Sultan Al Habsi and *Britta Rude*

Refugee Education 4.0: The Potential and Pitfalls of EdTech for Refugee Education

ABSTRACT

The pandemic has led to a spike in implementing education technologies around the globe. Now the educational sector might finally catch up with technological advancements in other industries. Do new technologies in the area of learning have the potential to achieve a more equitable education distribution and include population groups with low access rates? Refugees are especially vulnerable with only 1 out of 4 refugee children enrolled in secondary education. Their educational paths are often disrupted and marked by a lack of systematic approaches. The potential of EdTech for refugee education is large but marked by several pitfalls. A low digital infrastructure as well as a lack of digital skills are challenges, in addition to the need for tailored educational offers and more sustainable approaches.

While the methods of teaching have stagnated for several centuries, the pandemic has disrupted our understanding of education and led to a movement towards new ways of learning. Education has not changed much over time and there has barely been any transformation in the methods of teaching since the eighteenth century. This trend has recently been disrupted by the Covid-19 outbreak. Although the number of start-ups and companies engaged in developing innovative ways to educate has increased, the ratio of the global education market-to-market capitalization in education is 40:1 compared to 1:1 for the global market and 1:1 for most industries (Corbin Bridge 2019). This could mainly be due to the fact that the main sponsor of education is the government.

WHAT IS EDUCATIONAL TECHNOLOGY?

Still, the pandemic has accelerated a slowly emerging trend in the educational sector and a shift toward new technologies and digitization. While traditionally, education was strongly connected with a place (as schools or universities), it is now seen as an activity. Additionally, there has been a shift from education being supply- and institution-centric to being demand- and student-centric. Knowledge is becoming more and more accessible, as people start to share it freely.[1] Investments in EdTech are spiking lately. In 2018, China invested 10.1 billion US$ in education technology, followed by the US (2.4 billion US$), India (2.3 billion US$), and Europe (0.8 billion US$) – see EdSurge (2021). The rest of the world invested 0.5 billion US$.

There are two forms of delivering new technologies to education, which are E-learning versus M-learning. E-learning refers to learning through electronic technology. It consists of the possibility of sharing and interacting with material via electronic platforms on the one hand, and to providing classes directly on the other hand through virtual rooms. It is important to study E-learning as it has changed the methodology behind teaching and learning. E-learning has several advantages and a large potential, such as its accessibility from anywhere at any time. But there are also challenges to E-learning. Instructors might lack the necessary digital teaching skills; traffic overload might arise and there might be a lack of the required IT infrastructure. It might also violate privacy regulations and expose students. Delivering education through new technologies can also occur through mobile devices with a wireless connection (often called M-learning). The difference between E-learning and M-learning is that M-learn-

[1] One example is the platform Github on which codes are shared freely and openly.

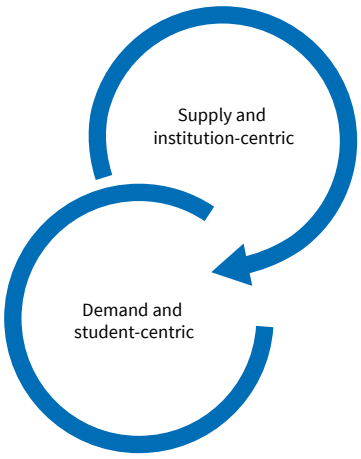
Sultan Al Habsi

is a fourth-year undergraduate student at Princeton University studying Economics and Political Economy. His fields of interests are development economics and international trade.

