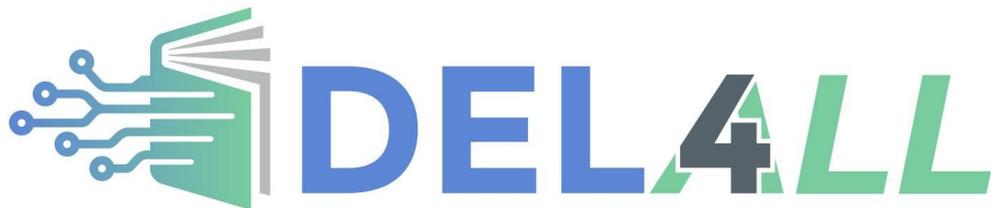




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WHITE PAPER COVID-19 EFFECTS ON HIGHER EDUCATION INSTITUTIONS Challenges and Opportunities

| | |
|-----------------|---|
| Abstract | The COVID-19 pandemic highlighted the need to reassess the potential of the transformation of digital education. To ensure that learning, teaching, and assessment could continue, DEL4ALL distributed two online surveys among digital education experts and higher education institutions and stakeholders. |
| Keywords | Digital education, emerging technologies |

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3. ABBREVIATIONS

| | |
|------------|----------------------------|
| AI | Artificial intelligence |
| AR | Augmented reality |
| LLL | Lifelong learning |
| LMS | Learning Management System |
| PLP | Personal Learning Profile |
| VR | Virtual reality |





4. DEFINITIONS

Blockchain - is a distributed ledger that provides a way for information to be recorded and shared by a community.

Games - educational games are designed to help people learn about certain subjects, expand concepts, reinforce development, understand a historical event or culture, or assist them in learning a skill as they play.

Data analytics - is the process of examining data sets in order to find trends and draw conclusions about the information they contain.





5. INTRODUCTION

The Coronavirus (COVID-19) pandemic and the closure of schools and universities in Europe highlights the need to reassess our assumptions about the transformation potential of digital education. To align with the key actions of the European Commission in stimulating digital transformation for Europe's economy and society, DEL4ALL conducted two surveys during the COVID-19 crisis. The first online survey was published at the end of May semester (2 June 2020 – 17 June 2020) to ensure that it reflected the 'new' experiences of digital education experts. A second survey was conducted between 16 July 2020 and 11 September 2020) among higher education institutions and stakeholders.

To secure more responses and gain a better understanding of how educational institutions are managing the continuity of higher education during COVID-19, and how they adapt their teaching practices to the future, the DEL4ALL surveys were designed to identify:

- major challenges facing schools and universities,
- main opportunities presented to education institutions,
- expected actions from authorities to guide the transformation in digital education,
- innovative and emerging technologies to support and enhance digital learning, and
- anticipations from stakeholders of permanent post-pandemic changes.





6. METHODOLOGY

The first survey was designed and distributed as an exploratory online survey during the final stages of the COVID-19 lockdown in Europe. The survey was sent to 50 digital education experts associated with the DEL4ALL project and distributed via various DEL4ALL channels. A total of 13 respondents (8 males, 5 females) based in 10 different EU countries and Malaysia completed the questionnaire. Most of the respondents are working as researchers, education consultants, and tertiary education lecturers covering an overlaying role between the mentioned options. The survey consisted of six open questions as well as four demographic questions.

The second survey ran after the COVID-19 lockdown in Europe. The survey was sent to more than 50 digital education experts associated with the DEL4ALL project and distributed via various proprietary and project partners' networks. A total of 30 respondents completed the survey. The quantitative survey consisted of four (4) demographic questions and five (5) multiple choice questions. Twenty-six (26) respondents answered the demographic questions: 17 males and 9 females between 35 and 65 years old, based in 10 different EU countries, Belize and United States of America, and most of the respondents are working as tertiary education lecturers (14) or researchers (9).

Respondents were asked to name at least 3 main action points for each question, the data analysis was completed by using the software NVivo and Qualtrics.

This paper summarises our findings from the two surveys and presents the statistical analysis of the collected data. The numbers included in the survey diagrams are the summarised values of each answer.

