e-Inclusion. Towards Inclusive Digital Learning

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Abstract. How can we make digital education more inclusive? Based on interviews with teachers and underserved students about their experiences with online teaching during the COVID pandemic, we advance the knowledge about equity and digital education. We identify specific opportunities and challenges to inclusion that come with digital education and underscore the importance of purposefully designed online, hybrid or blended education. The most important challenge is the lack of social presence, which severely affects student motivation and participation. This is particularly urgent for underserved students. The second challenge is formed by digital barriers for students without high-quality technical equipment and digital connections, and for those who are less 'digitally literate.' At the same time, the use of digital tools in education greatly extends the range of options for diversification and activation, which enhances accessibility and the appeal of education for underserved students. Students with disabilities, such as motor impairments or who are deaf or hard of hearing, experience specific benefits and challenges in online settings. We present six guidelines that help teachers make their online, hybrid or blended courses more inclusive.

Research Contribution: How can we make digital education more inclusive? Based on interviews with teachers and underserved students about their experiences, we identify specific opportunities and challenges to inclusion that come with digital education. These are translated into six practical guidelines that help teachers make their online or blended courses more inclusive.

Keywords: Inclusive Education · Inclusive Excellence · Online education · Digital Education · Blended Learning

1 Introduction

Inclusive education is education that is equitable, giving equal chances to every student. Inclusive education is accessible, engaging and enriching for everybody, regardless of students' identity, background or able-bodiedness. Developing good and inclusive digital education has become urgent, now that the embrace of online education has been accelerated by COVID and that online education, often in a combination with physical, offline education in blended or hybrid forms of education has become part of everyday reality in many countries [1]. Like in physical classrooms, the question of how to make

education more inclusive in online settings is pressing. Digital learning environments, which for most educational institutions are a substantive educational innovation, bring with them their own unique set of demands, challenges and opportunities in relation to diversity and inclusion.

In order for digital education (education that makes use of digital tools) to be inclusive, digital courses should be purposefully designed, making deliberate use of technology. In this paper, digital education encompasses blended education (which makes use of online and offline learning activities), hybrid education (with sessions that some students follow offline, in person, and other students follow online), or fully online education. In this paper, we present the I-TPACK model, with which we argue that digital education not only requires knowledge about Technology, Pedagogy and Content, but also requires Inclusion-knowledge about how pedagogy, technology and content shape inclusion and exclusion. Based on qualitative interviews with teachers and underserved students in the Netherlands, Poland and Belgium, we describe the challenges and opportunities of technology use in higher education in relation to diversity and inclusion. This results in concrete guidelines on how teachers can facilitate inclusive digital education.

Unfortunately, most educational institutions do not provide a level playing field to all students. Groups of students are underserved, as educational systems fail to cater to their needs and talents that diverge from students that have traditionally formed the majority of the student body. In many educational institutions, particularly in higher education, the majority of the student body traditionally has consisted of white, middle-class, able-bodied, cis-men, for whom their studies formed their main (and often sole) occupation. This group often still remains the implicit norm group that the institution is tailored for. Educational systems can be hard to access and navigate for students that lack the financial, cultural and social resources that come with the white, middle-class family backgrounds and that smoothen the path to and through higher education. Furthermore, many educational systems lack the flexibility that enables students to combine their studies with work or care obligations. Many educational spaces do not meet the needs of students with diverging physical and mental abilities, which turns these differences into impairments. Explicit and implicit forms of discrimination and micro-aggressions makes many educational settings into socially unsafe and unsupportive environments for many students. In addition, background and societal position also influence students' ambitions and interests, which means that the subject content and teaching practices can be less engaging to underserved students than for the traditional students that are taken as the norm. Unsurprisingly, underserved students often experience lower levels of belonging than students who fit the norm, which impacts their wellbeing and study success [2, 3]. When the educational system fails to cater to the needs of students with specific identity characteristics, this results in systematic barriers to access to higher education and lower study success for these students [4].

