E-INCLUSION? HARMS AND BENEFITS OF THE DIGITALISATION PROCESSES ON INCLUSIVE EDUCATIONAL CURRICULA

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Co-funded by the
Health Programme of
the European Union

Executive Summary

To address current and future challenges such as climate and demographic change, the design of educational frameworks and curricula is not only required to be updated but to place an increased emphasis on interdisciplinary learning and non-linear problem-solving skills (Wong et al., 2021). During the COVID-19 pandemic, the closing of schools was a widespread containment measure (Panovska-Griffiths et al., 2020). Consequently, educational curricula were forced to transform rapidly and shift towards the digital space. Whereas this already posed several challenges for mainstream schools and social facilities including to meet children's educational and health needs (van Kessel, Siepmann, et al., 2020), the transformation towards digital and inclusive educational curricula also illustrates a significant window of opportunity for policy making and changing current educational systems in a way that future generation are taught the right skills to address upcoming challenges. This policy brief examines by means of a scoping review how digitalisation can benefit or harm the quality of inclusive educational (IE) curricula for typical children, children with special educational needs (SEN) as well as their support networks such as teachers and parents. A systematic search strategy is performed following the PRISMA guidelines. Eight studies were eligible for inclusion and coded using a deductive-inductive approach. The included studies presented a high heterogeneity in terms of sample, country focus as well as models used to describe digitalisation. Beneficial effects of digitalisation on IE curricula are identified as increased autonomy and training in design thinking of typical children and children with SEN, training in digital skills, enhanced social interaction between typical children and children with SEN as well as stimulation of capacity building in IE frameworks. Harmful effects are described as increased need of parental involvement as well as training of teachers and parents in digital skills. The review proves its strength as it illustrates the first approach towards the identification of benefits and harms of digitalisation on the quality of IE curricula. As such, a strength of the research design at hand is the systematic approach to identify relevant documents in an under-researched area. Further research is required to understand the implication of digitalisation on IE curricula in more-depth and operationalise digital educational models. Against this background, policy recommendations are presented to the European Commission. Key recommendations, among others, are (1) to create a European Expert Group on Digital Inclusive Educational Curricula that consist of education, public health experts, interest groups of people with SEN and their social networks as well as experts of relevant sectors including IT-technology, (2) to provide funding for research projects through Horizon Europe's third pillar on Innovative Europe aiming to explore key requirements for digital inclusive educational curricula as well as (3) to build a supranational data-platform to share national and sub-national best practice examples as an extension of the European Toolkit for Schools as well as the eTwinning platform.

Introduction

To address current and future challenges such as climate and demographic change, the design of educational frameworks and curricula is not only required to be updated but to place an increased emphasis on interdisciplinary learning and non-linear problem-solving skills (Wong et al., 2021). In recent years, educational frameworks have shifted to accommodate inclusive education (van Kessel, Hrzic, Cassidy, et al., 2021). It is evident that the development of these curricula has beneficial impacts both for children with special educational needs (SEN) as well as for their typical peers (Dell'Anna et al., 2019; Kalambouka et al., 2007; van Kessel, Hrzic, Cassidy, et al., 2021). However, previous studies have shown several obstacles towards the establishment of IE curricula such as the design of domestic and subnational school systems (van Kessel, Dijkstra, et al., 2020) adverse attitudes and behaviours of teachers towards inclusion (Costello & Boyle, 2013; MacFarlane & Woolfson, 2013), and lack of teacher training (van Kessel, Hrzic, Cassidy, et al., 2021).

During the COVID-19 pandemic, the closing of schools was a widespread containment measure (Panovska-Griffiths et al., 2020). Consequently, educational curricula were forced to transform rapidly and shift towards the digital space. Whereas this already posed several challenges for mainstream schools and social facilities including to meet children's educational and health needs (van Kessel, Siepmann, et al., 2020), the transformation towards digital and inclusive educational curricula also illustrates a window of opportunity for policy making and changing current educational systems in a way that future generation are taught the right skills to address upcoming challenges. Thereby, digital transformation of educational curricula must be addressed under the premise of inclusion, especially as digitalisation is seen as a mega-driver of change that has potential beneficial or harmful effects on complex, societally relevant missions that require collaboration between an array of stakeholders on all governance levels (Bertelsmann Foundation, 2019; Mazzucato, 2021).