Britta Rude

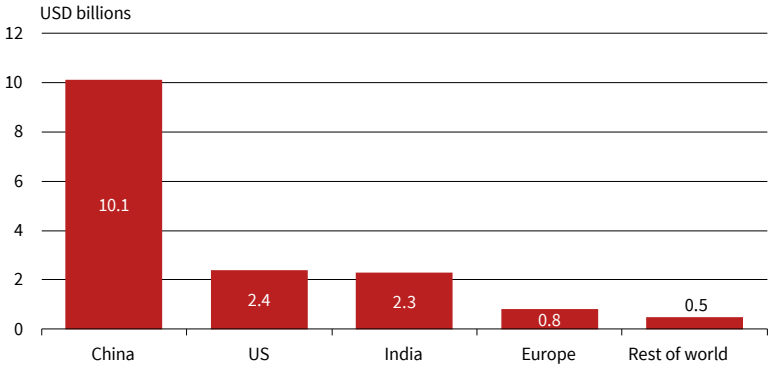
is a PhD Candidate at the ifo Institute, a Consultant at the World Bank, and a scholar at the Regional Academy on the United Nations. Her work focus is on development and discrimination economics.

Figure 1
The Recent Shift in Education



Source: Authors' compilation. © ifo Institute

Figure 2
Investments in EdTech Globally



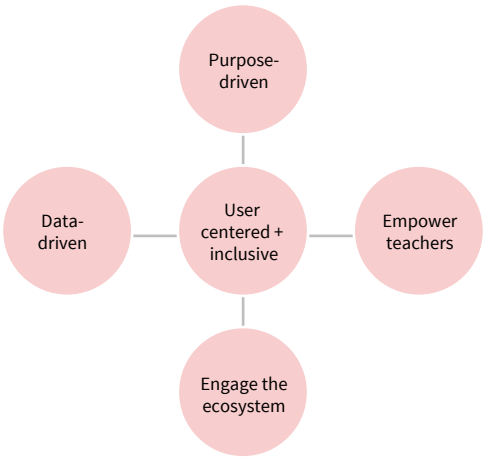
Source: EdSurge (2021). © ifo Institute

ing does not require any Internet connection nor computers.

Education technology should follow five principles. The World Bank defines Education Technology, or EdTech, as the usage of a variety of technological mechanisms, such as hardware, software, digital content, data and information systems, to support teaching and learning.[2] The potential of Educational Technology is immense and can contribute to bringing education to everybody. The pandemic has shown that education is not a place but an activity, and that technology has the potential to figure out innovative ways of teaching and learning. When engaging in EdTech, it is recommended to follow the principles outlined in Figure 1. These are that technologies interacting with education should be inclusive and user-driven, in a sense that they reach everyone and not just certain privileged groups. These principles should also center on students and their needs. Additionally, one should have a clear purpose, facilitate teacher engagement with the students, include a variety of stakeholders and be data- as well as purpose-driven.

[2] For more information, see Hawkins et al. (2020).

Figure 3
The Five Key Principles of EdTech



Source: The World Bank. © ifo Institute

The entry points for EdTech are manifold and there are a variety of tools and products available. EdTech can increase access to education, create important skills such as literacy and numeracy as well as digital skills, enrich and innovate the ways of teaching through online learning tools, provide new tools of learning, increase the precision and speed of assessments, provide valuable data and create networks that support learning. More concretely speaking, tools such as digital toolkits, educational games, or "edutainment," change the way we think about learning. Online learning can create a community and network of learners. There are several entry points for education technology: gamification, AR and VR, robotics, Artificial Intelligence, eSports, professional development and online testing as well as online assessments. Another evolving topic are learning management systems (LMS). Another important resource is open educational resources (OERs). Digital storytelling is another tool that can lead to identity development processes. There are also several EdTech solutions targeting teachers instead of students. These interventions are directed at training under-trained teachers and creating networks between teachers or the application of MOOCs.[3] An important caveat of EdTech is training teachers in order to secure an effective application of the learning tools created through new technologies. This means that rolling out new technologies in education should go hand in hand with an appropriate level of teacher training, giving them time to adjust.

