European Schoolnet | **Perspective**
FROM RESEARCH TO POLICY ACTION
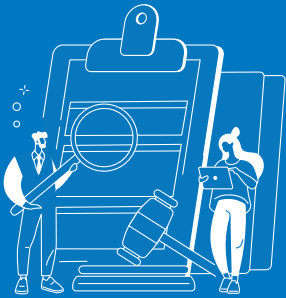
SCIENTIX
OBSERVATORY

One of European Schoolnet's key aims is to broker educational research findings and other evidence to our key stakeholders: ministries of education, schools, teachers, and industry partners. The European Schoolnet Perspectives series is one way through which we achieve this.

The issues aim to:

①
Summarize research evidence from key studies on innovation in education;

②
Translate this evidence into concrete ideas for policy action;

③
Conclude with the implications of the evidence for using technology in teaching and learning.

All issues can be accessed online: www.europeanschoolnet.org/ resources/perspectives

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European Schoolnet is the network of 33 European Ministries of Education, based in Brussels. As a not-for-profit organisation, we aim to bring innovation in teaching and learning to our key stakeholders: Ministries of Education, schools, teachers, researchers, and industry partners.

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Learning lessons to build resilience in times of crisis

In March 2020, teachers faced a new challenge –to switch their teaching online. How well were they prepared? What were the most frequent problems they faced and the solutions they employed to solve them? How much were they able to implement online what they intended to do in the classroom? With the support of Scientix and Amgen Foundation, EUN conducted the "Online survey on teaching during the COVID-19 pandemic" that can help address these questions. The current report offers a first analysis of the data. The full Scientix Observatory report will be released in January.

UNESCO's "What's next? Lessons on education recovery" survey indicates that schools were closed for an average of 79 days in 2020. On one hand the outbreak of the COVID-19 pandemic challenged education systems all around the world to respond quickly, without a transition period. On the other hand, this was a learning experience for schools and teachers with lots of potential for positive changes beyond the pandemic. It was also an opportunity for schools and teachers to try digital learning solutions more in their practice. The results, however, suggest that the first year of the pandemic did not have a transformative effect on teachers' practices, but rather, that being prepared was important.

Participation in the Scientix survey was voluntary and no sampling constraints were applied. Therefore, the reader should be careful when making generalisations for Europe or for any specific country based on the results. The practices and adaptational strategies used, recommendations and problems reported by thousands of teachers still offer valuable insights that can help in planning the transition to different modes of education.

About the survey

The "Online survey on teaching during the COVID-19 pandemic" was run in 25 languages from September 10th 2020 until January 15th 2021. It asked teachers in primary and secondary education (students aged 3-21) about the educational technologies that they used in the weeks that followed the outbreak of the COVID-19 pandemic, the problems they encountered, the solutions they adopted, and their recommendations. More than 42,000 respondents from 49 countries participated in the survey. The majority of participants were from Croatia, Greece, Italy, Portugal, Spain and Turkey.

This paper has been written as part of the Scientix observatory series and in collaboration with European Schoolnet's Perspectives, Amgen Foundation and the STEM Alliance. Scientix, the community for science and mathematics education in Europe, initiated by the European Commission (Research and Innovation DG), set up the Scientix Observatory to help the development and dissemination of different science education projects and document good practices in various aspects of STEM education. The Observatory provides short synthesizing articles, focused on one or several related themes or initiatives, or the state of play of different topics related to science education (http://www.scientix.eu/observatory). The work presented in this document has received funding from the European Union's H2020 research and innovation programme – project Scientix 4 (Grant agreement N. 101000063), coordinated by European Schoolnet (EUN). The content of the paper is the sole responsibility of the authors and it does not represent the opinion of the European Commission (EC), and the EC is not responsible for any use that might be made of information contained.

Findings

Synchronous, asynchronous or blended learning in distance teaching

When switching online, a blended approach (teaching happening in equal shares with and without real-time interaction with students) was the most preferred mode by more than half of the teachers overall (58%). This was not the case for Turkish teachers, 53% of which were going for a synchronous approach mostly. Most teachers (84%) reported that distance teaching forced them to modify their original mix of pedagogical practices.