Creating inclusive education not only requires better attunement to the diverging characteristics of students, it also requires acknowledgement of the characteristics of the teacher, the content and the wider context. Teachers have their own bodies, identities, backgrounds, talents, perspectives and preferences, which not only shape how teachers act and see themselves but also shape how they are treated by students and by the broader institution. For example, female faculty are consistently evaluated lower and are seen as

less credible and professional than male faculty [5, 6]. Hence, faculty member's identities shape their self-confidence and professional self-efficacy. To create inclusive education, content is also an important factor to consider. While certain knowledge is considered 'academic' and 'valuable', other perspectives and approaches – from other individuals, from other regions, communicated through other media – are seen as lesser, and are often ignored and excluded [7–9]. In addition, illustrations and examples often only represent people and situations that are considered the norm, while other perspectives are ignored or presented as aberrations. Consequently, many underserved students experience less connection and belonging with their education [2, 3]. Of course, this marginalization not only takes place within the educational institution but reflects inequities in the broader society.

The sudden change from on-campus education to fully online education due to the COVID pandemic in 2020 revealed that fully online education does not necessarily enhance equity. Instead, the switch seemed to have exacerbated social arrears. Apparently, making education inclusive remains a challenge, whether taking place in on-campus or online settings. This makes a study about the impact of fully online learning during the COVID pandemic on underserved students extremely relevant, as it informs us about the experiences of underserved students in fully online education in regular educational institutions that were unprepared for this switch. Their education, which often consisted of a mere shift from on-campus sessions to the online environment, can be characterized as 'Emergency Remote Teaching [10, 11], and contrasts with institutions which specifically design courses in an online distance learning format as is the case in Open Universities. Universities that have purposefully designed their online education, take into account many dimensions of digitalization, including pace, teacher-student and student-to-student interaction, mode of communication, assessment and feedback [12]. Although most educational institutions in most countries have started providing on-campus education again, the use of digital tools in blended or hybrid education is expected to stay and only advance over time [1, 13].

Our research underscores that the use of digital tools in education (in fully online, blended or hybrid education), requires a purposeful educational design. Every teacher's skill set should include skills with regard to technology use and different pedagogies, which are important to design effective and inclusive online, blended and hybrid education.

This is also the message of the TPACK model. The model explains that the creation of effective online education requires three different, intersecting kinds of knowledge: Technological knowledge (about technology and its possibilities), Pedagogical knowledge (about teaching methods), and Content Knowledge (about the subject) [14].

We argue that inclusive education requires a fourth intersecting kind of knowledge: that of inclusion. To create inclusive education, teachers need to be aware of how technology, pedagogy and content can strengthen or fight inequity. Thus, a knowledge layer needs to be added to the TPACK model, the layer of Inclusion knowledge, making it into the I-TPACK model (see Fig. 1). It is important that teachers know how to achieve inclusive education in a specific content area, in a digital learning environment, by utilising the opportunities for inclusive learning that technology provides while offsetting
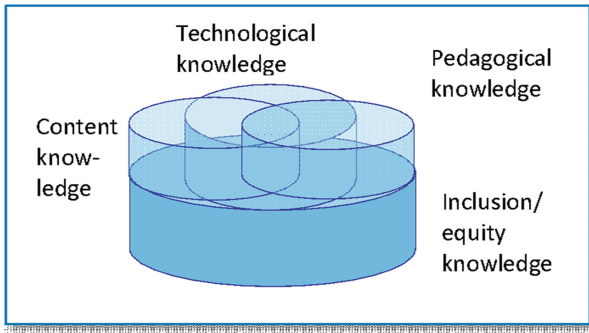
Fig. 1. The I-TPACK model

the possible downsides of technology use. In this article, we explore the intersection of technology and inclusion, using education during the COVID pandemic as a case.

2 Context and Methods

Fortunately, the need for inclusive education is increasingly recognized, also by the EU. Diversity, equity and inclusion are core values for the European Union. The EU strives to increase equitable opportunities for high-quality education [15]. The strategic framework for European cooperation in education and training explicitly aims to promote equity, social cohesion and active citizenship [16].

Our project *e-Inclusion* has been conducted in this context of increased attention to diversity & inclusion in (online) education. Co-funded by the EU Erasmus + program, in a consortium of European partners, we have examined inclusion in online higher education and developed guidelines that support teachers in creating inclusive education using digital tools in 2021/2022. This has resulted in publications [17], e-learning modules for teachers and an online course (see for more information and the e-learning modules, the project website www.einclusion.net). The consortium partners included Vrije Universiteit Amsterdam (Netherlands), Expertise Center for Diversity Policy ECHO (Netherlands), John Paul II Catholic University of Lublin (KUL) (Poland), Knowledge Innovation Centre (Malta), Universitat Oberta de Catalunya (Spain), and Universiteit Hasselt (Belgium).

