Digitalisation and remote learning

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Abstract: *Digital technology nowadays is applied in all spheres of life, especially in education digital remote learning became common. The pandemic of COVID-19 boosted and speeds up remote learning and digitalization. Countless institutions quickly organised and adapted their programs and curriculums for online delivery. In a short time, the e-materials and courses were amplified in a huge amount and became ordinary, replacing the traditional face-to-face teaching. After two years of the pandemic, the high institutions adopted digital remote learning and blended learning; new strategies were developed and applied to mitigate learning loss. Hence, numerous researchers thought that perhaps in the future remote learning will continue to take an essential part in acquiring a piece of new knowledge and skills. The aim of the article is to overview the positive and negative effects of digital remote learning, the leading trends, and the developed systems for monitoring and assessing the quality of learning process.*

Keyword: digital learning, remote learning, Remote Learning Readiness Index.

1. Introduction

The COVID pandemic gave "social learning" lessons (Abonyi, 2022). During the pandemic the nature of learning altered intensely with the incredible rise of remote learning, delivered by digital technologies as a combination of TV, radio, or online distributed through different digital mobile platforms (Li & Lalani, 2020; Whalley et al., 2021; Avanesian et al., 2021; Shehzadi et al., 2021; Lohr et al., 2021; Walters, 2022; OECD, 2022; Munoz-Najar et al., 2022). COVID-19 lockdown demonstrated the privileges of working at home (Whalley et al., 2021), and confirmed that digital remote education is a refundable investment reducing by 40% to 60% time spent for the academic staff and learners (Gutierrez, 2013; Gautam, 2020).

Online working increases productivity by 30% (Gutierrez, 2013). According to the World Economic Forum throughout the pandemic about 1.6 billion or 94% of the world's school-age children were out of the classroom, learning remotely from home, and around 63 million teachers connected with their pupils on digital platforms (Hurley, 2021). The usage of ICT was expanded globally with the improvement of Internet connectivity and digital infrastructure (Mutrik et al., 2021). The governments provided remote learning options, usually on digital platforms, and tried to increase access to the connectivity and devices needed to effectively access those platforms (Hurley, 2021). Some schools and governments provided students in need with digital equipment (Li & Lalani, 2020).

Nowadays, all virtual activities have become common, such as video-forums, conferences, and virtual meetings. Digitalization and remote activities proves as saving time, and with high efficiency for the participants and organisations. E-Learning found constantly place in education, moving towards implementation of innovations and developing new methods and strategies of training. Nevertheless, with the benefits comes and the cost of negative effects.

The goal of the paper is to review the positive and negative effects of remote digital learning and the trends in the field of future education.

2. The benefits of digital learning

Digital remote learning benefits both students and educational institutions by:
- *Unlimited access to the learning materials full-time* – that ensures a flexible learning process, when and where is possible, and eager;
- *Facilitate collaboration* – by video conferencing, shared documents, common projects and discussions (Koh & Kan 2020), no requests of spending time and money for travelling and accommodation;
- *More resources available to the learners* – potentials to hold more information up to 25-60% if compares to classroom traditional face-to face learning 8-10% (Gutierrez 2013; Gautam 2020; Josep 2022);
- *Better engagement* - organisations can achieve an 18% boost in employee engagement (Gutierrez 2013);
- *Personalised learning* - the mobile devices allow the development of Personal Learning Environments (PLEs) that permit easy obtaining educational excellence (Whalley et al. 2021). Digital technologies expand learning opportunities, people can learn on request, depending on what they need and want, personalising their learning process. Personalisation makes the learning process more adaptable and more effective;
- *Facilitates new digital learning strategies* – COVID-19 boost the changes and manner of teaching and learning all over the world, new digital learning strategies appeared (Gautam 2020), and became

predominant, many free online courses, virtual labs and classrooms, libraries, and virtual teachers (Lupanda, 2020), the researchers think that it is un inescapable results of the influence of the Fourth Industrial Revolution (Whalley et al., 2021);

- *Preparation for work in the coming future* - a great way to prepare students for future employment, through the use of technology and also in the ability to learn how to use new digital tools. Distance learning advances student responsibility (Zalite & Zvirbule, 2020);
- *Building peer communities* – the new technologies allows grouping of students by common interest and traits, establish connections and built communities that benefits everyone;
- *Boosts accountability* – flexibility and control over the education;
- *Student progress tracking* - ability to track student progress closely, attendance and exams (Walters, 2022), which gave possibilities to assess the strong and weak points in the systems for e-learning (Beblavý et al., 2019).

Digitalisation delivers more, cheaper, and better learning (Gutierrez, 2013; Beblavý et al., 2019; Gautam, 2020), enhances the possibility to learn remotely. Through digital learning, "old" subjects are introduced by new structured and systematic methods, generating new subjects and new skills significant for working and taking part in society. According to the IBM Company by implementing the eLearning programs, participants absorb new information five times faster (Gutierrez, 2013). Digital learning is a highly efficient solution to lower the costs of education and training. It provides more opportunities for learning to more people, without significantly increasing costs. This decreases the cost of education and training, allows producers to develop economies of scale and new business models, lower entry barriers to education and training. Additionally, digital technologies improve the quality of learning, enhancing its effectiveness in terms of individual results and for society. Teaching methods are enriched by novel technologies that increase interactivity and participation in class.