INNOVATION IN THE SPACE OF LEARNING AND REFUGEE EDUCATION

Education is often disrupted for refugees and refugee children are more likely not to attend school. While 91 percent of children are enrolled in primary edu-

[3] MOOC = Massive Open Online Course, usually free online classes available to a great number of people.

cation globally, only 63 percent of refugee children are. This gap is even larger for enrollment rates in secondary education, with 84 percent of secondary-school-age children enrolled globally, compared to 24 percent of refugee children (UNHCR 2019). There are several challenges related to refugee education, such as the lack of educational resources, schools, teachers, and classrooms (UNESCO 2018). Using data from the 2015-2016 school year, around 4 million of the 7.4 million school-age refugees do not attend school, which is equivalent to at least 1.75 million refugee children not attending primary school and 1.95 million refugee adolescents not attending secondary school (UNHCR 2016).

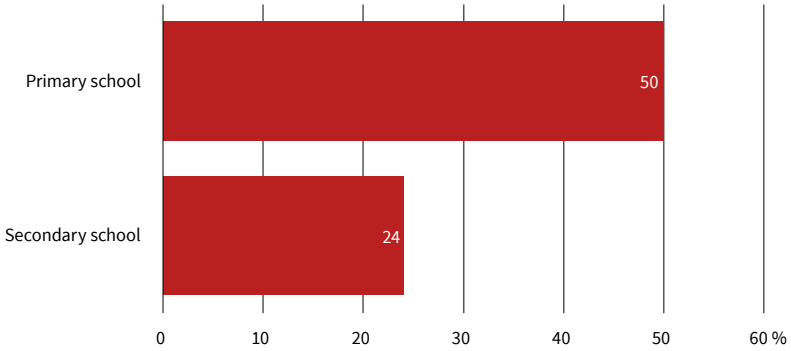
EdTech has a large potential for refugee education, but scientific evidence so far is limited. Technologies open new possibilities to bring education to displaced children independent of the availability of classrooms. Additionally, technologies can increase the social well-being of refugee children through digital games, for example, and they have the potential to support teachers engaged in refugee education. Still, there are important challenges when bringing EdTech to refugees. One is the cost of the underlying tools and the related sustainability (Ashlee et al. 2020). A recent rapid literature review found that there is limited evidence on refugee education and EdTech (Ashlee et al. 2020). There is a need for rigorous studies, impact evaluations as well as data on the perspectives and needs of refugees (Tauson and Stannard 2018). Most of the evidence so far is based on EdTech interventions for other vulnerable populations, or on qualitative research (Joynes and James 2018). In general, there are four broad fields of study within the area of EdTech and refugee education: continued access to education, modalities and pedagogies, supporting educators of refugee children as well as psycho-social support (see Figure 2).

The main limitation might be that refugees are less likely to have access to the Internet and digital tools. A recent report by UNHCR shows that refugee households are two-and-a-half times more likely to not have access to a phone, even though 93 percent of refugees live in areas that are covered by at least a 2G network (UNHCR 2016). In fact, according to the same report, 29 percent of refugee households have no mobile phone at all. The discrepancy between the lack of phone ownership among refugees while living in areas routinely serviced by network providers, highlights the potential that access to digital tools could provide refugees within the current infrastructure.

Offline solutions might solve the problem imposed by a limited access to infrastructure. First and foremost, access to mobile phones and other electronic devices is highly variable, and this difference in ownership and in the prevalent type of technology used requires EdTech to be incredibly adaptable, versatile, and compatible with as many media as possible (UNHCR 2016). Possible solutions must include off-line media resources as well, whether it is to target groups with no Internet access (using memory sticks and CDs to distribute programs, cellular networks, text message programs, etc.), and should be easy to access remotely and with minimal restrictions.