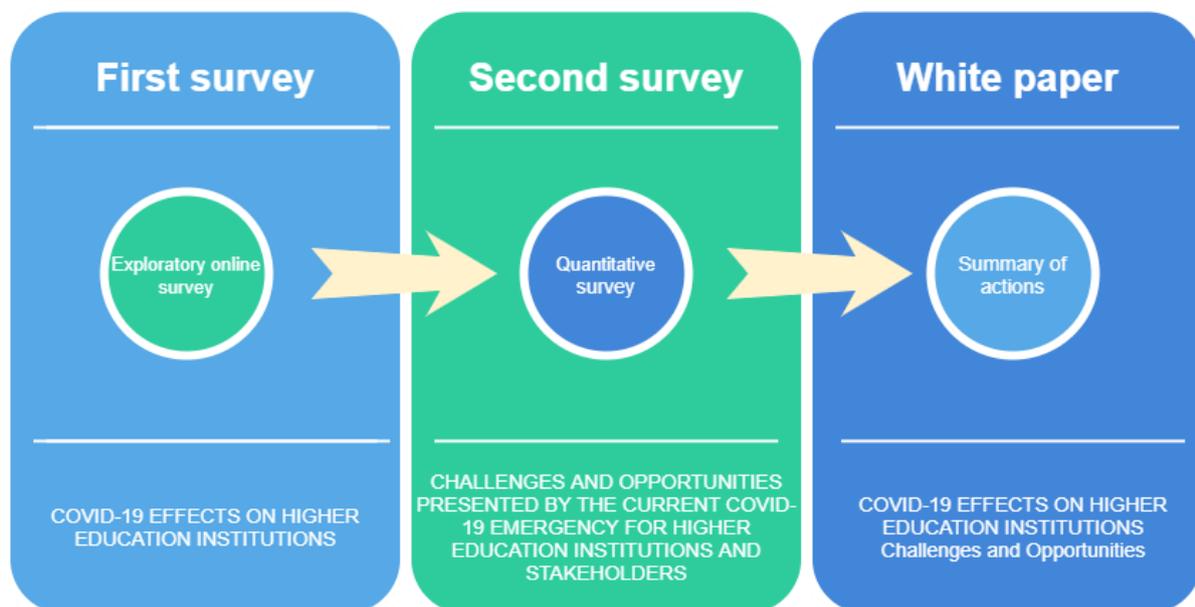


FIGURE 1 OUR APPROACH TO THE WHITE PAPER



7. RESULTS

1. FIRST SURVEY

In your opinion, which main challenges does the COVID-19 emergenc present to higher education institutions?

More than a fourth (27%) of respondents indicated that the digitalisation of offline education was the most challenging during the COVID-19 outbreak. A second main challenge identified by seven (7) respondents (18.9%) is related to the lack of tools and measures to enable remote education and the difficulties in setting up the necessary technologies. The lack of skills (10.8%) and experience of education staff with respect to the use of online platforms and flipped classroom models was considered to be the third main challenge COVID-19 presented to higher education institutions, answered by four (4) participants. In addition, four (4) survey respondents (8.1%) identified IT security issues, the predominance of “old” education structures, formative assessment and extra work load as challenge for higher education institutions, Difficult student interaction, health maintenance in face-to-face settings, frustration, and more competition between education institutions was stated by 2.7% of the respondents.

In your opinion, which main challenges does the COVID-19 emergenc present to higher education institutions?

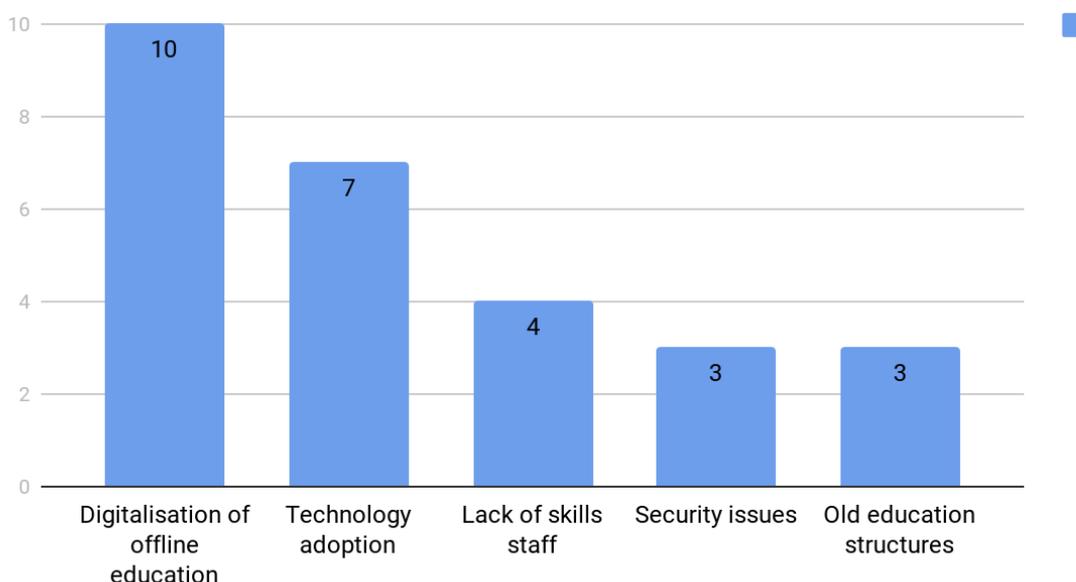


FIGURE 2 FIRST SURVEY QUESTION 1





Which main opportunities does the COVID-19 emergency present to higher education institutions?

Almost half of the participants (49.9%) see the transformation of our educational system as the main opportunity the COVID-19 emergency brings about. They expect a transformation of core business processes, see the opportunity to re-imagine education in terms of purpose, relevance and methodology and expect more hybrid approaches and experimentation with new teaching and learning techniques, which incorporate technology. In addition, four (4) survey respondents think the COVID-19 emergency offers an important chance to identify shortcomings in existing infrastructures (16.6%) and to invest in emerging technologies that support the current reality and the future vision for learning. Respondents believe the COVID-19 emergency has reminded us of the social context of learning, but also the individual needs of students. This is seen as an opportunity to personalise learning in an adaptive way and to tailor education (12.5%) to students' personal needs. Respondents also identified that the COVID-19 pandemic is speeding up policy changes (4.1%) within institutions, people start re-thinking travelling guidelines, increasing staff skills and competences, matters around diversity, equity, access and Universal Design for Learning can be creatively addressed now, and wider audiences can be reached.

