samples of North American and northern and western European emerging adults (e.g., Holdsworth & Morgan, 2005; Kins & Beyers, 2010; Seiffge-Krenke, 2006), while the findings in some other parts of Europe with a cultural tradition of strong and prolonged reliance on one's family did not support such an association. Emerging adults in southern and south-eastern parts of Europe who live with their parents longer have comparable rates of satisfying relationships with parents and life satisfaction than their peers who moved away from home (e.g., Lanz & Tagliabue, 2007; Mendonça & Fontaine, 2013; Zupančič et al., 2014).

Although the role of parents remains important, young people increasingly rely on social support from peers (Brauer & De Coster, 2015; Puklek Levpušček, 2006). Adolescents spend more time with peers and less with parents; high quality peer relationships and peer acceptance are among the most important predictors of socioemotional adjustment and mental health of young people (Bukowski, 2001; Waldrip, 2008). Towards the end of adolescence, romantic partners and friends become the main source of emotional support and companionship (Fuligni & Masten, 2010; Pnevmatikos & Bardos, 2014; Shulman & Kipnis, 2001). Interest in and formation of romantic/intimate relationships is a normative rite of passage for young people (Moore et al., 2012). Moreover, romantic experiences and sexual experimentation in adolescence and the early twenties provide the foundation for building personal preferences for emotional and physical intimacy that later lead to more mature romantic relationships and sexual behaviours (van de Bongardt et al., 2015).

### *The Impact of Social Isolation on Young People due to the Covid-19 Pandemic*

Social isolation due to the Covid-19 pandemic brought many difficulties for young people in accomplishing social developmental tasks. Instead of

expanding peer relationships outside of the family and practising independent life by moving away from the parental home, young people's social space became confined to the home environment, and their personal contacts were limited to family members, while social contacts with friends and romantic partners often remained only virtual (Power et al., 2020). Young people had to find new ways to maintain relationships with friends, intimate partners, and other relatives, mostly using virtual communication tools such as video conferencing, social media, phone calls, and text messaging. Limited research on the social and emotional lives of children and young people conducted during the Covid-19 pandemic has revealed the negative psychosocial effects of the pandemic: children and youth became more passive during quarantine; they slept longer, were less physically active, and spent more time in front of their computers. Furthermore, the level of emotional problems increased with the prolongation of quarantine (Orgiles et al., 2020). Early studies conducted in China a few weeks after Covid-19 emerged reported worsening physical and mental health status and increased rates of anxiety, depression, irritability, and loneliness in youth (Jiao et al., 2020; Liang et al., 2020; Zhou et al., 2020). Similar symptoms of psychological distress and cognitive and emotional dysfunction were later reported by authors in other parts of the world (e.g., Power et al., 2020; Rauschenberg et al., 2020; Shanahan et al., 2020). The pandemic not only affected the mental health of young people but also disrupted protective factors for mental health under stressful conditions, such as supportive relationships with family members, friends, schoolmates, teachers, romantic partners, and others (Gruber et al., 2020; Jokić Zorkić, 2021).

The impact of physical distancing and quarantine during the Covid-19 pandemic on young people's difficulties in social lives has not been well studied. Rauschenberg et al. (2020) found that 30% of German youth aged 16–25 years felt socially isolated 'often' to 'very often' even after the most restrictive social distancing measures in the country were lifted. Lep and Zupančič (2020) examined the Covid-19-related worries that Slovenian youth have about their future. Participants were most concerned about the future global economic situation, fulfilling their study obligations, and future employment opportunities, while they had lower concerns about their friendships or partnerships. Similarly, the results of the OECD survey of 90 youth organisations from 48 countries showed that young people expressed the greatest concerns about the impact of the Covid-19 pandemic on mental well-being, employment, disposable income, disruption to education and family relationships, and friendships<sup>3</sup> (OECD, 2020). One of the most vulnerable groups of young people in Slovenia were students in the final

<sup>3</sup> In descending order.

grade of upper-secondary school who were preparing for the state final exam (*Matura*). Slovenian students and their parents both emphasised a lack of personal contact with the teacher and poor communication with the teacher as the most frequent difficulties while preparing for the *Matura* in 2020 (Puklek Levpušček & Uršič, 2021). It is important to note that all the above studies were conducted during the first quarantine period, or when infection control measures were already beginning to lift in the first wave of the pandemic in the spring of 2020. At that time, young people's concerns focused mainly on financial, academic, and psychological well-being, and to a lesser extent on their social relationships.

## **The Present Study**

This study examines the difficulties in close social relationships experienced by students in their late teens and early twenties during the two government-imposed closures in spring 2020 and autumn/winter 2020/21 to prevent the transmission of Covid-19. Our study aims were as follows: (a) to determine which domains of close social relationships were most affected in the first two waves of the coronavirus pandemic, (b) to compare the level of difficulties in close social relationships experienced by students in the pre-pandemic period and during the first and second waves of the coronavirus pandemic, and (c) to determine how gender, educational status, intimate relationship status, and change in living situations were related to perceived difficulties in close social contacts.

## **Method**

### *Participants*

The participants were 650 Slovenian upper-secondary school and university students aged between 18 and 25 years ( $M = 19.5$ ,  $SD = 1.8$ ). Approximately an equal number of upper-secondary school students (44.5%;  $n = 289$ ;  $M_{age} = 18.1$ ,  $SD_{age} = 0.3$ ) and university students (55.5%;  $n = 361$ ;  $M_{age} = 20.6$ ,  $SD_{age} = 1.8$ ) were included in the study. Among the upper-secondary school students, the majority were in their final (4<sup>th</sup>) year of school (76.5%;  $n = 221$ ), while the others were in their 3<sup>rd</sup> year of school (23.5%;  $n = 68$ ). Among the university students, 79.8% ( $n = 288$ ) were enrolled in a bachelor's degree programme, while 19.1% ( $n = 69$ ) were master's degree students; 1.1% ( $n = 4$ ) of the university students responded by checking 'other', indicating that they were probably enrolled in a graduate year or had taken a year off between studies.

Most of the participants were women (75%;  $n = 482$ ). We excluded seven participants who identified their gender as 'other' from further analyses of

gender differences due to their low numbers. Female university students were overrepresented in this study ( $X^2 (1) = 24.77; p < .001$ ) compared to other groups. They represented 46.2% ( $n = 300$ ) of all participants, compared to 28.8% ( $n = 187$ ) of female upper-secondary school students, 15.2% ( $n = 99$ ) of male upper-secondary school students and 9.8% ( $n = 64$ ) of male university students.