Figure 4

Refugee Enrollment Rates in Primary and Secondary Education

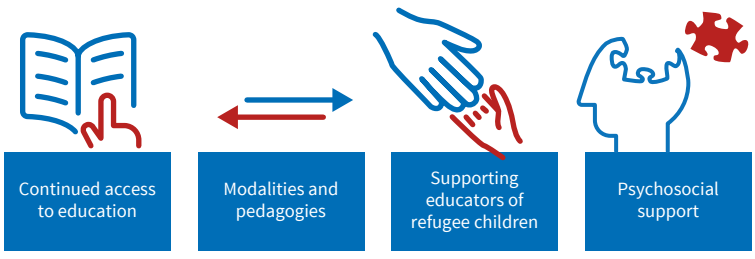


Source: UNHCR (2016). © ifo Institute

Overall, the potential for new technologies to promote social skills is large. Through technologies, it might be possible for refugees to connect and feel part of a community and a learning network (Ashlee et al. 2020). Some of the current technologies encourage social skills such as teamwork, planning and showing initiative. Online learning technologies also provide a way to engage in creative processes and deal with trauma (Lahal 2014). Several qualitative and quantitative evaluations have found that digital tools have positive effects on social skills. For example, Comings (2018) investigates the effects of literacy-teaching mobile games on the psychosocial outcomes of Syrian refugee children in camps, and finds that children who played these literacy games for around 30 hours over the period of the study experienced substantial improvement in their emotional symptoms, hyperactivity and inattention, prosocial behavior, conduct problems, as well as peer relationship problems. On the other hand, kids in the same camps who were not exposed to these mobile learning games experienced a deterioration in their psycho-social well-being. Social skills, on the other hand, can then lead to better labor market outcomes in the long-run (Aghion et al. 2019).

Figure 5

Four Subthemes of the Literature on EdTech and Refugee Education



Source: Authors' compilation. © ifo Institute

Technological tools, such as educational games, can serve as psycho-social support systems. Online educational games can provide not only skills, but also psycho-social support for those in crisis and traumatizing circumstances (UNESCO 2018). Research conducted by Stubbé (2018) underscores the power of mobile educational tools in increasing the self-esteem and self-efficacy of the engaged children and finds a positive relationship between playing a mathematics mobile game and an increase in self-esteem. This result is important in the realm of education, as Stubbé (2018) also finds that children who had higher self-esteem levels before the start of the study saw larger gains in their mathematical skills from playing the game. Furthermore, a report by UNESCO found that interactive EdTech tools might even increase refugee children's motivation to study as they engage with more interactive tools (Ashlee et al. 2020).

There are several challenges and limitations with respect to the potential of EdTech for refugee education. Technological solutions might not solve some of the quality concerns in refugee education. One question, for example, involves securing continuity in the learning curriculum and in securing a curriculum that is relevant for the local context. Consequently, it is crucial to involve local communities early on to contextualize the specific EdTech solution. Ashlee et al. (2020) has also pointed out that there are gender barriers in accessing technologies, as well as challenges imposed by community perceptions of technology.

Additionally, the lack of high-quality teachers may continue to be a hindrance for using innovative tools. Several papers have stressed the importance of involving teachers in EdTech and have highlighted the fact that technological tools alone are not sufficient. Additional challenges can arise through established beliefs regarding how learning and teaching should look (e.g., learner-centered versus teacher-centered approaches). In general, most of the literature agrees on the fact that technologies can never fully replace face-to-face interactions. Utilizing traditional teaching and learning methods as well as incorporating pedagogical principles is crucial when designing EdTech solutions (Tauson and Stannard 2018). Providing hardware is not enough to improve learning outcomes and there is no "one-fits-all" solution. It has been found that EdTech solutions that are not paired with access to a teacher or other knowledgeable mentors end up doing more harm than good, since learners end up feeling overwhelmed and lost when not provided with support (Drolia et al. 2020). This is especially relevant in terms of refugees, since they often already experience a lack of social support network, which is characterized by the loss of home ties and family members.

Furthermore, EdTech must be designed to be a real network, and not just separate nodes. Drolia et al. (2020) sketch out the main pillars of educational integration, which according to them, are composed of learning, social and emotional needs. They believe that EdTech should encompass all three of these needs, by providing freely accessible programs that teach learners in a step-by-step manner and help them develop cognitive skills, in addition to the possibility of creating social interactions. Here is where many EdTech solutions fail, as they often do not account for differences in the learning level of children or previous knowledge contexts (based on age, for example, instead of knowledge), which negatively affects learning. In addition to failing to provide material for different levels, most EdTech tools often assume that their users possess some level of digital literacy, which might not be the case for refugee children. Another important aspect of education is integration, and when not properly planned for, EdTech might increase marginalization, loneliness, and difficulty communicating and learning the social norms of the host country, since they rarely provide opportunities for cross-community dialogue (Drolia et al 2020). Therefore, EdTech solutions are often best when enhanced with opportunities for socialization between learners, teachers and even locals.