In order to assess the alterations in education and the new tendencies are invented different methods and are established new parameters, with the different signs, used to create models applying to the management of the training process and education for the further sustainability and economic growth of the society.

3. Remote Learning Readiness Index (RLRI) for monitoring the world education

Education is broadly accepted as a fundamental resource, both for individuals and societies (Roser & Ortiz-Ospina, 2016). Remote Learning Readiness Index (RLRI) appears in response to school closures during COVID-19 pandemic lockdown as a new composite indicator of UNICEF that illuminates which parts of the education system need to advance in order to provide all

scholars with remote learning opportunities. In the future, remote learning will continue to play a significant role in delivering education and to support students (OECD, 2022). Moreover, school closures can happen due to environmental disasters, or negative aggressive conflicts leading to dislocation and immigration of people (Chuang et al., 2018; Avanesian et al., 2021; Villegas, 2021).

The RLRI is based on four principles *Simplicity* - simple methodology, easy to be understand and replicate; *Sustainability* - circles of assessment annually as new data emerges; *Usability* - analyse education systems by level and domain, and to conduct policy discussions at the national level; *Robustness* - statistically robust in terms of its performance. The index is composed of three domains: *households, a government's policy, and the emergency preparedness of the national education sector*; the main aim is to reinforce the importance of investment into remote/digital tools to deliver education, which however should not be done at the expense of in-person learning (Avanesian et al., 2021; United Nations Children's Fund, 2021).

- *Household-level factors or Individual's learning outcomes* – access to information and communication technology (ICT) at home, important for the remote learning ability. Another factor is a parental education in the household environment;
- *Availability of digital learning* – the government should have a remote learning policy, and use broadcast channels as radio or television, online platforms. It is important to support teachers by providing them with training on how to teach classes through remote channels;
- *Institutions and policies for digital learning* - the academic staff needs of proper digital technology and tools. In fig. 1 are performed the results of that criteria for the different countries (OECD, 2022).
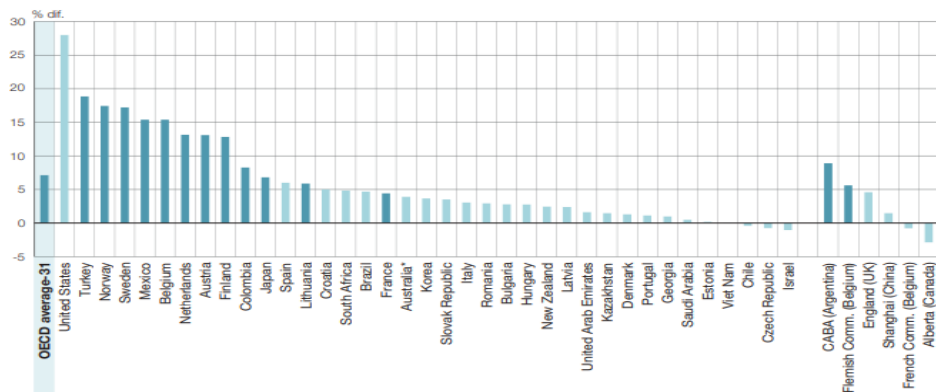
Figure 1. Teachers' digital self-efficacy by school digital resources (OECD 2022)

The RLRI is a part of UNICEF's Strategic Plan monitoring framework, each one of UNICEF country offices rates their country's education sector on a scale from 1 (weak) to 4 (strong), look on fig. 2. High remote learning readiness can be achieved with an effective policy and advanced household-level factors. In the RLRI the advancement in one component could not compensate for lower performance in another one. Remote learning systems must be planned as a chain that is only as strong as their weakest link. The successful delivery of remote learning depends on a country's accomplishment well in all three domains.

| | | Lowest Domain | | | |
		High	Medium-High	Medium-Low	Low
2nd Lowest Domain	High	5 Stars	5 Stars	4 Stars	3 Stars
	Medium-High	5 Stars	4 Stars	3 Stars	2 Stars
	Medium-Low	4 Stars	3 Stars	2 Stars	1 Stars
	Low	3 Stars	2 Stars	1 Stars	1 Stars

Figure 2. Methodology of aggregating the final score

Legend: **1 star** – the country needs to invest in a remote learning system; **2 stars** - the majority of students do not have access to the remote learning; **3 stars** - country's remote learning systems are relatively resilient; **4 stars** - well-established and resilient systems of remote learning; **5 stars** - best readiness for remote learning and highest resilience to crises.

The RLRI exhibits high-risk countries of losing proper education, and presume ways of improving and increasing remote learning and teacher training (Avanesian et al., 2021).