In the pre-pandemic period, most participants lived with their parents or in a shared apartment or dormitory during the week and moved to their parents' home on weekends and holidays (semi-resided with their parents). Only a minority of participants did not live with their parents (see Table 1). During the Covid-19 pandemic, the living independence of young people decreased, as 24.5% ( $n = 159$ ) of them (mostly university students) returned to their parents' homes, while only approximately 10% of participants (9.4% in the 1<sup>st</sup> wave of the pandemic and 11.3% in the 2<sup>nd</sup> wave of the pandemic) gained or retained their living independence during the pandemic.

**Table 1**

*Living Arrangement of the Participants in the Pre-Pandemic Period, the 1<sup>st</sup> and the 2<sup>nd</sup> Waves of the Pandemic*

|                            | Pre-pandemic time        |                            | 1 <sup>st</sup> wave of pandemic |                            | 2 <sup>nd</sup> wave of pandemic |                            |
|----------------------------|--------------------------|----------------------------|----------------------------------|----------------------------|----------------------------------|----------------------------|
|                            | <i>Upper sec. school</i> | <i>University students</i> | <i>Upper sec. school</i>         | <i>University students</i> | <i>Upper sec. school</i>         | <i>University students</i> |
|                            | <i>f</i><br>(%)          | <i>f</i><br>(%)            | <i>f</i><br>(%)                  | <i>f</i><br>(%)            | <i>f</i><br>(%)                  | <i>f</i><br>(%)            |
| Residing with parents      | 246<br>(85.1%)           | 186<br>(51.5%)             | 277<br>(95.8%)                   | 312<br>(86.4%)             | 276<br>(95.5%)                   | 301<br>(83.4%)             |
|                            | 432<br>(66.5%)           |                            | 589<br>(90.6%)                   |                            | 577<br>(88.8%)                   |                            |
| Semi-residing with parents | 39<br>(13.5%)            | 156<br>(43.5%)             | 7<br>(2.4%)                      | 34<br>(9.4%)               | 9<br>(3.1%)                      | 35<br>(9.7%)               |
|                            | 195<br>(30%)             |                            | 41<br>(6.3%)                     |                            | 44<br>(6.8%)                     |                            |
| Living independently       | 4<br>(1.4%)              | 19<br>(5.3%)               | 5<br>(1.7%)                      | 15<br>(4.2%)               | 4<br>(1.4%)                      | 25<br>(6.9%)               |
|                            | 23<br>(3.5%)             |                            | 20<br>(3.1%)                     |                            | 29<br>(4.5%)                     |                            |

About one-third of upper-secondary school students ( $f = 93$ ; 32.2%) and half of university students ( $f = 177$ ; 49.3%) were currently in an intimate relationship. There were significantly more university students than upper-secondary school students who reported being in an intimate relationship ( $X^2 (2) = 19.94, p < .001$ ).

### *Instruments*

Due to the lack of research on the topic of the difficulties experienced in close social relationships during the pandemic, we designed a questionnaire for the purpose of this study. The survey included information on demographics and social difficulties in the second wave of the pandemic (the current situation) and the first wave of the pandemic and the pre-pandemic period (both measured retrospectively).

The participants first reported their gender (male, female, or other), age in years, educational status (secondary school or university), and year of study. Then they reported their living situation (residing with parents, semi-residing with parents, or living independently) in the pre-pandemic period and in the two waves of the pandemic, as well as their current intimate relationship status (single, in a relationship).

Next, participants rated the extent of social difficulties they experienced in the second wave of the pandemic (2<sup>nd</sup> wave), in the first wave of the pandemic (1<sup>st</sup> wave), and in the pre-pandemic period (pre-pandemic). Participants rated the same 15 items three times. The response scales for the pre-pandemic and 1<sup>st</sup> wave were formed in the past tense (1 - *I did not experience it as a problem at all* to 5 - *I experienced it strongly as a problem*), while the response scale for the current situation (the 2<sup>nd</sup> wave) was formed in the present tense (1 - *I do not experience it as a problem at all* to 5 - *I experience it strongly as a problem*). The items described six domains of social difficulties: *Relationship with Friends* (4 items; pre-pandemic:  $\alpha = .88$ , 1<sup>st</sup> wave:  $\alpha = .85$ , 2<sup>nd</sup> wave:  $\alpha = .79$ ; example of an item: lack of physical contact with friends), *Establishing New Relationship with Intimate Partner* (1 item: having less opportunity to establish a new intimate relationship), *Relationship with Intimate Partner* (3 items, reported only by those who were in an intimate relationship; pre-pandemic:  $\alpha = .89$ , 1<sup>st</sup> wave:  $\alpha = .88$ , 2<sup>nd</sup> wave:  $\alpha = .81$ ; example of an item: alienation with a partner), *Sexuality* (1 item: less opportunity for sexual activity), *Parental Control and Living with Parents* (3 items, pre-pandemic:  $\alpha = .87$ , 1<sup>st</sup> wave:  $\alpha = .90$ , 2<sup>nd</sup> wave:  $\alpha = .85$ ; example of an item: lack of privacy at home), and *Family Conflicts* (3 items, pre-pandemic:  $\alpha = .75$ , 1<sup>st</sup> wave:  $\alpha = .78$ , 2<sup>nd</sup> wave:  $\alpha = .77$ ; example of an item: conflicts with parents).

### *Procedure*

After receiving approval from the Ethics Committee of the Faculty of Arts, University of Ljubljana, we conducted the survey in December 2020 and early January 2021. A link to an online survey in the *1ka* application was sent to teachers in upper-secondary general and vocational schools and university professors, who shared the link with their students during online lectures or they

invited students to participate in the study via e-classroom platforms, such as Moodle. Additionally, we reached out to young people by posting the invitation on various social networks.

After reading an informed consent form, telling the participants that their participation was voluntary, anonymous, and that they should be without any physical or mental impairment, participants completed the questionnaire.

After careful consideration, we decided to present the set of items to the participants in reverse chronological order (from the most recent situation to the most distant). We assumed that it would be easier for participants to recall the most recent events first. However, we present the results in chronological order to make it easier for the reader to follow. Additionally, we designed the survey in the online application so that participants answered only the items relevant to them according to their selected options in the demographic section (e.g., only participants in an intimate relationship answered the items on difficulties in the intimate relationship). On average, participants completed the survey in 10 minutes. Data were processed using the SPSS 25 statistical package.

## Results

First, we calculated the descriptive statistics for the items and domains of difficulties in close social relationships for the pre-pandemic and pandemic periods and checked for the normality of distribution. The Kolmogorov-Smirnov test showed that the variables were not normally distributed. Therefore, we used nonparametric tests in further analyses. We used the Friedman Test to compare the level of difficulty in close social relationships in three situations, in the pre-pandemic period and during the first and second waves of the coronavirus pandemic (Table 2 and Table 3). To reveal the association of gender, educational status, intimate relationship status, and change in living situations with perceived difficulties in close social contacts, we used the Mann-Whitney U test.