LEARNING FROM EDTECH BEST PRACTICE FOR APPLICAION TO REFUGEE EDUCATION

The application of EdTech to refugee education could draw from best practices in the field. Programs around the world have shown ways in which innovative solutions to remote education can bridge gaps and barriers, as well as providing deeper social integration and interaction between users. Two of such best practices are the EVOKE program and the EDUCLAN program. The common factor between EVOKE and EDUCLAN is that they both strive to utilize virtual solutions that bridge private and public institutions, draw from open sources, and complement real-life circumstances.

The EVOKE program is a multi-player online educational experience that bridges aspects of game mechanics and social networks with storytelling. It is primarily centered around online collaboration to engage learners with networks of innovators, entrepreneurs and other creatives in solving problems. The program fosters skills that are meant to empower learners to create change and development in their own local communities.[4] EVOKE differs from most other programs in the sense that it creates a network among users. It creates a virtual reality in which collaboration, communication and critical thought are key. This platform has proven exceedingly popular, and its over 20,000 participants recorded an increase in both levels of future ambitions and access to social

[4] See https://www.worldbank.org/en/topic/edutech/brief/evoke-an-online-alternate-reality-game-supporting-social-innovation-among-young-people-around-the-world.

networks, both exceedingly important to the success of disadvantaged groups in terms of entrepreneurship and innovation (Hawkins et al. 2020).

EDUCLAN is another program that transforms real-life problems and situations into learning experiences—for younger children learning English. This was specifically relevant towards the start of the Covid-19 pandemic and provided learning opportunities to over 25 million users, while incorporating themes of personal hygiene and solutions for lockdown-compliant physical activity and education for children.

The literature on EdTech in the field of refugee education is scarce but one can learn from evidence presented in related fields. When looking at education in general several studies have been conducted that analyze the effect of new technologies on several outcomes. One can draw from studies analyzing the impact of EdTech on children, higher education and adult learning.

EdTech for educating children can be successful but there are several pitfalls that need to be addressed. Tunmibi et al. (2015) find positive results of the application of e-learning on a variety of student and teacher outcomes in primary and secondary school in Africa, using a sample of 40 students. This study shows that e-learning leads to an increase in the accountability of teaching and achievements, as well as efficiency in learning. Most students agreed that it helped them to increase their communication skills, critical thinking as well as engagement in learning. Lynch et al. (2021) suggest that EdTech tools can enable learners with disabilities, whether they be mental or physical. They compile research spanning different regions of the world and different disabilities, and overall find that EdTech increases the overall learning opportunities as well as the independence of children with disabilities, and can help these learners catch up if they previously had to drop-out due to a lack of support through more conventional teaching environments. Abbey et al. (2019) study how EdTech can be used to improve teaching for children in rural and remote areas and close the education gap between those areas and the cities. Using China as the focus, they demonstrate that the child users of EdTech often exhibit positive feedback. However, this study highlights uneven student participation and poor teacher training as factors that could further exacerbate the education gap between students in the same learning environments.

Several papers have studied how using e-learning tools has impacted student performance in higher education. Shah and Barkas (2018), for example, analyze the impact of Blackboard (Bb) on the attendance rate as well as "engagement"[5] of students in engineering courses. Bb is a VLE technology, which falls under the category of Internet-based learning management systems. VLEs differ from other forms of Internet-based learning systems because they are available 24 hours a day. Students can improve the time spent on a task, the quality of effort as well as student involvement. Shah and Barkas (2018) study the effect of the number of Bb clicks for one course model of Level 4 and Level 6 undergraduate engineering students, and show that student engagement via Bb hit rates significantly correlates with class attendance, engagement and performance. Alkhalaf et al. (2012) find a positive impact of e-learning on student learning in the case of university students in Saudi Arabia. Vate-U-Lan (2020) provides evidence of a positive correlation between e-learning on social network sites and life satisfaction. Bere et al. (2020) show that e-learning using LMS[6] is more effective than traditional instructional methods when looking at teaching and learning performance. In Egypt, the introduction of an open-source Moodle[7] e-learning platform has increased the motivation of undergraduate students (El-Seoud et al. 2014).