Numerous qualitative interviews were conducted in studies in which e-Inclusion project partners were involved. The data and publications of these projects formed the basis for our understanding of the challenges and opportunities regarding inclusion and exclusion in online educational settings. The first main study was conducted in the spring of 2021, during the COVID pandemic, with the help of Bachelor students, 27 underserved students were interviewed about their experience with online education at Vrije Universiteit Amsterdam (VU). Most students had a non-Western migration background (20) and/or identified as LGBTQI+ (7), four were international students, two students were neurodiverse and one had a physical disability. We deliberately included interviewees with visible (for instance, non-western migration background) and non-visible (such as neurodiversity) identity markers. Interviews were conducted by various

interviewers (all Bachelor and Masterstudents themselves) and transcribed verbatim. Two coders jointly developed a coding frame that formed the basis for the analysis. See for more information about this study in other publications [18, 19]. These student interviews were complemented with interviews with teachers about their experiences with online education during the COVID pandemic, conducted in 2021 by researchers of the e-Inclusion project (five in the Netherlands (VU) and four in Belgium (Universiteit Hasselt)).

The second source of knowledge and data, consists of a project that studied the experiences of students with disabilities in online education. This project contained various studies that were conducted and published under the supervision of one of the paper's authors [20, 21]. For the study "Online teaching and learning and special educational needs. Experiences on Covid-19 pandemic" 30 persons with a motor disability were interviewed in spring 2020 [22]. For the project "Let's switch on your cameras: Experiences of online education at school and university", voices have been collected of students with hearing disorders (70 persons from 15 countries in 4 continents) [23, 24] and a motor disability (42 people) [22]. For more details about the methodology of these studies, we refer to the respective publications.

3   Challenges and Opportunities of Online Education. Findings and Discussion

3.1   Online Education Experiences of Underserved Students

Lack of Social Presence
The interviews show that, although students appreciated the efficiency and flexibility of online education, most spoke about the shift to online education as a negative experience.

First of all, supporting other studies, the interviews underscored the urgency of social presence. Social presence is the ability to present oneself as a 'real person' and build social and emotional connections [25]. Interviewees – teachers and students alike – indicated that during online sessions they missed social cues and missed the informal interactions that occur on-campus before, during and after classes. Students felt they were anonymous to fellow students and to the teacher, and that nobody really got to know them; they felt more like an anonymous crowd, as the following quote illustrates:

In physical classrooms, the teacher looks at you and asks things directly at you. In physical classrooms, you feel way more present and the teacher sees that, while in online classrooms you just feel like a number, quite anonymous. (Student VU) [19].

A lack of social presence makes it much harder to create an inclusive classroom environment that feels safe for every student to participate. The interviews showed that this led to decreased engagement: the anonymity – particularly when cameras are switched off – made it harder for the students to anticipate how others would react to their contributions [19]. The interviews showed that a sense of community was lacking, making studying an (even more) individual endeavour than in the previous on-campus

courses. This lack of community resulted in students feeling less responsible for the collective classroom dynamics, which places all the responsibility with the teacher and frustrates teachers.

> [B]ecause it's [fully online classrooms] anonymous, it's not like you don't belong but you can never really… people can never know what you look like or who you are. You don't have to even say anything. It's not like I feel like I don't belong, I also don't feel like I particularly belong, either. You just kind of feel like you're there to do what you have to do. But as a person, you don't matter much because you're not going to interact. (Student, VU) [19].

Although sometimes the shield of anonymity made students feel safer as they acted from the safety of their homes and could choose which identity characteristics to highlight and which to hide, such as a student feeling safer because their hearing aids are not visible in their online classes [18, 24], in most cases the online context negatively impacted students' motivation to participate during lectures and their joy in studying. Students felt uneasy and uncomfortable, which generally resulted in reduced engagement and participation. This is particularly poignant and most impactful for first-generation students (whose parents did not obtain a college or university degree), who are less familiar with the educational norms and codes of conduct (with the educational habitus), and for students who experience microaggressions and other forms of exclusion.

The students' experiences resonated with the experiences of teachers. In the interviews, they described they felt they did not know their students well enough in their online courses. They found it hard to assess students' engagement. And particularly when cameras are switched off, teachers feel they do not know how students are doing and cannot relate to them. They found it incredibly hard in their online education during COVID to increase the students' low engagement. They expressed the overall impression that students did not feel safe during class.