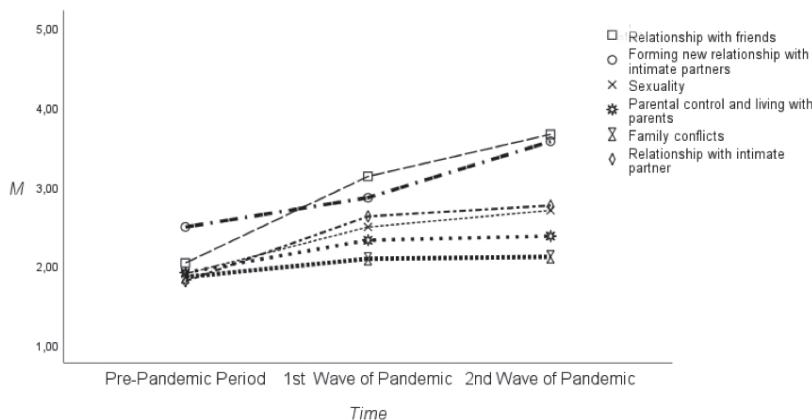
### *The Level of Social Difficulties in Pre-Pandemic and Pandemic Periods*

We calculated the average levels of difficulty in close social relationships during the two waves of the coronavirus pandemic and the pre-pandemic period. As shown in Figure 1, the mean scores in difficulties were below the medium value of the rating scale in the six domains of participants' close social relationships during the pre-pandemic period. However, during the two waves of the pandemic, the severity of difficulties increased in all domains of close social relationships. The domain of *Relationships with Friends* was the most affected, followed by the domain *Establishing New Relationship with Intimate Partner*.

The average level of difficulty in these two domains during the two waves of the pandemic was moderate to substantial. Although the magnitude of difficulties also increased for the domains Sexuality, Parental Control and Living with Parents, Family Conflicts, and Relationship with Intimate Partner, the mean scores in these domains remained below the medium value of the rating scale during the two waves of the pandemic.

**Figure 1**

*Social Difficulties in the Six Domains of Students' Close Social Relationships Across Three Time Points (Pre-Pandemic Period and the 1<sup>st</sup> and the 2<sup>nd</sup> Wave of the Pandemic).*



*Note.* The scores of the six domains of difficulties in close social relationships were calculated as an average score per item. The range of the response scale was 1 to 5.

Next, we compared the level of difficulties experienced in close social relationships in the pre-pandemic period and during the first and second waves of the coronavirus pandemic by using the Friedman Test, a non-parametric test similar to repeated measures ANOVA (see Table 2). We reported the effect size in the form of Kendall's W, as recommended by Tomczak and Tomczak (2014). Post hoc analysis was done using Wilcoxon signed-rank tests (see Table 3) with a Bonferroni correction applied, resulting in a significance level set at  $p < .0003$ .

Table 2 shows descriptive statistics for the six domains of perceived difficulties in close social relationships as reported by participants for the pre-pandemic period (T1, no restriction), the first wave of the pandemic (T2), and the second wave of the pandemic (T3). Overall, results showed that restrictive measures due to the coronavirus pandemic were strongly related to perceived social difficulties in all studied domains.

**Table 2**

*Descriptive Statistics and the Results of the Friedman Test: Comparison of Difficulties in the Six Domains of Youth's Close Social Relationships Across Three Time Points.*

|                                                                        | Pre-pandemic situation |            | 1 <sup>st</sup> wave of pandemic |            | 2 <sup>nd</sup> wave of pandemic |            | Friedman test                          |          |
|------------------------------------------------------------------------|------------------------|------------|----------------------------------|------------|----------------------------------|------------|----------------------------------------|----------|
|                                                                        | <i>M</i> ( <i>SD</i> ) | <i>Mdn</i> | <i>M</i> ( <i>SD</i> )           | <i>Mdn</i> | <i>M</i> ( <i>SD</i> )           | <i>Mdn</i> | <i>X</i> <sup>2</sup> ( <i>df</i> = 2) | <i>W</i> |
| <b>Relationship with Friends</b>                                       | 2.0 (0.9)              | 2          | 3.1 (1.0)                        | 3          | 3.7 (0.9)                        | 3,8        | 618.94*                                | .48      |
| <i>Lack of physical contact with friends</i>                           | 2.0 (1.2)              | 2          | 3.5 (1.2)                        | 4          | 3.9 (1.1)                        | 4          | 619.16*                                | .48      |
| <i>Alienation with friends</i>                                         | 2.1 (1.1)              | 2          | 3.1 (1.2)                        | 3          | 3.4 (1.2)                        | 4          | 401.93*                                | .31      |
| <i>Lack of opportunity to make new friends</i>                         | 2.0 (1.0)              | 2          | 3.0 (1.3)                        | 3          | 3.7 (1.2)                        | 4          | 530.00*                                | .41      |
| <i>Lack of opportunity to strengthen new friendships</i>               | 2.0 (1.0)              | 2          | 2.9 (1.3)                        | 3          | 3.6 (1.2)                        | 4          | 525.39*                                | .40      |
| <b>Establishing New Relationship with Intimate Partner<sup>1</sup></b> |                        |            |                                  |            |                                  |            |                                        |          |
| <i>Less opportunity to establish new intimate relationship</i>         | 2.5 (1.1)              | 2          | 2.9 (1.4)                        | 3          | 3.6 (1.4)                        | 4          | 189.07*                                | .26      |
| <b>Sexuality</b>                                                       |                        |            |                                  |            |                                  |            |                                        |          |
| <i>Less opportunity for sexual activity</i>                            | 1.9 (1.1)              | 2          | 2.5 (1.4)                        | 2          | 2.7 (1.5)                        | 3          | 223.30*                                | .17      |
| <b>Parental Control and Living with Parents</b>                        |                        |            |                                  |            |                                  |            |                                        |          |
| <i>Having more parental control</i>                                    | 2.0 (1.0)              | 2          | 2.4 (1.3)                        | 2          | 2.4 (1.3)                        | 2          | 134.15*                                | .10      |
| <i>Living in the parental home</i>                                     | 1.8 (1.0)              | 2          | 2.2 (1.3)                        | 2          | 2.2 (1.3)                        | 2          | 123.02*                                | .10      |
| <i>Having less privacy at home</i>                                     | 2.0 (1.1)              | 2          | 2.4 (1.3)                        | 2          | 2.5 (1.3)                        | 2          | 175.00*                                | .14      |
| <b>Family Conflicts</b>                                                |                        |            |                                  |            |                                  |            |                                        |          |
| <i>Conflicts with parents</i>                                          | 2.1 (1.0)              | 2          | 2.4 (1.2)                        | 2          | 2.4 (1.2)                        | 2          | 84.68*                                 | .07      |
| <i>Conflicts with siblings</i>                                         | 1.8 (0.9)              | 2          | 2.0 (1.1)                        | 2          | 2.0 (1.1)                        | 2          | 67.87*                                 | .05      |
| <i>Conflicts among other family members</i>                            | 1.7 (0.9)              | 1          | 1.9 (1.1)                        | 2          | 1.9 (1.1)                        | 2          | 78.38*                                 | .06      |
| <b>Relationship with Intimate Partner<sup>2</sup></b>                  |                        |            |                                  |            |                                  |            |                                        |          |
| <i>Having less opportunity to strengthen intimate relationship</i>     | 1.8 (1.0)              | 1.3        | 2.6 (1.3)                        | 2.3        | 2.8 (1.3)                        | 2.7        | 123.42*                                | .23      |
| <i>Having less privacy with an intimate partner</i>                    | 1.9 (1.1)              | 2          | 2.8 (1.5)                        | 2.5        | 3.0 (1.6)                        | 3          | 120.02*                                | .23      |
| <i>Alienation with intimate partner</i>                                | 1.7 (1.1)              | 1          | 2.3 (1.4)                        | 2          | 2.3 (1.4)                        | 2          | 56.96*                                 | .11      |