However, the development of digital IE frameworks faces multi-faceted challenges that are required to be explored theoretically. Theories on the access to inclusive education are asked to be expanded to the digital space (Connor et al., 2008). Additionally, educational theories should be conceptualised with theoretical models on access to healthcare e.g as outlined by Andersen et al. (Andersen, R. M., McCutcheon, A.,Aday, L. A., Chiu, G. Y., & Bell, 1983) and Levesque et al. (Levesque et al., 2013). This is of particular importance as previous research on the mental wellbeing of children during the COVID-19 pandemic outlined an urgent need to extend long-term research strategies to fully investigate the implications of the pandemic (Holmes et al., 2020). These health needs must be respected and evaluated both in an analogue as well as digitalised IE system "to build back better" (Finanical Times, 2020).

This policy brief aims to chart to what extent the digital transformation has positive or adverse effects on the educational quality of inclusive education using the SPIDER framework (Cooke et al., 2012). The sample (S) are target groups of inclusive education curricula including typical children, children with special education needs (SEN) and their support networks (e.g. parents); the Phenomenon of Interest (PI) is digitalisation of IE curricula; the design (D) are case studies, observational studies, interviews, surveys, questionnaires, focus groups; the evaluation (E) mode is the harm or benefit; and the research type (R) is qualitative or mixed-method. The targeted sample is broadly formulated since the investigation at hand represents an under-researched area.

Methods

Information sources, Search Strategy and Selection Criteria

A scoping review is performed following the PRISMA guidelines (Page et al., 2021). The systematic search strategy is devised to search the databases Medline, ERIC as well as Scopus. Additionally, the systematic search is complemented by search of the reference lists of the included studies. The strategy is guided by the components as outlined in the research question. As such, a combination of search terms is used related to the terms of sample, inclusive educational, and digitalisation. The search strategy can be found in the eMethods in the supplementary material. To be included in the review, the articles must be peer--reviewed and written in English. Only those studies are included that are published 2000 and 2021 and that can be accessed via the University of Maastricht library networks.

Data Extraction and Study Selection

Data is extracted and synthesised by a single researcher. The data extraction is designed as an iterative process as outlined in the eMethods in the supplementary material. After the removal of potential duplicates, data is organised via Mendeley. A data extraction chart (Appendix Table 2) indicates the study title, author(s), year of publication, location of study (country), study design, sample, model of digitalisation, main findings and used codes. For the selection, titles and abstracts are screened by a single researcher. The conducted data is synthesised using coding. Codes are established according to previously identified markers of inclusive education (van Kessel, Hrzic, Cassidy, et al., 2021) and can be found in the eMethods in the supplementary material. Harming or beneficial effects of digitalisation on inclusive educational curricula are identified using open coding. The programme atlas.ti is devised to perform and organise the coding process. Coding results are indicated in the eResults in the supplementary material. Accordingly, (+) indicates that there is a level of articulation within the study whereas (-) indicates that there is no level of articulation.

Results

The database searches yielded 205 results, eight of which were ultimately included in this study. The data collection process is shown in Figure 1 in the Appendix. The main reason of exclusion was the difference in scope such as mainstream schools, the absence of research components on digitalisation, the publication in different languages than English as well as the difference in sample such as a research focus on medical students. Characteristics of the individual studies are shown in Table 2 in the Appendix.