Which main opportunities does the COVID-19 emergency present to higher education institutions?

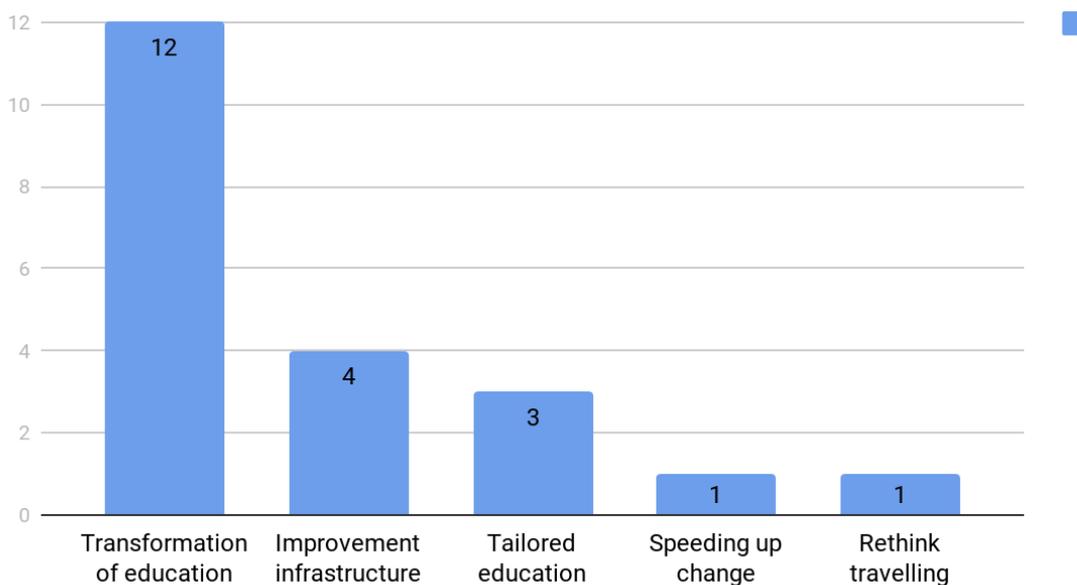


FIGURE 3 FIRST SURVEY QUESTION 2



In your opinion, which key actions should the European Commission take to support education technology in a higher education context?

The third of the respondents (33.3%) mentioned a need for increased budgetary support investing in education and educational technology research, as well as in consulting and mentoring. Moreover, four (4) respondents (13.3%) expressed a need for regulation and legal frameworks to protect staff from being “replaced” by technology and for enabling rapid contracting of services. Furthermore, experts would like to see support in the development of concepts for Internet of Things in education and for integrating education technologies to facilitate stronger learning. Besides these main key actions, three (3) respondents (9.9%) would like the EC to promote the identification and sharing of best practices, to provide an evidence base that other institutions can confidently learn from, and help in fostering networks and communities. The assistance with capacity building and skills development of educators to stimulate more research on scalable and resilient educational infrastructures was also mentioned by three (3) participants (6.6%).

In your opinion, which key actions should the European Commission take to support education technology in a higher education context?

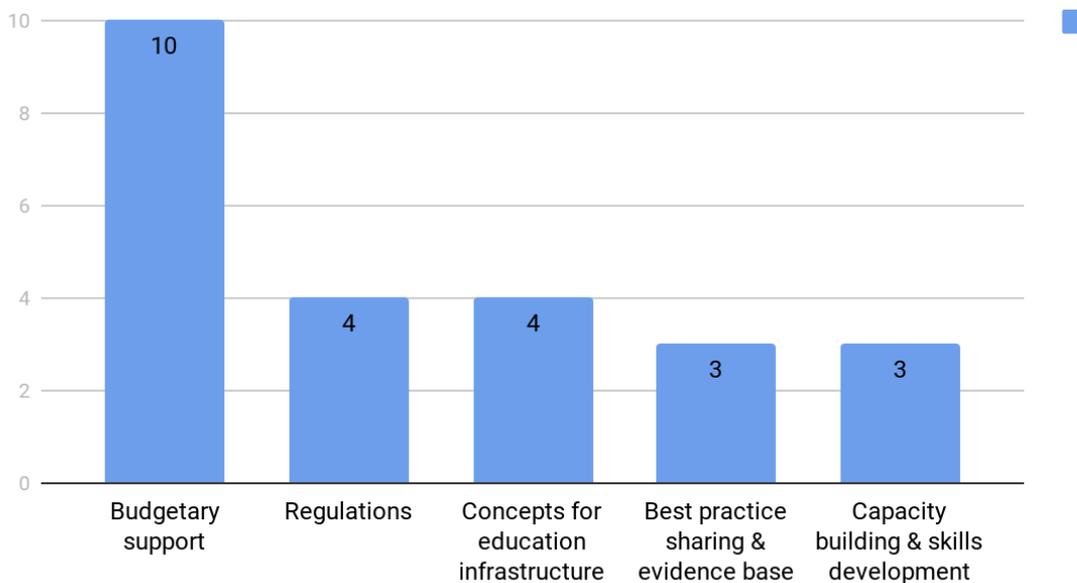


FIGURE 4 FIRST SURVEY QUESTION 3



How could emerging technologies, such as AI, AR, VR, blockchain, gaming, data analytics, support digital learning in a higher education context?