*Note.* The table presents the items that were used for the 1<sup>st</sup> and the 2<sup>nd</sup> waves of the pandemic. The scores of the six domains of difficulties in close social relationships were calculated as an average score per item. The range of the response scale was 1 to 5.

\* Statistically significant at  $p < .001$ .

<sup>1</sup> Only single participants responded to this item,  $n_1 = 368$ .

<sup>2</sup> Only participants in a relationship with an intimate partner responded to these items,  $n_2 = 266$ .

**Table 3**

*The Results of Post Hoc Analyses Done with Wilcoxon Signed-Rank Tests (z) and Corresponding Effect Sizes (r)*

|                                                                        | Change in difficulty from T1 to T2 |             | Change in difficulty from T1 to T3 |             | Change in difficulty from T2 to T3 |             |
|------------------------------------------------------------------------|------------------------------------|-------------|------------------------------------|-------------|------------------------------------|-------------|
|                                                                        | $z_{T1-T2}$                        | $r_{T1-T2}$ | $z_{T1-T3}$                        | $r_{T1-T3}$ | $z_{T2-T3}$                        | $r_{T2-T3}$ |
| <b>Relationship with Friends</b>                                       | -17.02*                            | -.47        | -20.35*                            | -.56        | -13.59*                            | -.38        |
| <i>Lack of physical contact with friends</i>                           | -17.22*                            | -.48        | -19.35*                            | -.54        | -9.40*                             | -.26        |
| <i>Alienation with friends</i>                                         | -14.09*                            | -.39        | -16.96*                            | -.47        | -7.18*                             | -.20        |
| <i>Lack of opportunity to make new friends</i>                         | -13.72*                            | -.38        | -18.53*                            | -.51        | -12.67*                            | -.35        |
| <i>Lack of opportunity to strengthen new friendships</i>               | -13.52*                            | -.37        | -18.80*                            | -.52        | -12.19*                            | -.34        |
| <b>Establishing New Relationship with Intimate Partner<sup>1</sup></b> | -4.63*                             | -.17        | -11.58*                            | -.43        | -9.87*                             | -.36        |
| <i>Less opportunity to establish new intimate relationship</i>         |                                    |             |                                    |             |                                    |             |
| <b>Sexuality</b>                                                       | -10.31*                            | -.29        | -12.82*                            | -.36        | -4.48*                             | -.12        |
| <i>Less opportunity for sexual activity</i>                            |                                    |             |                                    |             |                                    |             |
| <b>Parental Control and Living with Parents</b>                        | -10.68*                            | -.30        | -12.36*                            | -.34        | -2.66                              | -           |
| <i>Having more parental control</i>                                    | -9.01*                             | -.25        | -9.90*                             | -.27        | -1.85                              | -           |
| <i>Living in the parental home</i>                                     | -8.66*                             | -.24        | -9.57*                             | -.27        | -1.54                              | -           |
| <i>Having less privacy at home</i>                                     | -9.90*                             | -.27        | -11.03*                            | -.31        | -2.42                              | -           |
| <b>Family Conflicts</b>                                                | -8.18*                             | -.23        | -9.45*                             | -.26        | -2.18                              | -           |
| <i>Conflicts with parents</i>                                          | -7.09*                             | -.20        | -8.05*                             | -.22        | -.84                               | -           |
| <i>Conflicts with siblings</i>                                         | -6.82*                             | -.19        | -7.08*                             | -.20        | -.83                               | -           |
| <i>Conflicts among other family members</i>                            | -6.46*                             | -.18        | -7.64*                             | -.21        | -.193                              | -           |
| <b>Relationship with Intimate Partner<sup>2</sup></b>                  | -8.63*                             | -.37        | -10.11*                            | -.44        | -2.43                              | -           |
| <i>Having less opportunity to strengthen intimate relationship</i>     | -8.72*                             | -.38        | -9.75*                             | -.42        | -1.62                              | -           |
| <i>Having less privacy with an intimate partner</i>                    | -7.63*                             | -.33        | -9.37*                             | -.41        | -3.06                              | -           |
| <i>Alienation with intimate partner</i>                                | -6.05*                             | -.26        | -6.30*                             | -.27        | -.53                               | -           |

*Note.* The table presents the items that were used for the 1<sup>st</sup> and the 2<sup>nd</sup> waves of the pandemic.

T1 – pre-pandemic time; T2 – 1<sup>st</sup> wave of pandemic; T3 – 2<sup>nd</sup> wave of pandemic.

\* Statistically significant at  $p < .0003$ , due to Bonferroni correction.

<sup>1</sup>Only single participants responded to this item,  $n_1 = 368$ .

<sup>2</sup> Only participants in a relationship with an intimate partner responded to these items,  $n_2 = 266$ .

As evident from the post hoc analyses presented in Table 3, participants reported a significant increase in perceived difficulty from pre-pandemic time to the 1<sup>st</sup> wave of the pandemic, from the 1<sup>st</sup> wave of the pandemic to the 2<sup>nd</sup> wave of the pandemic, and from pre-pandemic time to the 2<sup>nd</sup> wave of the pandemic in the three domains: *Relationship with Friends*, *Establishing New*

*Relationship with Intimate Partner, and Sexuality.* The effect sizes (Cohen, 1992; Tomczak & Tomczak, 2014) were mostly medium (between .30 and .50) for all three domains.