Teachers were asked to what extent they employed a list of 15 teaching practices during the pandemic. Teachers' practices did not differ significantly, regardless of teaching mode (asynchronous, synchronous, blended). However, peer teaching and collaborative learning were used significantly less frequently by teachers who mostly went for asynchronous teaching. In any teaching mode, the practices most used were traditional direct instruction and formative assessment. During distance teaching teachers not only

adapted their practices, but also their teaching time: nearly 74% of teachers reported that they shortened their classes, and 68% of teachers reported that their classes lasted 30 minutes.

Half of the teachers said that their school gave IT support to them and their students. Teachers reported that this was mostly through providing information about free of charge IT tools and infrastructure (65%), clear instructions on how to use the available IT tools (68%) and support and follow up on the use of these (52%). Access to teachers' communities and creation of specific online group pages were offered considerably less frequently by schools (30% and 33%, respectively). Least occurring support forms were student/parent-oriented training courses on how to use the available IT tools (16%), access to non-free IT tools (17%) and teacher training on distance learning (28%).

💡 Ideas for policy action 1

• Providing the infrastructure for online teacher exchange can help teachers cope with the situation by offering them an alternative to the face-to-face interaction they have at school.

• Organising trainings that focus on diversifying practices during asynchronous teaching, especially collaborative learning, can help students improve their self-regulation and collaboration skills, during distance teaching and beyond. The survey results suggest that collaborative learning was occurring surprisingly lower in asynchronous teaching.

📍 Teacher characteristics that predict the implementation of innovative practices during distance teaching

The "Online survey on teaching during the COVID-19 pandemic" survey also explored the factors that predicted a diverse and frequent use of innovative practices such as inquiry-based teaching and collaborative learning during distance teaching. The analysis revealed that teachers were more likely to employ innovative practices if they: (1) intended to implement them already before COVID-19; (2) followed a training on distance teaching; (3) were already doing distance teaching regularly before COVID-19.

Teaching practices before and during the pandemic

The survey asked teachers about their intention to use 15 pedagogical practices before the COVID-19 pandemic outbreak and as mentioned above, about their actual use during the pandemic. All pedagogical practices decreased during the pandemic, except flipped classroom which increased a little (31,6% vs. 38% of teachers responding either "to some extent" or "a lot"). The least change is visible on inquiry-based education (49,9% vs. 49,5%), locus of control (32,9% vs. 32,4%), content and language Integrated learning (CLIL) (23,7% vs. 22%) but also on traditional direct instruction (77,3% vs. 68,1%). Traditional direct instruction remained high before and during the pandemic outbreak as well as formative assessment including self-assessment (82,4% vs. 70,9%). Although pedagogical practices such as project-/problem-based approach (68,3% vs. 56,7%), collaborative learning (72,4% vs. 42,1%) or peer teaching (57,2% vs. 29,2%) have potential for efficient use in blended and hybrid teaching, their use during the pandemic decreased a lot.

A predictive analysis on the survey data revealed that teachers were more likely to use innovative pedagogical and educational technology solutions during the COVID-19 pandemic if they had the opportunity to use distance teaching and followed training on distance teaching before the outbreak. It should be noted that only

15% of teachers reported that distance teaching was part of their teaching routine ("to some extent" or "a lot") before the outbreak. Also, only 19% of teachers said they followed any training course related to distance learning in the 12 months that preceded the outbreak of the COVID-19 pandemic.