More than the third of respondents (36.8%) identified the empowerment of education technologies as the main possible support towards digital learning for higher education institutions. Learning analytics can significantly enhance the learning experience, stated by four (4) respondents (20.8%) followed by VR and AR opportunities (15.6%). The usage of gaming in education training was highlighted by two (2) survey participants (10.4%), while blockchain was named by 5.2% of respondents. Participants stated that education technology can significantly enhance the learning experience, increase student engagement and participation and foster digital literacy – the latter is identified as a must for successfully competing on the labour market.

How could emerging technologies, such as AI, AR, VR, blockchain, gaming, data analytics, support digital learning in a higher education context?

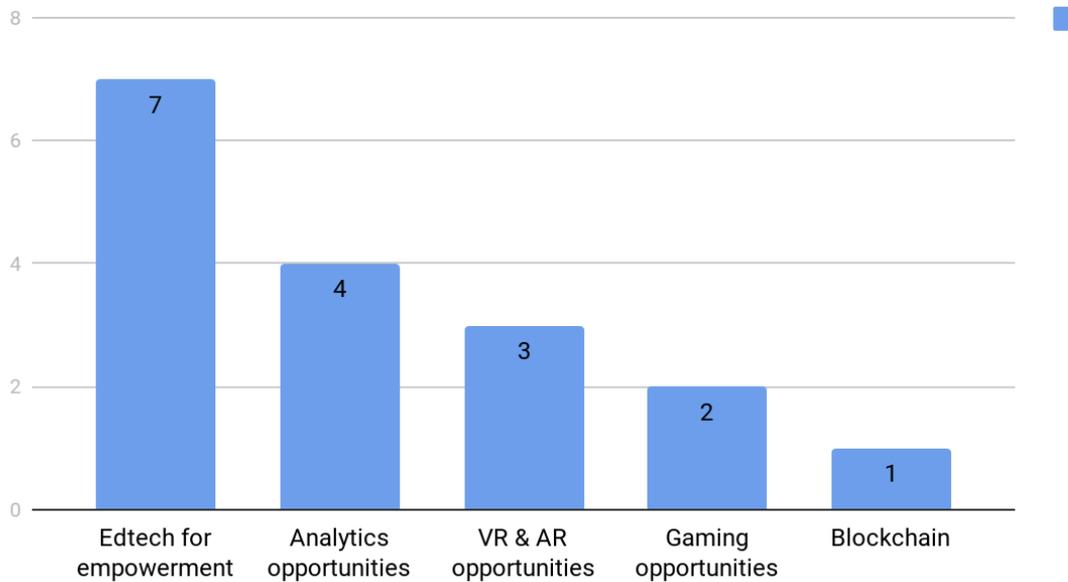


FIGURE 5 FIRST SURVEY QUESTION 4



Which concrete examples of emerging technologies can you identify that can improve the quality of life long learning?

Four (4) respondents (20%) see a great potential for the immersive technologies AR and VR to enhance the learning experience: These tools are considered to be beneficial for STEM related learning activities, simulations and lab work, augmented human learning and decision making, and to illustrate how complex subject matters can be taught in an experiential way. Personalised learning was identified by three (3) respondents (15%) as a possible improving opportunity for lifelong learning. Two (2) respondents (10%) also see gaming as a potentially beneficial tool for the educational context, followed by blockchain for secure learning certificates, and additionally the learning management systems. Virtual assistants & chatbots for supporting academic learning, social media, and conference tools were also highlighted by participants (5%).

Which concrete examples of emerging technologies can you identify that can improve the quality of life long learning?

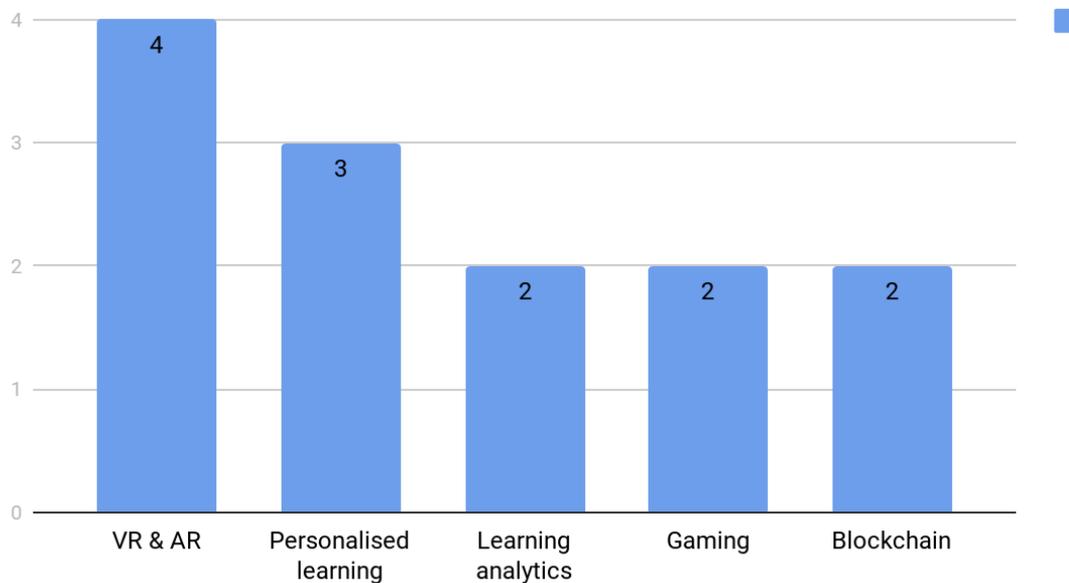


FIGURE 6 FIRST SURVEY QUESTION 5



In your opinion, what permanent post-pandemic changes will there and should there be to education?