E-learning can also impact adult learning and behavior. Navimipour and Batool (2015) show that e-learning considerably affects employee satisfaction. Gaggioli et al. (2015) find that online tools provide a space for decentralizing workflows and allow users the opportunity to interact and collaborate easily with their colleagues, all of which are factors positively related to creativity and flow. Chunngam et al. (2014) find that EdTech can help to form groups and connect people with similar interests, which positively influences each group's participation and knowledge building. Tseng and Kuo (2014) study the way that virtual tools can complement more conventional forms of learning, by connecting teachers and their materials to each other.

The Covid-19 pandemic has provided an opportunity to study how virtual learning and social interactions are affected by multiple factors. Park and Kim (2020) find that having interactive tools improved adult satisfaction and social presence in the virtual sphere, which led to better results. The ease of using of these online tools has been imperative to their success, with Zheng et al. (2013) finding that users are more likely to positively contribute if they find the tools to be easy and intuitive to use. Felnhofer (2014) argues that a gender gap still exists in the benefits that EdTech learning opportunities and meetings provide, with women reportedly feeling less engaged and socially present in these virtual spaces. On the whole, most participants benefited from the flexibility that online learning and working offers in terms of creative flows, but still found themselves craving face-to-face encounters, even among those who chose to work remotely before the pandemic (Daniel 2017).

[5] See a detailed overview of the definition of "engagement" in Shah and Barkas (2018).

[6] LMS (Learning Management System) is a software application used to manage e-learning and development programs.

[7] Moodle is an open source learning platform that allows users to create online courses, collaborative online spaces, and other e-learning experiences.

CONCLUSION

The pandemic has led to a spike in educational technologies and refugees could benefit from this innovative push in the educational sector. Refugees are among the most vulnerable populations with respect to obtaining adequate education. Their educational pathways are often disrupted, and they face high access barriers and low teacher quality. Innovative technological tools could help improve their access to education and their general wellbeing. Past evidence has shown that the potential is great but that several pitfalls persist. Tools depend on the presence of digital literacy, an adequate infrastructure, sustainable and targeted solutions to the specific needs of learners, as well as social norms. When developing and employing these solutions, tools need to be aligned with the specific learning profile of learners to ensure sustainable solutions. Governments should support systematic pilot studies that further explore the potential of EdTech for refugee education. When used properly, EdTech could revolutionize the way we learn and contribute to a more equitable education system.

REFERENCES

Abbey, C., Y. Ma, G. Li, et al. (2019), "EdTech for Equity in China: Can Technology Improve Teaching for Millions of Rural Students?", *REAP Working Paper,* https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/edtech_for_equity_landscape_working_paper_oct2019_0.pdf.

Aghion, P., et al. (2019), "The Innovation Premium to Soft Skills in Low-skilled Occupations", *Banque de France Working Paper* 739.

Alkhalaf, S., S. Drew and T. Alhussain (2012), "Assessing the Impact of E-Learning Systems on Learners: A Survey Study in the KSA", *Procedia-Social and Behavioral Sciences* 47, 98–104.

Ashlee, A. G. Clericetti and J. Mitchell (2020), *Refugee Education: A Rapid Evidence Review*, https://docs.edtechhub.org/lib/UUNEJ7FS/download/NBG9MLUZ/Refugee percent20Education_A percent20Rapid percent20Evidence percent20Review_FINAL.pdf.