Change in pedagogical practices

— before — during
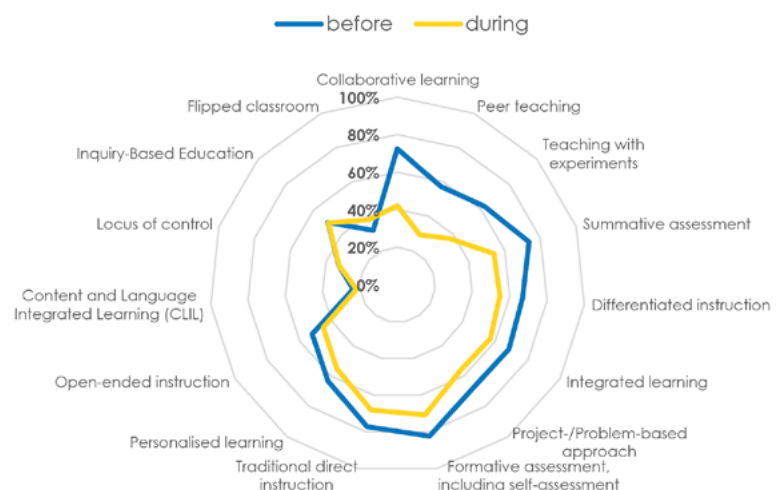
💡 Ideas for policy action 2

Mirroring pedagogical practices from the traditional face-to-face classroom setting to an online environment may not be a good solution because it misses interactions that are efficient in virtual spaces. Organising professional development for teachers with focus on pedagogical practices such as peer teaching, flipped classroom, personalised learning or project-/problem-based approach and their potential in virtual classrooms could have benefits for future situations of distance or hybrid education.

🤝 Supporting teacher collaboration one year into the pandemic

The same school year was covered in the State of School Education survey which revealed that countries are putting value in teacher collaboration. In 2020, in response to the COVID-19 outbreak, 68% of the surveyed countries supported the establishment or expansion of teacher networks or communities of practice with a focus on distance/hybrid teaching and related IT skills, and this increased to 75% in 2021.

Problems and solutions

Teachers reported that problems related to students' learning environment which they experienced the most were ("to some extent" or "a lot") a lack of a suitable Internet connection (77,7%), lack of suitable IT equipment (75,8%) but also students' lack of digital competences (68,6%) and their difficulty in managing the prescribed learning activities (68,9%). Highly rated was also parents' lack of digital competences (73,7%), although the UNESCO survey suggests that parental guidance in times of distance teaching is important. Many teachers (81%) increased their interaction with parents to some extent or a lot during distance teaching.

The least occurring problems as reported by teachers were teachers' personal lack of a suitable internet connection (34,8%) and digital competences (30,4%).

To adapt their class to online teaching, teachers used some pedagogical and educational technology solutions. The most often used pedagogical solutions were: set new and more realistic goals for my students given the exceptional circumstances (91,7%), frequently ask questions to check students' comprehension (91,3%), segment my presentations into short sequences to enhance students' engagement (85,2%). Develop flipped classroom models (31,2%) and organise peer-learning/-studying groups (31,2%) were the least used pedagogical solutions.

The educational technology solutions most often used were: tools for teachers to create digital learning content (74,9%), collaboration platforms that support live video communication (71,8%) and digital learning management systems (66,2%); with artificial intelligence-based tools (16,2%) and augmented/virtual reality-based solutions (19,6%) as the least often.

💻 Multiple modalities of distance learning during school closure

According to UNESCO's "What's next?" survey, governments around the world mobilised a variety of high-tech and low-tech modalities (tv, radio, take-home packages, etc.) to facilitate distance learning during the pandemic (94% of countries report using multiple modalities). It is evident that the mere supply of distance learning is not sufficient to induce take-up and engagement. The effective distance learning requires the design and implementation of high- and low-tech strategies that are relevant to the context, along with a supportive environment to mitigate the risks of learning loss, disengagement, and exclusion.

💡 Ideas for policy action 3

In the "Online Survey on teaching during the COVID-19 pandemic" teachers, based on their experience suggest these solutions to improve the quality of distance teaching and learning:

• For students: facilitate and promote better access to suitable devices (90,4%) and better internet connectivity (89,3%).

• For teachers: facilitate and promote professional development courses on the use of different educational technologies (89,8%) and courses on teaching strategies for remote classrooms (88,7%). The least chosen solution was: provide more educational TV programmes from the national media organisations (69,2%).