More than ten (10) respondents (40.7%) expect a larger adoption of online communication, collaboration and coordination as well as more digital forms of learning and assessment. Moreover, they predict more blended-learning scenarios replacing face-to-face sessions and a shift to collaborative and community-based learning methodologies. The second main change identified is related to the way students will learn in the future. Six (6) survey respondents (22.2%) expect more autonomous, decentralised studying, learning and working environments as well as a focus on personalised, student-centred learning pathways. The third main change, according to two (2) experts (7.4%) is the shift to Open Educational Resources (OER), more decentralised, remote learning and working, more multidisciplinary endeavours in course provision and the replacement of old infrastructures. Stronger capacity building programmes for educators, and more trust in online learning were named by 3.7% of respondents.

In your opinion, what permanent post-pandemic changes will there and should there be to education?

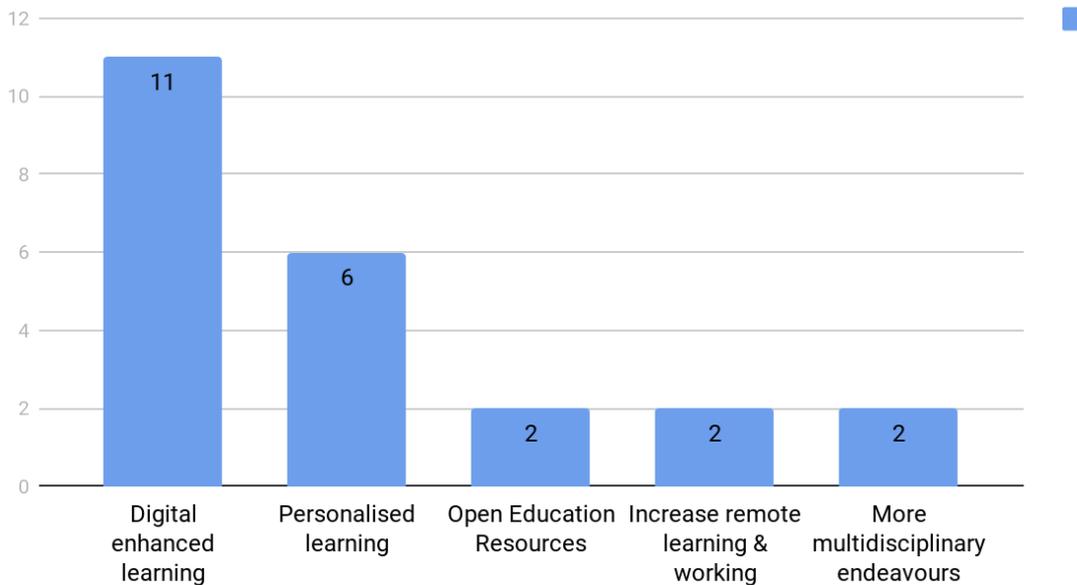


FIGURE 7 FIRST SURVEY QUESTION 6



2. SECOND SURVEY

Which main challenges does the COVID-19 emergency present to higher education institutions?

More than a third of the respondents identified “ensuring high quality online education”, “teaching staff’s lack of experience with online education”, and “difficulty in engaging and interacting with students” as the three main challenges. For more than 26%, converting offline teaching into online teaching material is a main challenge. Six (6) respondents (20%) experienced extra workload when moving from offline to online teaching, and four (4) of these six respondents reported the challenge of ensuring high quality online education. Four (13.3%) survey participants referred to the lack of online teaching infrastructure in education institutions and two (6.7%) stated difficulties with the setup of appropriate infrastructure. Inflexible administrative processes inside the educational institution were highlighted by 10%. Four (4) respondents identified online examination and assessment as a significant challenge. Respondents that mentioned difficulty in engaging and interacting with students also identified extra workload; turning offline into online teaching material; a lack of online teaching infrastructure; or teaching staff’s lack of experience with online education. Survey participants also identified privacy issues.

Which main challenges does the COVID-19 emergency present to higher education institutions?