Participants reported more intense difficulties during the 1<sup>st</sup> and 2<sup>nd</sup> waves of the pandemic compared to the time of no restrictions but there was no significant change between the two waves of the pandemic in the following domains of close relationships: *Relationship with Intimate Partner, Parental Control and Living with Parents, and Family Conflicts.* Effect sizes for the domains Parental Control and Living with Parents and Family Conflicts were predominantly small (between .10 and .30), whereas the effect size for the Relationship with Intimate Partner was predominantly of medium size (between .30 and .50; Cohen, 1992).

Furthermore, we compared the levels of specific difficulty within each of the close relationship composites across the three periods. As shown in Table 3, there were significant increases from pre-pandemic time to the second wave of the pandemic in all four perceived difficulties in the Relationship with Friends domain (lack of physical contact with friends, alienation with friends, lack of opportunity to make new friends, and lack of opportunity to strengthen new friendships). Further, during the first and second waves of the pandemic, students recognised more parental control, living in the parental home, and less privacy at home as more problematic than in the pre-pandemic period; however, their perception of these difficulties remained stable from the first to the second waves of the pandemic. Similarly, conflict with parents, conflict with siblings, and conflict among other family members increased from the pre-pandemic time to the two waves of the pandemic, but no significant differences were found between the first and the second waves of the pandemic.

Students who had an intimate relationship perceived more difficulties, such as having less opportunity to strengthen intimate relationships, having less privacy with their intimate partner, and alienation from their intimate partner in both waves of the pandemic than in the pre-pandemic time. However, their reported data did not change significantly from the first to the second waves of the pandemic.

### ***Social Difficulties and Demographics***

We further analysed how students' perceptions of social difficulties in six relationship domains at three periods were related to their educational status, gender, intimate relationship status, and their move back to the parental home during the first and/or second waves of the pandemic. Because the dependent variables did not meet the criteria for parametric tests, we used the

nonparametric equivalent Mann-Whitney's  $U$ . We reported effect size in form of an  $r$  value, as recommended by Tomczak and Tomczak (2014).

University students ( $n_{UNI} = 361$ ) reported more intense difficulties in the *Relationship with Friends* ( $U = 42396, z = -4.12, p < .001, r = -.16$ ) domain in the second wave than upper-secondary school students ( $n_{HS} = 289$ ) did. Specifically, university students reported more difficulties due to lack of physical contact with friends ( $U = 46686, z = -2.42, p = .01, r = -.10$ ), lack of opportunity to make new friendships ( $U = 42844, z = -4.07, p < .001, r = -.16$ ), and lack of opportunity to strengthen new friendships ( $U = 36841.5, z = -6.67, p < .001, r = -.26$ ) than upper-secondary school students did. Furthermore, university students in the second wave of the pandemic reported less opportunity to establish a new relationship with an intimate partner ( $n_{HS} = 192, n_{UNI} = 176, U = 12943, z = -4.01, p < .001, r = -.21$ ) than upper-secondary school students did. University students also perceived living in the parental home as more problematic compared to upper-secondary school students in the pre-pandemic period ( $n_{HS} = 285, n_{UNI} = 342, U = 44089, z = -2.22, p = .03, r = -.09$ ) and in the first ( $n_{HS} = 284, n_{UNI} = 346, U = 42697, z = -2.96, p = .003, r = -.12$ ) and second waves of the pandemic ( $n_{HS} = 285, n_{UNI} = 336, U = 41981, z = -2.76, p = .01, r = -.11$ ).

Females ( $n_F = 482$ ) reported slightly more difficulty than males did ( $n_M = 161$ ) in the *Relationship with Friends* domain during the pre-pandemic period ( $U = 34744, z = -2.00, p = .05, r = -.08$ ) and during the first ( $U = 34655, z = -2.04, p = .04, r = -.08$ ) and second waves of the pandemic ( $U = 33506.5, z = -2.61, p = .01, r = -.10$ ). Regarding specific items within the *Relationship with Friends* domain, females reported more difficulties than males due to lack of physical contact with friends (pre-pandemic:  $U = 34522, z = -2.22, p = .03, r = -.09$ ; 1<sup>st</sup> wave:  $U = 32840, z = -3.01, p = .003, r = -.12$ ; 2nd wave:  $U = 33408.5, z = -2.78, p = .01, r = -.11$ ), the lack of opportunity to make new friendships (2nd wave:  $U = 33997.5, z = -2.45, p = .01, r = -.10$ ), and lack of opportunity to strengthen new friendships (2<sup>nd</sup> wave:  $U = 34229.5, z = -2.32, p = .02, r = -.09$ ). Females also perceived more conflict with siblings (2<sup>nd</sup> wave:  $U = 34220.5, z = -2.37, p = .02, r = -.09$ ) than males. In contrast, males reported the lack of opportunity to establish new intimate relationships as more problematic than females did in the first wave ( $n_F = 263, n_M = 101, U = 10934, z = -2.67, p = .01, r = -.14$ ). Males ( $n_M = 161$ ) also perceived the lack of opportunities for sexual activity more negatively than females did ( $n_F = 482$ ) in both the pre-pandemic and pandemic periods (pre-pandemic:  $U = 33949, z = -2.55, p = .01, r = -.10$ ; 1<sup>st</sup> wave:  $U = 31669.5, z = -3.60, p < .001, r = -.14$ ; 2<sup>nd</sup> wave:  $U = 30506.5, z = -4.18, p < .001, r = -.16$ ).

Across all three periods, single students ( $n_s = 369$ ) reported a higher score on the *Family Conflicts* domain than students who were in a relationship

did ( $n_{IR} = 271$ ) (pre-pandemic:  $U = 43219, z = -2.99, p = .003, r = -.12$ ; 1<sup>st</sup> wave:  $U = 45459, z = -1.99, p = .05, r = -.08$ ; 2<sup>nd</sup> wave:  $U = 44011.5, z = -2.62, p = .01, r = -.10$ ). Specifically, the former reported more conflict with parents (2<sup>nd</sup> wave:  $U = 45130.5, z = -2.18, p = .03, r = -.09$ ), more conflict with siblings (pre-pandemic:  $U = 43608, z = -2.99, p = .003, r = -.12$ ; 2<sup>nd</sup> wave:  $U = 43478.5, z = -2.99, p = .003, r = -.12$ ) and more conflict among other family members (pre-pandemic:  $U = 42307.5, z = -3.69, p < .001, r = -.15$ ). Students who were single also reported more problems in the domain *Parental Control and Living with Parents* than students in intimate relationships did (pre-pandemic:  $U = 45419.5, z = -2.03, p = .04, r = -.08$ ; 2<sup>nd</sup> wave:  $U = 44989.5, z = -2.18, p = .03, r = -.09$ ). Specifically, students who were single reported higher parental control in the second wave ( $U = 42294.5, z = -3.44, p = .001, r = -.14$ ) than their peers with intimate partners did. In addition, students who were single reported a higher lack of opportunities for sexual activity (pre-pandemic:  $U = 42649.5, z = -3.41, p = .001, r = -.13$ ; 2<sup>nd</sup> wave:  $U = 44880.5, z = -2.28, p = .02, r = -.08$ ) and a higher lack of opportunities to make new friends (pre-pandemic:  $U = 43461.5, z = -2.99, p = .003, r = -.12$ ; 2<sup>nd</sup> wave:  $U = 42689, z = -3.28, p = .001, r = -.13$ ) than young people who had an intimate partner did.