Bere, A., H. Deng and R. Tay (2018), "Investigating the Impact of eLearning Using LMS on the Performance of Teaching and Learning in Higher Education", *2018 IEEE Conference on e-Learning, e-Management and e-Services (IC3e)*, 6–10.

Chunngam, B., S. Chanchalor and E. Murphy (2014), "Membership, Participation and Knowledge Building in Virtual Communities for Informal Learning", *British Journal of Educational Technology* 45, 863–879.

Comings, J. (2018), *Assessing the Impact of Literacy Learning Games for Syrian Refugee Children: An Executive Overview of Antura and the Letters and Feed the Monster Impact Evaluations*, World Vision and Foundation for Information Technology Education and Development, Washington DC.

Corbin Bridge (2019), *EdTech Industry: Mergers, Acquisitions & Venture Trends & Investments,* https://investmentbank.com/edtech-industry/.

Daniel, E., M. Di Domenico and D. Nunan (2018), "Virtual Mobility and the Lonely Cloud: Theorizing the Mobility-isolation Paradox for Self-employed Knowledge-workers in the Online Home-based Business Context", *Journal of Management Studies* 55, 174–203.

Drolia M, E. Sifaki, S. Papadakis and M. Kalogiannakis (2020), "An Overview of Mobile Learning for Refugee Students: Juxtaposing Refugee Needs with Mobile Applications' Characteristics", *Challenges* 11(2), 31, https://doi.org/10.3390/challe11020031.

EdSurge (2021), *Edtech Investment around the World in 2020*, https://www.edsurge.com/news/2021-03-11-edtech-investment-around-the-world-in-2020-infographic.

El-Seoud, S., et al. (2014), "The impact of E-Learning on Egyptian Higher Education and Its Effect on Learner's Motivation: A Case Study", *Computer Science and Information Technology* 2, 179–187.

Felnhofer, A., J. X. Kafka, H. Hlavacs, L. Beutl, I. Kryspin-Exner and O. D. Kothgassner (2018), "Meeting Others Virtually in a Day-to-Day Setting: Investigating Social Avoidance and Prosocial Behavior towards Avatars and Agents", *Computers in Human Behavior* 80, 399–406.

Gaggioli, A., E. Mazzoni, L. Milani and G. Riva (2015), "The Creative Link: Investigating the Relationship between Social Network Indices, Creative Performance and Flow in Blended Teams", *Computers in Human Behavior* 42, 157–166.

Hasan, N. and Y. Bao (2020), "Impact of "E-Learning Crack-Up" Perception on Psychological Distress among College Students during COVID-19 Pandemic: A Mediating Role of "Fear of Academic Year Loss"", *Children and Youth Services Review* 118, 105355.

Hawkins, R. J., M. Trucano, J. C. Cobo Romani, A. Twinomugisha and I. A. Sanchez Ciarrusta (2020), *Reimagining Human Connections: Technology and Innovation in Education at the World Bank,* http://documents.worldbank.org/curated/en/829491606860379513/Reimagining-Human-Connections-Technology-and-Innovation-in-Education-at-the-World-Bank.

Joynes, D. and Z. James (2018), *An Overview of ICT for Education of Refugees and IDPs*, K4D Helpdesk Report, 20 November, https://resourcecentre.savethechildren.net/node/15649/pdf/505_icts_for_education_of_refugees_and_idps.pdf.

Lahal, J. (2014), *The Ideas Box: Connecting and Empowering Communities in the Asia-Pacific Region,* Paper Presented at IFLA WLIC 2014 – Lyon – Libraries, Citizens, Societies: Confluence for Knowledge, http://library.ifla.org/984/1/190-lachal-en.pdf.

Lynch, P., N. Singal and G. Francis (2021), "EdTech for Learners with Disabilities in Primary School Settings in LMICs: A Systematic Literature Review", *EdTech Hub Working Paper* https://doi.org/10.5281/zenodo.4348995.

Navimipour, N. J. and B. Zareie (2015), "A Model for Assessing the Impact of E-Learning Systems on Employees' Satisfaction", *Computers in Human Behavior* 53, 475–485.