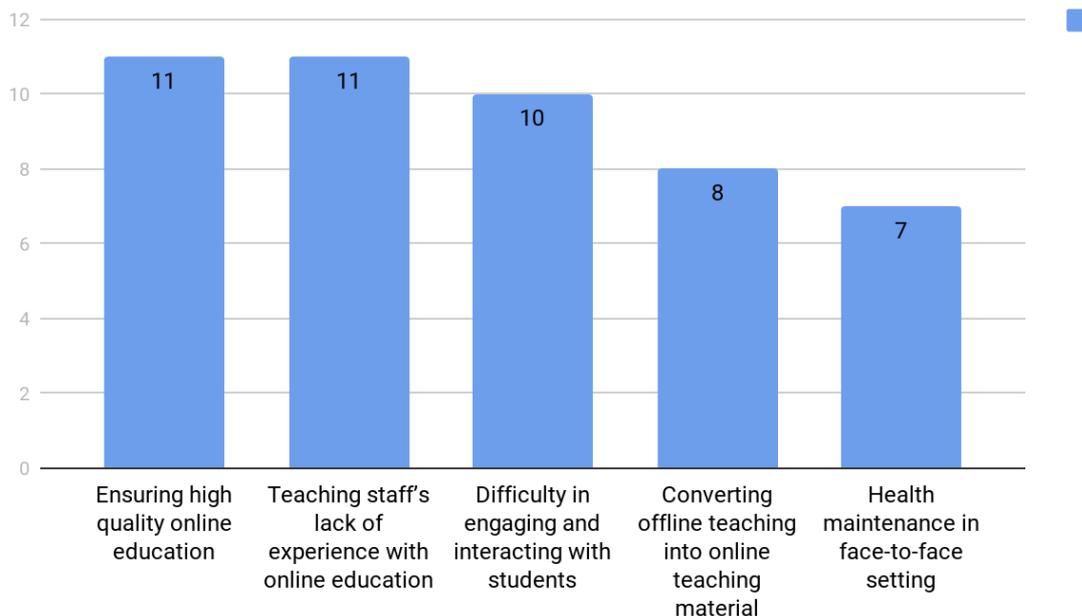


FIGURE 8 SECOND SURVEY QUESTION 1





Which main opportunities does the COVID-19 emergency present to higher education institutions?

Over 30% of respondents highlighted the need for improving the infrastructure of online teaching, while the same percentage (30%) of survey participants proposed increasing skills and competencies of staff, suggesting a possible correlation between the variables. The demand for speeding up policy changes within the institutions is supported by a third of respondents, who also associate such change as facilitating opportunities for lifelong learning. The COVID-19 emergency indicates the need to transform the formal education system by strengthening the relevance of technology in education, both acknowledged by 26.7% of respondents. Six (6) survey participants (20%) argued for better alignment between the education system and the needs of the future labour market and reaching a broad learning audience. 10% of respondents suggest that a focus on equity, diversity, universal learning design, and more student personalised learning opportunities will reap benefits. One (1) of each respondent (3.3%) stated that IT should not only be aligned, but be a fundamental part of the Higher Education Institutions (HEI) strategy, adding the need for improvement of online teaching, offering flexibility for students and a re-thinking of traveling guidelines.

Which main opportunities does the COVID-19 emergency present to higher education institutions?

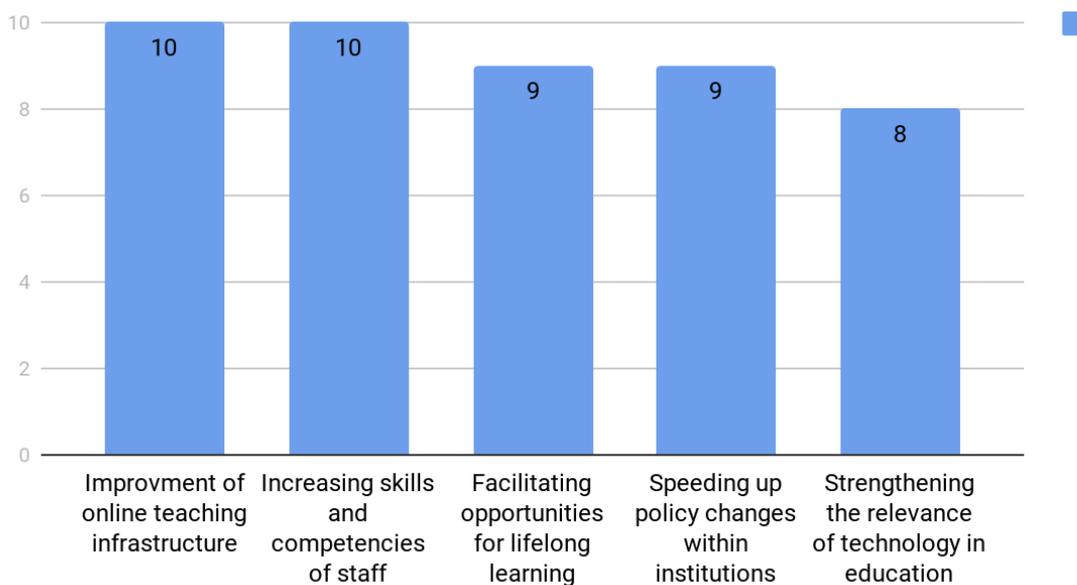


FIGURE 9 SECOND SURVEY QUESTION 2





Which main actions do you expect from authorities (e.g., European Commission, local governments, education policy makers) to support education technology in a higher education context?