4. Index of Readiness for Digital Lifelong Learning (IRDLL)

That indicator was involved with the project, collaboration between the Jobs & Skills Unit of CEPS and Grow with Google. The Index of Readiness for Digital Lifelong Learning (IRDLL) assesses the process of learning for the 27 EU's countries and exposes the stage of digitalisation in education (Beblavý et al., 2019). On Fig.3 the projections of the prediction model for total world population by level of education up to 2100 is estimated from the free available World data set, named "Our World in Data" (Roser & Ortiz-Ospina, 2016).
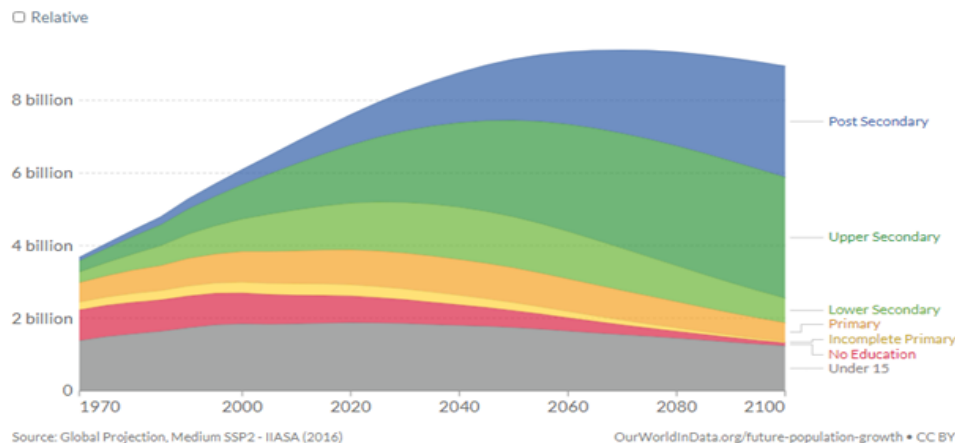
Figure 3. Prediction – model and projections of the total world population by level of education (Roser & Ortiz-Ospina, 2016)

Education is a presumption of economic growth and human-wellbeing. The model of learning outcome are calculated by a 'production function' (Glewwe & Muralidharan, 2016):

A = α(s, Q, C, H, I),

where: *A* - is skills learned (achievement); *s* - is years of schooling; **Q** - is a vector of school and teacher characteristics (quality); **C** - is a vector of child characteristics (including "innate ability"); **H** - is a vector of household characteristics; **I** - is a vector of school inputs (children's daily attendance, effort in school, doing homework, and purchases of school supplies).

5. Remote learning and negative effects of social isolation

Social isolation is not normal for humans and they cannot cope with this for a long period of time (Hämmig O., 2019; Pietrabissa & Simpson, 2020). Social quarantine in fewer than 10 days can create long-term psychiatric symptoms effects up to 3 years far ahead (Brooks et al., 2020). The reported consequences claim confused people's perceptions about what is "right to do/not to do", "to say/not to say", and "to think/not to think", resulting from unclear, threatening, conflicting information, so a decision is moved by the dread of an imperceptible enemy, cultivating a new universal belief based on vulnerability-to-harm, and human-beings poses a direct threat (Nardone & Portelli, 2005). Moreover, after a long time of social isolation and threats to their life, people start to avoid social relations by a choice, behaviour that gradually replaces old worldview and interpersonal relationships (Pietrabissa & Simpson, 2020).

Also, social isolation generates tension and stress affecting mental health and academic achievement (Limón-Vázquez et al., 2020). During the pandemic,

students frequently complained of headaches, bad mood, lack of control, nervousness, little fulfilment from activities, overwhelming, and insomnia (González-Jaimes, 2020; Brabner, 2021). In Mexico City, the activity of psychological support lines was increased by 40% (Limón-Vázquez et al., 2020), to mitigate the negative mental health effects to the communities was recommended to keep healthy life and to avoid excessive undesirable communications and interactions (Limón-Vázquez et al., 2020; Trujillo, 2020; Navarrete, 2020; Sistac, 2020).

Not all students like remote learning, because of missing face-to-face direct communication with the teachers and other learners (de Haas et al., 2020). Nevertheless, digital remote learning will continue to play an important role in the future (Gautam, 2020; United Nations Children's Fund, 2021; Avanesian, et al. 2021; OECD, 2022; Alakrash & Razak, 2022). The Student Futures Commission survey found that 66% of students want a blend teaching, 45% online activities at least once or twice a week and 21% prefer mostly online study, with in-person activities once or twice a week (Brabner, 2021). Correspondingly, the changes in the nature of education formulate a new 'Future Educational System' (Whalley et al., 2021), with more possibilities and challenges, with the implementations of innovations that corresponded to the Fourth Industrial Revolution and to the amendments of everyday life.

6. Conclusion

Many open questions exist and arise in front of the governments, political makers, and common people. Digital learning, study, and working from distance were not new approaches to solving the problems and realisation of tasks using ITC and high technology. Nevertheless, the rapid speed of innovations implemented in all spheres of life up to now was not pointed out before. Many researchers use the phrase „fourth revolution" or „the time of change" for business, education, and the way of thinking. Hence, humanity is at the front of big challenges and needs to cope with the best solutions for the future generation. Remote learning, long life-learning, acquiring new qualifications and pieces of knowledge are necessary and obligatory for a good adaptation, human mental health, and social prosperity.

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