Park, C. and D. G. Kim (2020), "Exploring the Roles of Social Presence and Gender Difference in Online Learning", *Decision Sciences Journal of Innovative Education* 18, 291–312.

Pirak, S. (2021), *EdTech Investing: The Time Is Now,* https://www.linkedin.com/pulse/edtech-investing-time-now-saar-pikar/.

Shah, R. K. and L. A. Barkas (2018), "Analysing the Impact of E-Learning Technology on Students' Engagement, Attendance and Performance", *Research in Learning Technology* 26, 2070.

Soni, V. D. (2020), *Global Impact of E-learning during COVID 19,* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3630073.

Stubbé, H. (2018), *Designing Learning Opportunities for the Hardest to Reach: Game-based Mathematics Learning for Out-of-school Children in Sudan,* https://repository.tno.nl/islandora/object/uuid percent3A406f5f5a-d859-4c22-9852-8fb55507d4b9.

Tauson, M. and L. Stannard (2018), *EdTech for Learning in Emergencies and Displaced Settings: A Rigorous Review and Narrative Synthesis*, Save the Children UK, https://resourcecentre.savethechildren.net/node/13238/pdf/edtech-learning.pdf.

Tseng, F. C. and F. Y. Kuo (2014), "A Study of Social Participation and Knowledge Sharing in the Teachers' Online Professional Community of Practice", *Computers & Education* 72, 37–47.

Tunmibi, S., et al. (2015), "Impact of E-Learning and Digitalization in Primary and Secondary Schools", *Journal of Education and Practice* 6, 53–58.

UNESCO (2018), *A Lifeline to Learning? Leveraging Technology to Support Education for Refugees,* https://en.unesco.org/icted/content/lifeline-learning-leveraging-technology-support-education-refugees.

UNHCR (2106), *Missing Out: Refugee Education in Crisis,* https://www.unhcr.org/missing-out-state-of-education-for-the-worlds-refugees.html.

UNHCR (2019), *Stepping Up: Refugee Education in Crisis*, https://www.unhcr.org/steppingup/wp-content/uploads/sites/76/2019/09/Education-Report-2019-Final-web-9.pdf.

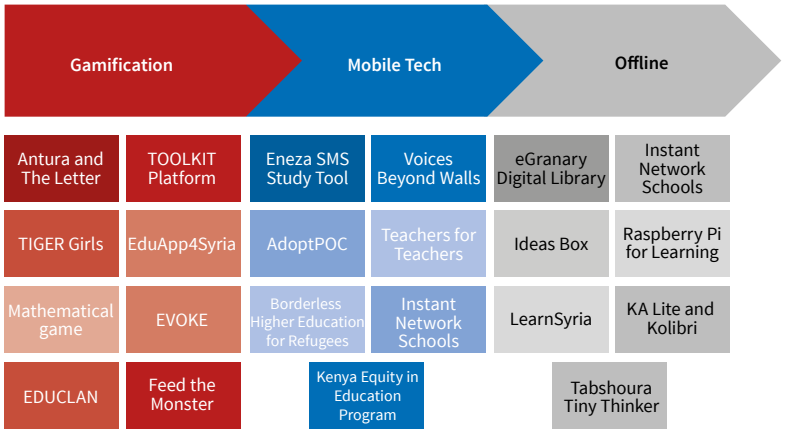
Vate-U-Lan, P. (2020), "Psychological Impact of E-Learning on Social Network Sites: Online Students' Attitudes and Their Satisfaction with Life", *Journal of Computing in Higher Education* 32, 27–40.

Zheng, Y., K. Zhao and A. Stylianou (2013), "The Impacts of Information Quality and System Quality on Users' Continuance Intention in Information-Exchange Virtual Communities: An Empirical Investigation", *Decision Support Systems* 56, 513–524.

APPENDIX: EXAMPLE PROJECTS AND TOOLS

Figure A1

Three Subcategories of EdTech Projects



Source: Authors' compilation.