With respect to the identification of harmful and beneficial factors of digitalisation on the quality the review was guided by the pre-defined conditions of IE curricula as outlined by van Kessel et al. (2021). Additionally, the open coding processes added the codes of (1) capacity building process, (2) digital interaction, (3) digital skills, (4) harm through cyberbullying, (5) harm through inappropriate sources, (6) harm through privacy issues, (7) harm through specific required skills, (8) interdisciplinary work, (9) learning environment, (10) missing parental support, (11) self-regulation, (12) shared governance model, (13) teachers' attitudes towards teaching at-risk students via home.

Beneficial factors of digitalisation on inclusive educational curricula

In the context of the included studies a predominant focus on beneficial factors of digitalisation of inclusive educational curricula could be detected in seven of eight included studies (Adriana Gomes Alves & Hostins, 2019; Eftring et al., 2016; Ferrari et al., 2018; Kumpulainen & Ouakrim-Soivio, 2019; Nusser, 2021; Pellerin Campus St Jean, 2013; Rasmitadila et al., 2020). Digitalisation processes are expected to enhance parental involvement in IE curricula and in the individual learning process of their children by six studies (Crescenzi-Lanna et al., 2019; Eftring et al., 2016; Ferrari et al., 2018; Kumpulainen & Ouakrim-Soivio, 2019; Nusser, 2021; Rasmitadila et al., 2020). Additionally, the digitalisation process and the introduction of digital models into IE curricula is described as driver of digital and social interaction, respectively, between typical children and children with SEN and their educational staff in six included studies (Adriana Gomes Alves & Hostins, 2019; Crescenzi-Lanna et al., 2019; Ferrari et al., 2018; Pellerin Campus St Jean, 2013; Rasmitadila et al., 2020). That said, the impact of COVID-19 remains unexplored as of yet. Moreover, in seven studies, digitalisation is expected to empower typical children and children with SEN as well as their support networks such as parents to actively participate in the design process of their IE experience (Alves & Hostins, 2019; Crescenzi-Lanna et al., 2019; Eftring et al., 2016; Ferrari et al., 2018; Kumpulainen & Ouakrim-Soivio, 2019; Nusser, 2021; Rasmitadila et al., 2020). As a result, the digitalisation process conveys a certain level of control on educational activities for typical children and children with SEN.

Hereby, relations can be drawn towards the beneficial effect of capacity building and the use of shared governance model instrument such as described by Ferrari et al. (2018), Pellerin (2013) as well as Rasmitadila et al. (2020). Consequently, it is expected that digitalisation would stimulate and necessitate capacity building in IE frameworks. Therefore, collaboration between and within interdisciplinary teams is a critical prerequisite for advancing this capacity-building process (Alves & Hostins, 2019). As such, capacity building should involve both the groups of children with and without SEN and their social networks in terms of empowerment as well as teachers, speech therapists, psychotherapists, social workers.

Harmful factors of digitalisation on inclusive educational curricula

With respect to the identification of harmful factors of digitalisation on the quality of IE curricula, particularly the included study by Crescenzi-Lanna et al. (Crescenzi-Lanna et al., 2019) outlined harmful determinants. Admittingly, digitalisation may be harmful for IE curricula through the risk of cyberbullying, the access to inappropriate sources as well as privacy issues, although further research is warranted in this area (Crescenzi-Lanna et al., 2019). Furthermore, as illustrated in four studies (Alves & Hostins, 2019; Crescenzi-Lanna et al., 2019; Ferrari et al., 2018; Nusser, 2021), digitalisation presents a challenge to IE practices by requiring special digital skills along with the potential need for in-person assistance, both for children and educational workers. According to one of the included studies (Nusser, 2021), a higher degree of parental involvement is needed to ensure the quality of IE curricula that are digitalised. Since the digitalisation of IE curricula expands the learning environment to include the home, parents' assistance is required to a greater extent. Although this may have positiv effects on certain children's learning outcomes, as stated by Pellerin (2013), the necessity for special teacher training extends to parents of typical children as well as children with SEN is expressed in one study (Nusser, 2021). Against this background, social determinants of parental involvement such as parents experiencing poverty, parents with limited health knowledge or single parent households must be taken into consideration. These hindering determinants must be included in teacher's education and public support infrastructures. Furthermore, teachers' attitudes toward educating at-risk children are seen as a possible barrier to IE curricula as a result of digitisation in five studies (Crescenzi-Lanna et al., 2019; Eftring et al., 2016; Ferrari et al., 2018; Pellerin, 2013; Rasmitadila et al., 2020). Although the exact nature of these effects is unknown, they can be defined as a significant threat for children in IE frameworks. Finally, the need for capacity building as part of the infrastructure for IE systems is examined as a determinant of digitalisation that has an adverse impact on IE curricula in three studies (Ferrari et al., 2018; Pellerin, 2013; Rasmitadila et al., 2020).