Those students who moved back to their parents' home during the pandemic ( $n_M = 159$ ), thus losing their residential independence, reported higher scores in the domain *Parental Control and Living with Parents* than those who lived at home all the time ( $n_H = 418$ ) (1<sup>st</sup> wave:  $U = 28650.5, z = -2.59, p = .01, r = -.11$ ; 2<sup>nd</sup> wave:  $U = 27513.5, z = -3.21, p = .001, r = -.13$ ). More specifically, the former perceived more difficulties because of parental control (1<sup>st</sup> wave:  $U = 29443, z = -2.19, p = .03, r = -.09$ ; 2<sup>nd</sup> wave:  $U = 29001.5, z = -2.43, p = .02, r = -.10$ ), living in the parental home (1<sup>st</sup> wave:  $U = 27056.5, z = -3.51, p < .001, r = -.15$ ; 2<sup>nd</sup> wave:  $U = 26287.5, z = -4.04, p < .001, r = -.17$ ) and lack of privacy (2<sup>nd</sup> wave:  $U = 29496.5, z = -2.15, p < .03, r = -.09$ ) than the latter did. In the second wave of the pandemic, students who had moved back into the parental home reported more difficulties in the domains Sexuality ( $U = 29196, z = -2.31, p = .02, r = -.10$ ), Establishing New Relationship with Intimate Partner ( $n_H = 264, n_M = 92, U = 9670.5, z = -3.00, p = .003, r = -.16$ ), and the Relationship with Friends ( $U = 28966.5, z = -2.93, p = .02, r = -.10$ ) than students who lived with parents during the pre-pandemic and pandemic periods. In the Relationship with Friends domain, students who had moved back to their parents' home reported fewer opportunities to establish new friendships ( $U = 29267, z = -2.31, p = .02, r = -.10$ ) and fewer opportunities to strengthen new relationships with friends ( $U = 26894, z = -3.67, p < .001, r = -.15$ ) than those who lived at home before and during the pandemic.

## Discussion

This study examined the difficulties Slovenian students aged 18 to 25 experienced in their close social relationships during the Covid-19 pandemic. The study included six domains of potential difficulties in close relationships: Relationship with friends, establishing a new relationship with an intimate partner, sexuality, relationship with current intimate partner, parental control and living with parents, and family conflict. We compared the extent of students' social difficulties in the pre-pandemic period and in the first two waves of the pandemic. We were also interested in whether gender, educational status, intimate status, and change in living situation were related to students' perceived social difficulties. Below, we address the difficulties that participants reported in the three domains of close social relationships (friends, intimate partners, family) during the pre-pandemic and pandemic periods.

### *Relationship with Friends*

Of all domains of close social relationships, relationships with friends emerged as the most vulnerable for students due to movement restrictions during the Covid-19 pandemic. As noted in our study, measures of social isolation not only reduced the frequency of physical contact with friends, but students also reported a significant increase in alienation from friends and a significant decrease in opportunities to make new friends and consolidate new acquaintances in both waves of the pandemic. These findings reflect the importance of friendships in adolescence and emerging adulthood, which are more emotionally intense and intimate than friendships at other stages of development (Arnett, 2014). Young people's friendships are characterised by greater openness, reciprocity, and trust than those of children. Young people's contacts with friends are also more frequent, longer, and involve more emotional exchanges than those of adults (Conger, 1991). Zupančič (2020) found that young people place high importance and trust on their friends, regardless of age, gender, or intimate relationship. The results of our study confirmed that social isolation due to the restrictions placed on people's movement and social interactions negatively affected relationships in the main social microsystem of young people in both waves of the pandemic, and perceived difficulties in friendships even increased from the first to the second lockdown due to Covid-19.

Compared to the pre-pandemic time, university students in the second wave of the pandemic reported more difficulties in relating to friends than upper-secondary school students. The closure of academic institutions during the pandemic particularly affected university students who spent most of the spring

semester of the 2019/2020 academic year and most of the 2020/2021 academic year online. In our sample, 48.8% of university students were living independently or semi-independently with their parents before the Slovenian government declared a pandemic state on March 12, 2020. Of these students, 45% returned to their parents' home in the first or second wave of the pandemic. Most of the university students in our sample were younger undergraduates who had made new acquaintances and friendships with fellow students from different parts of the country during their studies. Movement restrictions during the pandemic prevented contact with these friends. In contrast, upper-secondary school students mostly lived at home in the pre-pandemic period; during the pandemic, they had friends nearby and met with classmates more frequently than university students due to the somewhat less severe restrictions on closing upper-secondary schools. More friendship problems were also reported by those young participants who had to return to their parents due to dormitory closures and movement restrictions in the state regions. In the second wave of the pandemic, they perceived more problems in establishing and maintaining new friendships than their peers who were already living with their parents before the pandemic did. As mentioned earlier, most participants who had to return to their parents during the pandemic were university students who were less able to maintain their newly established friendship networks at university due to the prolonged closure of academic institutions and movement restrictions. In terms of gender differences, females reported more difficulties with friendships than males did during the pandemic time. More specifically, females perceived a lack of physical contact with friends as a greater problem than males in both waves of the pandemic. In addition, women in the second wave of the pandemic emphasised fewer opportunities to make new friends and strengthen relationships with new friends than men did. The findings reflect differences in the quality of friendships between men and women. Female friendships are more intimate, confidential, emotionally intense, and reciprocal than male friendships are (Bauminger et al., 2008; Wissink et al., 2009). Women and their more pronounced need for mutual care, mutual disclosure, help, and verbal communication with a friend (Radmacher & Azmitia, 2006) were, therefore, more affected by social isolation from the Covid-19 pandemic than men were.