Hypervisibility

Paradoxically, feeling invisible as a person was combined with hypervisibility: online video conferencing tools explicitly display names, and when someone speaks, the box showing their camera-image is highlighted. Another aspect of hypervisibility concerned the visibility of the environment. Not everybody is comfortable when their room – including parents, siblings, or roommates – is showing. Some students, particularly those living in old-fashioned or cramp spaces, felt ashamed to share their living conditions. Microphones also transmit background noises of roommates, which can feel awkward. For those with sufficient digital skills and equipment, the use of artificial backgrounds and headphones could solve these problems to some extent. Nevertheless, digital barriers (deficient technical equipment or digital illiteracy) and spatial barriers (lack of a private workspace and clear distinctions between study and home responsibilities), form barriers for some students to participate in online sessions.

The hypervisibility of online synchronous classrooms created new social fears and new forms of microaggressions. Students reported psychological discomfort because they were afraid to switch on their cameras as they felt their appearance is not how they wanted to be seen by others or was not pleasant for others to see. Students were also

afraid they were recorded by other participants and that their images would be uploaded to social media as material to ridicule and intimidate. This fear was aggravated because moments of internet disconnection can make someone briefly look weird. Especially women expressed this fear:

> *I am not using the camera as at home, I did not have a full [face of] makeup. Also, some people might take a print-screen and upload it somewhere on the internet, I prefer to lie [and say] I do not have the proper equipment. Actually, I am also afraid of speaking – I am not sure if it is my turn to speak and I am afraid I start speaking at the same moment as another person. I do not like my online voice so if I can – I prefer not to take part. (Student, KUL)* [26].

Although the recording of classes – which is technically relatively easy for online classes – offers great opportunities to increase accessibility (for students who cannot be present at a certain time or place, or want to listen to a lecture at their own pace), recording classes can also create a serious disadvantage. When a session is recorded, participants do not know who is going to view the recording. Viewers might react to certain opinions or physical characteristics with microaggressions or explicit aggression – discrediting or ridiculing the speaker's opinion or social position. Therefore, some students decide not to express their views, which not only hampers their own education but also affects the broader classroom dynamics. Even more than other students, students with a disability fear the possibility of being recorded during online sessions.

> *I know there is a possibility to record the meetings. I have some problems with speaking – my speech is not clear and I stumble a bit – and I am really afraid to take part in the discussions. I feel insecure knowing it may be recorded and people might laugh at me (student)* [22].

Specific Upsides and Downsides for Students with Disabilities

For many students with disabilities, studying from home increased their independence and physical comfort. They had the possibility to take more breaks, do rehabilitation exercises, and take medicines or injections during breaks. Online participation, with cameras switched off, allowed for participation in classes in comfortable positions (students can use armchairs or take comfortable body positions, such as lying down). Studying from home was also easier for students who needed special facilities, such as special toilet equipment or meal adjustments (such as blended food or special drinking cups). Contrary to days on campus, at home these students were able (or felt more comfortable) to have meals or drinks during the day.

Deaf and hard-of-hearing students profited from discussions taking place via the written chat function [18, 23]. This way, they could participate on par with other students. They also indicated they benefited from the visuals used in online teaching, better understood the content, and were more active online than in on-campus group work. Online teaching enabled them to 'hide' the hearing impairment, which made them more self-confident. In addition, often, the sound was of a better quality than in on-campus lecture rooms, which are often acoustically uncomfortable and noisy.

People do not see my hearing aid, they just hear or read what I want to share (Student, KUL)

In online learning the sound – the lecturers' voice – comes straight to you, you do not have to 'fish for' the sound, it comes in a way 'straight to your brain'. It is not as stressful and tiring as using CI [cochlear implant], hearing aid and lip-reading. I felt safer and more comfortable and I understood the content better. (Student) [24].

At the same time, the quality of broadcast and switched-off cameras often made it difficult to lip-read and the lack of enough breaks created a serious disadvantage. Hearing aid users or cochlear implant (CI) users have to take regular breaks and switch off their devices to avoid overstraining the hearing system. In addition, lip reading is a very tiring activity. Short breaks help to make it more efficient, but breaks were not provided regularly in online classes [23, 24]. And although in online settings the possibility to include subtitles is more accessible, in most classes this feature was not used.