Discussion

The performance of the scoping review outlined several beneficial and harmful factors that digitalisation poses for quality of IE curricula. While education systems are historically designed to be a place where pupils are taught, perhaps it is time to rethink the position of knowledge transfer. In Alves et al. (Alves & Hostins, 2019) it is explained how valuable young people are to digital development and how older people can contribute their content knowledge. In this regard, the scoping review found that digitalisation, such as the use of digital games in IE curricula, provides children with a greater sense of autonomy and the ability to create their own learning environments (Alves & Hostins, 2019; Eftring et al., 2016; Ferrari et al., 2018; Kumpulainen & Ouakrim-Soivio, 2019; Nusser, 2021; Rasmitadila et al., 2020). However, we must also acknowledge that the disability community (including children with disabilities) often experience disproportionate problems in accessing digital tools and services (Honeyman et al., 2020). As such, we find ourselves in a digital paradox, which means that the population groups who stand to have the most benefit from accessing digital services are the exact population group that experiences disproportionate difficulties in accessing those services (van Kessel, Hrzic, O'Nuallain, et al., 2021).

Through digital transformation process not only social interaction between typical children and children with SEN is enhanced but design-based problem thinking is trained (Alves & Hostins, 2019; Crescenzi-Lanna et al., 2019; Ferrari et al., 2018; Kumpulainen & Ouakrim-Soivio, 2019; Nusser, 2021; Rasmitadila et al., 2020). Hereby, children's role as drivers as well as target groups of IE framework is expressed. Therefore, it is shocking that so little has been done to amend IE curricula in a way that prepares children to address important societal issues. In this regard, the lack of digital training and methodological awareness among teachers' staff as well as parents clearly poses a threat to IE quality during the digital transformation phase. As a result, methods for older people to contribute their content knowledge in a manner that benefits the autonomous process of digitalising IE curricula must be explored. Therefore, interdisciplinary, and shared governance approaches are suggested to assist this process and to shape the design of IE curricula (Alves & Hostins, 2019; Ferrari et al., 2018; Nusser, 2021).

Moreover, it remains crucial to investigate the level of digital transformation, capacities and capabilities in different European countries that are required for digitalised IE frameworks. This is true given the continued existence of digital divides across European countries (van Kessel et al., 2021). To minimise potential harmful effects of digitalised IE curricula such as an increase in educational inequalities between children with and children without SEN, these existing differences must be acknowledged and addressed through targeted, local-centred policy solutions instead of creating "one size fits it all"-strategies. Countries in which the digital

divide is relatively large must be supported in a distinct way to minimise cross-country differences.

Another important factor that was outlined in this scoping review were harmful effects through cyberbullying and privacy issues (Crescenzi-Lanna et al., 2019). This finding underlines the importance to create cyber-secure environments for digital IE curricla. Although one can expect that both neuro-typical children and children with SEN present a certain vulnerability in the digital space, it is thus far under-researched what specific risks there are for children with SEN. Consequently, solutions must be found that ensure the health and safety of children with SEN that access educational services in the digital sphere as well as educate their social networks.