### *Intimate Relationships*

The study compared students' difficulties in their current intimate relationships, in establishing new intimate relationships, and in engaging in sexual activity in the pre-pandemic and pandemic periods. Of the three aspects, the

opportunity to establish new intimate partnerships was most limited during the Covid-19 pandemic. It decreased significantly since pre-pandemic time through the first two waves of the pandemic. The reported difficulties in establishing new partnerships increased, on average, to the level of 'substantial' during the second lockdown. This finding highlights the vulnerability of single young participants who were unable to form new intimate relationships due to their social isolation and limited mobility. Similarly, perceived opportunities for sexual intercourse were significantly reduced during both pandemic lockdowns. Shulman and Connolly (2013) found that partnership stability and duration grow relatively slowly in late adolescence and early twenties. During this developmental period, many young people change partners, are single for a while, or engage in brief romantic/sexual relationships. Love relationships that involve passion and intimacy are still nascent at this age and do not necessarily involve long-term plans for a future together (Seifge-Krenke & Shulman, 2012; Shulman & Connolly, 2013). Social isolation and movement restrictions during the Covid-19 pandemic deprived young people of important romantic experiences and sexual experimentation that set the stage for later mature emotional and physical intimacy (van de Bongardt et al., 2015).

Difficulties in maintaining current intimate relationships increased significantly during the pandemic, but no significant change in reported difficulties was found between the first and second waves of the pandemic. The only exception was the difficulty of 'having less privacy with an intimate partner', which was rated significantly higher by participants in a relationship in the second wave of the pandemic than in the first wave. We assume that students gradually found ways to cope with restrictions during the pandemic waves to maintain an intimate relationship. They used communication tools, such as video calls and text messaging, some young couples lived in the same household, while others met in person despite the strict lockdown measures. However, staying at home and living with parents may not prevent fewer opportunities for physical intimacy between young partners. Establishing and maintaining an intimate relationship with a romantic partner is a lengthy process and requires a great deal of experience in the partners' daily activities together. Through pleasant and unpleasant joint events, partners develop mutual sensitivity, empathise with each other's position, learn ways to resolve conflicts in their relationship, and define the boundaries of their freedom in the relationship (Arnett, 2014; Zupančič, 2020). These are all foundations of a solid and lasting love relationship that have been challenged by the pandemic restrictions.

### *Relationship with Family*

The Covid-19 pandemic interrupted the important social developmental task of young people, which is gaining independence from their parents and establishing a mature parent-child relationship. Periods of stay-at-home requirements, academic closures, increased engagement with parents and other family members, more parental monitoring, and reduced physical interaction with friends and intimate partners will 'likely have yet unknown effects on this cohort's developmental trajectory' (Lindberg et al., 2020, p. 2).

The young participants in our study perceived more difficulties due to parental control and less privacy at home during quarantine periods compared to the pre-pandemic period. More frequent and intense contact between all family members also set the stage for more family conflict. However, the increase in reported difficulties was of low magnitude, and mean scores in these domains remained below the rating scale average in both pandemic waves. This result may reflect the Slovenian cultural tradition of strong and prolonged reliance on one's family as a source of security and support (Zupančič et al., 2014), which somewhat prevented students from feeling more constrained in their pursuit of personal autonomy while living with parents during the Covid-19 lockdowns.

Those students who moved back to their parents' home after a period of independence or semi-independence had more negative perceptions of living with their parents than those who had lived with their parents in the pre-pandemic period. Presumably, the former were less accustomed to their parents' requests and demands and had to adjust to living together again. Independent living provides young people with more opportunities to practice personal autonomy, contributes to psychological independence from parents (Kins et al., 2013; Seiffge-Krenke, 2013), and helps build a mature parent-child relationship. Living with parents, enforced by the Covid-19 situation, and extended parental supervision likely creates the conditions for prolonged development of young people's individuation.

### *Study Limitations*

This study has some important limitations. The sample was gathered from convenience sampling. It is predominantly female and only students in the last two years of upper-secondary school and university students were included in the study. A more balanced sample might provide better insight into the social difficulties of young people. In addition, our data are likely to be subject to recall bias due to retrospective data collection. The follow-up study with in-time measurement of difficulties in close social relationships would be preferable. Even though online data collection has many advantages, we should not overlook possible

disadvantages, such as it being more impersonal and less controllable (e.g., we cannot interfere if the answering instructions are unclear; we cannot ensure the sample population is from the targeted population; Evans & Mathur, 2005; Nayak & Narayan, 2019). Our aim was to determine the extent of difficulties in students' close social relationships in the pre-pandemic and pandemic situations and to report possible differences in some demographic variables. However, more detailed and systematic studies that include additional psychosocial factors related to the quality of social relationships would be desirable to gain better insight into the consequences of the Covid-19 pandemic on students' mental health.

## Conclusions

The restrictions on individual freedom of movement and social interactions imposed to deal with Covid-19 have significantly affected the social lives of young people. Although students were at low risk for hospitalisation and death from Covid-19 compared with older age groups, the pandemic measures affected other aspects of their physical and mental health and likely slowed the completion of their normative developmental tasks in close/intimate social relationships (Lindberg et al., 2020; Wignall et al., 2021). This study found a significant increase in reported difficulties in relationships with friends, intimate relationships, and family relationships during the first two waves of the pandemic compared to reported pre-pandemic levels. The most affected areas of close relationships were relationships with friends and the opportunity to form new intimate relationships. More negative experiences of lockdown measures were found among students who were single and those who had to move back into the parental home due to lockdown restrictions. Intimate relationships appear to be a protective factor that mitigates several negative outcomes in young people. The magnitude of reported difficulties in current intimate relationships, living in the parental household, and family conflict did not change from the first to the second lockdown, which may suggest that students developed adaptive mechanisms to cope with the ongoing pandemic situation. Close social relationships, particularly with peers, are an important component of students' psychological wellbeing and mental health, providing comfort and security. In the event of future pandemic waves, it would be very important to maintain the stable living and study conditions of students as far as possible.

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### **Publication Ethics**

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## Biographical note

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Tina Štemberger, Še ena knjiga o statistiki: Univariatne in bivariatne statistične metode v edukaciji, Založba Univerze na Primorskem, 2021: ISBN 978-961-293-101-8

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Reviewed by ŽAN KOROŠEC<sup>1</sup>

With regard to the monograph – or better yet manual – that is reviewed here, one could assert that it focuses on bringing statistical analysis within a range that is accessible and directly applicable to university students, thus constituting the latter as its primary audience. By way of introduction, we could venture the generalisation that, at some point during their education, students familiarise themselves with research methods, techniques, instruments, etc., in which data analysis is undoubtedly an indispensable aspect. Even though this topic is lectured and thus exemplified, it is often accompanied by a scarcity of suitably adapted reference materials: although statistical compendiums, proceedings, encyclopaedias and other sources are ubiquitous and profuse, not many are tailored to the specific needs of a certain discipline, eliminating the redundant ballast and offering what is required. While the present publication is not the only one of its kind, it is one of the most recent works in the Slovenian language that targets students of pedagogical programmes, offering them tactile tools to employ in their own pursuits.