Budgetary support is the main expected action from the authorities, according to thirteen (13) responses (43,3%) of the respondents, followed by encouraging open debate about the future of education and assistance with capacity building and skills development for teaching staff, both identified by 40% of the survey participants. One of the main required outcomes of the DEL4ALL project, the sharing of best practices between higher education institutions, is considered to be essential by 30% of the respondents. Eight (8) participants (26.7%) recommended further support in research activities, and seven (7) respondents (23.3%) suggested facilitating cross-institution exchange and community building, as well as launching more regulations for digital education. Four (4) respondents (13.3%) highlighted the need for an established concept to improve teaching infrastructure. In addition, 3.3% of survey participants encouraged establishing an EU standard for online education, building a transversal vision for Lifelong learning (LLL), and Personal Learning Profile (PLP), as well as identifying and sharing governance frameworks. Moreover, 3.3% of respondents also advised connecting funding to the digitalisation of learning delivery and supporting higher education context with assessment and certification practices.

Which main actions do you expect from authorities to support education technology in a higher education context?

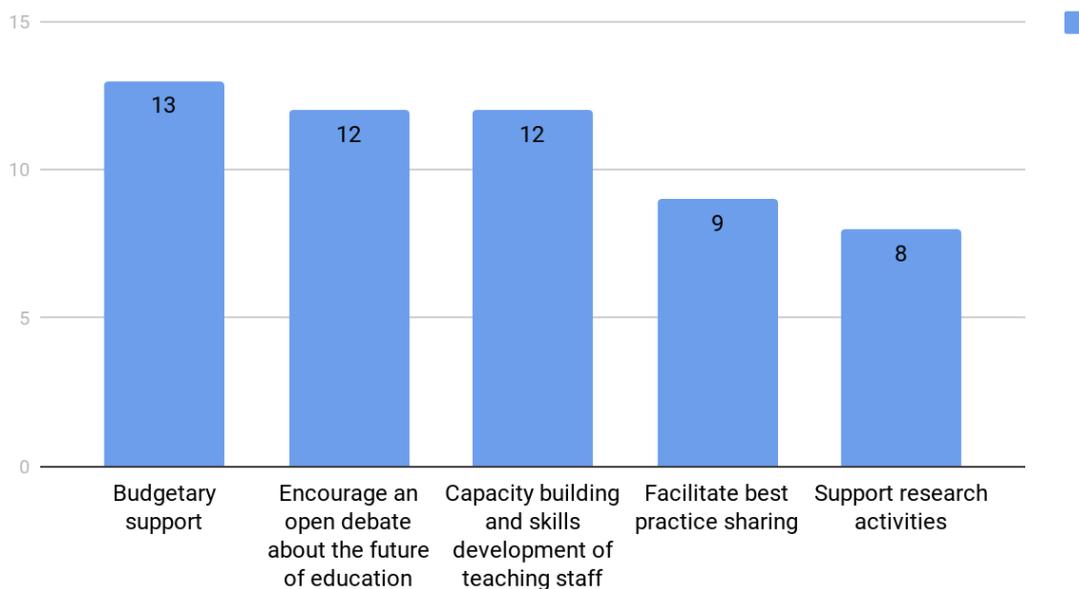


FIGURE 10 SECOND SURVEY QUESTION 3



Which emerging technologies (e.g., AI, AR, VR, blockchain, gaming, data analytics) can support digital learning in a higher education context?

More than half of the respondents (53.3%) identified virtual learning platforms as the most relevant support of digital learning in a higher education context. Conference tools, data analytics, and learning games are also beneficial to develop new learning environments based on more than 30% of the responses. Seven (7) survey participants (23.3%) are supporting the use of artificial intelligence and blockchain, while 16.7% and 13.3% of respondents encourage applications such as augmented- and virtual reality. Two (2) participants (6.7%) identified with the need for machine learning and virtual assistant applications in digital education. In addition to this, the use of social media platforms and various training programs such as apprenticeships, internships, and virtual traineeships are considered to be essential components of solutions dependent on emerging technologies, and selected by 3.3% of the survey participants.

Which emerging technologies (e.g., AI, AR, VR, blockchain, gaming, data analytics) can support digital learning in a higher education context?