Policy Recommendations

In light of the COVID-19 pandemic's new window of opportunity, policymakers must not only declare their willingness to "build back better" (Finanical Times, 2020), but also incentivise valuable actions, particularly in IE frameworks. This is especially true to pave the path for future generations, who are supposed to face several wicked problems that are yet to be discovered (Mazzucato, 2021). Accordingly, the following policy recommendations per stakeholder (group) are presented:

European Commission

1) To foster the development of holistic models for digital inclusive educational frameworks:

- Provision of funding for research projects through Horizon Europe's third pillar on Innovative Europe aiming to explore key requirements for digital inclusive educational curricula;
- Provision of funding for flagship projects that test digital inclusive educational frameworks in a national and subnational context.

2) To assist EU member states in the amendment of their educational curricula in a digital and inclusive way through a European Expert Group on Digital Inclusive Educational Curricula

- Building a supranational data-platform to share national and sub-national best practice examples (e.g Sweden: establishmentof a National Agency for Special Needs Education and Schools) as an extension of the European Toolkit for Schools as well as the eTwinning platform
- Organisation of an EU hackathon with presentation of the results in the context of a Europe fit for Digital Education Action Day

- Incentivision for European member states to invest in digital capacities in the population to minimise the digital divide in accessing digital IE frameworks.

3) To create a European Expert Group on Digital Inclusive Educational Curricula that consist of education, public health experts, interest groups of people with SEN and their social networks as well as experts of relevant sectors including IT-technology:

- Sharing knowledge on the need of interdisciplinary cooperation such as of teachers, psychotherapists, speech therapists and social workers;
- Accumulation and exchange of expert knowledge on how to develop digital IE curricula.

European Agency for Special Needs and Inclusive Education

1) To develop a position paper on inclusive, digital curricula that includes national and subnational best practice examples.

2) To organise a conference on inclusive, digital curricula to open the consultation to develop the respective position paper.

3) To create a strategy on inclusive, digital education that focuses on the participation and empowerment of the target groups.

ICT Companies

1) To create a body responsible for the respect of special needs in the development process of digital, educational devices.

2) To collaborate with target groups in the development of respective devices to ensure participation and empowerment in innovation processes.

European Educational Research Association (EERA) and other specialised societies

1) To create working groups on European, national and sub-national level that actively involve target groups in research to monitor current demands and produce further research on this topic;

2) To actively involve their national and subnational networks to foster piloting project on digital, inclusive education;

3) To build a broad network of interest groups that advocate for individuals with special needs in educational purposes.

Conclusion

Ultimately, the post-pandemic rebuild presents a unique opportunity to make significant headway in Goal 4 of the 2030 Agenda on Sustainable Development, while also embracing the potential that the Digital Age offers. However, doing so requires us – as society – to set a mission and collectively achieve it. The Convention on the Rights of Persons with Disabilities was a hallmark document that propelled the development of education systems for the better. We now arrive at the next cross-roads and can ill afford to let this opportunity go to waste. The scoping review at hand poses several strengths and limitations. The review proves its strength as it illustrates the first approach towards the identification of benefits and harms of digitalisation on the quality of IE curricula. As such, a strength of the research design at hand is the systematic approach to identify relevant documents in an under-researched area. Moreover, the semi-open coding based on previous research by van Kessel et al. (2021) systematises the conducted data. Additional coding identifies patterns in the included studies systematically. However, there are limitations due to the synthesis's narrative character. No eligibility study is performed due to the nature of the scoping review. Additionally, the guiding research question including the targeted sample is formulated broadly since the cluster is under-studied. As only a single researcher executed the search strategy as well as the coding process, a certain degree of threat of validity through bias is given. The scoping review at hand indicates the need for further research in the cluster of digitalisation and digital administrative capacity building, respectively, of IE curricula. This is especially true given that the review revealed that research in respective cluster is limited and rather heterogeneous. As the design of IE curricula in the light of digitalisation poses an immediate call for policy actions, research practices are asked to guide this process with scientific evidence.

Conflict of Interest

The authors report no conflict of interest.

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