It is evident both from the title and the content that emphasis is placed on the most frequent univariate (involving one variable) and bivariate (incorporating two variables) procedures. This is a logical limitation – after all, selection needs to be bound by something, and in this case it is by the number of variables concurrently considered – and other similar reference texts<sup>2</sup> have



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<sup>2</sup> See for example: B. Kožuh. (2000). *Statistične obdelave v pedagoških raziskavah*. FF UL, Oddelek za pedagogiko in andragogiko; M. Cenčič. (2009). *Kako poteka pedagoško raziskovanje: Primer kvantitativne empirične neeksperimentalne raziskave*. Zavod RS za šolstvo; B. Kožuh and J. Vogrinc. (2011). *Obdelava podatkov*. ZZFF; T. Štemberger. (2016). *Univariatne in bivariatne statistične metode v edukaciji*. Založba Univerze na Primorskem; T. Štemberger. (2020). *Uvod v pedagoško raziskovanje*. Založba Univerze na Primorskem.

done exactly the same. Briefly, the text addresses: *descriptive statistics* (measures of central tendency, dispersion, distribution), *correlation coefficients*, *chi-square for goodness of fit test*, *chi-square test of independence*, *normality testing*, *t-tests and one-way ANOVA* (along with nonparametric alternatives), and *reliability analysis* (via Cronbach  $\alpha$ ). Although we fully understand that by increasing the number of tests the handbook would become less relevant for the target students, our reservation applies to introducing and consequently explaining factor analysis, multiple regression, multiple analysis of variance and covariance, precisely because these methods are often theoretically presented, but not practically applied.<sup>3</sup> For example, certain undergraduate programmes introduce the concept of factor analysis in connection with characteristics of measurement, whereby students are typically instructed to devise a research plan with accompanying instruments without fully knowing how to implement their design or verify the quality of their apparatuses. Let this serve as background information or, better still, as a justification why some multivariate procedures could have been incorporated without forfeiting the relevancy to its end users.

Although the purpose of the monograph, as indicated in the preface, is to equip students with knowledge about statistical procedures, it is clearly stated that it is also intended to demonstrate how to use IBM SPSS, statistical software widely employed in the social sciences. The use of SPSS (or to its free alternative PSPP<sup>4</sup>) is prevalent in pedagogical methodology and statistics. As well as being referred to in other works, it also coincides with tertiary education syllabi of several faculties, e.g., the University of Ljubljana's Faculty of Education uses SPSS almost exclusively to instruct students of bachelor, masters and doctoral levels. We can therefore argue that the stated goal "that as a user of SPSS and various statistical methods, [the student] would be able to do their best in their use and applicability" (p. 13) is realised and the promise that the handbook is "distinctly adapted to their [students'] needs, especially to students of second-level programmes in the field of initial teacher education" (*ibid.*) is fulfilled. The mode of achievement is as follows: statistical procedures are presented in relation to the level of measurement (i.e., nominal, ordinal, interval, ratio), ergo, what can be performed for attributive and numerical variables or for a combination of the two. Thus, it progresses from a variable type and number of variables to a number of independent samples, using the latter to establish a distinction between t-tests and analysis of variance (and their

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<sup>3</sup> This statement, like the book itself, applies to Slovenian contexts and is in no way regarded as the only possible outcome.

<sup>4</sup> In 2015, B. Kožuh wrote *Statistične metode in program PSPP*, and later in 2020 published on his website *Obdelava podatkov s programom PSPP*, detailing the differences and otherwise demonstrating that it is sufficient for domestic use, including seminar, research, graduate theses.

nonparametric alternatives). Not only is everything described, it is also outlined in several diagrams, all designed to aid comprehension and not to convolute the otherwise exact order. A few pages later, instructions are added on how to analyse or obtain something from SPSS; however, it details mostly the path, and rarely touches upon the extra options whose output frequently assumes a major role in interpretation.

In the following pages, the above procedures are nonetheless explained in terms of usage conditions and situations, annotated and interpreted. The core and paramount contribution, however, is the exercises. Due to the latter, the publication cannot be considered a prototypical example of manuals, as is operates in the vicinity of textbooks, first clarifying the content, then offering sets of tasks with which the reader can improve their statistical knowledge. Screenshots and hints are abundant, and gradation in difficulty is maintained as well: students are initially required to interpret tables and spreadsheets that are already edited, but once they reach Part Two of the textbook, independent use of SPSS with complementary analysis is expected. These tasks are based on data that has been gathered with a Slovenian version of the questionnaire *Career Development Scale, Career Choice Scale and Career Development Scale* (p. 27), which was adjusted and validated in a separate study. Part Two of the textbook therefore “relies on data obtained with the said questionnaire [...], where you need to copy and interpret the necessary information, then find commands for statistical tests yourselves via ‘hints’ and screen captures, as well as transcribing and interpreting these results” (p. 63). It is stated that “the data are in an attachment in e-form” (*ibid.*), which is somewhat problematic seeing that this file is nowhere to be found. We contacted the publisher,<sup>5</sup> who said this particular textbook never had any official supplements, but that they might have been disseminated by the author upon publication, additionally urging us to contact the author directly. Naturally, we did so, but no reply had been received by the time this review was offered for recension. It is rather inconvenient to have a task like “Enter the necessary results in Table 11.1 for the variable ‘Length of service’ and explain them” (p. 67), if you cannot access and thus operate with said database. Being in a state of uttermost perplexity, we started contemplating this conundrum and speculating whether the textbook is in fact not intended for students of pedagogical programmes *per se*, but rather for the author’s students, with whom SPSS and its applications could be tackled in lectures, classes, seminars, etc. where the “missing attachment” is made available as a part of

<sup>5</sup> We did so on 31 May 2023, both via email (zalozba@upr.si) and phone (by first calling the University of Primorska directly, which connected us with the publisher, i.e., *University of Primorska Press*).

the course materials. Nevertheless, this is just our conjecture about the probable cause of absent materials. Another flaw, albeit a minor one, we feel obliged to expose is that of incongruence between the preface and the actual body of the text. The preface claims that Part Two details application possibilities and restrictions, while Part Three features exercises. In fact, Part One discloses and illustrates statistical procedures, Part Two contains exercises, and Part Three presents ways of further data customisation and editing. In our opinion, this discrepancy has no particular effect on the reading process, unless you fixate on the preface. It should, of course, be consistent, but fortunately it does not hinder comprehension.

To recapitulate, the textbook provides more than just SPSS commands or a manual to using SPSS software, as it elucidates frequently employed procedures succinctly and in a way that is relevant to students training to become teachers or other education professionals. Although a significant portion is somewhat restricted in terms of realisation, as not all of the tasks can be completed due to the missing database, the rest of textbook still presents enough content to explain, exemplify and equip the readers with new skills.

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