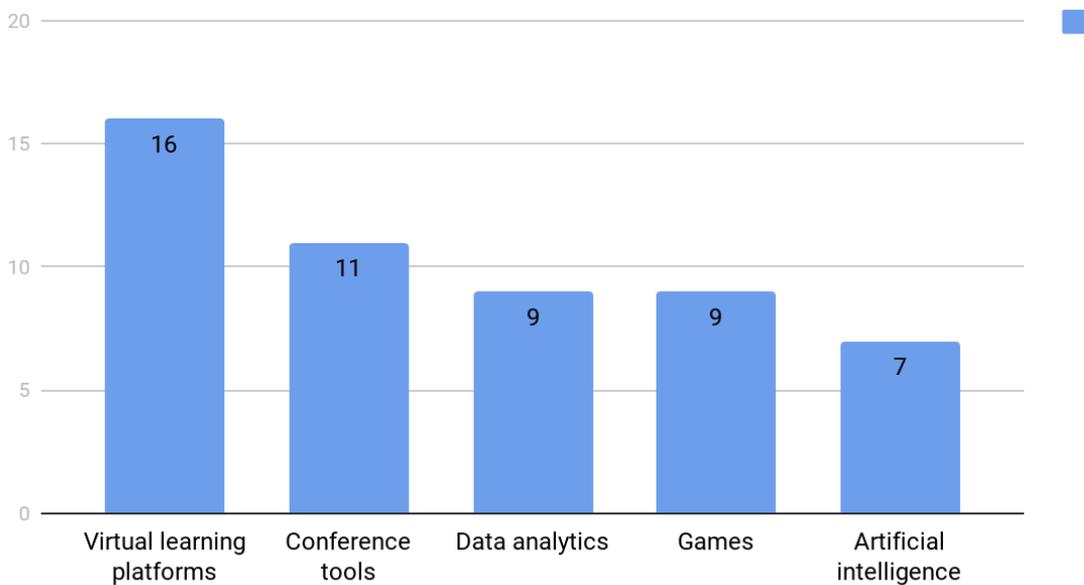


FIGURE 11 SECOND SURVEY QUESTION 4



Which permanent post-pandemic changes will there be to education?

The mix of online and offline learning methods deployed in blended learning was anticipated as the most permanent post-pandemic change by 66.7% of respondents, leading to more digitalised learning (50%), and to the digital skills development of educators (46.7%). Seven (7) survey participants supported co-and peer learning through virtual team spaces for teachers and learners and six (6) suggested more focus on credible digital certificates and the digital transformation of education as a whole. The increased use of Open Education Resources was identified by 13.3% of the respondents, while more personalised learning was suggested by 10.0% of the participants. Two (2) respondents suggested the replacement of “old” teaching and learning infrastructures, such as the traditional textbook and teacher directed memorisation and recitation techniques, and one (1) participant recommended more decentralisation.

Which permanent post-pandemic changes will there be to education?

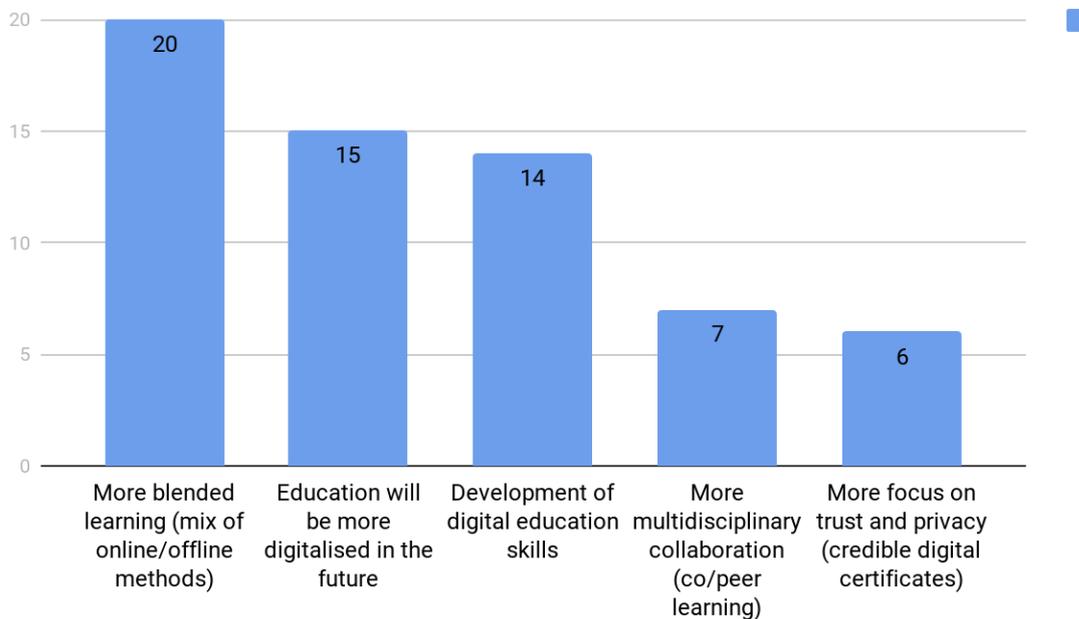


FIGURE 12 SECOND SURVEY QUESTION 5





8. CONCLUSIONS

The results of our surveys show that the COVID-19 pandemic exposed structural weaknesses in the current higher education systems. The digital education experts reported incompatible teaching materials, non-existent infrastructure, and a lack of skills, and expect more focus on digital enhanced and personalised learning as well as Open Educational Resources. The surveys also resulted in highlighting the need for a digital enhanced learning guide with structured concepts, standards, and best practices. Respondents also identified open educational resources, virtual learning platforms integrated with learning analytics, digital games, and artificial intelligence as resources for digital learning in higher education.

Both the first and second survey suggested budgetary support from the European Commission and expressed a need for regulation and legal frameworks to protect staff from being “replaced” by technology and for enabling rapid contracting of services. Furthermore, experts encouraged support for an open debate about the future of education and assistance with capacity building and skills development for teaching staff.

The DEL4ALL survey analyses were released and discussed within our expert community via online meetings, such as a workshop and webinar, where participants could comment and respond to our findings. The participants identified the lack of investments in digital learning in private and public level and the need of technology based interactive learning process and learning management systems (LMS) with the project designed approach. Attendees also urged to rethink the business model of teaching, capitalising on the upskilling, development and adoption of the new technologies and the positioning of the different technologies on the value chain. The European Commission highlighted their aim of tackling on European tools and their objectives included in the revised European Action Plan 2021-2027.





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