3.2 Opportunities of Digital Education

The negative experiences of online education during the COVID pandemic do not necessarily represent the opportunities and challenges of digital education. The sudden switch of entire educational institutions to completely online education, in combination with encompassing societal lockdowns was an intense emergency situation. Although the experiences help us better understand the challenges of online education, many of the negative effects of online education were intensified by the social lockdowns. In addition, in nearly all situations, on-campus education was simply transferred to online settings. The online education at the on-campus universities was 'emergency remote teaching' instead of deliberately designed online education [10, 11]. The result was that many of the opportunities that digital education offers for inclusion were not seized.

First of all, digital education provides a wide range of options for diversification. Digital tools and access to online resources enable the use of varying teaching approaches, sources, assignments, tests and assessment forms. This diversification is in line with the teaching approach Universal Design for Learning (UDL) [27] or Universal Design in Higher Education [28] which advocates the provision of multiple means of engagement, representation and action to ensure that education is accessible, flexible, and easy to use to every student. Digital tools make it easier to go beyond text and use images, record videos, add subtitles, or upload an audio file in assignments, exams and feedback. The interviews touched upon another advantage of purely online education: When a course is fully online, this also creates more freedom for participants to present oneself themselves to others, as they can choose to refrain from articulating traits that are visible in face-to-face contexts like wearing a hearing aid (as we read above), a physical disability or transsexual identity, as one of the students, who is a trans-man, explained:

And that made it difficult [in offline, on-campus classrooms]– that I had to explain everywhere: 'Yes, I am trans, and would you please address me as a man?' I kind of liked education online because of that. Nobody uses anything apart from 'he'

anymore. (…) It's just easier to put pronouns after your name and hope that people just do it right, instead of having to always explain it in front of the entire class. (…) This gives me more confidence to speak up, I know that they will not misgender me when they talk about it after. (Student, VU) [18]*.*

Next to the ways in which teaching, time and place form major barriers to providing accessible and equitable education [29], As digital education offers many alternatives to on-campus lectures, it provides flexibility in place and time. With online synchronous (real- time) sessions and the use of various digital tools in asynchronous activities, students and teachers do not have to be in specific places at specific times. This increases efficiency for all participants and enhances the accessibility for students and teachers who are less mobile or who live further away, or have other responsibilities, such as a job or care-tasks. Also, without the need to commute, online education increases efficiency and reduces the costs of studying.

Thirdly, the use of digital tools in learning offers great opportunities for activation and participation, which facilitates student input and co-construction. Input can be given in named and anonymous ways, synchronous or asynchronous. The online context enables students to collect and bring in diverse content, and to jointly shape a (dynamic) course program. Collaboration software enables students to work on the same document, integrate content and assignments, and give peer feedback in various forms.

4   What to Do? Conclusion and Recommendations

The COVID experiences underscored that providing good online (or blended and hybrid) education requires a purposeful design, which makes deliberate use of digital tools and online education, seizing the opportunities for inclusion while minimizing the risks. To summarize, the most important aspects of technology use in teaching that impact equity and inclusion are:

- Risk: Lack of social presence, resulting in reduced motivation and participation,
- Risk: Digital barriers, resulting in reduced accessibility,
- Opportunity: More options for diversification and flexibility, contributing to higher accessibility,
- Opportunity: More options for activation (anonymously/named), resulting in more engagement, deeper learning, more inclusion and diversity.

We have developed six practical guidelines that support teachers in building inclusive education. Creating inclusive education is not a checkbox exercise, it is a continuous activity that is shaped during each course, in interaction between the teacher, students and course content.

Guideline 1. Develop Awareness and Practice Continuous Self-Reflection. Creating inclusive education requires awareness of the teacher on how exclusion and inclusion are shaped by technology, pedagogy and content. It requires the four intersecting kinds of knowledge of the I-TPACK model and self-reflection to understand what role the teachers themselves (can) play in classroom dynamics. As teaching is shaped during

classroom interactions 'on the spot', this awareness and self-reflection is a continuous endeavor. Inclusive education requires the social presence of the teacher. Although the openness that is needed for inclusive education can make teachers feel vulnerable, teachers should not take on a 'distant', all-knowing role but be present as persons, with their own characteristics and positions.

Guideline 2. Get to Know the Needs of Students. Of course, in order to attune to the needs, talents, ambitions and perspectives of students in a course, teachers need to know their students. Digital tools offer great opportunities to get to know your students. They can introduce themselves in various ways (text, image, video, audio) on various digital platforms, or the teacher can collect specific information in anonymous ways. The same tools can be used for the teacher to express their needs and perspectives. It is important to reduce the risk of a lacking social presence, which can make students feel unsafe to be open about their interests, experiences and opinions (see Guideline 5).