Solutions to improve the quality of distance teaching and learning

Solution	Percentage	Type of solution
Provide more educational TV programmes from the national media organisations.	69.2%	Resources
Provide Live Webinars and TeachMeets for teachers to share ideas and challenges.	81.8%	Teachers
Provide clear guidance from the school administration.	82.0%	Guidelines
Provide good-quality resources and tools from Education Technology companies.	83.6%	Resources
Facilitate and promote communities of practice for teachers to share ideas and good practices for remote teaching.	84.2%	Teachers
Provide clear guidance from the Ministry of Education and/or other public authorities.	84.5%	Guidelines
Provide video clips/lesson plans of good practice.	86.2%	Resources
Facilitate and promote school access to appropriate IT infrastructure and tools (VPN, repository, communication tools, online and virtual labs, language-learning applications, AR/VR based tools for knowledge acquisition, etc.)	86.6%	Guidelines
Provide lists of websites with useful resources.	87.2%	Resources
Facilitate and promote professional development courses for teachers on teaching strategies for remote classrooms.	88.7%	Teachers
Facilitate and promote better Internet connectivity for students.	89.3%	Students
Facilitate and promote professional development courses for teachers on the use of different educational technologies.	89.8%	Teachers
Facilitate and promote better student access to suitable devices.	90.4%	Students

Type of solution:
- Resources
- Teachers
- Guidelines
- Students

Conclusion

While there are international surveys focusing on the national policies in response to the pandemic, more surveys are needed to explore the perspective of teachers. The current survey results provide important insights into teachers' experiences when switching from face-to-face to distance teaching.

More innovative, student-centred teaching practices seem to have decreased in diversity and frequency during distance teaching. It remains to be seen if teachers have been diversifying their practices in 2021. A positive point is the adoption of formative assessment by teachers besides direct instruction. It would be interesting to investigate how effectively teachers make use of formative assessment. In UNESCO's "What's next? survey, 58% of countries reported conducting formative assessment at classroom level. Teachers might have employed formative assessment to make up for the lack of standardised tests during school closure and to assess learning loss. Finally, teachers should not be only provided with digital tools and infrastructure, but also a mapping of different solutions to various student-centred, collaborative pedagogies.

The use of multiple modalities to provide distance learning, combining one-way technologies, such as radio or television, with interactive internet-based modalities can allow tailored feedback from teachers to students and potentially improve the effectiveness of distance instruction while helping increase access for children from marginalised, rural or low-income households who lack regular access to technology needed for distance learning.

Blended (the blend of offline and online instruction), hybrid (some individuals participate in person and some participate online) or even hyflex learning (each class is offered in-person, synchronously online and asynchronously online) started to occur more often in all education levels, which emphasise the need for teachers to be supported in transition of their pedagogical practices so that they could create an appropriate combination of online and offline methods, asynchronous and synchronous activities to empower students' learning in physical and virtual classrooms. Recent European Commission proposal for a Council Recommendation on blended learning supports a longer-term strategic approach to blended learning and recommends measures to achieve it.

Predictive analyses showed the importance of being prepared. There was a positive relation between the use of innovative practices during distance teaching and the intention to use them as well as training and prior experience in distance teaching. Teachers were also more likely to use more educational technology and pedagogical solutions to adapt to distance teaching if they were already using IT in their teaching and were trained in distance teaching before the outbreak. Future professional development opportunities could focus on hybrid and distance teaching to prepare teachers not only for future school closures but also to better cope with diversified student needs with the help of IT.

With high percentages (around 85%) teachers express their expectations for clear guidance from the Ministry of Education. Governments need to develop clearly outlined and operationalised policy on integration of digital learning in education, building on lessons from the provision of distance learning.

The Scientix "Online survey on teaching during the COVID-19 pandemic", coordinated by European Schoolnet with the support of Amgen Foundation and the STEM Alliance, collected and presented valuable insights about pedagogical models, distance learning issues, technological and pedagogical solutions teachers implemented during the first year of the pandemic and suggestions for improvement which could help in planning the response to future lockdowns. This is not only important to mitigate the educational impact of the current pandemic but also to build resilience against the challenges that might be brought about by any large-scale change in education policy.

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