Guideline 3. Diversify Content. Inclusive courses engage with perspectives of non-mainstream regions and non-mainstream thinkers, and include a broad range of examples, illustrations and visuals. The use of digital tools facilitates the search for and access to a wider assortment of resources – in many languages (using translation tools or subtitles) and many media formats (text, images, video, audio). This enriches education for all students, stimulates critical thinking and makes education more engaging to underserved students. Teachers can also invite students to collect and bring in non-mainstream resources, using digital collaboration tools.

Guideline 4. Diversify Teaching Practices and Ensure Accessibility of the Course. Diversification of means of engagement, representation and action increases the accessibility and appeal of courses, as is the core of the 'Universal Design for Learning' approach. This applies to learning activities and to assessment and feedback. Variation in learning activities, in ways of assessment and feedback (textual/oral/visual; synchronous/asynchronous) makes the course more accessible and more appealing to a broader range of students. It also expands the skill development of all students, making education more enriching and challenging for all.

Online sessions and asynchronous activities offer flexibility in place and time, which greatly enhances the accessibility of a course for all students, particularly for students with disabilities, students with certain work or care-responsibilities, and students who live far away from the campus.

To minimize the effect of digital barriers, we recommend to always provide clear instructions about the use of technology and offer opportunities for testing the technology. This is particularly important in the context of online/digitalized assessments.

Guideline 5. Create an Inclusive Learning Climate (Belonging and Agency). In an inclusive learning climate, every student feels safe to contribute and feels accepted, has agency and feels valued as a full-fledged member of the group. As mentioned above, students whose bodies, identities, experiences and worldviews diverge from what is mainstream generally experience lower levels of belonging. After all, it is harder to share your opinions when these diverge from the dominant voices. It is harder to feel accepted as a

unique individual when you are singled out and addressed as a representative of a certain group (who knows everything about for example disabilities, 'the Islam' or 'the gay community'). In an inclusive learning environment, diversity is invited and valued. To create room for this diversity and critical thinking, the teacher avoids to (pretend to) be an all-knowing person and students' agency is crucial.

In the light of an inclusive learning climate, the lack of social presence in online courses cannot be taken too lightly. Teachers should pay explicit attention to establishing social presence. Introduction activities are crucial means for students and teachers to get to know each other. Ideally, these activities invite the articulation of unique traits and skills, and formulate these as important assets to the learning community. The teacher can set the example by sharing personal details and expressing needs or challenges. Working in smaller groups or dyads enhances safety and mutual recognition.

The use of digital tools in education offers extra opportunities for student activation. Students can give input to the teachers and to each other via chat-functions, discussion or notice boards, digital collaborative whiteboards, and polling and quiz tools. This can be done synchronous or asynchronous, anonymous or named. Students can work together through collaboration platforms and use digital tools for (anonymous) peer feedback. Collaborative tools enable teachers to make students co-constructors of the course, and to collect a variety of sources.

As not every student is equally familiar with the educational codes and norms, particularly in an online, blended, or hybrid course, we advise to articulate guiding behavioral norms; these can be jointly formulated with the entire group. When teachers regularly monitor the classroom climate (for example with an anonymous polling tool), they know when to make adjustments [30]. For practical examples of classroom activities with digital tools/in online learning environments, see [31].

Guideline 6. Organize Institutional Leverage. Teachers do not have to do this alone. Interaction with peers can be supportive and empowering and advance learning and awareness.

As teachers are only one cog in a large educational machine, making education inclusive requires broad institutional change. Educational management, educational support, students themselves need to be aware of how to make education more inclusive. Hopefully, the use of digital tools in education can make the educational institutions a more level playing field, with belonging, equal chances and agency for every student.

Development Prospects

Our research also has its own blind spots in knowledge and practice that still needs to be filled and calls for further research. The most important being the attention for underrepresented and underserved teachers. We know that the diversity in their perspectives and experiences is invaluable to create inclusive excellence. How can we understand their experiences in our educational systems, and how can our educational systems be made more inclusive for them?

We hope that the I-TPACK model will inspire educational researchers and developers to include Inclusion as a standard consideration in all research design and innovation. We furthermore hope that our practical guidelines will encourage and support teachers

and educational management in their endeavors to create more equitable education, which will bring out the most of all students, particularly those that are currently (still) underserved in our educational institutions.

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